Chapter 18
Summary of Impacts and Comparison of Alternatives

18.1 Introduction

This chapter compares the alternatives that are described in Chapter 3, *Alternatives Description*, and evaluated in Chapters 5–15, and summarizes their environmental impacts. It also incorporates the evaluation and determinations identified in Chapter 16, *Evaluation of Other Indirect and Additional Actions*. The California Environmental Quality Act (CEQA) requires an analysis of a range of reasonable alternatives to a project, or its location, that will feasibly attain most of the project's objectives but that would avoid or substantially lessen any of the significant effects of the project. (Cal. Code Regs., tit. 14, § 15126.6(a); id., tit. 23, § 3777(b)(3).) Accordingly, this recirculated substitute environmental document (SED) analyzes four Lower San Joaquin River (LSJR) alternatives and three Southern Delta Water Quality (SDWQ) alternatives that feasibly meet the objectives of the 2006 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (2006 Bay-Delta Plan) amendments, including LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative). This analysis is intended to provide sufficient information about the environmental effects of each alternative to allow for informed decision-making. Section 15126.6 of the State CEQA Guidelines also requires an evaluation of the comparative merits of the alternatives and an identification of an environmentally superior alternative among the other alternatives if the environmentally superior alternative is the no project alternative.

As described in more detail in Chapter 3, *Alternatives Description*, the plan amendments[1] would include new February–June LSJR flow objectives for the protection of fish and wildlife beneficial uses and an associated program of implementation. The plan amendments would also modify the existing SDWQ objective for the protection of agricultural beneficial uses and the associated program of implementation for that objective. The LSJR flow objectives would be implemented through water right actions and water quality actions, including Federal Energy Regulatory Commission (FERC) hydropower licensing processes. The southern Delta salinity objective would be achieved through water right and water quality control actions. Both the LSJR flow objectives with adaptive implementation and the southern Delta salinity objective comprise the plan amendments, and the flow objectives may affect salinity as discussed in the various resource chapters (Chapters 5–14).

The LSJR alternatives, simply stated, are as follows.

- LSJR Alternative 1, which is the No Project Alternative, would be a continuation of, and full compliance with, the 2006 Bay-Delta Plan and the flow requirements as described by the plan and implemented through the State Water Board's Water Rights Decision 1641 (D-1641)[2].
- LSJR Alternative 2 would establish a range between 20 and 30 percent, with 20 percent as the starting percentage of unimpaired flow[3] in the program of implementation.

[1] These plan amendments are the *project* as defined in State CEQA Guidelines, Section 15378.

[2] In Water Right Decision 1641 (revised March 15, 2000), the State Water Board allocated responsibility for meeting the SJR flow objectives in the 1995 Bay-Delta Plan to the U.S. Bureau of Reclamation.

- LSJR Alternative 3 would establish a range between 30 and 50 percent, with 40 percent as the starting percentage of unimpaired flow in the program of implementation.
- LSJR Alternative 4 would establish a range between 50 and 60 percent, with 60 percent as the starting percentage of unimpaired flow in the program of implementation.

As described in more detail in Chapter 3, *Alternatives Description*, LSJR Alternatives 2, 3, and 4 would also include adaptive implementation intended to foster coordinated and adaptive management of flows based on best available scientific information in order to protect fish and wildlife beneficial uses. Adaptive implementation could also optimize flows to achieve the objective, while allowing for consideration of other beneficial uses, provided that these other beneficial uses do not reduce intended benefits to fish and wildlife.

There are four methods of adaptive implementation, detailed in Chapter 3, which allow for an adjustment of the volume of water required under LSJR Alternatives 2, 3, and 4. In general, the methods are as follows: method 1, increasing or decreasing the percent of unimpaired flow required by 10 percent depending on the LSJR alternative selected; method 2, adjusting the percent of unimpaired flow either within or between the months of February–June; method 3, adjusting the percent of unimpaired flow outside of February–June depending on the LSJR alternative selected; and method 4, maintaining a certain base flow in the San Joaquin River (SJR) at Vernalis at all times during the February–June period. The operational changes made using the adaptive implementation methods above may be approved if the best available scientific information indicates that the changes will be sufficient to support and maintain the natural production of viable native SJR Watershed fish populations migrating through the Delta and meet any biological goals. The changes may take place on either a short-term (e.g., monthly or annually) or a longer-term basis.

The Stanislaus, Tuolumne and Merced Working Group (STM Working Group) will assist with implementation, monitoring, and assessment activities for the unimpaired flow objectives and with developing biological goals to help evaluate the effectiveness of the unimpaired flow objectives and adaptive implementation actions.

The SDWQ alternatives, simply stated, are as follows.

- SDWQ Alternative 1, which is the No Project Alternative, would be a continuation of full compliance with the 2006 Bay-Delta Plan and the existing salinity objective in the plan (1.0 deciSiemens per meter [dS/m] September–March and 0.7 dS/m April–August in the southern Delta). It would also include continued conditioning of the U.S. Bureau of Reclamation (USBR) water rights at New Melones Dam to meet the water quality objective for salinity on the SJR at Vernalis (0.7 dS/m) and continued use of the temporary agricultural barriers in the southern Delta.
- SDWQ Alternative 2 would establish an annual 1.0 dS/m salinity objective for the southern Delta and include continued conditioning of USBR water rights to meet its current D-1641 salinity compliance requirement at Vernalis; allow for continued use of the temporary agricultural barriers; and establish various study, planning, and monitoring requirements.

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[3] *Unimpaired flow* represents the water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds. It differs from natural flow because unimpaired flow is the flow that occurs at a specific location under the current configuration of channels, levees, floodplain, wetlands, deforestation and urbanization.

- SDWQ Alternative 3 would establish an annual 1.4 dS/m salinity objective for the southern Delta and include continued conditioning of USBR water rights to meet its current D-1641 salinity compliance requirement at Vernalis; allow for continued use of the temporary agricultural barriers; and establish various study, planning, and monitoring requirements.

Details of these three SDWQ alternatives are provided in Chapter 3, *Alternatives Description,* and the language of the amended water quality control plan is included in Appendix K, *Revised Water Quality Control Plan*.

Other alternatives that were considered but eliminated during the alternatives screening process are summarized in Chapter 3.

18.2 LSJR Alternatives Comparison

Table 18-1 summarizes the results of the CEQA significance analysis for each resource area and the LSJR alternatives in the plan area, as discussed in Chapters 5–15. Table 18-2 summarizes the results of the CEQA significance analysis for each resource area and the LSJR alternatives in the extended plan area, as discussed in Chapters 5–15. Table 18-3 summarizes the results of the CEQA significance analysis for each resource area as discussed in Chapters 5–15 and the LSJR alternatives by geography. Table 18-4 (at the end of the chapter) summarizes the impacts, without adaptive implementation, by resource and threshold. Table 18-5 summarizes those significance determinations for each resource area that change with the inclusion of adaptive implementation. Additional information regarding these impact determinations can be found in Chapters 5–15. Although adaptive implementation is part of each LSJR alternative, impacts without adaptive implementation are also disclosed because it is unknown whether and to what extent adaptive implementation would be employed. The alternatives comparison includes the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1). This alternative is analyzed in detail in Chapter 15, *No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1)*, and technical information is presented in Appendix D, *Evaluation of the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1)*.

As shown in Table 18-1, the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in significant impacts on water quality, aquatic biological resources, terrestrial biological resources, agricultural resources, cultural resources, service providers, and energy and greenhouse gases.

LSJR Alternatives 2 would not result in significant and unavoidable impacts. LSJR Alternative 2, with adaptive implementation, would result in significant and unavoidable impacts on groundwater resources, agricultural resources, and service providers. In the extended plan area, LSJR Alternative 2, with adaptive implementation, could also result in significant and unavoidable impacts on aquatic biological resources, terrestrial biological resources, recreational resources and aesthetics, and energy and greenhouse gases.

Several significant and unavoidable impacts on various resources were identified for LSJR Alternative 3. LSJR Alternative 3 would result in significant and unavoidable impacts on groundwater resources, agricultural resources, service providers, and energy and greenhouse gases. LSJR Alternative 3, with adaptive implementation, would also result in significant and unavoidable impacts on recreational resources. In the extended plan area, LSJR Alternative 3, with or without

adaptive implementation, could also result in significant and unavoidable impacts on aquatic biological resources, terrestrial biological resources, recreational resources and aesthetics, and energy and greenhouse gases.

Several significant and unavoidable impacts on various resources were identified for LSJR Alternative 4. LSJR Alternative 4, with or without adaptive implementation, would result in significant and unavoidable impacts on groundwater resources, recreational resources, agricultural resources, service providers, and energy and greenhouse gases. In the extended plan area, LSJR Alternative 4, with or without adaptive implementation, could also result in significant and unavoidable impacts on aquatic biological resources, terrestrial biological resources, recreational resources and aesthetics, and energy and greenhouse gases.

Table 18-1. Summary of CEQA Significance Determinations in Chapters 5–15

Environmental Resource Area	No Project Alternative (LSJR /SDWQ Alternative 1)	LSJR Alternative 2		LSJR Alternative 3		LSJR Alternative 4	
		Without AI	With AI (30%)	Without AI	With AI (30%, 50%)	Without AI	With AI (50%)
Surface Hydrology and Water Quality	S	L	L	L	L	L	L
Flooding, Sediment, and Erosion	L	L	L	L	L	L	L
Aquatic Biological Resources	S	L	L	L	L	L	L
Terrestrial Biological Resources	S	L	L	L	L	L	L
Groundwater Resources	L	L	SU	SU	SU	SU	SU
Recreational Resources and Aesthetics	S	L	L	L	SU	SU	SU
Agricultural Resources	S	L	SU	SU	SU	SU	SU
Cultural Resources	S	L	L	L	L	L	L
Service Providers	S	L	SU	SU	SU	SU	SU
Energy and Greenhouse Gases	S	L	L	SU	SU	SU	SU

Note: Gray shading denotes a change in the significance determination for a resource between an alternative without adaptive implementation and with adaptive implementation.

AI = Adaptive implementation as described in Chapter 3, *Alternatives Description.* (%) reflects the maximum or minimum percent of unimpaired flow allowed under adaptive implementation method 1. If there is a change in significance determinations with and without adaptive implementation, it is because of this method.

S = significant impact

SU = significant and unavoidable impact

L = less-than-significant impact

N = no impact

Table 18-2. Summary of CEQA Significance Determinations for LSJR Alternatives 2, 3, and 4 in Chapters 5–14—Extended Plan Area

	LSJR Alternative 2		LSJR Alternative 3		LSJR Alternative 4	
Environmental Resource Area	Without AI	With AI (30%)	Without AI	With AI (30%, 50%)	Without AI	With AI (50%)
Surface Hydrology and Water Quality	L	L	L	L	L	L
Flooding, Sediment, and Erosion	L	L	L	L	L	L
Aquatic Biological Resources	L	SU	SU	SU	SU	SU
Terrestrial Biological Resources	L	SU	SU	SU	SU	SU
Groundwater Resources	L	L	L	L	L	L
Recreational Resources and Aesthetics	L	SU	SU	SU	SU	SU
Agricultural Resources	L	L	L	L	L	L
Cultural Resources	L	L	L	L	L	L
Service Providers	L	SU	SU	SU	SU	SU
Energy and Greenhouse Gases	L	SU	SU	SU	SU	SU

Notes:
The impact determinations in this table are for the extended plan area. The No Project Alternative is not included in this table because it would have no effect in the extended plan area. The SDWQ alternatives are not included in this table because they would have no effect in the extended plan area.
Gray shading denotes a change in the significance determination for a resource between the plan area and extended plan area.
AI = Adaptive implementation as described in Chapter 3, *Alternatives Description.* (%) reflects the maximum or minimum percent of unimpaired flow allowed under adaptive implementation method 1. If there is a change in significance determinations with and without adaptive implementation, it is because of this method.
SU = significant and unavoidable impact
L = less-than-significant impact
N = no impact

Table 18-3. Summary of LSJR Alternatives CEQA Significance Analysis by Geography in Chapters 5–15

Environmental Resource Area	No Project Alternative (LSJR /SDWQ Alternative 1)	LSJR Alternative 2		LSJR Alternative 3		LSJR Alternative 4	
		Without AI	With AI (30%)	Without AI	With AI (30%, 50%)	Without AI	With AI (50%)
River and Reservoir Geography							
Surface Hydrology and Water Quality							
Stanislaus	L	L	L	L	L	L	L
Tuolumne	L	L	L	L	L	L	L
Merced River	S	L	L	L	L	L	L
Lower San Joaquin and Southern Delta	L	L	L	L	L	L	L
New Melones	L	L	L	L	L	L	L
New Don Pedro	L	L	L	L	L	L	L
Lake McClure	L	L	L	L	L	L	L
Flooding, Sediment, and Erosion							
Stanislaus	L	L	L	L	L	L	L
Tuolumne	L	L	L	L	L	L	L
Merced River	L	L	L	L	L	L	L
Lower San Joaquin and Southern Delta	L	L	L	L	L	L	L
Aquatic Biological Resources							
Stanislaus	S	L	L	L	L	L	L
Tuolumne	L	L	L	L	L	L	L
Merced River	S	L	L	L	L	L	L
Lower San Joaquin and Southern Delta	L	L	L	L	L	L	L
New Melones	S	L	L	L	L	L	L
New Don Pedro	L	L	L	L	L	L	L
Lake McClure	S	L	L	L	L	L	L

Environmental Resource Area	No Project Alternative (LSJR /SDWQ Alternative 1)	LSJR Alternative 2		LSJR Alternative 3		LSJR Alternative 4	
		Without AI	With AI (30%)	Without AI	With AI (30%, 50%)	Without AI	With AI (50%)
Terrestrial Biological Resources							
Stanislaus	L	L	L	L	L	L	L
Tuolumne	L	L	L	L	L	L	L
Merced River	S	L	L	L	L	L	L
Lower San Joaquin and Southern Delta	L	L	L	L	L	L	L
New Melones	L	L	L	L	L	L	L
New Don Pedro	L	L	L	L	L	L	L
Lake McClure	L	L	L	L	L	L	L
Recreational Resources and Aesthetics							
Stanislaus	L	L	L	L	SU	SU	SU
Tuolumne	L	L	L	L	SU	SU	SU
Merced River	L	L	L	L	L	L	L
Lower San Joaquin	L	L	L	L	L	L	L
New Melones	S	L	L	L	L	L	L
New Don Pedro	L	L	L	L	L	L	L
Lake McClure	L	L	L	L	L	L	L
Cultural Resources							
Stanislaus	L	L	L	L	L	L	L
Tuolumne	L	L	L	L	L	L	L
Merced River	L	L	L	L	L	L	L
Lower San Joaquin	L	L	L	L	L	L	L
New Melones	S	L	L	L	L	L	L
New Don Pedro	L	L	L	L	L	L	L
Lake McClure	L	L	L	L	L	L	L

Environmental Resource Area	No Project Alternative (LSJR /SDWQ Alternative 1)	LSJR Alternative 2		LSJR Alternative 3		LSJR Alternative 4	
		Without AI	With AI (30%)	Without AI	With AI (30%, 50%)	Without AI	With AI (50%)
Service Providers							
Stanislaus	L	L	L	SU	SU	SU	SU
Tuolumne	L	L	SU	SU	SU	SU	SU
Merced River	L	L	SU	SU	SU	SU	SU
Southern Delta	S	L	L	L	L	L	L
River and Groundwater Subbasin Geography							
Groundwater Resources							
Stanislaus River - Eastern San Joaquin Subbasin	L	L	L	L	L	SU	SU
Stanislaus River and Tuolumne River - Modesto Subbasin	L	L	L	SU	SU	SU	SU
Tuolumne River - Turlock Subbasin	L	L	L	SU	SU	SU	SU
Merced River - Extended Merced Subbasin[a]	L	L	SU	SU	SU	SU	SU
River, Irrigation District and Agricultural Geography							
Agricultural Resources							
Stanislaus River - Stockton East Water District/Central San Joaquin Water Conservation District	S	L	L	L	L	L	L
Stanislaus River - South San Joaquin Irrigation District	S	L	L	SU	SU[b]	SU	SU
Stanislaus River - Oakdale Irrigation District	S	L	SU	SU	SU	SU	SU
Tuolumne River - Modesto Irrigation District	L	L	SU	SU	SU	SU	SU
Tuolumne River - Turlock Irrigation District	L	L	L	SU	SU[b]	SU	SU

Environmental Resource Area	No Project Alternative (LSJR /SDWQ Alternative 1)	LSJR Alternative 2		LSJR Alternative 3		LSJR Alternative 4	
		Without AI	With AI (30%)	Without AI	With AI (30%, 50%)	Without AI	With AI (50%)
Merced River - Merced Irrigation District	L	L	L	L	L	L	SU

Notes:

Energy and greenhouse gases are not included in this table because while changes on each river were calculated, potential impacts associated with these resources (impacts on the California electric grid and global climate change) would affect a larger region.

Gray shading denotes a determination of a significant impact for a resource under a particular alternative.

AI = Adaptive implementation as described in Chapter 3, Alternatives Description. (%) reflects the maximum or minimum percent of unimpaired flow allowed under adaptive implementation method 1. If there is a change in significance determinations with and without adaptive implementation, it is because of this method.

S = significant impact

SU = significant and unavoidable impact

L = less-than-significant impact

N = no impact

[a] As described in Chapter 9, *Groundwater Resources*, northern portion of the Chowchilla Subbasin is combined with the Merced Subbasin because the small area between the Merced Subbasin and the Chowchilla River is part of the surface water delivery area for the Merced River.

[b] Impact would be less than significant at 30% unimpaired flow.

Table 18-5. Impact Determinations that Change with Adaptive Implementation (LSJR Alternatives 2 and 3) [a,b]

Impact	Without Adaptive Implementation	With Adaptive Implementation[c,d]
Chapter 9: Groundwater Resources—LSJR Alternative 2		
Impact GW-1: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge	Less than significant— The average annual groundwater balance is expected to be reduced by less than the equivalent of 1 inch across each of the subbasins. This is not expected to produce a measurable decrease in groundwater elevations. Therefore, there would not be a substantial depletion of groundwater supplies or substantial interference with groundwater recharge.	Significant and unavoidable— If adaptive implementation method 1 were implemented on a long-term basis (an increase in the February–June percent of unimpaired flow from 20% up to 30%), it is expected that the average annual groundwater balance would be reduced by the equivalent of more than 1 inch across the Extended Merced Subbasin, thus producing an eventual measurable decrease in groundwater elevations. Therefore, it is expected that there would be a substantial depletion of groundwater supplies or substantial interference with groundwater recharge in this subbasin under LSJR Alternative 2.
Impact GW-2: Cause subsidence as a result of groundwater depletion	Less than significant—The average annual groundwater balance is expected to be reduced by less than the equivalent of 1 inch across each of the subbasins. This is not expected to produce a measurable decrease in groundwater elevations or associated subsidence.	Significant and unavoidable— If adaptive implementation method 1 were implemented on a long-term basis (an increase in the February–June percent of unimpaired flow from 20% up to 30%), the average annual groundwater balance could potentially be reduced by the equivalent of more than 1 inch across the Extended Merced Subbasin. If this occurred, it could worsen subsidence that is already occurring in this subbasin. Therefore, subsidence could potentially significantly increase under LSJR Alternative 2.
Chapter 11: Agricultural Resources—LSJR Alternative 2		
Impact AG-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use	Less than significant— Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses is not expected because potential reductions in surface water diversions would result in less than 4% average reduction in irrigated acreage for the irrigation districts in the LSJR area of potential effects.	Significant and unavoidable— If adaptive implementation method 1 were implemented on a long-term basis (an increase in the February–June percent of unimpaired flow from 20% up to 30%), environmental impacts would be potentially significant and unavoidable as it is estimated that OID could experience a ~~4.4%~~4.6% average reduction in irrigated crops, which equates to ~~2,356~~2,490 acres receiving reduced irrigation, and MID could experience a 4.4%~~4.5%~~ average reduction in irrigated crops, which equates to ~~2,589~~2,909 acres

Impact	Without Adaptive Implementation	With Adaptive Implementation[c,d]
		receiving reduced irrigation and TID could experience a 3.8% average reduction in irrigated crops, which equates to 5,013 acres receiving reduced irrigation. It is reasonable to assume that a portion of the reduced irrigated acreage is Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and that some portion of acreage with reduced irrigation could potentially be converted to nonagricultural uses even though there are many factors affecting whether land is converted. Conversely, land can be maintained in agricultural use through crop substitution, crop rotation, fallowing, and dry land farming.
Chapter 10: Recreational Resources and Aesthetics—LSJR Alternative 3		
Impact REC-1: Substantially physically deteriorate existing recreational facilities on the rivers or at the reservoirs	Less than significant—Modeled frequencies of flows greater than 2,500 cfs would change little on the Stanislaus and Merced Rivers, and therefore on-bank recreational facilities would not experience substantially more inundation relative to baseline conditions. However, flows greater than 2,500 cfs would increase in frequency on the Tuolumne River in May and June, but would remain close to baseline values July – September. Although the flows on the Tuolumne River could result in an increase in the frequency of inundation of on-bank recreation areas during May and June, recreational facilities are not anticipated to substantially physically deteriorate along the river. On-bank recreational facilities are built to withstand periodic inundation with higher river flows.	Significant and unavoidable— If adaptive implementation method 1 were implemented on a long-term basis (an increase in the February–June percent of unimpaired flow from 40% up to 50%), it is expected that the modeled seasonal average frequency of river flows above 2,500 cfs on the Tuolumne River would greatly increase, especially during May and June. The frequency of inundation of on-bank facilities on the Tuolumne River and, to a lesser extent, on the Stanislaus River is expected to increase compared to baseline and result in substantial deterioration of existing recreational facilities.
Chapter 13: Service Providers—LSJR Alternative 2		
Impact SP-1: Require or result in the construction of new water supply facilities or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant	Less than significant—Average surface water diversions on the Stanislaus, Tuolumne, and Merced Rivers would be reduced by 2%, 2%, and 6%, respectively, compared to baseline conditions, and there would not be a substantial depletion of groundwater supplies. Therefore, it is not expected	Significant and unavoidable—If adaptive implementation method 1 were implemented on a long-term basis (an increase in the February–June percent of unimpaired flow from 20% up to 30%) it is expected that there would be a substantial reduction in the water supply on the Tuolumne and Merced Rivers of approximately 7%, and

Impact	Without Adaptive Implementation	With Adaptive Implementation[c,d]
environmental effects.	that service providers or public water suppliers would need to construct or operate new wastewater treatment facilities or water supply facilities or infrastructure.	10%, respectively, and a substantial depletion of groundwater supplies in the Extended Merced Subbasin. These reductions would potentially require service providers to construct new or expanded water supply or wastewater treatment facilities, which could result in significant and unavoidable environmental impacts.
Impact SP-2b: Violate any water quality standards such that drinking water quality from domestic wells would be affected.[e]	Less than significant—Because service providers and irrigation districts relying primarily on surface water would not need to supplement their supply with groundwater under LSJR Alternative 2, there would likely be no degradation of groundwater quality.	Significant and unavoidable—If an increase in the February–June percent of unimpaired flow from 20% up to 30% were implemented on a long-term basis, increased groundwater pumping and reductions in groundwater levels in the Extended Merced Subbasin could affect groundwater quality. Domestic well users are largely unregulated and are not subject to any state requirements to monitor, test, and treat their water to meet the state and federal Safe Drinking Water Act. There is no required mechanism to prevent private domestic wells from using groundwater that may exceed Maximum Contaminant Levels.

[a] The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) and SDWQ Alternatives 2 and 3 have no adaptive implementation and therefore are not included in this table.

[b] As discussed in Section 18.2.1, *Summary of Alternatives Impact Analysis*, there are no differences in the impact determinations between LSJR Alternative 4 with the inclusion of adaptive implementation, and as such, it is not included in this table.

[c] Four adaptive implementation methods could occur under the LSJR alternatives, as described in Chapter 3, *Alternatives Description*, and summarized in the Chapters 9, 11, and 13 *Methods and Approach* sections.

[d] Implementing adaptive implementation method 1 on a more frequent basis can result in a change in the impact determination for LSJR Alternative 2, as analyzed in Chapters 9, 11, and 13 and LSJR Alternative 3, as analyzed in Chapters 10.

[e] Salinity in the SJR at Vernalis and in the southern Delta is not relevant to groundwater and drinking water quality from domestic wells and, therefore, there would be no impact from the changes in salinity in these surface waters, and this is not discussed further in Impact SP-2b.

18.2.1 Summary of Alternatives Impact Analysis

Overall, LSJR alternatives (e.g., LSJR Alternative 2, without adaptive implementation) that require similar unimpaired flows when compared to baseline on the three eastside tributaries[4] have less-than-significant impacts on resources that require or are dependent on surface water diversion. These resources include agricultural resources, groundwater resources, service providers, and energy and greenhouse gases. Overall, LSJR alternatives (e.g., LSJR Alternative 4, with adaptive implementation) that could require higher percentages of unimpaired flows when compared to baseline conditions on all three eastside tributaries have less-than-significant impacts on resources requiring or relying on flow, such as surface hydrology, water quality; aquatic biological resources; and terrestrial biological resources.

Generally, the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in lower flows on the Merced River and less surface water diversion on the Stanislaus River when compared to baseline (see Chapter 15, *No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1,* for impact analysis and Appendix D, *Evaluation of the No Project Alternative [LSJR Alternative 1 and SDWQ Alternative 1]* for technical assumptions and results). This would result in significant impacts on resources requiring or relying on flow in the river(s) or relying on surface water diversions. Specifically, there would be significant impacts on water quality; aquatic biological resources; terrestrial biological resources; agricultural resources; recreational resources, cultural resources, service providers; and energy and greenhouse gases. Thus, the alternative that results in a continuation of, and full compliance with, the existing 2006 Bay-Delta Plan would not avoid significant environmental impacts.

Generally, LSJR Alternative 2 would result in flows similar to, or slightly greater than, baseline conditions on the three eastside tributaries. This alternative would result in less-than-significant impacts on all resources. However, if adaptive implementation method 1 is implemented long-term and the percent of unimpaired flow is increased from 20 to 30, then significant and unavoidable impacts would occur to resources that require water for beneficial uses other than fish and wildlife, such as groundwater resources, agricultural resources and service providers.

LSJR Alternatives 3 or 4, with or without adaptive implementation, generally require higher flow on the Stanislaus, Tuolumne, and Merced Rivers when compared to baseline. Thus, these alternatives result in significant and unavoidable impacts on resources that require water for uses other than fish and wildlife, such as agricultural resources, service providers, and energy and greenhouse gases. These alternatives would also result in significant and unavoidable impacts on groundwater resources because of the average annual groundwater balance is expected to be reduced by less than the equivalent of 1 inch across each of the four primary subbasins, which could produce a measurable decrease in groundwater elevations and substantially deplete groundwater supplies. In addition, LSJR Alternative 3, with adaptive implementation, and LSJR Alternative 4, with or without adaptive implementation, would have significant and unavoidable impacts on recreational resources because of increased flows on the eastside tributaries that would result in more frequent inundation of on-bank recreational facilities.

[4] In this document, the term *three eastside tributaries* refers to the Stanislaus, Tuolumne, and Merced Rivers.

Construction and operation of different facilities could occur in the plan area or extended plan area as a result of either indirect actions that entities could take as a result of the LSJR alternatives or as a result of implementing non-flow measures in order to inform the body of scientific information potentially used to make adaptive implementation decisions under LSJR Alternatives 2, 3, and 4. The construction and operation of these facilities could involve impacts on different resources (summarized in Tables 18-6 and 18-7). While many of these activities would result in no impacts or less-than-significant impacts on different resources, it primarily depends on the location of the activity, the duration of the activity, and the ability of a lead agency to mitigate potential significant impacts as to whether activities would result in no impacts or significant and unavoidable impacts, as described below in Section 18.2.2, *Significant and Unavoidable Impacts.*

18.2.2 Significant and Unavoidable Impacts

Generally, the contribution of the LSJR alternatives to significant and unavoidable impacts depends on the percent of unimpaired flow required and the number of rivers, reservoirs, groundwater subbasins, or irrigation districts affected. It also depends on whether the percent of unimpaired flow would be adjusted through adaptive implementation on a more frequent basis or a longer duration to a higher or lower unimpaired flow (i.e., adaptive implementation method 1). As such, generally lower flows that may be adjusted more frequently and for longer periods of time may result in a smaller contribution to a significant and unavoidable impact when compared to higher flows that may be adjusted less frequently.

Surface Hydrology and Water Quality

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative) would result in significant impacts on water quality because the flows on the Merced River would be reduced when compared to baseline (especially during drier years and in April and May), thereby potentially increasing the pollutant concentrations.

Aquatic Biological Resources

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant impacts on aquatic biological resources on the Merced and Stanislaus Rivers and at New Melones Reservoir and Lake McClure. Flows on the Merced River would be reduced when compared to baseline (especially during drier years and in key months of April and May), thereby increasing temperatures for aquatic species, as well as increasing the risk of disease and exposure to pollutants and predation. Significant impacts would also occur on the Stanislaus River because higher summer and fall release temperatures associated with reduced storage in New Melones Reservoir would increase the frequency of stressful water temperatures, as well as increasing the risk of disease and exposure to pollutants and predation. Reservoir water levels at New Melones Reservoir and Lake McClure would substantially fluctuate April–September, such that spawning success and habitat availability for warmwater species would be significantly reduced. Furthermore, at New Melones, given the end-of-September changes in storage, coldwater species reservoir habitat would also be significantly affected.

In the extended plan area, LSJR Alternative 2, with adaptive implementation, and LSJR Alternatives 3 and 4, with or without adaptive implementation, could also result in significant and unavoidable impacts on aquatic biological resources. This is because of potential loss, or substantial decrease, in

suitable habitat (including temperature) in existing reservoirs and rivers, particularly on the Stanislaus and Tuolumne Rivers.

Terrestrial Biological Resources

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant impacts on terrestrial biological resources, particularly riparian habitat and those terrestrial species relying on riparian habitat, because the flows on the Merced River would be reduced when compared to baseline (especially during drier years and potentially in the spring), thereby reducing riparian habitat that is currently limited under baseline.

In the extended plan area, LSJR Alternatives 2, with adaptive implementation, and LSJR Alternatives 3 and 4, with or without adaptive implementation, could also result in significant and unavoidable impacts on terrestrial biological resources. This is because of potential loss, or substantial decrease in, habitat at existing reservoirs and on rivers, particularly on the Stanislaus and Tuolumne Rivers.

Groundwater Resources

LSJR Alternative 2, with adaptive implementation, would have significant and unavoidable impacts on groundwater resources. The magnitude of the significance is related to the amount of expected groundwater pumping needed to replace the lost surface water diversions under each of the alternatives. There would be a higher magnitude of pumping expected in the Extended Merced Subbasin when compared to the three other subbasins evaluated. It is expected that the average annual groundwater balance would be reduced by the equivalent of more than 1 inch across the Extended Merced Subbasin, thus producing an eventual measurable decrease in groundwater elevations. Therefore, it is expected that there would be a substantial depletion of groundwater supplies or substantial interference with groundwater recharge in this subbasin.

LSJR Alternatives 3 and 4, with or without adaptive implementation, would have significant and unavoidable impacts on groundwater resources. Similar to LSJR Alternative 2, with adaptive implementation, the average annual groundwater balance would be reduced, producing eventual measureable decrease across multiple subbasins. These subbasins include: Eastern San Joaquin, Modesto, Turlock, and Extended Merced.

LSJR Alternative 2, with adaptive implementation, is expected to have the smallest contribution of the alternatives that have significant and unavoidable impacts on groundwater resources because less groundwater is expected to be pumped and because only the Extended Merced Subbasin is affected.

Recreational Resources and Aesthetics

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative) would result in significant impacts on recreation and aesthetics because the elevation levels of New Melones Reservoir would be substantially reduced more frequently and visual quality of the reservoir would be degraded, thereby affecting recreational facilities (e.g., boat ramps) and the visual character and quality of the reservoir.

There are significant and unavoidable impacts on recreational resources for LSJR Alternative 3, with adaptive implementation, and LSJR Alternative 4, with or without adaptive implementation. It is expected that the modeled seasonal average frequency of river flows above 2,500 cubic feet per

second (cfs) on the Tuolumne River would greatly increase, especially during May and June, under LSJR Alternative 3, with adaptive implementation, and on the Stanislaus and Tuolumne Rivers, under LSJR Alternative 4, with adaptive implementation. Thus, the frequency of inundation of on-bank facilities would be substantially more, when compared to baseline, particularly in May and June, during the recreational season. As such, implementation of LSJR Alternative 3, with adaptive implementation and LSJR Alternative 4, with or without adaptive implementation, could substantially physically deteriorate existing recreational facilities.

In the extended plan area, LSJR Alternative 2, with adaptive implementation, and LSJR Alternatives 3 and 4, with or without adaptive implementation, could also result in significant and unavoidable impacts on recreational resources and aesthetics. This is because of potential significant reductions in reservoir elevation and river levels, particularly on the Stanislaus and Tuolumne Rivers, in areas frequently used by recreationists or that are designated as wild and scenic rivers or areas that are along designated state scenic highways.

Agricultural Resources

Significant impacts on agricultural resources would result from the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) because the flow would be increased on the Stanislaus River when compared to baseline to comply with the 2006 Bay-Delta Plan, and surface water diversions that are currently used to irrigate Prime, Unique, and Farmland of Statewide Importance lands would be reduced. As such, it is anticipated that a substantial reduction in crop acreage would occur in irrigation districts (i.e., Stockton East Water District/Central San Joaquin Water Conservation District, South San Joaquin Irrigation District [SSJID], and Oakdale Irrigation District [OID]) that rely on Stanislaus surface water, and these types of farmland could potentially be converted to nonagricultural uses.

LSJR Alternative 2, with adaptive implementation, would experience a reduction in surface water diversions that are currently used to irrigate Prime, Unique, and Farmland of Statewide Importance lands. As such, it is anticipated that substantial reduction in crop acreage would occur in the Modesto Irrigation District (MID) that relies on Tuolumne River surface water, and Oakdale Irrigation District (OID) that relies on Stanislaus River surface water. As such, these types of farmland could potentially be converted to nonagricultural uses.

LSJR Alternatives 3 and 4, with or without adaptive implementation, would also experience a reduction in surface water diversions on the Stanislaus, Tuolumne, and Merced Rivers that are currently used to irrigate Prime, Unique, and Farmland of Statewide Importance lands. As such, it is anticipated that a substantial reduction in crop acreage could occur in more irrigation districts that rely on surface water from the three eastside tributaries when compared to LSJR Alternative 2 (i.e. SSJID, OID, TID, MID, and Merced Irrigation District). As such, these types of farmland could be converted to nonagricultural uses.

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1), and LSJR Alternative 2, with adaptive implementation, would have the smallest contribution of the other alternatives that have significant and unavoidable impacts on agricultural resources because it is expected that any potential conversion of agricultural land to nonagricultural land would only occur within those areas served by Stanislaus River water (i.e., SEWD/CSJWCD, SSJID, and OID) or Tuolumne River surface water (i.e., MID) and Stanislaus River surface water (i.e., OID), whereas under LSJR Alternatives 3 or 4, with or without adaptive implementation, more irrigation districts could potentially experience a conversion of designated farmland to nonagricultural lands.

Cultural Resources

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in significant impacts on cultural resources because the end-of-September storage at New Melones Reservoir is anticipated to be greatly reduced in over half the years when compared to baseline. This would most likely expose cultural resources and could result in a substantial adverse change to the significance of existing cultural resources if they were disturbed by people or disturbed by another physical method (e.g., light, exposure).

Service Providers

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in significant impacts on service providers; LSJR Alternative 2, with adaptive implementation, and LSJR Alternatives 3 and 4, with or without adaptive implementation, would result in significant and unavoidable impacts on service providers. This is because it is expected the increase in unimpaired flows on the rivers under the alternatives would result in a corresponding decrease in surface water diversions for other beneficial uses. As a result, service providers that rely on surface water supplies from the tributary rivers (e.g., TID, MID, City of Modesto, CCSF, and Merced ID under LSJR Alternative 2 with adaptive implementation and TID, MID, City of Modesto, CCSF, Merced ID, SSJID, OID, City of Tracy, and SEWD under LSJR Alternatives 3 and 4 with or without adaptive implementation) may have to construct new or expanded water treatment facilities or water supply infrastructure, the construction of which could cause significant environmental effects on other resources (e.g., aesthetics, terrestrial or aquatic biological resources, cultural resources, etc.). In addition, service providers that rely on groundwater in the Extended Merced Subbasin under LSJR Alternative 2 with adaptive implementation, the Merced, Modesto, Turlock Subbasins, and Eastern San Joaquin Subbasin for LSJR Alternative 3 with or without adaptive implementation may also need to construct new or expanded facilities. The need to construct new facilities depends on a variety of factors, including the size of the population being served and the number of active municipal wells in their service area, the range of differences between well depths and depths to groundwater, the physical condition of wells, and other factors.

As a result of increased groundwater pumping, reductions in groundwater levels in the Extended Merced Subbasin under LSJR Alternative 2, with adaptive implementation, in the Modesto, Turlock, and Extended Merced Subbasins under LSJR Alternative 3, with or without adaptive implementation, and also in the Easter San Joaquin Subbasin under LSJR Alternative 4, with or without adaptive implementation, could affect groundwater quality such that drinking water from domestic wells could be significantly affected. Domestic well users are largely unregulated and are not subject to any state requirements to monitor, test, and treat their water to meet the state and federal Safe Drinking Water Act. There is no required mechanism to prevent private domestic wells from using groundwater that may exceed maximum contaminant levels (MCLs). Therefore, impacts would be significant and unavoidable.

In the extended plan area, LSJR Alternative 2, with adaptive implementation, and LSJR Alternatives 3 and 4, with or without adaptive implementation, could also result in significant and unavoidable impacts on service providers (Table 13-6). This is similar to the impacts in the plan area and relate to the potential reductions in surface water supply. The reduction could result in construction of new or expanded water treatment facilities or water supply infrastructure, the construction of which could cause significant environmental effects on other resources.

Energy and Greenhouse Gases

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would have significant greenhouse gas impacts. LSJR Alternatives 3 and 4, with or without adaptive implementation, would have significant and unavoidable greenhouse gas impacts. The magnitude of the significance is related to the amount of hydropower reduced and potential groundwater that could be pumped to replace the lost surface water diversions under each of the alternatives. Compared to LSJR Alternatives 3 and 4, the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) is expected to have the smallest contribution on climate change because it is expected the groundwater pumping would take place as a result of the decrease in surface water diversions from the Stanislaus River alone, whereas LSJR Alternative 3 or 4, with or without adaptive implementation, would experience a decrease in surface water diversions from additional eastside tributaries (the Merced and Tuolumne Rivers).

In the extended plan area, LSJR Alternative 2, with adaptive implementation, and LSJR Alternatives 3 and 4, with or without adaptive implementation, could also result in significant and unavoidable impacts on energy and greenhouse gases. This is because of potential changes to surface water elevations of reservoirs on the Stanislaus and Tuolumne Rivers.

Indirect Actions and Non-Flow Measures

The evaluation contained in Chapter 16, *Evaluation of Other Indirect and Additional Actions,* provides a discussion of other indirect actions and additional actions associated with LSJR Alternatives 2, 3, and 4. The actions include those that the regulated community could take to reduce potential reservoir or water supply effects associated with implementing LSJR Alternatives 2, 3, and 4 or that would inform the body of scientific information potentially used to make adaptive implementation decisions under LSJR Alternatives 2, 3, and 4 (i.e., non-flow measures). This subsection presents a suite of reasonably foreseeable actions that affected entities may undertake to address possible surface water supply reductions anticipated under LSJR Alternatives 2, 3, and 4 and analyzes the indirect environmental impacts associated with those actions. The combination of the different types of additional actions and other indirect actions that entities could take in response to each of the alternatives is unknown. While entities could take one or more of these actions, the combination of actions taken under each alternative is speculative and cannot be predictably aligned with each alternative. As such, the summary tables below (Tables 18-6 and 18-7) focus on the actions (discussed primarily in Chapter 16) that agencies or entities could undertake as a result of each alternative, without specifically assigning the actions to a particular alternative.

In many cases, the evaluations of actions presented in Chapter 16 include both construction and operation impacts. In cases with both construction and operation, the summary tables reflect the highest level of impact, which is generally construction-related. The determinations are post-mitigation level of significance. Potential mitigation measures are proposed in Chapter 16 to reduce potentially significant impacts; however, the particular circumstances of the actions and appropriate mitigation measures would be project specific. In addition, as required by CEQA (State CEQA Guidelines § 15126.2) lead agencies would describe a reasonable range of alternatives based on project-specific conditions and project-specific objectives, and one of the project-specific alternatives may in and of itself reduce significant environmental impacts. A project-specific alternative could be selected as a proposed project. The effectiveness of mitigation is contingent upon several other factors, such as those listed below.

- The ability of lead agencies or other entities to implement the mitigation.

- The other responsible agencies involved in the project.
- The thresholds lead agencies use to evaluate the impact.
- Site-specific conditions.

Lead agencies or other entities with discretionary approval authority can and should impose the relevant mitigation measures identified in Tables 16-38 and 16-39. However, depending on project specifics, implementing mitigation measures may not be fully able to reduce significant impacts, and such impacts may remain significant and unavoidable after mitigation. Until such time that potential mitigation measures are implemented, the impacts would remain significant and unavoidable, consistent with State CEQA Guidelines Section 15091. The summary tables reflect this.

Table 18-6. CEQA Significance Summary of LSJR Alternatives—Other Indirect Actions

Environmental Resource Area	Transfer of Surface Water	Substitution with Groundwater	Aquifer Storage and Recovery	Recycled Water Sources for Water Supply	In-Delta Diversion	Water Supply Desalination	New Surface Water Supplies
Aesthetics	SU	**SU***	N	**SU***	**SU***	**SU***	SU
Agriculture and Forestry Resources	SU	**L**	L	**SU***	**SU***	**SU***	SU
Air Quality	L	**SU***	L	**SU***	**SU***	**SU***	**SU**
Biological Resources	SU	**SU***	L	**SU***	**SU***	SU	SU
Cultural Resources	L	**SU***	L	**SU***	**SU***	**SU***	**SU**
Geology and Soils	L	**SU***	N	**SU***	**SU***	**SU***	**SU***
Greenhouse Gas Emissions	~~L~~SU	SU	L	SU	SU	SU	SU
Hazards and Hazardous Materials	L	**SU***	N	**SU***	**SU***	**SU***	**SU***
Hydrology and Water Quality	SU	**SU***	L	**SU***	**SU***	SU	**SU***
Land Use and Planning	L	L	L	L	L	**SU***	L
Mineral Resources	L	**N**	L	**L**	**L**	**N**	**SU**
Noise	N	**SU***	N	**SU**	**SU***	**SU***	**SU**
Population and Housing	N	**L**	N	**N**	**L**	**N**	**L**
Public Services	L	**N**	N	**N**	**L**	**SU***	SU
Recreation	SU	**N**	N	**L**	**L**	**SU***	**SU**
Transportation and Traffic	L	**SU***	L	**SU***	**SU***	**SU***	SU
Utilities and Service Systems	L	SU	N	SU	SU	SU	SU

Notes:
Bold text indicates primarily construction-driven impacts. Operation-driven impacts are not bold.
* Indicates that the impact after mitigation may be less than significant; however, given the various factors influencing the potential implementation of mitigation, and until such time that mitigation measures are implemented, the impacts would remain significant and unavoidable, consistent with State CEQA Guidelines Section 15091.
SU = significant and unavoidable impact
L = less-than-significant impact
N = no impact

Table 18-7. CEQA Significance Summary of LSJR Alternatives—Non-Flow Measures

Environmental Resource Area	Floodplain and Riparian Habitat Restoration	Reduce Vegetation-Disturbing Activities	Gravel Augmentation	Enhance In-Channel Complexity	Improve Temperature Conditions	Fish Passage Improvements – Fish Screens	Fish Passage Improvements – Physical Barriers in S. Delta	Fish Passage Improvements – Human-Made Barriers to Migration	Predatory Fish Control	Invasive Vegetation Control
Aesthetics	**L**	N	**L**	**L**	**SU***	**L**	**L**	N	**L**	L
Agriculture and Forestry Resources	**SU**	N	**N**	**N**	**N**	**N**	**L**	N	**N**	N
Air Quality	**SU***	N	**SU***	**SU***	**SU***	**SU***	**SU***	L	**SU***	L
Biological Resources	**SU***	N	**SU***	**SU**	**SU***	**SU**	**SU**	L	**SU**	SU*
Cultural Resources	**SU***	N	**L**	**SU***	SU	**SU***	**SU***	N	**SU***	L
Geology and Soils	**SU***	N	**SU***	**SU***	**L**	**SU***	**SU***	N	**N**	N
Greenhouse Gas Emissions	SU	L	SU	SU	SU	SU	SU	L	SU	SU
Hazards and Hazardous Materials	**SU***	N	**SU***	**SU***	**SU***	**SU***	**SU***	N	**SU***	SU*
Hydrology and Water Quality	**SU***	N	**SU***	**SU***	**SU***	**SU***	**SU***	N	**SU***	SU*
Land Use and Planning	**N**	N	**N**	**N**	**L**	**L**	**L**	N	**L**	N
Mineral Resources	**L**	N	SU	**L**	**N**	**N**	**N**	N	**N**	N
Noise	**L**	N	**L**	**L**	**SU***	**SU**	**SU***	N	**SU***	L
Population and Housing	**N**	N	**N**	**N**	**N**	**N**	**N**	N	**N**	N
Public Services	**N**	N	**N**	**N**	**N**	**N**	**N**	N	**N**	N
Recreation	**L**	N	**L**	**L**	**N**	**N**	**SU***	N	**L**	L
Transportation and Traffic	**SU***	N	**N**	**L**	**L**	**L**	**L**	N	**L**	L

Environmental Resource Area	Floodplain and Riparian Habitat Restoration	Reduce Vegetation-Disturbing Activities	Gravel Augmentation	Enhance In-Channel Complexity	Improve Temperature Conditions	Fish Passage Improvements – Fish Screens	Fish Passage Improvements – Physical Barriers in S. Delta	Fish Passage Improvements – Human-Made Barriers to Migration	Predatory Fish Control	Invasive Vegetation Control
Utilities and Service Systems	**N**	N	**N**	**N**	**N**	**N**	**N**	N	**N**	N

Note:
Bold text indicates primarily construction-driven impacts. Operation-driven impacts are not bold.
* Indicates that the impact after mitigation may be less than significant; however, given the various factors influencing the potential implementation of mitigation, and until such time that mitigation measures are implemented, the impacts would remain significant and unavoidable, consistent with State CEQA Guidelines Section 15091.
SU = significant and unavoidable impact
L = less-than-significant impact
N = no impact

18.2.3 Environmentally Superior Alternative

CEQA requires a discussion of the environmentally superior alternative. If that alternative is the no project alternative, the environmental document shall also identify an environmentally superior alternative among the other alternatives. (Cal. Code Regs., tit. 14, § 15126.6(e).) In considering the selection of the environmentally superior alternative, this SED evaluates which alternatives result in fewer significant impacts relative to the other alternatives, and also considers whether those alternatives are feasible, taking into account economic, environmental, social, technological, and other factors. (Pub. Resources Code, §§ 21081(a)(3), 21061.1.) An agency may conclude that an alternative is infeasible, for example, if it is inconsistent with agency goals or policies or if it will not satisfy project objectives.

LSJR Alternatives

The No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in significant changes when compared to baseline conditions in Merced River flows (reduced flows) and Stanislaus River flows (increased flows). Therefore, the No Project Alternative is expected to result in significant impacts on Merced River resources such as aquatic biological resources, terrestrial biological resources, and recreational resources that rely on existing baseline flows because the flows would be reduced under No Project Alternative conditions. In addition, the No Project Alternative is expected to result in impacts on agricultural resources, service providers, and other resources that rely on surface water diversions from the Stanislaus River because surface water diversions would be reduced on the Stanislaus River to allow for the increase in flow. No Project Alternative conditions would be the same on the Tuolumne River and, therefore, would result in impacts that are less than significant. In sum, the No Project Alternative is not the environmentally superior alternative because it would not avoid impacts relative to the other alternatives (and, in fact, would result in more significant effects than the other alternatives). As discussed below, it also would not satisfy the purposes and goals of the plan amendments.

LSJR Alternative 2, without adaptive implementation, has no significant and unavoidable impacts when compared to the other LSJR alternatives, as baseline flows on the rivers are similar to the unimpaired flow (20 percent) that would be required by this alternative. As such, LSJR Alternative 2, without adaptive implementation, is the environmentally superior alternative because it has no significant and unavoidable environmental impacts. As discussed below, however, the alternative does not meet the purposes and goals of the proposed plan amendments. In addition, adaptive implementation is part of, and one of the goals of, the plan amendments.

Typically the type, magnitude, and severity of impacts from the LSJR alternatives would increase as the percent of unimpaired flow increases. LSJR Alternative 2, with adaptive implementation, has significant and unavoidable environmental impacts on three resources: groundwater resources, agricultural resources, and service providers. Impacts on these resources would primarily occur as a result of long-term implementation of adaptive implementation method 1 (increase to 30 percent unimpaired flow) and the reduction of surface water supply that could result in impacts on groundwater resources in one out of four subbasins (Extended Merced Subbasin); agricultural resources in two out of eight irrigation districts (MID and OID); and five service providers that rely on surface water diversions (TID, MID, City of Modesto, CCSF, and Merced ID). LSJR Alternatives 3 or 4, with or without adaptive implementation, generally result in impacts that are less than significant on those resources requiring or relying on flow (e.g., aquatic biological resources, terrestrial

biological resources) but significant and unavoidable impacts on those resources that rely on surface water diversions (e.g., groundwater resources; recreation, agricultural resources; service providers; and energy and greenhouse gases). None of the LSJR alternatives would result in growth-inducing effects.

Generally, the LSJR alternatives, with adaptive implementation, all have significant and unavoidable impacts on the following resources in the extended plan area: aquatic biological resources, terrestrial biological resources, recreational resources and aesthetics, service providers, and energy and greenhouse gases. As such, there is very little difference between the LSJR alternatives. However, it is expected that the potential magnitude and severity of impacts on these resources would increase from LSJR Alternative 2 with adaptive implementation (i.e., 30 percent unimpaired flow) to LSJR Alternative 4 without adaptive implementation (i.e., 60 percent unimpaired flow). Under all LSJR alternatives, the program of implementation and the proposed mitigation measure (of considering carryover storage and other requirements to implement the flow water quality objectives in a water right proceeding to ensure that reservoir levels upstream of the rim dams[5] do not cause significant resource impacts, unless doing so would be inconsistent with applicable laws), could potentially reduce impacts on these resources. However, impacts are considered significant because mitigation may not fully mitigate impacts in all situations. Significant and unavoidable agricultural resource impacts in the plan area may be reduced if the extended plan area were affected because potentially more water could be used below the rim dams to irrigate agricultural resources; however, the extent of the offset and potential reduction of impacts is unknown until a water right proceeding occurs and the responsibility of meeting the approved unimpaired flow objectives is assigned.

Under all of the LSJR alternatives, indirect actions and non-flow measure could occur (as disclosed in Chapter 16, Section 18.2.2, and Tables 18-6 and 18-7). While implementation of indirect actions and non-flow measures may be less likely under certain LSJR alternatives (e.g., LSJR Alternative 2, with or without adaptive implementation, given this alternative is more similar to baseline conditions when compared to other LSJR alternatives), it cannot be predicted as to the number or type of actions that could occur under each LSJR alternative. The indirect actions and non-flow measures have been identified as having significant and unavoidable impacts. Since the potential combination of indirect actions and non-flow measures under the LSJR alternatives is unknown, so is the scope, magnitude, and location of the significant and unavoidable impacts. As such, it cannot be concluded that specific significant and unavoidable impacts would occur under one LSJR alternative when compared to another with respect to the indirect and non-flow actions.

In evaluating whether an alternative is feasible or infeasible, a lead agency may take into account a broad range of factors, including whether an alternative is inconsistent with agency goals or policies, meets the project objectives, and other considerations. The purpose and goals of the plan amendments (flow objectives and associated program of implementation), as described in Chapter 3, *Alternatives Description*, are as follows.

1. Maintain inflow conditions from the SJR Watershed sufficient to support and maintain the natural production of viable native fish populations migrating through the Delta.

[5] In this document, the term *rim dams* is used when referencing the three major dams and reservoirs on each of the eastside tributaries: New Melones Dam and Reservoir on the Stanislaus River; New Don Pedro Dam and Reservoir on the Tuolumne River; and New Exchequer Dam and Lake McClure on the Merced River.

2. Provide flows that more closely mimic the natural hydrographic conditions (including frequency, timing, magnitude, and duration of natural flows) in the LSJR and three eastside, salmon-bearing tributaries—the Stanislaus, Tuolumne, and Merced Rivers—to which these migratory native fish species are adapted.
3. Provide flows in a quantity necessary to achieve functions essential to native fishes such as increased floodplain inundation, improved temperature conditions, improved migratory conditions, and promote other conditions that favor native fishes over nonnative fishes.
4. Allow adaptive implementation of flows that will afford maximum flexibility in establishing beneficial habitat conditions for native fishes, addressing scientific uncertainty and changing conditions, developing scientific information that will inform future management of flows, and meeting biological goals, while still reasonably protecting the fish and wildlife beneficial uses.
5. Promote transparency in decision-making and provide certainty to the regulated community by expressing flow requirements for the protection of fish and wildlife as a share of the total quantity of water available for all beneficial uses.
6. In establishing flow water quality objectives to reasonably protect fish and wildlife, take into consideration all of the demands being made and to be made on waters in the LSJR and the three eastside, salmon-bearing tributaries and the factors to be considered for establishing water quality objectives in Water Code Section 13241, including, but not limited to, past, present and probable future beneficial uses and economic considerations.
7. Provide for the development and implementation of an appropriate monitoring and evaluation program to inform adaptive implementation of LSJR flows and future changes to the Bay-Delta Plan.
8. Provide for, and encourage, collaboration, coordination, and integration of regulatory, scientific, and management processes related to LSJR flows.

These goals are used in conjunction with the significance determinations to inform the feasibility of the environmentally superior alternatives relative to the other alternatives. The No Project Alternative does not meet most of the purpose and goals, in part, because it does not allow for flows that more closely mimic the natural hydrographic conditions, it does not provide flows in the geographic area under consideration (it does not allow for flows on the three salmon-bearing tributaries) and it does not allow for adaptive implementation. LSJR Alternatives 2, with adaptive implementation, does not meet purpose and goal 1 and 2 as fully as LSJR Alternatives 3, and 4, with adaptive implementation, since increased flows better advance purpose and goal 1 and 2 related to maintaining inflow conditions from the SJR Watershed sufficient to support and maintain the natural production of viable native fish populations and to providing flows that more closely mimic the natural hydrographic conditions between February through June. LSJR Alternatives 2, 3, and 4 tend to meet purpose and goal 4, 5, 7, and 8 by providing for adaptive implementation, promoting transparency, establishing the STM Working Group and implementing an appropriate monitoring and evaluation program to inform adaptive implementation of LSJR flows and future changes to the Bay-Delta Plan.

There is, however, a difficult tradeoff between providing sufficient inflow to support and maintain the natural production of viable native fish populations migrating through the Delta or flows in a quantity necessary to achieve functions essential to native fishes, as is reflected in goals 1 and 3, and taking into consideration all of the demands being made of the water, as is reflected in goal 6. The degree to which goals 1 and 3 are achieved reduces the amount of water available for other

beneficial uses, and vice versa. LSJR Alternative 3, with adaptive implementation, strikes a balance between goals 3 and 6 more fully than the other LSJR alternatives. LSJR Alternative 3 provides flows in a quantity necessary to achieve functions essential to native fishes, such as increased floodplain inundation, improved temperature conditions, improved migratory conditions, and other conditions that favor native fishes over nonnative fishes (Chapter 19, *Analyses of Benefits to Native Fish Populations from Increased Flow Between February 1 and June 30,* Tables 19-3 through 19-14 [temperature] and Tables 19-19 through 19-24 [floodplain]). LSJR Alternative 3 also satisfies goal 6 because it takes into consideration the potential costs and economic effects of the flow objective (Chapter 20, *Economic Analyses*). Thus, LSJR Alternative 3, with adaptive implementation, meets more of the purposes and goals of the plan amendments more fully than the other LSJR alternatives.

18.3 SDWQ Alternatives Comparison

18.3.1 Summary of Alternatives Impact Analysis and Significant and Unavoidable Impacts

As stated above in Section 18.2.1, *Summary of Alternatives Impact Analysis*, generally, the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in significant impacts on resources requiring or relying on flow in the river(s) or relying on surface water diversions. Specifically, there would be significant impacts on water quality; aquatic biological resources; terrestrial biological resources; agricultural resources; recreational resources, cultural resources, service providers; and energy and greenhouse gases. Thus, the alternative that results in a continuation of, and full compliance with, the existing 2006 Bay-Delta Plan would not avoid environmental impacts.

As discussed in Chapter 5, *Surface Hydrology and Water Quality*, the water quality of the southern Delta under SDWQ Alternatives 2 or 3 would not result in a change to the general range of historical salinity in the southern Delta (0.2 dS/m–1.2 dS/m). This is because the program of implementation included in these alternatives does not call for a change to the USBR compliance requirements at Vernalis (0.7 dS/m from April–August and 1.0 dS/m from September–March as a 30-day average), and the relationship between the salinity at SJR at Vernalis and the southern Delta is not expected to change; thus, a change in baseline is not expected. Therefore, because there is no change to baseline conditions, there are very few impact mechanisms that could result in impacts on resources. As such, Table 18-4 presents a summary of impact determinations related to potential impacts primarily associated with water quality, identified in Chapters 5–15.

SDWQ Alternative 2 would reduce the number of water quality exceedances experienced at the three interior southern Delta compliance stations when compared to baseline. There would be no water quality exceedances at the three interior southern Delta compliance stations under SDWQ Alternative 3 because salinity at these stations has never exceeded 1.4 dS/m. Under SDWQ Alternative 2 or SDWQ Alternative 3, impacts on agricultural resources would be less than significant.

SDWQ Alternative 2 ~~w~~could result in significant impacts ~~on~~ related to service providers' need to construct or expand facilities. This is because SDWQ Alternative 2 could result in a change to existing wastewater treatment requirements established by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) in National Pollution Discharge Elimination

System (NPDES) permits. The Central Valley Water Board would have to impose effluent limitations consistent with the water quality objective adopted for the southern Delta by the State Water Board in point-source discharge permits for wastewater treatment plants (WWTPs). Appendix K's program of implementation for SDWQ Alternative 2 has been revised to state that reverse osmosis (RO) treatment of WWTP effluent in the southern Delta is currently not a feasible technology for the purpose of controlling salinity in the southern Delta for the reasons stated therein. Where it is infeasible for ~~Therefore,~~ service providers to meet numeric effluent limitations ~~(i.e., City of Tracy and Mountain House Community Services District [CSD]) may not meet the new NPDES effluent limitations that are~~ based on this objective~~.~~ due to the current infeasibility (i.e., inappropriateness) of RO treatment in the southern Delta, the program of implementation requires best management practices. It is possible that the facts and circumstances for finding RO treatment currently infeasible could potentially change in the future. For example, RO treatment of wastewater effluent in the southern Delta could improve, become less cost-prohibitive, and have less energy and brine disposal impacts. In addition, wastewater discharges could cease to have a de minimis effect on salinity in the southern Delta and affect overall compliance with the salinity objective in the southern Delta. To account for this potential future possibility, the program of implementation requires compliance with numeric water quality based effluent limitations where it becomes feasible to comply with them. If that occurs~~As such~~, ~~they~~ service providers may need to modify or construct water treatment facilities or infrastructure, the construction or operation of which could have significant environmental impacts and the SED conservatively discloses these potential impacts. Otherwise, the impacts associated with the construction and operation of RO treatment facilities would not occur.

SDWQ Alternative 3 would not result in significant and unavoidable impacts on service providers related to the construction or expansion of facilities because there would be no change from baseline conditions with respect to water quality in the southern Delta. Furthermore, service providers in the southern Delta without existing NPDES permit limitations could likely meet the new effluent limitations if the Central Valley Water Board implements the water quality objective specified in SDWQ Alternative 3.

Beyond the construction or expansion of facilities at wastewater treatment plants, ~~T~~to comply with ~~either specific~~the salinity water quality objectives ~~or~~ and the program of implementation under SDWQ Alternatives 2 or 3, construction and operation of different facilities in the southern Delta could occur, which could involve impacts on different resources (~~summarized in~~see Table 18-8). While many of these activities would result in no impacts or less-than-significant impacts on different resources, it primarily depends on the location of the activity, the duration of the activity, and the ability of a lead agency to mitigate potentially significant impacts, as to whether activities would result in no impacts or significant and unavoidable impacts~~, as discussed below, in Section 18.3.2, *Significant and Unavoidable Impacts*~~.

18.3.2 ~~Significant and Unavoidable Impacts~~

~~SDWQ Alternative 2 would result in significant impacts on service providers because SDWQ Alternative 2 could result in a change to existing wastewater treatment requirements established by the Central Valley Water Board in NPDES permits. Therefore, significant and unavoidable impacts could result because service providers may not meet NPDES effluent limitations and may need to construct or operate new WWTP facilities or infrastructure that could cause significant environmental effects on other resources (e.g., aesthetics, terrestrial or aquatic biological resources, cultural resources, etc.).~~

18.3.3 SDWQ Methods of Compliance

The evaluation contained in Chapter 16, *Evaluation of Other Indirect and Additional Actions,* provides a discussion of the potential methods of compliance associated with SDWQ Alternatives 2 and 3. This chapter does not prescribe different activities under the SDWQ alternatives. Under SDWQ Alternative 2, modifications to wastewater treatment plants to install RO treatment would not occur unless it becomes feasible for service providers to comply with numeric water quality based effluent limitations, as explained above. ~~service providers in the southern Delta (i.e., Cities of Tracy and Stockton and Mountain House CSD) may need to modify current wastewater treatment practices or obtain different source water supplies given their potential to exceed 1.0 dS/m salinity objective (Tables 13-8, 13-9 and 13-19). This could occur through~~ Methods of compliance such as new source water supplies and~~,~~ salinity pretreatment programs would occur, although their extent and location is not known~~or desalination (at wastewater treatment plants)~~. In addition, under the program of implementation for SDWQ Alternative 2, agricultural return flow salinity control in the southern Delta or low lift pumping stations could occur, both of which could have significant and unavoidable impacts to the environment.

For SDWQ Alternative 3, modifications to wastewater treatment plants or different source water supply would likely not occur, given the potential ability of the service providers to meet 1.4 dS/m salinity objective (Table 13-20); however, agricultural return flow salinity control or low lift pumping stations could occur under the program of implementation for SDWQ Alternative 3, both of which could have significant and unavoidable impacts to the environment.

The summary table below (18-8) focus on the methods of compliance (discussed primarily in Chapter 16, Section 16.4, *Southern Delta Water Quality Alternatives – Reasonably Foreseeable Methods of Compliance*) that agencies or entities could undertake under each alternative, without specifically assigning the actions to a particular alternative. Some of the methods of compliance could result in significant and unavoidable impacts. Because the combination of actions that entities would take under each SDWQ alternative is speculative and cannot be predictably aligned with each alternative, significant and unavoidable impacts could occur under each alternative to different resources (as summarized in table 18-8). As such, the combination of different types of methods of compliance that could be taken in response to each of the SDWQ alternatives are unknown; therefore, specific combinations of actions cannot be predictably matched with each alternative. ~~While agencies could take one or more of these actions, the combination of actions that entities would take under each alternative is speculative and cannot be predictably aligned with each alternative. As such, the summary table below (18-8) focus on the methods of compliance (discussed primarily in Chapter 16) that agencies or entities could undertake under each alternative, without specifically assigning the actions to a particular alternative.~~

In many cases, the evaluations presented in Chapter 16 include both construction and operation impacts. In cases with both construction and operation, Table 18-8 reflects the highest level of impact, which is frequently related to construction. The determinations are post-mitigation level of significance. Potential mitigation measures are proposed in Chapter 16 to reduce potentially significant impacts (Table 16-38); however, the particular circumstances of the actions and appropriate mitigation measures would be project specific. In addition, as required by CEQA (State CEQA Guidelines § 15126.2) lead agencies would describe a reasonable range of alternatives based on project-specific conditions and project-specific objectives, and one of the alternatives may in and of itself reduce significant environmental impacts. This alternative could be selected as a proposed

project. The effectiveness of mitigation is contingent upon several other factors, such as those listed below.

- The ability of lead agencies or other entities to implement the mitigation.
- The other responsible agencies involved in the project.
- The thresholds lead agencies use to evaluate the impact.
- Site-specific conditions.

Lead agencies or other entities with discretionary approval authority can and should impose the relevant mitigation measures identified in Tables 16-38. However, depending on project specifics, implementing mitigation measures may not be fully able to reduce significant impacts, and such impacts may remain significant and unavoidable after mitigation. Until such time that potential mitigation measures are implemented, the impacts would remain significant and unavoidable, consistent with State CEQA Guidelines Section 15091. Table 18-8 reflects this.

Table 18-8. CEQA Significance Summary SDWQ Alternatives—Methods of Compliance

Environmental Resource Area	New Source Water Supplies	Salinity Pretreatment Programs	Desalination (WWTP)	Agricultural Return Flow Salinity Control	South Delta Temporary Barriers	Low Lift Pumping Stations
Aesthetics	**SU***	**SU***	**SU***	**L**	**N**	**SU***
Agriculture and Forestry Resources	**SU**	N	**SU***	**SU***	**N**	**SU***
Air Quality	**SU***	**SU***	SU	**L**	**N**	**SU***
Biological Resources	**SU**	**SU***	**SU***	**SU***	**N**	**SU**
Cultural Resources	**SU**	**SU***	**SU***	**SU***	**N**	**SU***
Geology and Soils	**SU***	**SU***	**SU***	**SU***	**N**	**SU***
Greenhouse Gas Emissions	SU	SU	SU	SU	N	SU
Hazards and Hazardous Materials	**SU***	**SU***	**SU***	**SU***	**N**	**SU***
Hydrology and Water Quality	**SU***	**SU***	**SU***	**SU***	**N**	**SU***
Land Use and Planning	**SU***	**SU***	**SU***	**SU***	**N**	**SU***
Mineral Resources	**L**	**L**	**L**	**N**	**N**	**N**
Noise	**SU**	**SU***	**SU**	**SU***	**N**	**SU***
Population and Housing	**L**	**N**	**N**	**N**	**N**	**N**
Public Services	**N**	**N**	**N**	**N**	**N**	**N**
Recreation	**SU***	**SU***	**SU**	**N**	**N**	**N**
Transportation and Traffic	**SU***	**SU***	**SU***	**L**	**N**	**SU***
Utilities and Service Systems	SU	SU	SU	N	**N**	**N**

Environmental Resource Area	New Source Water Supplies	Salinity Pretreatment Programs	Desalination (WWTP)	Agricultural Return Flow Salinity Control	South Delta Temporary Barriers	Low Lift Pumping Stations

Notes:

Bold text indicates primarily construction-driven impacts. Operation-driven impacts are not bold.

* Indicates that the impact after mitigation may be less than significant; however, given the various factors influencing the potential implementation of mitigation, and until such time that mitigation measures are implemented, the impacts would remain significant and unavoidable, consistent with State CEQA Guidelines Section 15091.

SU = significant and unavoidable impact

L = less-than-significant impact

N = no impact

18.3.4 Environmentally Superior Alternative

CEQA requires a discussion of the environmentally superior alternative. If that alternative is the no project alternative, the environmental document shall also identify an environmentally superior alternative among the other alternatives. (Cal. Code Regs., tit. 14, § 15126.6(e).) In considering the selection of the environmentally superior alternative, this SED evaluates which alternatives result in fewer significant impacts relative to the other alternatives, and also considers whether those alternatives are feasible, taking into account economic, environmental, social, technological, and other factors. (Pub. Resources Code, §§ 21081(a)(3), 21061.1.) An agency may conclude that an alternative is infeasible, for example, if it is inconsistent with agency goals or policies or if it will not satisfy project objectives

As discussed above, the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1) would result in significant impacts resulting from changes in flows on the tributaries. Although these changes are not directly related to the implementation of the salinity objective, they are still effects resulting from the No Project Alternative and it is not the environmentally superior alternative.

Under SDWQ Alternative 2, there ~~w~~could be significant and unavoidable ~~impacts on service providers because~~ if some service providers (i.e., Cities of Tracy and Stockton and Mountain House CSD) ~~may exceed effluent limitations set at the salinity objective proposed under SDWQ Alternative 2, thus potentially necessitating~~ need to construct~~ion~~ and ~~or~~ operate~~ion of~~ new, upgraded, or expanded WWTP facilities or infrastructure (i.e., RO treatment) to comply with numeric effluent limitations, which could occur if circumstances change such that RO treatment of effluent in the southern Delta becomes feasible, as explained above. Until then, the significant environmental impacts associated RO treatment would not occur. Under SDWQ Alternative 3, impacts on service providers would be less than significant because it is expected all service providers may be able to meet effluent limitations if the limitations are set at the salinity objective proposed under SDWQ Alternative 3, with the exception of Deuel Vocational Institution (Deuel). However, currently Deuel is not meeting the effluent limitations, and SDWQ Alternative 3 would not increase the number of existing violations or increase the salinity of the discharge at Deuel. As the Deuel facility comes into compliance with its existing NPDES permit limits, salinity conditions in the southern Delta would correspondingly improve. When considering the environmental impacts of SDWQ Alternatives 2 and 3 related to RO treatment, SDWQ Alternative 3 would be considered the environmentally superior alternative only if in the future RO treatment in the southern Delta becomes feasible. Otherwise, RO treatment and its impacts would not occur under both SDWQ Alternatives 2 and 3~~because it has fewer significant and unavoidable impacts~~.

Under SDWQ Alternatives 2 and 3, the other reasonably foreseeable methods of compliance could result in significant and unavoidable impacts (as disclosed in Chapter 16, *Evaluation of Other Indirect and Additional Actions*~~, and Section 18.3.2, *Significant and Unavoidable Impacts*~~). Fewer methods of compliance ~~(i.e., agricultural return flow and low lift pump stations)~~ may occur under SDWQ Alternative 3, given service providers may not need to modify existing wastewater treatment plants or change source water supplies, when compared to SDWQ Alternative 2. However, significant and unavoidable impacts could still occur under SDWQ Alternative 3 because of the program of implementation and the potential for agricultural return flow salinity control or low lift pumping stations. Since the potential combination of methods of compliance under the SDWQ alternatives is unknown, so is the scope, magnitude and location of the significant and unavoidable

impacts. As such, it cannot be concluded that specific significant and unavoidable impacts from the methods of compliance would occur under one SDWQ alternative when compared to another.

The purpose and goals of the salinity objectives and associated program of implementation, as described in Chapter 3, *Alternatives Description,* are as follows.

1. Provide salinity conditions that reasonably protect agricultural beneficial uses of surface waters in the southern Delta.
2. In establishing salinity water quality objectives to reasonably protect agricultural beneficial uses, take into consideration all of the demands being made and to be made on waters in the southern Delta, the LSJR and the three eastside, salmon-bearing tributaries, and the factors to be considered for establishing water quality objectives in Water Code Section 13241, including, but not limited to, past, present and probable future beneficial uses and economic considerations.
3. Establish salinity objectives, supported by existing scientific information, that are not lower than necessary to reasonably protect the most salt sensitive crops currently grown or suitable to be grown on saline- and drainage-impaired soils in the southern Delta.
4. Maintain or improve salinity conditions in the southern Delta to comply with state and federal antidegradation policies.
5. Provide for development and implementation of monitoring and modeling studies needed to better understand the characteristics of salinity conditions in the southern Delta and the dynamics of factors controlling or contributing to those conditions.

These goals are used in conjunction with the significance determinations to inform the feasibility of the environmentally superior alternatives. SDWQ Alternative 3 does not meet purpose and goal 1 and 4 as well as either SDWQ 2 or the No Project Alternative because it requires salinity in the southern Delta at a level that is less protective of agricultural beneficial uses ~~than either SDWQ Alternative 2 or the No Project Alternative~~. For example, while SDWQ Alternative 3 will not exceed the standard of significance for yield reductions related to conversions of agricultural land to non-agricultural uses, it will result in more yield reductions than SDWQ Alternative 2. Specifically, as disclosed in Chapter 11, *Agricultural Resources*, SDWQ Alternative 3 would result in a 5 percent yield reduction of dry beans under a scenario with minimum precipitation and a leaching fraction of 20 percent while SDWQ Alternative 2 would result in no yield reductions under the same scenario. SDWQ Alternative 3~~It also~~ does not meet goal 2 because it does not take into consideration the water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality, as required under Water Code Section 13241, because water quality better than the proposed salinity objective could be achieved. The No Project Alternative does not meet goal 3 because the existing salinity objective is lower than necessary to protect the most sensitive crops in the southern Delta. SDWQ Alternative 2 fully meets goals 1 through 5.

Table 18-4. Impact Determinations Identified in Chapters 5–15

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
Chapter 5: Surface Hydrology and Water Quality						
WQ-1: Violate water quality standards by increasing the number of months with EC above the water quality objectives for salinity at Vernalis or southern Delta compliance stations	Less than significant— The No Project Alternative is the continuation of the existing 2006 Bay-Delta Plan, which includes implementation measures to achieve water quality objectives (e.g., the Vernalis and southern Delta EC objectives).Evaluation of monthly flows shows that although a few of the median No Project flows are less than baseline, Vernalis flows are generally higher under the No Project Alternative, especially during years with low flow (which would be more likely to have EC violations). Because higher flows generally reduce EC, the No Project Alternative would not be expected to cause an increase in the amount of time the water quality objectives for salinity are exceeded at Vernalis or southern Delta compliance stations.	Less than significant—There would be an overall reduction in monthly exceedances of EC values for the interior southern Delta compliance stations.	Less than significant—There would be an overall reduction in monthly exceedances of EC values for the interior southern Delta compliance stations.	Less than significant—There would be an overall reduction in monthly exceedances of EC values for the interior southern Delta compliance stations.	Less than significant—There would be an overall reduction of EC values above the new constant 1. 0 dS/m EC objective when compared to existing EC objectives.	Less than significant—There would be a reduction of EC values above the new constant 1.4 dS/m EC objective when compared to existing EC objectives such that there would no longer be any violations.
WQ-2: Substantially degrade water quality by increasing Vernalis or southern Delta salinity (EC) such that agricultural beneficial uses are impaired	Less than significant— See WQ-1.	Less than significant—The range of average EC values during the irrigation season of April–September in the SJR at Vernalis and in the southern Delta channels is expected to be reduced. Accordingly, it is not anticipated that agricultural beneficial uses would be impaired.	Less than significant—The range of average EC values during the irrigation season of April–September in the SJR at Vernalis and in the southern Delta channels is expected to be reduced. Accordingly, it is not anticipated that agricultural beneficial uses would be impaired.	Less than significant—The range of average EC values during the irrigation season of April–September in the SJR at Vernalis and in the southern Delta channels is expected to be reduced. Accordingly, it is not anticipated that agricultural beneficial uses would be impaired.	No impact—This alternative does not have the ability to result in an increase in EC because the baseline 0.7 dS/m Vernalis EC objective would continue to be maintained as part of the program of implementation. Therefore, this alternative would not cause a change in flow or water quality. Accordingly, it is not anticipated that agricultural beneficial uses would be impaired.	No impact—This alternative does not have the ability to result in an increase in EC because the baseline 0.7 dS/m Vernalis EC objective would continue to be maintained as part of the program of implementation. Therefore, this alternative would not cause a change in flow or water quality. Accordingly, it is not anticipated that agricultural beneficial uses would be impaired.
WQ-3: Substantially degrade water quality by increasing pollutant concentrations caused by reduced river flows	Significant—Under the No Project Alternative flows would not be substantially reduced on the Stanislaus, Tuolumne, or LSJR such that contaminant concentrations would increase. However, on the Merced River, flows under the No Project Alternative would be substantially reduced during April and May compared to baseline, which could result in a significant	Less than significant—Flows would generally increase, and no months with low to median flows (10th and 50th percentiles) would experience flow reductions greater than 33% of the baseline flows on the Stanislaus, Tuolumne or Merced Rivers or the LSJR. Therefore, it is expected that the change in concentrations	Less than significant—Flows would generally increase, and no months with low to median flows (10th and 50th percentiles) would experience flow reductions greater than 33% of the baseline flows on the Stanislaus, Tuolumne, or Merced Rivers or the LSJR. Therefore, it is expected that the change in concentrations	Less than significant—Flows would generally increase, and no months with low to median flows (10th and 50th percentiles) would experience flow reductions greater than 33% of the baseline flows on the Stanislaus, Tuolumne or Merced Rivers or the LSJR. Therefore, it is expected that the change in concentrations	No impact – This alternative does not have the ability to result in an increase in pollutant concentrations because the baseline 0.7 dS/m Vernalis EC objective would continue to be maintained as part of the program of implementation. Therefore, this alternative would not cause a change in flow or water quality.	No impact – This alternative does not have the ability to result in an increase in pollutant concentrations because the baseline 0.7 dS/m Vernalis EC objective would continue to be maintained as part of the program of implementation. Therefore, this alternative would not cause in flow or water quality.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	increase in contaminant concentrations above baseline conditions.	would not substantially degrade water quality.	would not substantially degrade water quality.	would not substantially degrade water quality.		
Chapter 6: Flooding, Sediment, and Erosion						
FLO-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on- or off-site	Less than Significant— Under the No Project Alternative, flows would be lower than channel capacities on the Stanislaus, Tuolumne, and Merced Rivers as described under LSJR Alternative 4, in Chapter 6, Flooding, Sediment, and Erosion. Sediment transport, bank erosion or meander-bend migration issues and contribution to levee instability would not increase. It is expected that very occasional gravel transport and bank erosion would occur in the upper gravel-bedded reaches of the Stanislaus, Tuolumne, and Merced Rivers. The amount of bank erosion would be limited by flood action levels and existing bank armoring. Impacts would be less than significant.	Less than significant— Substantial erosion is caused by high flow events resulting from flood control releases of peak flows. These flows would not increase under this alternative. On average, the occurrence of monthly flows greater than 1,500 cfs on the Stanislaus River would be similar to baseline and would not influence stream bank erosion. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in substantial erosion or siltation.	Less than significant—Very occasional gravel transport and bank erosion would occur in the upper gravel-bedded reaches of the three eastside tributaries. The amount of bank erosion is limited by flood stage action levels, which is the river stage at which actions are presumed to occur to reduce flood risk, and existing bank armoring. Flows greater than 1,500 cfs on the Stanislaus River would occur with somewhat greater frequency than baseline, particularly during April to June; however, these flows are not sufficiently high to increase stream bank erosion. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in substantial erosion or siltation.	Less than significant—Similar to LSJR Alternative 3, there would be occasional gravel transport and bank erosion in the upper gravel-bedded reaches of the three eastside tributaries. The amount of bank erosion is limited by the action stage, which is the river stage at which actions are presumed to occur to reduce flood risk, and existing bank armoring. Flows greater than 1,500 cfs on Stanislaus River would occur with greater frequency than baseline, particularly during April to June; however, these flows are not sufficiently high to increase stream bank erosion. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in substantial erosion or siltation.	No impact—Any change in salinity in the southern Delta as a result of southern Delta water quality is expected to be similar to that of the historic range of salinity because Vernalis water quality would be maintained under the SDWQ alternatives through the program of implementation. Furthermore, change in water quality does not affect flooding, sedimentation, or erosion.	No impact—Any change in salinity in the southern Delta as a result of southern Delta water quality (SDWQ) Alternatives 2 or 3 is expected to be similar to that of the historic range of salinity because Vernalis water quality would be maintained under the SDWQ alternatives through the program of implementation. Furthermore, change in water quality does not affect flooding, sedimentation, or erosion.
FLO-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in manner that would result in flooding on- or off-site	Less than significant— Flows would be much lower than channel capacities on the Stanislaus, Tuolumne, and Merced Rivers, as described under LSJR Alternative 4, in Chapter 6, Flooding, Sediment, and Erosion. Therefore, significant flooding impacts would not occur outside of floodways. The No Project Alternative would not change reservoir flood storage capacity and would not violate USACE flood reservation, so there would be no changes in flood control releases during major flood events.	Less than significant— Controlled reservoir releases would be much lower than channel capacities and no significant flooding would occur outside of floodway. LSJR Alternative 2 would not change reservoir flood storage capacity and would not violate USACE flood reservation so there would be no changes in flood control operation procedures during major flood events. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in flooding. Consequently, people or structures would not be exposed to a significant risk of loss, injury or death involving flooding.	Less than significant – Similar to LSJR Alternative 2 with respect to flood control operations. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in flooding. Consequently, people or structures would not be exposed to a significant risk of loss, injury or death involving flooding.	Less than significant—Similar to LSJR Alternative 2, with respect to flood control operations. Substantial alterations of the existing drainage patterns would not occur and would not result in flooding. Consequently, people or structures would not be exposed to a significant risk of loss, injury or death involving flooding.	No impact—See FLO-1.	No impact—See FLO-1.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
Chapter 7: Aquatic Biological Resources						
AQUA-1: Changes in spawning success and habitat availability of warmwater species resulting from changes in reservoir water levels	Significant—Under the No Project Alternative, month-to-month fluctuations in reservoir elevations at New Don Pedro Reservoir would remain similar to the baseline elevations during April-September (the primary spawning, incubation, and early rearing –). Therefore, the availability of warmwater reservoir species habitat and their spawning success would not change at the New Don Pedro Reservoir. However, month-to-month fluctuations at New Melones Reservoir and Lake McClure would be increased under the No Project Alternative during April–September, as compared to baseline. Monthly fluctuations of greater than or equal to 15 feet (ft) would increase by more than 10% during April–August at New Melones Reservoir and during April at Lake McClure. Therefore, warmwater reservoir species habitat would be significantly altered under the No Project Alternative, which would affect the spawning success of these species.	Less than significant—The frequency of 15-foot fluctuations in reservoir levels would not change or would be reduced relative to baseline conditions. Therefore, no significant reductions in spawning success and habitat availability for warmwater species would occur.	Less than significant—The frequency of 15-foot fluctuations in reservoir levels would not change or would be reduced relative to baseline conditions. Therefore, no significant reductions in spawning success and habitat availability for warmwater species would occur	Less than significant—The frequency of 15-foot fluctuations in reservoir levels would not change or would be reduced relative to baseline conditions. Therefore, no significant reductions in spawning success and habitat availability for warmwater species would occur.	No impact – This alternative does not have the ability to result in changes to reservoir salinity because it is not applied at the reservoirs.	No impact – This alternative does not have the ability to result in changes to reservoir salinity because it is not applied at the reservoirs.
AQUA-2: Changes in availability of coldwater species reservoir habitat resulting from changes in reservoir storage	Significant—Under the No Project Alternative, end-of-September storage at New Don Pedro and Lake McClure are expected to remain similar to, or be greater than, the storage under baseline elevations. End-of-September storage is not expected to be significantly reduced when compared to baseline. Therefore, the availability of coldwater reservoir species habitat and their spawning success are not expected to change at these reservoirs. However, on average, end-of-September storage at New Melones Reservoir would be reduced by 27%. Therefore, coldwater reservoir species habitat would be significantly altered under the No Project Alternative, which would affect the spawning success of these species.	Less than significant—Changes in average reservoir storage levels at the end-of-September would range from little or no change to substantial increases relative to baseline levels. Therefore, no significant reductions in coldwater habitat availability would occur.	Less than significant—Changes in average reservoir storage levels at the end-of-September would range from little or no change to substantial increases relative to baseline levels. Therefore, no significant reductions in coldwater habitat availability would occur.	Less than significant—Changes in average reservoir storage levels at the end-of-September would range from little or no change to substantial increases relative to baseline levels. Therefore, no significant reductions in coldwater habitat availability would occur.	No impact – See AQUA-1.	No impact – See AQUA.1.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-3: Changes in quantity/ quality of physical habitat for spawning and rearing resulting from changes in flow	Less than significant—Under the No Project Alternative, flows on the Stanislaus River would increase, while flows on the Tuolumne River would be similar to baseline flows and thus would not reduce the quantity and quality of spawning and rearing habitat. Under the No Project Alternative, the Merced River would experience a relatively large percentage reduction in flows in April and May compared to baseline. However, predicted changes in flow within this range correspond to only minor increases or decreases in WUA and no changes in floodplain inundation area. Therefore, they are not likely to substantially affect the amount of physical habitat for Chinook salmon juvenile rearing and steelhead fry rearing.	Less than significant—Suitable spawning habitat on the three eastside tributaries would remain unchanged or increase. Therefore, no significant adverse impacts on the amount of spawning habitat for Chinook salmon and steelhead in the Stanislaus, Tuolumne, and Merced Rivers would occur. No reductions in Chinook salmon fry and juvenile rearing habitat are expected on the Stanislaus River or LSJR compared to baseline. In the Tuolumne and Merced Rivers, weighted usable area (WUA) for Chinook salmon fry and juvenile rearing would decrease, but floodplain habitat would increase in response to higher spring flows. No substantial differences would occur in WUA for steelhead fry and juvenile rearing compared to baseline conditions. No long-term reductions in habitat availability for other native fish species would occur. Therefore, no significant adverse impacts on the amount of habitat for Chinook salmon, steelhead, and other native fishes in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would occur.	Less than significant— Reductions in WUA for Chinook salmon spawning would occur in the three eastside tributaries, but higher flows and lower temperatures are expected to improve attraction and migration and the longitudinal extent of suitable spawning habitat. This alternative would substantially improve rearing habitat conditions for Chinook salmon and steelhead in the three eastside streams and LSJR. Considering the overall beneficial effects of higher flows on rearing habitat availability, no significant adverse impacts on Chinook salmon and steelhead populations would occur. Higher spring flows under this alternative would also benefit other native fish species.	Less than significant— Predicted changes in WUA values for Chinook salmon and steelhead spawning in the Stanislaus, Tuolumne, and Merced Rivers would be similar in magnitude to those predicted under LSJR Alternative 3. This alternative would further improve rearing habitat conditions for Chinook salmon and steelhead in the three eastside tributaries and LSJR. Higher spring flows under this alternative would also further improve habitat conditions for other native fish species. Therefore, no significant adverse impacts would occur.	No impact—this alternative does not have the ability to result in changes to flow because it is a water quality objective for salinity; furthermore, the volume of water needed to meet the Vernalis EC objective is included in the modeling results and, thus, in the impact determinations, for the LSJR alternatives.	No impact – this alternative does not have the ability to result in changes to flow because it is a water quality objective for salinity; furthermore the volume of water needed to meet the Vernalis EC objective is included in the modeling results and, thus, in the impact determinations, for the LSJR alternatives.
AQUA-4: Changes in exposure of fish to suboptimal water temperatures resulting from changes in reservoir storage and releases	Significant—Under the No Project Alternative, temperatures would not increase on the Tuolumne because flows and end-of-September storage would be similar to baseline. However, reductions in April and May flows on the Merced River would very likely increase temperatures in the river in more than half the years (mostly below normal and dry years), in which would increase the frequency of stressful temperatures for Chinook salmon and steelhead rearing and smolt life stages. On the Stanislaus River, higher summer and fall	Less than significant—No substantial changes would occur in exposure of Chinook salmon and steelhead adult migration, spawning and incubation, juvenile rearing, and smolt life stages to suboptimal water temperatures in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR. Therefore, no significant adverse impacts on Chinook salmon and steelhead populations would occur.	Less than Significant— Decreases in exposure of Chinook salmon and steelhead life stages to suboptimal water temperatures would occur for spawning/incubation in the Tuolumne River (March); spring rearing in the Tuolumne, Merced, and LSJR (April–May); and summer rearing (steelhead only) in the Stanislaus, Tuolumne, and Merced Rivers (July). Therefore, no significant adverse impacts would occur. This alternative would have beneficial temperature effects	Less than significant— Decreases in exposure of Chinook salmon and steelhead life stages to suboptimal water temperatures would occur for spawning/incubation in the Stanislaus, Tuolumne, and Merced Rivers (February–March); spring rearing in the Stanislaus, Tuolumne, Merced, and LSJR (March–May); spring outmigration in the Stanislaus, Tuolumne, and Merced Rivers (April–June); and summer rearing (steelhead only) in the Tuolumne River (July).	No impact— See AQUA-3.	No impact—See AQUA-3.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	release temperatures associated with reduced storage in New Melones Reservoir are also expected to increase the frequency of stressful water temperatures for Chinook salmon and steelhead adult migration, Chinook salmon spawning and incubation, and steelhead rearing life stages, especially in dry years. Flows and water temperatures in the LSJR would remain largely unchanged relative to baseline conditions, which would result in little or no change in exposure of migrating adults and juveniles to stressful water temperatures.		on Chinook salmon and steelhead in the Stanislaus, Tuolumne, and Merced Rivers (including Chinook salmon reared at Merced River Hatchery), and the LSJR.	Therefore, no significant adverse impacts would occur. Overall, this alternative would have beneficial temperature effects on Chinook salmon and steelhead in the Stanislaus, Tuolumne, and Merced Rivers (including Chinook salmon reared at Merced River Hatchery), and the LSJR.		
AQUA-5 : Changes in exposure to pollutants resulting from changes in flow	Significant—Under the No Project Alternative, the exposure to pollutants resulting from changes in flow would not increase on the Stanislaus or Tuolumne Rivers because flows in these rivers would generally be similar to, or greater than, baseline flows. However, on the Merced River, reduction in April and May flows under the No Project Alternative, especially during dry periods, would likely increase pollutant exposure to fish on this river compared to the baseline.	Less than significant—Changes in the frequency and magnitude of flows would not be sufficient to result in long-term changes in dilution effects and exposure of fish to potentially harmful contaminants.	Less than significant—Similar or higher 10th and 50th (median) percentile flows in most months would result in similar or reduced long-term exposure of fish to potentially harmful pollutants. Decreases in exposure of Chinook salmon and steelhead life stages to suboptimal water temperatures would contribute to reductions in the potential for adverse effects associated with contaminant exposure.	Less than significant—Dilution would potentially increase as a result of the increase in flows, and temperatures would either be maintained or reduced; thus, an increase in exposure to pollutants would not occur.	No impact– See AQUA-3.	No impact – See AQUA-3.
AQUA-6: Changes in exposure to suspended sediment and turbidity resulting from changes in flow	Less than significant—Changes in the frequency, duration, and magnitude of increased suspended sediment and turbidity levels would be minor and within the range of historical levels experienced by native fishes and other aquatic species on the three eastside tributaries and the LSJR. Because the No Project Alternative flows during wet years are expected to be less than those described in LSJR Alternative 4 on the Stanislaus River, impacts would be less than those described above. Similar but fewer impacts as those described above would occur on the Tuolumne and Merced Rivers because flows under the No Project Alternative would be similar to or less than baseline flows on these rivers.	Less than significant—Changes in the frequency, duration, and magnitude of increased suspended sediment and turbidity levels are expected to be minor and within the range of historical levels experienced by native fishes and other aquatic species on the three eastside tributaries and the LSJR.	Less than significant—Changes in the frequency, duration, and magnitude of increased suspended sediment and turbidity levels are expected to be minor and within the range of historical levels experienced by native fishes and other aquatic species on the three eastside tributaries and the LSJR.	Less than significant—Changes in the frequency, duration, and magnitude of increased suspended sediment and turbidity levels are expected to be minor and within the range of historical levels experienced by native fishes and other aquatic species on the three eastside tributaries and the LSJR.	No impact—See AQUA-3.	No impact—See AQUA-3

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	Therefore, the change in flows would not mobilize more suspended sediment.					
AQUA-7: Changes in redd dewatering resulting from flow fluctuations	Less than significant—Changes in the frequency and magnitude of flow reductions under the No Project Alternative are not expected in the Stanislaus, Tuolumne, and Merced Rivers when compared to baseline conditions. Therefore, redd dewatering impacts on Chinook salmon and steelhead populations in the Stanislaus, Tuolumne, and Merced Rivers would be less than significant.	Less than significant— There would be no substantial changes on the major SJR tributaries or the LSJR in the frequency and magnitude of flow reductions associated with potential impacts on Chinook salmon and steelhead redd dewatering.	Less than significant—There would be no substantial changes on the major SJR tributaries or the LSJR in the frequency and magnitude of flow reductions associated with potential impacts on Chinook salmon and steelhead redd dewatering.	Less than significant—There would be no substantial changes on the major SJR tributaries or the LSJR in the frequency and magnitude of flow reductions associated with potential impacts on Chinook salmon and steelhead redd dewatering.	No impact—See AQUA-3.	No impact—See AQUA-3.
AQUA-8: Changes in spawning habitat quality resulting from changes in peak flows	Less than significant—Under the No Project Alternative, substantial changes in the frequency and magnitude of peak flows would not occur relative to LSJR Alternatives 2, 3, and 4 (because the February – June flows at the zero to 10% exceedance level are between those for LSJR Alternatives 2 and 4, Figure 15-2a). Therefore, changes in peak flows would not deleteriously affect the frequency and magnitude of gravel mobilization events in the Stanislaus, Tuolumne, and Merced Rivers, and long-term changes in geomorphic conditions significantly affecting spawning and rearing habitat quality would not occur.	Less than significant—Modeled results indicate that changes in peak flows are not expected to affect the frequency and magnitude of gravel mobilization events in the Stanislaus, Tuolumne, and Merced Rivers. Therefore, no long-term changes in geomorphic conditions significantly affecting spawning and rearing habitat quality are expected to occur.	Less than significant—Modeled results indicate that changes in peak flows are not expected to affect the frequency and magnitude of gravel mobilization events in the Stanislaus, Tuolumne, and Merced Rivers. Therefore, no long-term changes in geomorphic conditions significantly affecting spawning and rearing habitat quality are expected to occur.	Less than significant—Modeled results indicate that changes in peak flows are not expected to affect the frequency and magnitude of gravel mobilization events in the Stanislaus, Tuolumne, and Merced Rivers. Therefore, no long-term changes in geomorphic conditions significantly affecting spawning and rearing habitat quality are expected to occur.	No impact—See AQUA-3.	No impact—See AQUA-3.
AQUA-9: Changes in food availability resulting from changes in flow and floodplain inundation	Less than significant— Under the No Project Alternative, no substantial in frequency and magnitude of floodplain inundation and associated food web conditions would occur on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR (because there would be no substantial decreases in the highest flows). Therefore, no significant impacts on food availability are expected to occur.	Less than significant—No substantial changes are likely to occur in frequency and magnitude of floodplain inundation and associated food web conditions in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR. Therefore, no significant impacts on food availability are expected to occur.	Less than significant—Higher spring flows and associated increases in riparian and floodplain inundation in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would potentially increase food abundance and growth opportunities for fish on floodplains as well as contribute to downstream food web support. This represents a beneficial effect on aquatic biological resources in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR.	Less than significant—Higher spring flows and associated increases in riparian and floodplain inundation in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would potentially increase food abundance and growth opportunities for fish on floodplains as well as contribute to downstream food web support. This represents a beneficial effect on aquatic biological resources in the Stanislaus, Tuolumne, and Merced Rivers and the LSJR.	No impact—See AQUA-3.	No impact—See AQUA-3.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-10: Changes in predation risk resulting from changes in flow and water temperature	Significant— Under the No Project Alternative, predation risk would be unlikely to change on the Tuolumne River because flow, storage, and water temperature would be similar to baseline. However, reductions in flow and associated higher temperatures on the Merced River in April and May would very likely increase predation risk for Chinook salmon and steelhead rearing and smolt life stages. On the Stanislaus River, higher summer and fall release temperatures associated with reduced storage in New Melones Reservoir would also increase predation risk for juvenile steelhead, especially in dry years. Flows and water temperatures on the LSJR are expected to remain largely unchanged relative to baseline, which would result in little or no change in predation risk.	Less than significant—No substantial changes are predicted to occur in habitat availability and water temperatures potentially affecting Chinook salmon and steelhead populations or conditions supporting predator populations.	Less than significant—Higher flows and cooler water temperatures in the three eastside tributaries would reduce predation impacts by improving growth opportunities and reducing temperature-related stress in juvenile Chinook salmon and steelhead and limiting the distribution and abundance of largemouth bass and other nonnative species that prey on juvenile salmonids.	Less than significant—Higher flows and cooler water temperatures in the three eastside tributaries would reduce predation impacts by improving growth opportunities and reducing temperature-related stress in juvenile Chinook salmon and steelhead and limiting the distribution and abundance of largemouth bass and other nonnative species that prey on juvenile salmonids.	No impact—See AQUA-3.	No impact—See AQUA-3.
AQUA-11: Changes in disease risk resulting from changes in water temperature	Significant—Under the No Project Alternative, higher summer and fall release temperatures on the Stanislaus River associated with reduced storage in New Melones Reservoir would increase disease risk for Chinook salmon and steelhead adult migration, Chinook salmon spawning and incubation, and steelhead-rearing life stages, especially in dry years. On the Tuolumne River, disease risk would be unlikely to change because flow, storage, and water temperature would be very similar to baseline. However, reductions in flow and associated higher temperatures on the Merced River in April and May would very likely increase disease risk for Chinook salmon and steelhead-rearing and smolt life stages. Flows and water temperatures on the LSJR would remain largely unchanged relative to baseline, which would result in little or no change in disease risk	Less than significant—The frequency of spring water temperatures associated with potential increases in disease risk would stay the same or decrease.	Less than significant—The frequency of spring water temperatures associated with potential increases in disease risk would stay the same or decrease.	Less than significant—The frequency of spring water temperatures associated with potential increases in disease risk would stay the same or decrease.	No impact—See AQUA-3	No impact—See AQUA-3

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-12: Changes in southern Delta and estuarine habitat resulting from changes in SJR inflows and export effects	Less than significant—Under the No Project Alternative, Delta operations would continue to be governed by current restrictions on export pumping rates, inflow/export ratios, and Old Middle River (OMR) flows to protect listed fish species from direct and indirect impacts of southern Delta operations. Furthermore, during the primary months of concern for fish using the Delta (December–June), changes in exports would be relatively small and less than the changes under LSJR Alternatives 3 and 4, while average monthly Delta outflow would either be similar to or slightly greater than baseline outflow. Therefore, no significant changes in southern Delta and estuarine habitat are expected to occur under the No Project Alternative.	Less than significant—No substantial changes in southern Delta and estuarine habitat are expected to occur. The combination of monthly changes in pumping rates, SJR flow, and Delta outflow would not have substantial long-term effects on flow patterns in the southern Delta. Furthermore, there would be little effect on Delta outflows and the position of X2; Delta operations would continue to be governed by current restrictions on export pumping rates, inflow/export ratios, and Old Middle River flows to protect listed fish species from direct and indirect impacts of southern Delta operations.	Less than significant—No substantial changes in southern Delta and estuarine habitat are expected to occur. The combination of monthly changes in pumping rates, SJR flow, and Delta outflow would not have substantial long-term effects on flow patterns in the southern Delta. Furthermore, there would be little effect on Delta outflows and the position of X2; Delta operations would continue to be governed by current restrictions on export pumping rates, inflow/export ratios, and Old Middle River flows to protect listed fish species from direct and indirect impacts of southern Delta operations.	Less than significant —No substantial changes in southern Delta and estuarine habitat are expected to occur. The combination of monthly changes in pumping rates, SJR flow, and Delta outflow would not have substantial long-term effects on flow patterns in the southern Delta. Furthermore, there would be little effect on Delta outflows and the position of X2; Delta operations would continue to be governed by current restrictions on export pumping rates, inflow/export ratios, and Old Middle River flows to protect listed fish species from direct and indirect impacts of southern Delta operations.	No impact—See AQUA-3.	No impact—See AQUA-3.
Chapter 8: Terrestrial Biological Resources						
BIO-1 : Have a substantial adverse effect on any riparian habitat or other sensitive natural terrestrial communities identified in local or regional plans, policies, regulations or by CDFW and USFWS	Significant—Fluctuations in reservoir elevations would not be substantially different than those that currently occur. Therefore, the No Project Alternative would not have adverse effects on riparian or other sensitive natural terrestrial communities around the reservoirs. Under the No Project Alternative, flow on the Stanislaus and Tuolumne Rivers and LSJR would not substantially alter riparian habitat or other sensitive natural terrestrial communities because flows on these rivers would be similar to, or greater than, baseline. However, the reduced flow on the Merced River under the No Project Alternative when compared to the baseline would very likely result in a substantial alteration of riparian habitat or other sensitive natural terrestrial communities on this river, especially during moderate to dry years in the spring growing season (April and May).	Less than significant—The change in median monthly flows or overall cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would not substantially effect riparian habitat or other sensitive terrestrial communities because the plants located within the area of potential effects can survive inundation, are resistant to the effects of scouring and deposition, and are limited by water availability. Fluctuations in reservoir elevations would not be substantially different than those that currently occur. Therefore, the LSJR alternatives would not have significant adverse effects on riparian or wetland habitats or other sensitive terrestrial communities around the reservoirs.	Less than significant—The change in median monthly flows or overall cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would not substantially effect riparian habitat or other sensitive terrestrial communities because the plants located within the area of potential effects can survive inundation, are resistant to the effects of scouring and deposition, and are limited by water availability. Fluctuations in reservoir elevations would not be substantially different than those that currently occur. Therefore, the LSJR alternatives would not have significant adverse effects on riparian or wetland habitats or other sensitive terrestrial communities around the reservoirs.	Less than significant—The change in median monthly flows or overall cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would not substantially effect riparian habitat or other sensitive terrestrial communities because the plants located within the area of potential effects can survive inundation, are resistant to the effects of scouring and deposition, and are limited by water availability. Fluctuations in reservoir elevations would not be substantially different than those that currently occur. Therefore, the LSJR alternatives would not have significant adverse effects on riparian or wetland habitats or other sensitive terrestrial communities around the reservoirs.	No impact—No ability to result in changes to flow because it is a water quality objective for salinity; furthermore, the volume of water needed to meet the Vernalis EC objective is included in the modeling results and, thus, in the impact determinations for the LSJR alternatives. Finally, salinity in the southern Delta would remain within the historical range, and the terrestrial plant and animal species can adapt to the variable salinity levels that the southern Delta currently experiences.	No impact—No ability to result in changes to flow because it is a water quality objective for salinity; furthermore, the volume of water needed to meet the Vernalis EC objective is included in the modeling results and, thus, in the impact determinations for the LSJR alternatives. Finally, salinity in the southern Delta would remain within the historical range, and the terrestrial plant and animal species can adapt to the variable salinity levels that the southern Delta currently experiences.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
BIO-2: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrologic interruption, or other means	Significant— See BIO-1.	Less than significant—Monthly median flows or the cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would generally increase. Increased flow would not adversely affect wetland communities because wetland plants can survive inundation, are resistant to the effects of scouring and deposition, and are growth-limited by water availability. Little change is expected in the frequency and range in water level fluctuation in the reservoirs as a result of this alternative, therefore adverse effects are not expected to occur on wetland communities surrounding the reservoirs. Therefore, substantial adverse effects on wetland communities would not occur.	Less than significant—Monthly median flows or the cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would generally increase. Increased flow would not adversely affect wetland communities because wetland plants can survive inundation, are resistant to the effects of scouring and deposition, and are growth-limited by water availability. Little change is expected in the frequency and range in water level fluctuation in the reservoirs as a result of this alternative, therefore adverse effects are not expected to occur on wetland communities surrounding the reservoirs. Therefore, substantial adverse effects on wetland communities would not occur.	Less than significant—Monthly median flows or the cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR would generally increase. Increased flow would not adversely affect wetland communities because wetland plants can survive inundation, are resistant to the effects of scouring and deposition, and are growth-limited by water availability. Little change is expected in the frequency and range in water level fluctuation in the reservoirs as a result of this alternative, therefore adverse effects are not expected to occur on wetland communities surrounding the reservoirs. Therefore, substantial adverse effects on wetland communities would not occur.	No impact—See BIO-1.	No impact – See BIO-1.
BIO-3: Facilitate an increase in distribution and abundance of invasive plants or nonnative wildlife that would have a substantial adverse effect on native terrestrial species	Less than significant— Invasive plants and animals already exist throughout the watersheds of the Stanislaus, Tuolumne, and Merced Rivers and the LSJR. Although the No Project Alternative could alter vegetation patterns at specific locations, there is no information available to suggest that increased flows on the Stanislaus River or decreased flows on the Merced River would substantially increase the distribution or abundance of invasive plant or nonnative wildlife in a manner that would substantially native terrestrial species.	Less than significant—Changes in flows in the LSJR and the three eastside tributaries and fluctuations in reservoir elevations may result in alteration of vegetation patterns in specific locations, but there is no basis to suggest increased flows would substantially increase the distribution and abundance of invasive plant species. Little change is expected in the frequency and range in water level fluctuation in the reservoirs as a result of this alternative. In addition, the potential for invasive plants and nonnative wildlife species to increase due to a reduction in irrigation water supply availability or potential fallowing would not be expected to exceed existing levels because some agricultural lands would be farmed less intensively,	Less than significant—Changes in flows in the LSJR and the three eastside tributaries and fluctuations in reservoir elevations may result in alteration of vegetation patterns in specific locations, but there is no basis to suggest increased flows would substantially increase the distribution and abundance of invasive plant species. Little change is expected in the frequency and range in water level fluctuation in the reservoirs as a result of this alternative. In addition, the potential for invasive plants and nonnative wildlife species to increase due to a reduction in irrigation water supply availability or potential fallowing would not be expected to exceed existing levels because some agricultural lands would be farmed less intensively,	Less than significant—Changes in flows in the LSJR and the three eastside tributaries and fluctuations in reservoir elevations may result in alteration of vegetation patterns in specific locations, but there is no basis to suggest increased flows would substantially increase the distribution and abundance of invasive plant species. Little change is expected in the frequency and range in water level fluctuation in the reservoirs as a result of this alternative. In addition, the potential for invasive plants and nonnative wildlife species to increase due to a reduction in irrigation water supply availability or potential fallowing would not be expected to exceed existing levels because some agricultural lands would be farmed less intensively,	No impact—See BIO-1.	No impact—See BIO-1.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
		fallowed lands can retain growth, and existing invasive species programs would continue to be implemented. Therefore, an increase in the distribution and abundance of invasive plants or nonnative wildlife is not expected to result from implementation of this alternative.	fallowed lands can retain growth, and existing invasive species programs would continue to be implemented. Therefore, an increase in the distribution and abundance of invasive plants or nonnative wildlife is not expected to result from implementation of this alternative.	fallowed lands can retain growth, and existing invasive species programs would continue to be implemented. Therefore, an increase in the distribution and abundance of invasive plants or nonnative wildlife is not expected to result from implementation of this alternative.		
BIO-4: Have a substantial adverse effect, either directly or through habitat modifications, on any terrestrial animal species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW and USFWS	Significant—Under the No Project Alternative, flows on Stanislaus and Tuolumne Rivers and the LSJR would be similar to, or greater than, baseline. Therefore, the special-status animal species on these rivers would not be substantially affected. However, the reduced flow on the Merced River under the No Project Alternative compared to the baseline would very likely result in substantial effects on special-status species reliant on riparian habitat on this river. Therefore, the special-status animal species on the Merced River would be adversely affected.	Less than significant—Most of the special-status animal species present in the area of potential effects are dependent on riparian habitat. As described above for BIO-1, there would not be a substantial change to available riparian habitat. Similarly, the frequency and range in reservoir elevation fluctuation are not expected to change substantially compared to the baseline conditions consequently, adverse effects are not expected to occur to special-status species or their habitat at the reservoirs. A potential reduction in irrigation water supply in the area of potential indirect effects would not have a substantial adverse effect on special status species due to indirect habitat modification because agricultural land cover would not necessarily be fallowed in perpetuity, as lands could be dryland farmed, deficit irrigated, or rotated. This could result in less agricultural intensive practices on some lands. The resulting halt of mechanized agriculture, pesticide and rodenticide application, and anthropogenic disturbance as a result of less agricultural intensive practices is unlikely to result in a substantial adverse effect on sensitive or special-status species. The potential reduction	Less than significant—Most of the special-status animal species present in the area of potential effects are dependent on riparian habitat. As described above for BIO-1, there would not be a substantial change to available riparian habitat. Similarly, the frequency and range in reservoir elevation fluctuation are not expected to change substantially compared to the baseline conditions consequently, adverse effects are not expected to occur to special-status species or their habitat at the reservoirs. A potential reduction in irrigation water supply in the area of potential indirect effects would not have a substantial adverse effect on special status species due to indirect habitat modification because agricultural land cover would not necessarily be fallowed in perpetuity, as lands could be dryland farmed, deficit irrigated, or rotated. This could result in less agricultural intensive practices on some lands. The resulting halt of mechanized agriculture, pesticide and rodenticide application, and anthropogenic disturbance as a result of less agricultural intensive practices is unlikely to result in a substantial adverse effect on sensitive or special-status species. The potential reduction	Less than significant—Most of the special-status animal species present in the area of potential effects are dependent on riparian habitat. As described above for BIO-1, there would not be a substantial change to available riparian habitat. Similarly, the frequency and range in reservoir elevation fluctuation are not expected to change substantially compared to the baseline conditions consequently, adverse effects are not expected to occur to special-status species or their habitat at the reservoirs. A potential reduction in irrigation water supply in the area of potential indirect effects would not have a substantial adverse effect on special status species due to indirect habitat modification because agricultural land cover would not necessarily be fallowed in perpetuity, as lands could be dryland farmed, deficit irrigated, or rotated. This could result in less agricultural intensive practices on some lands. The resulting halt of mechanized agriculture, pesticide and rodenticide application, and anthropogenic disturbance as a result of less agricultural intensive practices is unlikely to result in a substantial adverse effect on sensitive or special-status species. The potential reduction	No impact—See BIO-1.	No impact—See BIO-1.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
		of monocultural irrigated crops is likely to support the species and ecosystem recovery strategy outlined in the USFWS recovery strategy. Therefore, it is not expected that special-status animal species would be adversely affected.	of monocultural irrigated crops is likely to support the species and ecosystem recovery strategy outlined in the USFWS recovery strategy. Therefore, it is not expected that special-status animal species would be adversely affected.	of monocultural irrigated crops is likely to support the species and ecosystem recovery strategy outlined in the USFWS recovery strategy. Therefore, it is not expected that special-status animal species would be adversely affected.		
BIO-5: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan or conflict with any local policies or ordinances protecting biological resources	Significant—Under the No Project Alternative, flow on Stanislaus and Tuolumne Rivers and the LSJR would not substantially affect riparian habitat or special-status species. Therefore, the No Project Alternative would not conflict with habitat conservation plans or natural community conservation plans for these rivers. However, the reduced flow on the Merced River under the No Project Alternative when compared to baseline conditions could reduce habitat value, which could result in conflicts with habitat conservation plans or natural community plans.	Less than significant—The change in median monthly flows or overall cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR and changes to the range and/or frequency in reservoir fluctuation would not substantially affect riparian habitat or other sensitive terrestrial communities or the special-status animal species dependent on them (Impact BIO-1and Impact BIO-4). In addition, it is expected that wildlife refuges would continue to receive surface water, as needed, and continue to implement existing water management plans. Therefore, impacts on habitat value would not occur and there would not be a potential to conflict with plans protecting biological resources.	Less than significant—The change in median monthly flows or overall cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR and changes to the range and/or frequency in reservoir fluctuation would not substantially affect riparian habitat or other sensitive terrestrial communities or the special-status animal species dependent on them (BIO-1and BIO-4). In addition, it is expected that wildlife refuges would continue to receive surface water, as needed, and continue to implement existing water management plans. Therefore, impacts on habitat value would not occur and there would not be a potential to conflict with plans protecting biological resources.	Less than significant—The change in median monthly flows or the overall cumulative distribution of flows on the Stanislaus, Tuolumne, and Merced Rivers and the LSJR and changes to the range and/or frequency in reservoir fluctuation would not substantially affect riparian habitat or other sensitive terrestrial communities or the special-status animal species dependent on them (BIO-1 and BIO-4). In addition, it is expected that wildlife refuges would continue to receive surface water, as needed, and continue to implement existing water management plans. Therefore, impacts on habitat value would not occur and there would not be a potential to conflict with plans protecting biological resources. .	No impact—See BIO-1.	No impact—See BIO-1.
Chapter 9: Groundwater Resources						
Impact GW-1: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge	Less than significant— Surface water diversions on the Tuolumne and Merced Rivers would be similar under the No Project Alternative and baseline. Because there would be no change in surface water availability, the groundwater subbasins (Modesto, Turlock, and Extended Merced) served by these rivers would not be affected by the No Project Alternative. However, surface water diversions on the Stanislaus River would be reduced by approximately 9% under the No Project Alternative; diversions would also be reduced under LSJR	Less than significant—The average annual groundwater balance is expected to be reduced by less than the equivalent of 1 inch across each of the subbasins. This is not expected to produce a measurable decrease in groundwater elevations. Therefore, there would not be a substantial depletion of groundwater supplies or substantial interference with groundwater recharge.	Significant and unavoidable—The average annual groundwater balance could potentially be reduced by more than the equivalent of 1 inch in three subbasins (Modesto, Turlock, and Extended Merced). If this occurred, it would eventually produce a measurable decrease in groundwater elevations. The effect would be more severe during dry years and in areas farther from the SJR, the valley low point toward which groundwater slowly moves.	Significant and unavoidable—The average annual groundwater balance could potentially be reduced by more than the equivalent of 1 inch in all four subbasins (Eastern San Joaquin, Modesto, Turlock, and Extended Merced). If this occurred, it would eventually produce a measurable decrease in groundwater elevations. The effect would be more severe during dry years and in areas farther from the SJR, the valley low point toward which groundwater slowly moves.	No impact— This alternative would not result in a change in groundwater pumping or groundwater recharge from surface water that currently takes place in the plan area.	No impact— This alternative would not result in a change in groundwater pumping or groundwater recharge from surface water that currently takes place in the plan area.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	Alternatives 2 and 3 (average reduction of 2% and 12%, respectively). As such, the Eastern San Joaquin Subbasin, with is served by the Stanislaus River, would be affected by the reduced surface water diversions. However, the groundwater impacts associated with LSJR Alternative 3 would be less than significant. Because surface water diversions reductions under No Project Alternative (9%) would be less than surface water diversion reductions under LSJR Alternative 3 (12%, the groundwater affects associated with the No Project Alternative would also be less than significant.		Therefore, there could potentially be a significant and unavoidable depletion of groundwater supplies or substantial interference with groundwater recharge, and resulting potential migration of groundwater contamination under this alternative.	Therefore, there could be a potentially significant and unavoidable depletion of groundwater supplies or substantial interference with groundwater recharge, and resulting potential migration of groundwater contamination under this alternative.		
Impact GW-2: Cause subsidence as a result of groundwater depletion	Less than significant— As described above for impact GW-1, the effect of the No Project Alternative on groundwater supplies is expected to be less than significant. As a result, subsidence resulting from the No Project Alternative is also expected to be less than significant.	Less than significant— The average annual groundwater balance is expected to be reduced by less than the equivalent of 1 inch across each of the subbasins. This is not expected to produce a measurable decrease in groundwater elevations or associated subsidence.	Significant and unavoidable — The average annual groundwater balance could potentially be reduced by more than the equivalent of 1 inch across three subbasins (Modesto, Turlock, and Extended Merced) under LSJR Alternative 3 and across all four subbasins under LSJR Alternative 4. If this occurred, it could worsen subsidence that is already occurring in the Extended Merced Subbasin. Therefore, there could be a potentially significant and unavoidable increase in subsidence.	Significant and unavoidable — The average annual groundwater balance could potentially be reduced by more than the equivalent of 1 inch across three subbasins (Modesto, Turlock, and Extended Merced) under LSJR Alternative 3 and across all four subbasins under LSJR Alternative 4. If this occurred, it could worsen subsidence that is already occurring in the Extended Merced Subbasin. Therefore, there could be a potentially significant and unavoidable increase in subsidence.	No impact—See GW-1.	No impact—See GW-1.
Chapter 10: Recreational Resources and Aesthetics						
REC-1: Substantially physically deteriorate existing recreation facilities on the rivers or at reservoirs	Significant— During the primary recreation months of May–September, the No Project Alternative could slightly shift recreational activities on the Stanislaus River between May and August to those months that are more suited to higher flows and slightly shift recreational activities on the Merced River during May to those more suited for lower flows. These shifts are unlikely to cause significant recreational impacts. Under the No Project Alternative,	Less than significant—Modeled flows are not expected to cause substantial physical deterioration of on-bank recreational facilities because the seasonal average frequency of river flows (cubic feet per second [cfs]) would not change substantially from baseline. Modeled flows would also not affect in-water recreational activities because they would not change significantly from baseline. Under this alternative,	Less than significant— Modeled frequencies of flows greater than 2,500 cfs would change little on the Merced and Stanislaus Rivers, and therefore on-bank recreational facilities would not experience substantially more inundation relative to baseline conditions. However, flows greater than 2,500 cfs would increase in frequency on the Tuolumne River in May and June, but would remain close to baseline	Significant and unavoidable— There would be a substantial increase in flows above 2,500 cfs on the Tuolumne and Stanislaus Rivers under this alternative. Although on-bank recreational facilities are built to withstand periodic inundation, facilities may substantially physically deteriorate from the expected significant increase in inundation frequency relative to baseline. The modeled	No impact—Changes in salinity would not result in changes to water-dependent or water-enhanced recreation opportunities in the southern Delta. Salinity levels are imperceptible to recreationists who use the southern Delta for water-dependent activities, such as boating or kayaking and water-enhanced activities, such as wildlife viewing.	No impact—Changes in salinity would not result in changes to water-dependent or water-enhanced recreation opportunities in the southern Delta. Salinity levels are imperceptible to recreationists who use the southern Delta for water-dependent activities, such as boating or kayaking, and water-enhanced activities, such as wildlife viewing.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	reservoir elevations at New Don Pedro and Lake McClure are expected to remain similar to baseline conditions. Therefore, substantial physical deterioration at existing recreational facilities at these reservoirs is not expected to occur. However, end-of-September reservoir elevations at New Melones would be greatly reduced when compared to baseline, especially during the years with lowest storage. At New Melones Reservoir, boat launches are inoperable when the reservoir elevation is below 850 ft; under the No Project Alternative, the surface of New Melones Reservoir would be below 850 ft approximately 30% of the time in September, which is when recreationists use the reservoir. Therefore, it is anticipated that the No Project Alternative would interfere with the operation of boat ramps and this could result in a substantial physically deterioration of facilities at New Melones Reservoir, and thus reduce the use of existing recreation facilities.	there would be relatively small changes in reservoir elevations. These changes would not substantially deteriorate existing recreational facilities at the reservoirs because all boat ramps and other facilities would remain available to recreationists.	values July – September. Although the flows on the Tuolumne River could likely result in an increase in the frequency of inundation of on-bank recreation areas during May and June, recreational facilities are not anticipated to substantially physically deteriorate along the river. On-bank recreational facilities are built to withstand periodic inundation with higher river flows. The modeled seasonal average frequency of low flows (less than 500 cfs) on the Merced and Tuolumne Rivers would decrease more than 10% relative to baseline conditions. However, during July-September, the most popular recreational months for the three eastside tributaries, the frequency of low flows would change by less than 10% relative to baseline for the three eastside tributaries. Therefore, this alternative is not anticipated to affect in-water activities. The change in reservoir elevations under this alternative would not significantly affect recreation at New Melones or Lake McClure. It is expected that there would be a substantial decrease in elevation at New Don Pedro Reservoir. However, because all boat ramps would remain operable at the 30% cumulative distribution elevation (e.g., dry years), and some boat ramps in New Don Pedro Reservoir are still operable at minimum reservoir elevations, there would be no physical deterioration nor reduction in the use of existing recreation facilities at this location.	seasonal average frequency of low flows on the Merced and Tuolumne Rivers, without adaptive implementation, would decrease more than 10%. The decrease is mostly due to low flow reduction in May and June. However, because there would be little change in low flows on the Stanislaus, Merced, and Tuolumne Rivers relative to baseline during the warmest months in the San Joaquin Valley when swimming and wading are most popular (July–August), the reduced opportunity for swimming and wading on the three eastside tributaries in May, and particularly in June (i.e., early in the summer recreational season), is not expected to substantially reduce recreational use for the season. Seasonal average elevations at Lake McClure and New Melones Reservoir are expected to increase. The seasonal average elevation at New Don Pedro Reservoir is expected to decrease at the 30% cumulative distribution elevation. Decreased reservoir levels at New Don Pedro Reservoir would not substantially physically deteriorate existing recreation facilities at the reservoirs (marinas and boat ramps), and all boat ramps would remain operable. There would be no reduction in use of the facilities at New Don Pedro Reservoir. Therefore, given the significant increase in the modeled frequency of high seasonal average flows (greater than 2,500 cfs) on the Tuolumne and Stanislaus Rivers associated with LSJR Alternative 4, substantial physical		

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
				deterioration of existing recreational facilities is expected.		
REC-2: Substantially degrade the existing visual character or quality of the reservoirs	Significant— Under the No Project Alternative, reservoir elevations at New Don Pedro and Lake McClure would remain relatively constant and would not be substantially reduced compared to baseline. Therefore, substantial degradation of the visual character and quality of area surrounding these reservoirs would not occur. However, summer elevations at New Melones Reservoir would be reduced when compared to baseline, especially during years with lowest storage. At the 30% cumulative distribution level, the May–September seasonal average No Project Alternative elevation would be reduced by more than 50 ft, well above the 10-foot level identified as the criteria for significance. This reduction would substantially degrade the existing visual character or quality of the New Melones Reservoir.	Less than significant—Under certain conditions, reservoir elevations at Lake McClure and New Melones Reservoir could increase and could result in an improvement to the existing views. The decrease in reservoir elevation that could occur at New Don Pedro Reservoir would not result in a substantial degradation of existing visual character or quality.	Less than significant—Under certain conditions, reservoir elevations would increase at Lake McClure and New Melones Reservoir and could improve the existing views. At New Don Pedro Reservoir, decreases in water surface elevation during some dry years could cause a substantial degradation of existing visual character or quality; however, views at this location are Class III, and changes to the character of the landscape can be moderate without compromising visual quality.	Less than significant—Under certain conditions, reservoir elevations would increase at Lake McClure and New Melones Reservoir and could improve the existing views. At New Don Pedro Reservoir, decreases in water surface elevation during some dry years could cause a substantial degradation of existing visual character or quality; however, views at this location are Class III, and changes to the character of the landscape can be moderate without compromising visual quality.	No impact— This alternative would not apply directly to the reservoirs, and the USBR Vernalis salinity requirement in the program of implementation for this alternatives is the same as under baseline conditions.	No impact—This alternative would not apply directly to the reservoirs, and the USBR Vernalis salinity requirement in the program of implementation for this alternatives is the same as under baseline conditions
Chapter 11: Agricultural Resources						
AG-1: Potentially convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses	Significant— Under the No Project Alternative, in areas that receive surface water from the Tuolumne and Merced Rivers, a conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural uses would not be expected because surface water diversions on the Tuolumne and Merced Rivers would not be significantly reduced. Therefore, it is anticipated that a substantial reduction in crop acreage would not occur in these watersheds and a conversation of these types of farmland to nonagricultural uses would not occur. The No Project Alternative would result in conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses as a result of	Less than significant—Potential reductions in surface water diversions could result in a less than 4% average reduction in irrigated acreage for the irrigation districts in the LSJR area of potential effects.	Significant and unavoidable—Approximately ~~22,879~~24,902 acres, on average, of Prime or Unique farmland or Farmland of Statewide Importance requiring irrigation, could have reduced surface water diversions, and it is reasonable to assume that a portion could potentially be converted to nonagricultural uses even though land can be maintained in agricultural use through crop substitution, crop rotation, and dry land farming. Specifically, reductions in surface water diversions could result in reduced acres of irrigated land for Alfalfa for SSJID, MID, and TID; ~~Grain in MID;~~ Field Crops in SSJID, MID and TID; Pasture in SSJID, OID, MID, and TID; Rice in SSJID and MID; and Dry	Significant and unavoidable—Approximately ~~70,640~~64,038 acres on average of Prime or Unique Farmland or Farmland of Statewide Importance requiring irrigation could have reduced surface water diversions, and it is reasonable to assume that a portion could potentially be converted to nonagricultural uses even though land could be maintained in agricultural use through the crop substitution, crop rotation, and dry land farming. Specifically, reductions in surface water diversions could result in reduced acres of irrigated land for Alfalfa, Pasture, Corn, Grain, and Field in SSJID, OID, MID, and Merced ID; Rice and Safflower in SSJID, OID, and MID; Dry Bean and	Less than significant—No reduction or conversion of agricultural acreage is likely because water quality within the southern Delta is expected to remain unchanged as USBR would be responsible for complying with the same salinity requirements that currently exist at Vernalis.	Less than significant—No reduction or conversion of agricultural acreage is likely because water quality within the southern Delta is expected to remain unchanged as USBR would be responsible for complying with the same salinity requirements that currently exist at Vernalis.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	the reductions in surface water diversions on the Stanislaus River. The average reduction in surface water diversions of 9% would be slightly greater than the reduction under LSJR Alternative 2 with adaptive implementation (average reduction of % with implementation of adaptive implementation method 1[30% unimpaired flow]) and slightly less than the reduction described for LSJR Alternative 3 (average reduction of 12% at 40% unimpaired flow requirement). LSJR Alternative 3 would result in significant impacts on agricultural resources of the irrigation districts that receive water from the Stanislaus River. Although reductions in surface water supply under the No Project Alternative would be slightly less than those expected for LSJR Alternative 3, significant impacts would occur.		Beans and Processing Tomatoes in SSJID. Those potential average reductions in irrigated acreage range from ~~0.8%~~0.9% for Merced ID to ~~9.9%~~9.3% for MID.	Cucurbits in SSJID, OID, MID, and Merced ID; Processing and Fresh Tomato and Truck in SSJID, and Truck in SSJID, MID, and TID. Those potential average reductions in irrigated acreage range from ~~2.6%~~2.9% for Merced ID to ~~27.5%~~22.9% for MID.		
AG-2: Involve other changes in the existing environment which, due to their location or nature, could result in a conversion of farmland to nonagricultural use	Less than significant—Flows on the Stanislaus River would be increased, which may result in seepage; however, given the small amount of acreage for crops that could be affected, impacts would be less than significant. Similar to conditions under the LSJR alternatives, given the cost of feed input compared to other dairy inputs and the availability of the feed input, the value of dairy production in the LSJR area of potential effects, and the potential use of equitable distributions from local water suppliers, it is unlikely that dairies, as an agricultural use, would be converted to nonagricultural uses. Impacts would be less than significant.	Less than significant—Impacts on irrigated agriculture from a high water table resulting from increased river flows on the Stanislaus River are expected on less than 0.01% of irrigated acreage; therefore, crop production would not be substantially reduced.	Less than significant—Impacts on irrigated agriculture from a high water table resulting from increased river flows on the Stanislaus River are expected on less than 0.1% of irrigated acreage; therefore, crop production would not be substantially reduced. Given cost of feed input compared to other dairy inputs and the availability of the feed input, the value of dairy production in the LSJR area of potential effects, and the potential use of equitable distribution of local water suppliers, it is unlikely dairies, as an agricultural use, would be converted to nonagricultural uses.	Less than significant—Impacts on irrigated agriculture from a high water table resulting from increased river flows on the Stanislaus River are expected on less than 0.1% of irrigated acreage; therefore, crop production would not be substantially reduced. Given cost of feed input compared to other dairy inputs and the availability of the feed input, the value of dairy production in the LSJR area of potential effects, and the potential use of equitable distribution of local water suppliers, it is unlikely dairies, as an agricultural use, would be converted to nonagricultural uses.	Less than significant – Conversion of farmland to nonagricultural use is not expected because water quality within the southern Delta is expected to remain unchanged as USBR would be responsible for complying with the same salinity requirements that currently exist at Vernalis.	Less than significant – Conversion of farmland to nonagricultural use is not expected because water quality within the southern Delta is expected to remain unchanged as USBR would be responsible for complying with the same salinity requirements that currently exist at Vernalis.
AG-3: Conflict with existing zoning for agricultural use or a Williamson Act contract	Less than significant—The No Project Alternative would not conflict with existing zoning for agricultural use or Williamson Act contracts because the No Project Alternative would not change zoning. Lands that are under Williamson Act contracts must be	Less than significant—This alternative would not conflict with existing zoning for agricultural use or Williamson Act contracts because it would not change zoning, and lands that are under Williamson Act contracts must be maintained	Less than significant—This alternative would not conflict with existing zoning for agricultural use or Williamson Act contracts because it would not change zoning, and lands that are under Williamson Act contracts must be maintained	Less than significant—This alternative would not conflict with existing zoning for agricultural use or Williamson Act contracts because it would not change zoning, and lands that are under Williamson Act contracts must be maintained	Less than significant—This alternative would not conflict with existing zoning for agricultural use or Williamson Act contracts because it would not change zoning, and agricultural lands would continue to divert water from	Less than significant—This alternative would not conflict with existing zoning for agricultural use or Williamson Act contracts because it would not change zoning, and agricultural lands would continue to divert water from

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	maintained in the compatible uses specified in those contracts until non-renewed, canceled, or otherwise withdrawn from contract. Lands that experience a reduction in surface water supply could be dry farmed, rotated, or fallowed, all of which would be agricultural activities that are consistent with agricultural zoning and Williamson Act contracts.	in the compatible uses specified on those contracts until non-renewed, canceled, or otherwise withdrawn from contract. Lands that experience a reduction in surface water supply could be dryfarmed, rotated, or fallowed, all of which would be agricultural activities that are consistent with agricultural zoning and Williamson Act contracts.	in the compatible uses specified on those contracts until non-renewed, canceled, or otherwise withdrawn from contract. Lands that experience a reduction in surface water supply could be dryfarmed, rotated, or fallowed, all of which would be agricultural activities that are consistent with agricultural zoning and Williamson Act contracts.	in the compatible uses specified on those contracts until non-renewed, canceled, or otherwise withdrawn from contract. Lands that experience a reduction in surface water supply could be dryfarmed, rotated, or fallowed, all of which would be agricultural activities that are consistent with agricultural zoning and Williamson Act contracts.	existing waterways and rely on suitable water quality to irrigate crops.	existing waterways and rely on suitable water quality to irrigate crops.
AG-4: Conflict with any applicable land use plan, policy, or regulation related to agriculture of an agency with jurisdiction over a project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect	Less than significant— The No Project Alternative would not conflict with applicable land use plans, policies, or regulations because while some agricultural land could be taken out of irrigated agricultural use as a result of the No Project Alternative, many of these lands could actually remain in agricultural use, even if they are not irrigated. Furthermore, local agencies have accommodated the conversion and preservation or protection of agricultural lands through various means including: agricultural mitigation programs, agricultural preservation easements, or general plan policies that protect and preserve agricultural land.	Less than significant— This alternative would not conflict with applicable land use plans, policies, or regulations because it is not proposing amendments to existing land use plans, policies, or regulations. While some agricultural land could be taken out of irrigated agricultural use as a result of this alternative, many of these lands could remain in agricultural use, even if they are not irrigated and must remain in uses that are compatible with applicable local land use plans, policies or regulations.	Less than significant— This alternative would not conflict with applicable land use plans, policies, or regulations because it is not proposing amendments to existing land use plans, policies, or regulations. While some agricultural land could be taken out of irrigated agricultural use as a result of this alternative, many of these lands could remain in agricultural use, even if they are not irrigated and must remain in uses that are compatible with applicable local land use plans, policies or regulations.	Less than significant— This alternative would not conflict with applicable land use plans, policies, or regulations because it is not proposing amendments to existing land use plans, policies, or regulations. While some agricultural land could be taken out of irrigated agricultural use as a result of this alternative, many of these lands could remain in agricultural use, even if they are not irrigated and must remain in uses that are compatible with applicable local land use plans, policies or regulations.	No impact— This alternative would not conflict with applicable land use plans, policies, or regulations because it would not change zoning, and agricultural lands would continue to divert water from existing waterways and rely on suitable water quality to irrigate crops.	No impact— This alternative would not conflict with applicable land use plans, policies, or regulations because it would not change zoning, and agricultural lands would continue to divert water from existing waterways and rely on suitable water quality to irrigate crops.
Chapter 12: Cultural Resources						
CUL-1: Cause a substantial adverse change in the significance of a historical or archaeological resource	Significant—Changes in river flows are not expected to alter the low potential for significant cultural resources to exist along rivers due to previous natural and anthropogenic disturbances. Given the low potential, impacts would be less than significant on the three eastside tributaries and the LSJR. Reservoir elevations at New Don Pedro and Lake McClure are expected to remain relatively constant when compared to baseline. Therefore, substantial adverse changes in the significance of historical or archeological resources are not expected at these reservoirs. However, the end-of-	Less than significant—The expected changes in reservoir elevations are within historical fluctuations, and known or unknown significant cultural resources are expected to continue to be inundated or exposed as usual under current operations. Additionally, historic property management plans at the reservoirs would continue to be implemented. Changes in river flows are not expected to alter the low potential for significant cultural resources to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant—The expected changes in reservoir elevations are within historical fluctuations, and known or unknown significant cultural resources are expected to continue to be inundated or exposed as usual under current operations. Additionally, historic property management plans at the reservoirs would continue to be implemented. Changes in river flows are not expected to alter the low potential for significant cultural resources to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant—The expected changes in reservoir elevations are within historical fluctuations, and known or unknown significant cultural resources are expected to continue to be inundated or exposed as usual under current operations. Additionally, historic property management plans at the reservoirs would continue to be implemented. Changes in river flows are not expected to alter the low potential for significant cultural resources to exist along rivers due to previous natural and anthropogenic disturbances.	No impact – The historic range of salinity because Vernalis water quality would be maintained through the program of implementation. Since the chemical properties of the baseline water quality conditions would not change, there would be no potential to substantially adversely impact significant cultural resources.	No impact—The historic range of salinity because Vernalis water quality would be maintained through the program of implementation. Since the chemical properties of the baseline water quality conditions would not change, there would be no potential to substantially adversely impact significant cultural resources.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	September storage at New Melones Reservoir is anticipated to be greatly reduced in over half the years when compared to baseline, and this would most likely expose cultural resources, and could result in a substantial adverse change to the significance of existing cultural resources if they were disturbed by people or disturbed by another physical method (e.g., light, exposure).					
CUL-2: Disturb any human remains, including those interred outside formal cemeteries	Less than significant—The potential for human remains to exist within the fluctuation zone of the reservoirs is low. As a result, the changes in New Melones Reservoir elevations under the No Project Alternative are unlikely to result in disturbance of human remains. In addition, considering the prior disturbance by agriculture, irrigation practices, mining activities, and development within the riverine floodplains, the change in flows under the No Project Alternative would have an extremely low potential to disturb documented or currently undocumented human remains, including those interred outside formal cemeteries.	Less than significant—The expected changes in reservoir elevations are within historical fluctuations and are not expected to affect human remains due to low potential for human remains to exist within the fluctuation zone of the reservoirs Additionally, existing management plans at the reservoirs would continue to be implemented. Additionally, any human remains would be treated in accordance with existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant—The expected changes in reservoir elevations are within historical fluctuations and are not expected to affect human remains due to low potential for human remains to exist within the fluctuation zone of the reservoirs Additionally, existing management plans at the reservoirs would continue to be implemented. Additionally, any human remains would be treated in accordance with existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant—The expected changes in reservoir elevations are within historical fluctuations and are not expected to affect human remains due to low potential for human remains to exist within the fluctuation zone of the reservoirs Additionally, existing management plans at the reservoirs would continue to be implemented. Additionally, any human remains would be treated in accordance with existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	No impact – See CUL-1.	No impact – See CUL-1.
CUL-3: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	Significant—The potential for paleontological resources within and adjacent to the LSJR and the Stanislaus, Tuolumne, and Merced Rivers is considered low due to the depth of occurrence of rock units with high paleontological potential below reworked surficial sediments and Holocene-age floodplain and channel deposits. Buried paleontological resources would be found at soil and rock depth too deep for the rivers to modify or change. Reservoir elevations at New Don Pedro and Lake McClure are expected to remain relatively constant or generally greater, not	Less than significant—The expected changes in reservoir elevations are within historical fluctuations, and unique paleontological or geologic resources, specifically caves, are expected to continue to be inundated and exposed as they currently are under operations. Additionally, the documented caves are managed and protected under a cave management plan. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers due to depth	Less than significant—The expected changes in reservoir elevations are within historical fluctuations, and unique paleontological or geologic resources, specifically caves, are expected to continue to be inundated and exposed as they currently are under operations. Additionally, the documented caves are managed and protected under a cave management plan. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers	Less than significant—The expected changes in reservoir elevations are within historical fluctuations, and unique paleontological or geologic resources, specifically caves, are expected to continue to be inundated and exposed as they currently are under operations. Additionally, the documented caves are managed and protected under a cave management plan. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers	No impact – See CUL-1.	No impact – See CUL-1.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	significantly reduced, when compared to baseline. Therefore, disturbance of unique paleontological resources is not expected at these reservoirs. However, the-end-of September storage at New Melones is anticipated to be greatly reduced in over half the years when compared to baseline, and this could lead to the disturbance of paleontological resources, such as caves.	of occurrence of rock units with high paleontological potential.	due to depth of occurrence of rock units with high paleontological potential.	due to depth of occurrence of rock units with high paleontological potential.		
Chapter 13: Service Providers						
SP-1: Require or result in the construction of new water supply facilities or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects	Significant— Under existing conditions, existing wastewater treatment plant dischargers (i.e., Cities of Tracy, Stockton, and Manteca, and Mountain House CSD) are required to comply with National Pollution Discharge Elimination System (NPDES) permit requirements and waste discharge requirements. However, the southern Delta salinity water quality objectives do not currently apply to the City of Tracy and other municipal dischargers. If the southern Delta salinity objectives are not applied to the municipal dischargers, then the No Project Alternative would not result in a change to the NPDES permit or other discharger requirements; the No Project Alternative would not result in the need to expand existing facilities or infrastructure and would not result in significant environmental effects. However, it is reasonable to expect that the litigation in City of Tracy v. California State Water Resources Control Board will be resolved in the foreseeable future in a manner that will allow for the application of the Delta salinity objectives to municipal wastewater dischargers. The increase in flow expected under the No Project Alternative would reduce the salinity in the southern Delta at the interior compliance stations and achieve compliance at these stations. However, based on	Less than significant—Average surface water diversions on the Stanislaus, Tuolumne, and Merced Rivers would be reduced by 2%, 2%, and 6%, respectively, compared to baseline conditions. Further, there would not be a substantial depletion of groundwater supplies; therefore, it is not expected that service providers or public water suppliers would need to construct or operate new water supply or wastewater treatment facilities or expand existing facilities.	Significant and unavoidable—Surface water diversion reductions on the Stanislaus, Tuolumne, and Merced Rivers are expected to be approximately 12%, 14% and 16%, respectively. Further, as a result of the substantial reduction of surface water supply on the rivers, it is expected that there would be a substantial depletion of groundwater supplies in the Modesto, Turlock, and Extended Merced Subbasins. These reductions would potentially require service providers to construct new or expanded water supply or wastewater treatment facilities, the construction of which could result in significant environmental effects.	Significant and unavoidable—Surface water diversion reductions on the Stanislaus, Tuolumne, and Merced Rivers are expected to be approximately 32%, 35%, and 32%, respectively. Further, as a result of the substantial reduction of surface water supply on the rivers, it is expected that there would be a substantial depletion of groundwater supplies in the Eastern San Joaquin, Modesto, Turlock, and Extended Merced Subbasins. These reductions would potentially require service providers to construct new or expanded water supply or wastewater treatment facilities, the construction of which could result in significant environmental effects.	Significant and unavoidable—The Cities of Tracy, Stockton and Mountain House CSD may need to construct new wastewater treatment facilities or expand existing facilities to comply with potential changes to NPDES effluent limitation implementing a 1.0 dS/m salinity objective, the construction of which could result in significant environmental effects.	Less than significant—The construction of new wastewater treatment facilities is not expected in order to comply with changes to NPDES effluent limitations implementing a 1.4 dS/m objective for salinity. As such, construction would not occur and would not result in significant environmental effects.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	current effluent discharge concentrations and past violations, it is unlikely that existing service providers would be able to meet the current 2006 Bay-Delta Plan salinity objective of 0.7 dS/m from April to August. Additionally, it is unlikely that the Cities of Tracy and Stockton meet the current 2006 Bay-Delta Plan salinity objective of 1.0 dS/m from September–March. Therefore, it is expected that these service providers would exceed wastewater treatment requirements during some parts of the year and that the construction of new wastewater treatment facilities, or the expansion of existing facilities or infrastructure, could result; construction or operation of the facilities could cause significant environmental effects.					
SP-2a: Violate any water quality standards such that drinking water quality from public water systems would be affected	Less than significant— The No Project Alternative is unlikely to reduce surface drinking water quality because flows at Vernalis would be higher than baseline. In addition, a higher flow at Vernalis is generally associated with better water quality. A reduction in the quality of groundwater drinking supply is not expected because the effect of the No Project Alternative on groundwater supplies is expected to be less than significant (as shown in Impact GW-1 has under the No Project Alternative).	Less than significant—Because service providers and irrigation districts relying primarily on surface water would not need to supplement their supply with groundwater under LSJR Alternative 2, there would likely be no degradation of groundwater quality. During some months, salinity in the SJR at Vernalis and in the southern Delta channels may increase slightly, but on average, salinity is expected to be reduced; therefore, a substantial degradation of water quality affecting service providers diverting drinking water from the southern Delta would not occur, and impacts would be less than significant	Less than significant—As a result of increased groundwater pumping, reductions in groundwater levels in the Modesto, Turlock, and Extended Merced Subbasins under LSJR Alternative 3 could affect groundwater quality. However, a substantial increase in groundwater pumping would not necessarily result in an increase in violation of water quality standards for drinking water because recent data do not indicate increased water quality standard violations in public water systems despite greatly increased groundwater pumping, and if a drinking water quality problem is detected, action would be taken (as covered under SP-1) to improve water quality. Salinity in the SJR at Vernalis and in the southern Delta channels is expected to be reduced; therefore, a substantial degradation of water quality affecting service	Less than significant—As a result of increased groundwater pumping, reductions in groundwater levels in the Modesto, Turlock, Merced and Easter San Joaquin Subbasins. However, a substantial increase in groundwater pumping would not necessarily result in an increase in violation of water quality standards for drinking water because recent data do not indicate increased water quality standard violations in public water systems despite greatly increased groundwater pumping, and if a drinking water quality problem is detected, action would be taken (as covered under SP-1) to improve water quality. Salinity in the SJR at Vernalis and in the southern Delta channels is expected to be reduced; therefore, a substantial degradation of water quality affecting service providers diverting drinking water from the southern Delta	Less than significant—The USBR water rights permits will continue to include requirements to meet the current 0.7 EC April–August Vernalis salinity standard, as contained in the program of implementation. This would maintain the historical range of salinity in the southern Delta. Therefore, a substantial degradation of water quality affecting service providers diverting drinking water from the southern Delta would not occur.	Less than significant—The USBR water rights permits will continue to include requirements to meet the current 0.7 EC April–August Vernalis salinity standard, as contained in the program of implementation. This would maintain the historical range of salinity in the southern Delta. Therefore, a substantial degradation of water quality affecting service providers diverting drinking water from the southern Delta would not occur.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
			providers diverting drinking water from the southern Delta would not occur. Therefore, impacts would be less than significant.	would not occur. Therefore, impacts would be less than significant.		
SP-2b: Violate any water quality standards such that drinking water quality from domestic wells would be affected.c	Less than significant- See SP-2a.	Less than significant—Because service providers and irrigation districts relying primarily on surface water would not need to supplement their supply with groundwater under LSJR Alternative 2, there would likely be no degradation of groundwater quality.	Significant and unavoidable—As a result of increased groundwater pumping, reductions in groundwater levels in the Modesto, Turlock, and Extended Merced Subbasins could affect groundwater quality. Domestic well users are largely unregulated and are under no state requirements to monitor, test, and treat their water to meet the state and federal Safe Drinking Water Act. There is no required mechanism to prevent private domestic wells from using groundwater that may exceed MCLs. Therefore, impacts would be significant.	Significant and unavoidable—As a result of increased groundwater pumping, reductions in groundwater levels in the Modesto, Turlock, Merced and Easter San Joaquin Subbasins could affect groundwater quality. Domestic well users are largely unregulated and are under no state requirements to monitor, test, and treat their water to meet the state and federal Safe Drinking Water Act. There is no required mechanism to prevent private domestic wells from using groundwater that may exceed MCLs. Therefore, impacts would be significant.	No impact—Salinity in the SJR at Vernalis and in the southern Delta is not relevant to groundwater and drinking water quality from domestic wells and, therefore, there would be no impact from the changes in salinity in these surface waters.	No impact—Salinity in the SJR at Vernalis and in the southern Delta is not relevant to groundwater and drinking water quality from domestic wells and, therefore, there would be no impact from the changes in salinity in these surface waters.
SP-3: Result in substantial changes to SJR inflows to the Delta such that insufficient water supplies would be available to service providers relying on CVP/SWP exports	Less than significant—Under the No Project Alternative, average annual inflows to the Delta at Vernalis would increase slightly relative to baseline as a result of the No Project Alternative, and average annual exports could increase slightly, by 26 TAF/y. Consequently, service providers relying on CVP/SWP exports would not be adversely affected.	Less than significant—Inflows would generally remain similar to baseline and, as such, a reduction in average annual exports to the CVP and SWP export service areas is not expected. Therefore, insufficient water supplies to service providers relying on exports would not occur and would not require or result in the construction of new water supply facilities or wastewater treatment facilities or the expansion of existing facilities.	Less than significant—Inflows would generally increase relative to baseline, which would result in an estimated average increase in exports of 76 TAF/y to the CVP and SWP export service areas. Therefore, insufficient water supplies to service providers relying on exports would not occur and would not require or result in the construction of new water supply facilities or wastewater treatment facilities or the expansion of existing facilities.	Less than significant—Inflows would generally increase relative to baseline, which would result in an estimated average increase in exports of 194 TAF/y to the CVP and SWP export service areas. Therefore, insufficient water supplies to service providers relying on exports would not occur and would not require or result in the construction of new water supply facilities or wastewater treatment facilities or the expansion of existing facilities.	No impact – The flows to satisfy the USBR Vernalis EC requirement contained in the program of implementation are already included in the modeling results for the LSJR alternatives.	No impact – The flows to satisfy the USBR Vernalis EC requirement contained in the program of implementation are already included in the modeling results for the LSJR alternatives.
Chapter 14: Energy and Greenhouse Gases						
EG-1: Adversely affect the reliability of California's electric grid	Less than significant—Under the No Project Alternative, a moderate reduction in the capacity of New Melones hydroelectric plant in July and August during dry years could result in minor reliability violations. However, the New Melones hydroelectric plant is located in a SMUD region. The report of SMUD's 2013 Ten-year Transmission	Less than significant—Transmission line loadings would not exceed the limits under contingency outage conditions because hydropower generation and reservoir elevation would not be substantially modified. Therefore, adverse effects on the reliability of California's	Less than significant—Transmission line loadings would not exceed the limits under contingency outage conditions because hydropower generation and reservoir elevation would not be substantially modified. Therefore, adverse effects on the reliability of California's	Less than significant—Transmission line loadings would not exceed the limits under contingency outage conditions after re-dispatch of generator facilities to correct a minor violation between Borden and Gregg substations and Gregg and Storey substations. Re-dispatches are	No impact—The general historical range of salinity in the southern Delta would remain unchanged under and, thus, would not adversely affect the reliability of California's electric grid.	No impact— The general historical range of salinity in the southern Delta would remain unchanged and, thus, would not adversely affect the reliability of California's electric grid.

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	Assessment Plan indicates that there are adequate generating resources in the SMUD region to meet its load demand and planning reserve margin obligations until 2018. So it is likely that the minor violations could be alleviated by re-dispatching electrical power from other generating resources available either in a local region or neighboring regions. Therefore, the No Project Alternative would not adversely affect the reliability of California's electric grid and the impact of the reduction in the New Melones capacity would be less than significant.	electric grid would not occur.	electric grid would not occur.	regular occurrences in the California energy grid, and they provide a solution to redistribute power. Therefore, adverse effects on the reliability of California's electric grid would not occur.		
EG-2: Result in inefficient, wasteful, and unnecessary energy consumption	Less than significant— The No Project Alternative could result in additional energy consumption as a result of groundwater pumping. However, because groundwater pumping may be necessary to maintain the water supply irrigation demand, the No Project Alternative would not result in inefficient, wasteful, and unnecessary consumption of energy. Furthermore, it is anticipated that if new groundwater wells were to be installed, they would be efficient. The No Project Alternative could result in additional energy generation at other facilities to compensate for a potential loss of hydropower. However, this increased electricity generation is not considered inefficient, wasteful, and unnecessary as it is energy that would be generated to maintain the energy supply level that is currently supplied by hydropower.	Less than significant— Additional groundwater pumping would not result in inefficient, wasteful, and unnecessary consumption of energy to the extent groundwater pumping is used to meet water supply irrigation demand in accordance with state law. Additional energy generation at other facilities to compensate for a potential loss of hydropower would not be considered inefficient, wasteful, and unnecessary as it is energy that would be generated to maintain the energy supply level that is currently supplied by hydropower. Therefore, there would be no inefficient, wasteful or unnecessary energy consumption.	Less than significant— Additional groundwater pumping would not result in inefficient, wasteful, and unnecessary consumption of energy to the extent groundwater pumping is used to meet water supply irrigation demand in accordance with state law. Additional energy generation at other facilities to compensate for a potential loss of hydropower would not be considered inefficient, wasteful, and unnecessary as it is energy that would be generated to maintain the energy supply level that is currently supplied by hydropower. Therefore, there would be no inefficient, wasteful or unnecessary energy consumption.	Less than significant— Additional groundwater pumping would not result in inefficient, wasteful, and unnecessary consumption of energy to the extent groundwater pumping is used to meet water supply irrigation demand in accordance with state law. Additional energy generation at other facilities to compensate for a potential loss of hydropower would not be considered inefficient, wasteful, and unnecessary as it is energy that would be generated to maintain the energy supply level that is currently supplied by hydropower. Therefore, there would be no inefficient, wasteful or unnecessary energy consumption.	No impact—The general historical range of salinity in the southern Delta would remain unchanged under and, thus, would not result in inefficient, wasteful, and unnecessary energy consumption.	No impact—The general historical range of salinity in the southern Delta would remain unchanged under and, thus, would not result in inefficient, wasteful, and unnecessary energy consumption.
EG-3: Generate GHG emissions, either directly or indirectly, that have a significant impact on the environment	Significant—The No Project Alternative could result in an increase in groundwater pumping and a potential shift from hydropower to non-hydropower energy production as a result of the expected reduction in surface water diversions and change to flow on the Stanislaus River. Both of these would be expected to generate GHG	Less than significant— Emissions would not exceed the 10,000 MTCO2e threshold. Therefore, GHG emissions would not have a significant impact on the environment.	Significant and unavoidable— Emissions exceed the 10,000 MT CO2e threshold. Therefore, GHG emissions would have a significant impact on the environment.	Significant and unavoidable— Emissions exceed the 10,000 MT CO2e threshold. Therefore, GHG emissions would have a significant impact on the environment.	NA—The general historical range of salinity in the southern Delta would remain unchanged under and, thus, would not result in direct GHG emissions. Significant indirect GHG emissions may be produced through the construction and operation of facilities in the southern Delta (Table 18-8) that could exceed	NA—The general historical range of salinity in the southern Delta would remain unchanged under and, thus, would not result in direct GHG emissions. Significant indirect GHG emissions may be produced through the construction and operation of facilities in the southern Delta

Impact	No Project Alternative (LSJR/SDWQ Alternative 1)	LSJR Alternative 2a	LSJR Alternative 3 a	LSJR Alternative 4 a	SDWQ Alternative 2	SDWQ Alternative 3
	emissions greater than the threshold of 10,000 MT of GHGs, as described for both LSJR Alternative 3 and 4.				GHG thresholds depending on the nature of the activity.	(Table 18-8) that could exceed GHG thresholds depending on the nature of the activity.
EG-4: Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing the GHG emissions	Significant—Since the No Project Alternative would exceed the 10,000 MT GHG threshold, it would conflict with existing applicable plans, policies, or regulations adopted for the purposes of reducing GHG emissions, such as AB32, the California Global Warming Solutions Act.	Less than significant—Since GHG emissions would not exceed the 10,000 MT CO2e threshold, there would be no conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHGs.	Significant and unavoidable— – Since GHG emissions would exceed the 10,000 MT CO2e threshold, there would be a conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHGs.	Significant and unavoidable— Since GHG emissions would exceed the 10,000 MT CO2e threshold, there would be a conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHGs.	No impact – The general historical range of salinity in the southern Delta would remain unchanged and, thus, would not result in GHG emissions or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions.	No impact – The general historical range of salinity in the southern Delta would remain unchanged and, thus, would not result in GHG emissions or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions.
EG-5: Effect of global climate change on the LSJR and SDWQ alternatives	Less than significant—The State Water Board is required to prepare WQCPs. The WCQPs are regularly reviewed to update water quality standards. As a result, the planning process continually accounts for changing conditions related to water quality and water planning, such as climate change. Therefore, the effect of global climate change on the No Project Alternative would be less than significant.	Less than significant—Climate change would not significantly affect LSJR Alternative 2 because adaptive implementation would allow agencies to respond to changing circumstances with respect to flow and water quality that might arise due to climate change. Furthermore, the required review and update of WQCPs, accounted for in the program of implementation, continually accounts for changing conditions related to water quality and water planning such as climate change.	Less than significant—Climate change would not significantly affect LSJR Alternative 3 because adaptive implementation would allow agencies to respond to changing circumstances with respect to flow and water quality that might arise due to climate change. Furthermore, the required review and update of WQCPs, accounted for in the program of implementation, continually accounts for changing conditions related to water quality and water planning such as climate change.	Less than significant—Climate change would not significantly affect LSJR Alternative 4 because adaptive implementation would allow agencies to respond to changing circumstances with respect to flow and water quality that might arise due to climate change. Furthermore, the required review and update of WQCPs, accounted for in the program of implementation, continually accounts for changing conditions related to water quality and water planning such as climate change.	Less than significant—Climate change would not significantly affect SDWQ Alternative 2 because the required review and update of WQCPs, accounted for in the program of implementation, continually accounts for changing conditions related to water quality and water planning, such as climate change.	Less than significant – Climate change would not significantly affect SDWQ Alternative 3 because the required review and update of WQCPs, accounted for in the program of implementation, continually accounts for changing conditions related to water quality and water planning, such as climate change.

NA = not applicable
EC = electrical conductivity (salinity)
dS/m = deciSiemens per meter
CDFW = California Department of Fish and Wildlife
USFWS = U.S. Fish and Wildlife Service
NPDES = National Pollution Discharge Elimination System
USACE = U.S. Army Corps of Engineers
USBR = U.S. Bureau of Reclamation
SSJID = South San Joaquin Irrigation District
MID = Modesto Irrigation District
TID = Turlock Irrigation District
OID = Oakdale Irrigation District
Merced ID = Merced Irrigation District
CVP = Central Valley Project
SWP = State Water Project
GHG = greenhouse gas
CO2e = carbon dioxide equivalent
MT = megatons
AB32 = Assembly Bill 32, California Global Warming Solutions Act
WQCP = Water Quality Control Plans

[a] Impact determinations are without adaptive implementation included. For a summary of what determinations changed with and without adaptive implementation, refer to Table 18-5.