

Chapter 17

Summary of Impacts and Comparison of Alternatives

17.1 Summary

This chapter compares the alternatives that are summarized in Chapter 3, *Alternatives Description*, and evaluated in Chapters 5–15. The California Environmental Quality Act (CEQA) requires an analysis of a reasonable range of alternatives. Accordingly, this 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 level of analysis is included to provide sufficient information about the environmental effects of each alternative to allow for informed decision-making.

As described in more detail in Chapter 3, *Alternatives Description*, the plan amendments identify changes to the flow requirements on the LSJR and three eastside tributaries (the Stanislaus, Tuolumne, and Merced Rivers) and the water quality objective for salinity in the southern Delta. 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 D-1641.
- LSJR Alternative 2 would establish 20 percent unimpaired flow equally on the three eastside tributaries.
- LSJR Alternative 3 would establish 40 percent of the unimpaired flow equally on the three eastside tributaries.
- LSJR Alternative 4 would establish 60 percent unimpaired flow equally on the three eastside tributaries.

The program of implementation for all LSJR alternatives also includes: water rights actions; adaptive management of flows February–June; and special studies, reporting, and monitoring. The water quality certifications issued by the State Water Resources Control Board (State Water Board) for the relicensing of the New Don Pedro facility on the Tuolumne River and the New Exchequer facility on the Merced River will need to include consideration of the objectives and program of implementation in each of the LSJR alternatives. As noted at the beginning of this SED, the State Water Board's Phase III would specifically identify the water rights that could be modified. Details of these four LSJR alternatives are provided in Chapter 3, *Alternatives Description*, and the language of the amended 2006 Bay-Delta Plan (water quality control plan [WQCP]) is included in Appendix K, *Revised Water Quality Control Plan*.

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 objectives in the plan (1.0

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 San Joaquin River (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; continued use of the temporary agricultural barriers; and various study, planning, and monitoring requirements.
- 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; continued use of the temporary agricultural barriers; and 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 WQCP 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, *Alternatives Description*.

17.2 Requirements

The State CEQA Guidelines (Cal. Code Regs., tit. 14, § 15126.6) require that an environmental document (e.g., environmental impact report [EIR] or SED as part of a certified regulatory program) present a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any significant effects of the project. Section 15126.6 of the State CEQA Guidelines also requires an evaluation of the comparative merits of the alternatives. An environmental document is not required to consider alternatives that are infeasible.

17.2.1 Alternatives Comparison

Table 17-1 summarizes the results of the CEQA significance analysis for each resource area and the alternatives that would result in significant and unavoidable impacts under CEQA, as discussed in Chapters 4–15. Table 17-2 (at the end of this chapter) summarizes the impacts by resource and threshold for the alternatives. Additional information regarding these impact determinations can be found in Chapters 5–14 and Chapter 15, *LSJR Alternative 1 and SDWQ Alternative 1, (No Project Alternative)*. The CEQA alternatives comparison includes LSJR Alternative 1 and SDWQ Alternative 1, which is the No Project Alternative (i.e., continuation of, and full compliance with, the existing 2006 Bay-Delta Plan). This alternative is analyzed in detail in Chapter 15 and technical information is presented in Appendix D, *Evaluation of LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)*.

Table 17-1. CEQA Significance Analysis by Alternative

Environmental Resource Area	LSJR Alternative 1 and SDWQ Alternative 1	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
Water Supply, Surface Hydrology, and Water Quality	S	S	S	S	L	L
Flooding, Sediment, and Erosion	L	L	L	L	N	N
Aquatic Resources	S	S	L	L	N	N
Terrestrial Biological Resources	S	S	L	L	L	L
Groundwater Resources	S	L	S	S	N	N
Recreational Resources and Visual Quality	L	L	S	S	N	N
Agricultural Resources	S	L	S	S	L	L
Cultural Resources	L	L	L	L	N	N
Service Providers	S	L	S	S	S	L
Energy Resources and Climate Change	S	L	S	S	N	N

S = significant and unavoidable impact
 L = less than significant impact
 N = no impact

As shown in Table 17-1, LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant and unavoidable impacts on water supply, surface hydrology, and water quality; aquatic resources; terrestrial biological resources; groundwater resources; agricultural resources; service providers; and energy resources and climate change.

LSJR Alternatives 2 would result in significant and unavoidable impacts on water supply, surface hydrology, and water quality; aquatic resources; and terrestrial biological resources.

LSJR Alternatives 3 or 4 would result in significant and unavoidable impacts on water supply, surface hydrology, and water quality; groundwater resources; recreational resources and visual quality; agricultural resources; service providers; and energy resources and climate change.

As discussed in Chapter 5, *Water Supply, Surface Hydrology, and Water Quality*, the water quality of the southern Delta under the 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). Therefore, because there is no change to baseline conditions, there are very few impact mechanisms that could result in impacts on resources under these two alternatives. SDWQ Alternative 2 would result in significant and unavoidable impacts on service providers. SDWQ Alternative 3 would not result in significant and unavoidable impacts.

17.3 Alternatives Impact Analysis

Overall, LSJR Alternatives 1–4 would result in less-than-significant impacts on flooding, sediment, and erosion and cultural resources. Overall, LSJR alternatives (LSJR Alternative 2) that would require lower unimpaired flows when compared to baseline conditions on the Stanislaus River and similar unimpaired flows when compared to baseline on the Merced and Tuolumne Rivers have less-than-significant impacts on resources that require or are dependent on surface water diversion. These resources include water supply, agricultural resources, groundwater resources, service providers, and energy resources and climate change. Overall, LSJR alternatives (LSJR Alternative 3 or 4) that require higher 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 resources; and terrestrial biological resources.

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

Generally, LSJR Alternative 2 would result in lower flows in the Stanislaus River when compared to baseline conditions. This results in significant and unavoidable impacts on resources that require or

rely on river flow, such as water supply, surface hydrology, and water quality; aquatic resources; and terrestrial biological resources.

Generally, LSJR Alternatives 3 or 4 require higher unimpaired flow on the Merced and Tuolumne Rivers (and the Stanislaus River for LSJR Alternative 4) when compared to baseline. Thus, these alternatives result in significant and unavoidable impacts on resources that require water for beneficial uses other than fish and wildlife, such as surface water supply for irrigation, agricultural resources, service providers, and energy resources and climate change. These alternatives would also result in significant and unavoidable impacts on groundwater resources because of decreased surface water diversions that would likely be augmented by an increase in groundwater pumping. In addition, there would also be significant and unavoidable impacts on recreational resources and visual quality because of increased flows on the Merced and Tuolumne Rivers that would result in reduced recreational opportunities at lower recreational flows.

Overall SDWQ Alternatives 2 or 3 would generally have no impacts or less-than-significant impacts on many resources including: water supply, surface hydrology and water quality, flooding, sediment, and erosion, aquatic resources, terrestrial biological resources, groundwater resources, recreational resources and visual quality, agricultural resources; cultural resources; and energy resources and climate change. This is generally because the general historical range of salinity within the southern Delta would remain between 0.2 dS/m and 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), nor is the relationship between the salinity at SJR at Vernalis and the southern Delta expected to change; thus, a change in baseline is not expected.

SDWQ Alternative 2, however, would result in significant impacts on service providers. 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) and National Pollution Discharge Elimination System (NPDES) permits. The Central Valley Water Board would likely apply the water quality objectives adopted for the southern Delta by the State Water Board as effluent limits to point-source discharge permits for wastewater treatment plants (WWTPs). Therefore, significant and unavoidable impacts would result from service providers not being able to meet the new NPDES effluent limitations that are based on these objectives and construct or operate the new wastewater treatment facilities or infrastructure needed to be in compliance.

SDWQ Alternative 3 would not result in significant and unavoidable impacts on any resource 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 are expected to meet new effluent limitations if the Central Valley Water Board uses the water quality objective specified in LSJR Alternative 3.

17.4 Resources With Significant and Unavoidable Impacts

17.4.1 Water Supply, Surface Hydrology, and Water Quality

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant and unavoidable impacts on water supply, surface hydrology, and water quality because the flows on the Merced River would be reduced when compared to baseline (especially during drier years), thereby reducing the overall value of the flows. This would also likely affect water temperature on the Merced River. There would be significant and unavoidable impacts on surface hydrology and water quality under LSJR Alternative 2 because of the lower flows on the Stanislaus River resulting in an overall lower volume of water in the river February–June and an increase in temperature (i.e., decrease in water quality). Significant and unavoidable impacts on water supply would result under LSJR Alternatives 3 or 4 because of the expected substantial reductions in surface water diversions to sustain the required unimpaired flow requirements in the Merced and Tuolumne Rivers and the Stanislaus River (only under LSJR Alternative 4). LSJR Alternatives 1–4 would have significant and unavoidable water supply, surface hydrology, and water quality impacts.

17.4.2 Aquatic Resources

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant and unavoidable impacts on aquatic resources because the flows on the Merced River would be reduced when compared to baseline (especially during drier years), thereby reducing habitat and increasing temperature for aquatic species. LSJR Alternative 2 would have significant and unavoidable impacts on aquatic resources because the lower flows on the Stanislaus River would result in an overall lower volume of water in the river February–June and an increase in temperature.

17.4.3 Terrestrial Biological Resources

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant and unavoidable 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), thereby reducing riparian habitat that is currently limited under baseline. LSJR Alternative 2 would have significant and unavoidable impacts on terrestrial biological resources because of the lower flows on the Stanislaus River resulting in an overall lower volume of water in the river February–June; thereby reducing riparian habitat that is currently limited under baseline.

17.4.4 Groundwater Resources

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) and LSJR Alternative 3 and 4 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. Compared to LSJR Alternatives 3 and 4, LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) is expected to have the smallest contribution to the overall impact on groundwater resources. This is because under LSJR Alternative

1 and SDWQ Alternative 1 (No Project Alternative), 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 would lead to a decrease in surface water diversions from additional eastside tributaries (e.g., the Merced and Tuolumne Rivers).

17.4.5 Recreational Resources and Visual Quality

There are significant and unavoidable impacts on recreational resources for LSJR Alternatives 3 and 4. The required unimpaired flows would reduce the frequency of lower flow periods on rivers during the recreational season (May–September) suitable for low-flow recreational activities (e.g., floating, wading, and swimming).

17.4.6 Agricultural Resources

Significant and unavoidable impacts on agricultural resources would result from LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) 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 are expected to be reduced. Similarly, LSJR Alternatives 3 and 4 would also experience a reduction in surface water diversions on the Merced and Tuolumne. Therefore, it is expected that agricultural resources would experience a reduction in irrigation water supply such that agricultural acreage would decline and be converted to nonagricultural uses. LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) is expected to have the smallest contribution of the alternatives that have significant and unavoidable impacts on agricultural resources because it is expected the decrease in surface water diversions would only take place on the Stanislaus River, whereas LSJR Alternative 3 or 4 would experience a decrease in surface water diversions from additional eastside tributaries (i.e., the Merced and Tuolumne Rivers).

17.4.7 Service Providers

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative), LSJR Alternative 3, and LSJR Alternative 4 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 (e.g., irrigation and/or municipal and industrial uses). As a result, service providers (e.g., City of Modesto under LSJR Alternative 3 and irrigation districts, City of Tracy, under LSJR Alternative 4 or LSJR Alternative 1 and SDWQ Alternative 1 [No Project Alternative]) may require or 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 (e.g., biological resources, cultural resources, air quality, etc.).

SDWQ Alternative 2 would result in significant impacts on service providers. As described above in Section 17.3, this is because SDWQ Alternative 2 could result in a change to existing wastewater treatment requirements established by the Central Valley Water Board and NPDES permits. Therefore, significant and unavoidable impacts would be a result of service providers not meeting NPDES effluent limitations and needing to construct or operate new wastewater treatment facilities or infrastructure that could cause significant environmental effects on other resources (e.g., biological resources, cultural resources, air quality, etc.).

17.4.8 Energy and Climate Change

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative), LSJR Alternative 3, and LSJR Alternative 4 would have significant and unavoidable climate change 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, LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) 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 would experience a decrease in surface water diversions from additional eastside tributaries (e.g., the Merced and Tuolumne Rivers).

17.5 Comparison of Alternatives

LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative) would result in significant changes when compared to baseline conditions in Merced River flows (reduced) and Stanislaus River flows (increased). Therefore, the No Project Alternative is expected to result in significant impacts on resources such as aquatic 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 agriculture, groundwater resources, service providers, and other resources that rely on surface water diversions because surface water diversions are expected to be reduced on the Stanislaus River to allow for the increase in flow. No Project Alternative conditions are expected to be the same on the Tuolumne River and, therefore, would result in impacts that are less than significant.

LSJR Alternative 2 has the fewest significant and unavoidable impacts when compared to the other LSJR alternatives, particularly on the Tuolumne and Merced Rivers, as baseline flows on those rivers are nearly similar to those that would be required by this alternative. However, LSJR Alternative 2 does not achieve the purpose and goals of protecting and maintaining the beneficial use of fish and wildlife on the Stanislaus River because of this alternative would allow substantially lower flows when compared to baseline conditions. These lower flows result in significant and unavoidable impacts on resources requiring or relying on flows, including surface hydrology and water quality, aquatic resources, and terrestrial biological resources. LSJR Alternatives 3 or 4 result in impacts that are less than significant on those resources requiring or relying on flow (e.g., aquatic resources, terrestrial biological resources) but significant and unavoidable impacts on those resources that rely on surface water diversions (e.g., water supply, surface hydrology, and water quality; groundwater resources; agricultural resources; service providers; and energy resources and climate change). None of the LSJR alternatives would result in growth-inducing effects.

When comparing the environmental impacts of all the LSJR alternatives, LSJR Alternative 2 might be considered the environmentally superior alternative because of its relatively few environmental effects on the Tuolumne and Merced Rivers. However, taking into consideration that it does not achieve the purpose and goals of protecting and maintaining the beneficial uses of fish and wildlife, particularly on the Stanislaus River, and that it would actually result in significant and unavoidable impacts on aquatic and terrestrial biological resources, LSJR Alternative 3 would be the next environmentally superior alternative. LSJR Alternative 3 (requiring 40 percent unimpaired flow) would have fewer impacts on aquatic and terrestrial biological resources than LSJR Alternative 2

and, would provide for improved conditions on the Tuolumne and Merced Rivers. This is generally because the baseline flow on the Stanislaus River is approximately 40 percent of the average unimpaired flow and thus would either have no impacts when compared to baseline conditions or less than significant impacts when compared to baseline conditions. And because the flows on the Tuolumne and Merced Rivers are approximately 20 percent of the average unimpaired flow and thus would only increase an additional 20 percent under LSJR Alternative 3 when compared to LSJR Alternative 4. The impacts on resources dependent on surface water diversions would be more impacted under LSJR Alternative 3, particularly on the Tuolumne and Merced Rivers, but much less than under LSJR Alternative 4.

As discussed in Chapter 5, *Water Supply, Surface Hydrology, and Water Quality*, the water quality of the southern Delta under SDWQ Alternative 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), primarily because there would be no change in the USBR requirement to maintain salinity at Vernalis (0.7 dS/m April–August and 1.0 dS/m September–March as a 30-day average). Therefore, because there is no change to baseline conditions, there are very few impact mechanisms that could result in impacts on resources under these two alternatives. SDWQ Alternative 2 would reduce the number of water quality exceedances experienced at the 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.

Under SDWQ Alternative 2, there would be significant and unavoidable impacts on service providers because some service providers (e.g., City of Tracy and City of Stockton) may exceed effluent limitations if the limitations are set at the water quality objective proposed under SDWQ Alternative 2, thus necessitating the need for the construction or operation of new or expanded wastewater treatment plant facilities or infrastructure. Under SDWQ Alternative 3, impacts on service providers would be less than significant because it is expected all service providers could meet the effluent limitations if the limitations are set at the water quality 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 will correspondingly improve.

When considering the environmental impacts of SDWQ Alternative 2 and SDWQ Alternative 3, SDWQ Alternative 3 would be considered the environmentally superior alternative because it has no significant and unavoidable impacts.

17.6 Impact Summary Table

Table 17-2 below summarizes the environmental impacts and determinations by resource and alternative.

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Table 17-2. Impact Determinations by Alternative

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
Chapter 5: Water Supply, Surface Hydrology, and Water Quality						
HYD-1: Substantially reduce monthly river flow values caused by the percent unimpaired flow objective	Significant and unavoidable - Flows would be greater than the LSJR Alternative 3 flows on the Stanislaus River; therefore, it is expected that monthly river flows would not be reduced when compared to the baseline. Additionally, the No Project Alternative flow on the Tuolumne is expected to be similar to baseline flows and thus is not expected to substantially reduce the monthly river flows. However, the flows on the Merced River would be less than the baseline flows without Vernalis Adaptive Management Program (VAMP) (particularly during lower flow times in drier periods) when compared to the baseline. Therefore, monthly river flows values would be reduced. The Vernalis salinity objective would continue to be maintained and does not represent a change from baseline with respect to flow.	Significant and unavoidable - Flows are reduced substantially on the Stanislaus River such that the average February—June flows value are reduced by 5% of the maximum flow when compared to the baseline flows; adaptive management cannot modify flows on this river as there would not be enough water to reallocate between months. Therefore, monthly river flow values would be substantially reduced on the Stanislaus. The average monthly flow values on the Merced and Tuolumne Rivers and LSJR would not be reduced by 5% of the maximum flow values.	Less than significant - The average monthly flow value would increase on the Stanislaus, Merced and Tuolumne rivers and LSJR; therefore, monthly river flow values would not be substantially reduced on these rivers.	Less than significant - The average monthly flow value would increase on the Stanislaus, Merced and Tuolumne rivers and LSJR; therefore, monthly river flow values would not be substantially reduced on these rivers.	No Impact - The Vernalis objective would continue to be maintained and would not represent a change from baseline with respect to flow. Furthermore, this alternative would not be related to percent of unimpaired flow.	No Impact - The Vernalis objective would continue to be maintained and would not represent a change from baseline with respect to flow. Furthermore, this alternative would not be related to percent of unimpaired flow.
HYD-2: Substantially alter hydrology such that regulating reservoir operations are limited	Less than significant - The monthly average hydropower release flow variations would continue to be within the normal baseline on the three rivers and the No Project would not cause substantial changes in the flows or water elevations in the regulating reservoirs or in the river segments that connect the rim dams to the downstream regulating reservoirs. Dam operators would continue to have the flexibility with hydroelectric production to choose to generate with reduced capacity for more hours each day or with increased capacity for less hours.	Less than significant - The monthly average hydropower release flow variations would be within the baseline. No substantial changes in the flows or water elevations in the regulating reservoirs or in the river segments that connect the rim dams to the downstream regulating reservoirs would occur.	Less than significant - The monthly average hydropower release flow variations would be within the baseline. No substantial changes in the flows or water elevations in the regulating reservoirs or in the river segments that connect the rim dams to the downstream regulating reservoirs would occur.	Less than significant - The monthly average hydropower release flow variations would be within the baseline. No substantial changes in the flows or water elevations in the regulating reservoirs or in the river segments that connect the rim dams to the downstream regulating reservoirs would occur.	No Impact - The Vernalis objective would continue to be maintained and would not represent a change from baseline with respect to flow; therefore, substantial alterations to hydrology are not expected that would affect regulating reservoirs.	No Impact - The Vernalis objective would continue to be maintained and would not represent a change from baseline with respect to flow. Therefore, substantial alterations to hydrology are not expected that would affect regulating reservoirs.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
Impact WS-1: Substantially reduce surface water supply diversions caused by a change in river flows or reduce exports to CVP and SWP export service areas caused by a change in river flows	Significant and unavoidable - Surface water diversions would be greatly reduced when compared to baseline conditions on the Stanislaus River. The surface water diversion reductions would be greater than those expected under LSJR Alternative 4 and, therefore, impacts associated with surface water diversion reductions would be greater. The modeled surface water diversions on the Tuolumne and Merced Rivers are not expected to be reduced significantly when compared to baseline conditions. A reduction in exports to the CVP/SWP export service areas is not expected because the Stanislaus River flow would be higher than baseline flows and because the Tuolumne River flows would remain the same as baseline conditions.	Less than significant - Surface water diversions would not be reduced greater than 5% of the maximum demand from the Stanislaus, Tuolumne, or Merced Rivers. A reduction in annual average exports to the CVP and SWP export service areas is not expected as a result of reduced inflow in some months from the LSJR. Therefore, a substantial reduction in surface water supply diversions or reduced exports would not occur.	Significant and unavoidable - Surface water diversions would be reduced greater than 5% of the maximum demand and would be unable to be replaced by additional surface water diversions on the Stanislaus, Tuolumne, or Merced Rivers. A reduction in the annual average exports to the CVP and SWP export service areas is not expected as inflow would increase from the LSJR. Therefore, a substantial reduction in surface water supply diversions would occur, but a reduction in exports would not occur.	Significant and unavoidable - Surface water diversions would be reduced greater than 5% of the maximum demand and would be unable to be replaced by additional surface water diversions on the Stanislaus, Tuolumne, or Merced Rivers. A reduction in the annual average exports to the CVP and SWP export service areas is not expected as inflow would increase from the LSJR. Therefore, a substantial reduction in surface water supply diversions would occur, but a reduction in exports would not occur.	No Impact - See HYD-1.	No Impact - See HYD-1.
WQ-1: Violate water quality objectives 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 Vernalis and/or southern Delta EC objective would be met because the purpose of the No Project Alternative is to meet the flow and EC objectives. Therefore, a violation of water quality objectives above the water quality objectives for salinity at Vernalis or southern Delta compliance stations would not occur	Less than significant - There would be an increased incidence of EC values above the existing EC objectives for the interior southern Delta compliance stations; but they would not increase greater than 5%. Therefore, a violation of water quality objectives above the water quality objectives for salinity at Vernalis or southern Delta compliance stations would not occur because it is expected the slight increase would continue to protect beneficial uses.	Less than significant - There would be an overall reduction in the incidence of EC values above the existing EC objectives for the interior southern Delta compliance stations. Therefore, a violation of water quality objectives above the water quality objectives for salinity at Vernalis or southern Delta compliance stations would not occur	Less than significant - There would be an overall reduction in the incidence of EC values above the existing EC objectives for the interior southern Delta compliance stations. Therefore, a violation of water quality objectives above the water quality objectives for salinity at Vernalis or southern Delta compliance stations would not occur	Less than significant - There would be an overall reduction of EC values above 1.0 dS/m when compared to existing EC objectives. Therefore, a violation of water quality objectives for salinity at Vernalis or southern Delta compliance stations would not occur.	Less than significant - There would be a reduction of monthly exceedances when compared to existing EC objectives. Therefore, a violation of water quality objectives above the water quality objectives for salinity at Vernalis or southern Delta compliance stations would not occur.
WQ-2: Substantially degrade water quality by increasing Vernalis and/or southern Delta salinity (EC) such that agricultural beneficial uses are impaired	Less than significant - Vernalis and/or southern Delta EC would not be expected to increase because part of the purpose of the No Project flow is to maintain EC at Vernalis.	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 under LSJR Alternative 2 would remain very similar to baseline salinity conditions, and would not experience an increase of more than 5% of the EC objective (0.035 dS/m); 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 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 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 - There would be no change in water quality relative to baseline; accordingly, it is not anticipated agricultural beneficial uses would be impaired.	Less than significant - There would be no change in water quality relative to baseline; accordingly, it is not anticipated agricultural beneficial uses would be impaired.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
WQ-3: Substantially degrade water quality by increasing water temperature caused by reduced river flows	Significant and unavoidable - Water temperatures are not expected to increase because flow in the Stanislaus River would remain above baseline. Temperature effects are not expected on the Tuolumne because flows would not change. However, on the Merced River, flows would be reduced when compared to baseline and would likely result in an increase in temperature in this river above baseline conditions.	Significant and unavoidable - The average monthly water temperatures would not increase more than 2°F in the Merced and Tuolumne Rivers and LSJR but are expected to increase in April, May, and June by more than the 2°F in the Stanislaus River because of the reduced river flows when compared to baseline. Therefore, it is expected that the increase in water temperatures would substantially degrade water quality.	Less than significant - The average monthly water temperatures would not increase more than 2°F in the Merced, Tuolumne, and Stanislaus Rivers and the LSJR. Therefore, it is expected that the change in water temperatures would not substantially degrade water quality.	Less than significant - The average monthly water temperatures would not increase more than 2°F in the Merced, Tuolumne, and Stanislaus Rivers and the LSJR. Therefore, it is expected that the change in water temperatures would not substantially degrade water quality.	No Impact – this alternative does not have the ability to change temperature in a river because it sets a water quality objective for salinity (not temperature).	No Impact – this alternative does not have the ability to change temperature in a river because it sets a water quality objective for salinity (not temperature).
WQ-4: Substantially degrade water quality by increasing contaminant concentrations caused by reduced river flows	Significant and unavoidable – Flows are not expected to be reduced on the Tuolumne, LSJR or Stanislaus such that contaminant concentrations would increase. However, on the Merced River, flows would be reduced when compared to baseline and would likely result in an increase in contaminant concentrations above baseline conditions.	Significant and unavoidable – Flows are reduced on the Stanislaus and Tuolumne Rivers in some months such that contaminant concentrations would increase by more than 50% of the baseline concentrations. Therefore, it is expected that this increase in concentration would substantially degrade water quality. Flows are not reduced substantially on the Merced River or LSJR.	Less than significant – Flows are not reduced substantially and baseline contaminant concentrations would not increase by more than 50% of the baseline concentrations on the Stanislaus, Tuolumne, or Merced Rivers or in the LSJR. Therefore, it is expected that the change in concentrations would not substantially degrade water quality.	Less than significant – Flows are not reduced substantially and baseline contaminant concentrations would not increase by more than 50% of the baseline concentrations on the Stanislaus, Tuolumne, or Merced Rivers or in the LSJR. Therefore, it is expected that the change in concentrations would not substantially degrade water quality.	No Impact – this alternative does not have the ability to result in an increase in contaminant concentrations because the Vernalis objective would continue to be maintained and does not represent a change from baseline with respect to flow.	No Impact – this alternative does not have the ability to result in an increase in contaminant concentrations because The Vernalis objective would continue to be maintained and does not represent a change from baseline with respect to flow.
Chapter 6: Flooding, Sediment, and Erosion						
FLO-1: Substantially alter the existing drainage pattern of the site or area through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on or offsite	Less than Significant - Flows would be lower than channel capacities on the Stanislaus, Tuolumne, and Merced Rivers. Sediment transport, bank erosion or meander-bend migration issues, and contribution to levee instability are not expected. 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.	Less than significant - Flows would be much lower than channel capacities, so there would be no sediment transport, bank erosion or meander-bend migration issues, and no contribution to levee instability. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in substantial erosion or siltation.	Less than significant - Same as LSJR Alternative 2 although very occasional gravel transport and bank erosion would occur in the upper gravel-bedded reaches of the eastside tributaries. The amount of bank erosion is limited by flood action levels and existing bank armoring. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in substantial erosion or siltation.	Less than significant - Same as LSJR Alternative 3 with occasional gravel transport and bank erosion in the upper gravel-bedded reaches of the eastside tributaries. The amount of bank erosion is limited by the action stage and existing bank armoring. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in substantial erosion or siltation. m	No Impact – this alternative does not have the ability to result in flooding, sediment, or erosion because it sets a water quality objective for salinity.	No Impact – this alternative does not have the ability to result in flooding, sediment, or erosion because it sets a water quality objective for salinity.
FLO-2: Substantially alter the existing drainage pattern of the site or area through the alteration of the course of a stream or river or substantially increase the rate of surface runoff in manner that would result in flooding on or offsite	Less than significant - Flows would be much lower than channel capacities on the Stanislaus, Tuolumne, and Merced Rivers. Therefore, significant flooding impacts are not expected to occur outside of floodways. The No Project Alternative would not change reservoir flood storage capacity and would not violate U.S. Army Corps of Engineers (USACE) flood reservation, so there would be no changes in flood control releases during major flood events.	Less than significant - Flows would be much lower than channel capacities, and no significant flooding impact would occur outside of floodway. Flow objectives 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. On an annual basis, flows greater than 1,500 cubic feet per second (cfs) on the Stanislaus River would be less frequent than under baseline conditions. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in flooding.	Less than significant – Same as Alternative 2. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in flooding.	Less than significant - Flows greater than 1,500 cfs on the Stanislaus River would occur with greater frequency than baseline conditions from April–June; however, the associated seepage would not have an effect on erosion due to the rate and volume of water and would not be surface inundating. Therefore, substantial alterations of the existing drainage patterns would not occur and would not result in flooding.	No Impact – See FLO-1.	No Impact – See FLO-1.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
Chapter 7: Aquatic Resources						
AQUA-1: Changes in availability of warmwater species reservoir habitat resulting from change in reservoir water levels	Less than significant - Reservoir elevations at New Melones, New Don Pedro, or Lake McClure are expected to remain similar to the baseline elevations. They are not expected to be significantly reduced when compared to baseline conditions. Therefore, changes in the availability of warmwater reservoir species habitat are not expected.	Less than significant - Changes in the occurrence of 15 foot fluctuations in reservoir levels would be less than 10%; therefore, a reduction in spawning/rearing success of warmwater species is not expected.	Less than significant - Changes in the occurrence of 15 foot fluctuations in reservoir levels would be less than 10%; therefore, a reduction in spawning/rearing success of warmwater species is not expected.	Less than significant - Changes in the occurrence of 15 foot fluctuations in reservoir levels would be less than 10%; therefore, a reduction in spawning/rearing success of warmwater species is not expected.	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	Less than significant - Reservoir elevations at New Melones, New Don Pedro, or Lake McClure are expected to remain similar to the baseline elevations. They are not expected to be significantly reduced when compared to baseline conditions. Therefore, changes in the availability of coldwater reservoir species habitat are not expected.	Less than significant - Changes to reservoir storage levels in the end of September would be less than 10%; therefore, a reduction in the availability of coldwater habitat is not expected.	Less than significant - Changes to reservoir storage levels in the end of September would be less than 10%; therefore, a reduction in the availability of coldwater habitat is not expected.	Less than significant - Changes to reservoir storage levels in the end of September would be less than 10%; therefore, a reduction in the availability of coldwater habitat is not expected.	No Impact – See AQUA-1.	No Impact – See AQUA.1.
AQUA-3: Changes in quantity/quality of spawning, rearing, and migration habitat resulting from changes in flow	Significant and unavoidable - Flow on the Stanislaus River would be increased relative to the baseline flows and would not reduce the quantity and quality of spawning, rearing, and migration habitat. The Tuolumne River would experience flow conditions similar to baseline conditions. However, the Merced River would experience a reduction in flow when compared to the baseline and would likely reduce habitat quantity and quality on this river.	Significant and unavoidable - Flows would be reduced greater than 10% during rearing and outmigrating periods on the Stanislaus River; furthermore, insufficient water would be available in the spring period (February–June) when compared to baseline conditions for adaptive management. Therefore, substantial impacts to the quantity/quality of spawning, rearing, and migration habitat would occur. The monthly median flow or the overall volume of water February–June would not substantially decrease on the Tuolumne and Merced Rivers and the LSJR during salmonid rearing and outmigrating periods; furthermore, the overall volume of water would be similar to baseline conditions on the Merced River during this time period, thus there would be sufficient water during the spring period to adaptively manage flows. Therefore, a reduction in the quantity/quality of spawning, rearing, and migration habitat on these rivers would not occur.	Less than Significant - The overall volume of water February–June would be similar to baseline conditions on the Stanislaus River; therefore, there would be sufficient water during the spring period to adaptively manage flows. Furthermore, flows would not be reduced greater than 10% during salmonid rearing and outmigrating periods on the Tuolumne, Merced, and LSJR. Therefore, a reduction in the quantity/quality of spawning, rearing, and migration habitat would not occur.	Less than significant - Flows would not be reduced greater than 10% on the major SJR tributaries or LSJR; therefore, a reduction in the quantity/quality of spawning, rearing, and migration habitat would not 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.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-4: Changes in exposure of fish to stressful water temperatures resulting from changes in reservoir storage and releases	Significant and unavoidable - Temperatures would not increase on the Stanislaus or Tuolumne Rivers because flows would increase on the Stanislaus River and would remain similar to baseline flows on the Tuolumne. However, the reduction in flow on the Merced River when compared to the baseline would likely increase temperatures on this river during lower flow periods resulting in stressful water temperatures.	Significant and unavoidable - The frequency of temperatures exceeding U.S. Environmental Protection Agency recommended criteria are anticipated to increase by over 10% on the Stanislaus River, therefore, significant impacts would occur on rearing and emigrating salmonids. The monthly median flow or the overall volume of water February–June would not substantially decrease on the Tuolumne and Merced Rivers and the LSJR; therefore, changes in the exposure of fish to stressful water temperatures would not occur.	Less than Significant - The overall volume of water February–June would be similar to baseline conditions on the Stanislaus River; therefore, there would be sufficient water during the spring period to adaptively manage flows and changes in exposure of fish to stressful water temperatures would not occur. Flows are expected to generally increase on the Tuolumne and Merced Rivers and not substantially change on the LSJR from baseline conditions; therefore, changes in the exposure of fish to stressful water temperatures would not occur.	Less than significant - The frequency of water temperatures potentially causing thermal stress in juvenile salmon and steelhead during the spring rearing and outmigration period would decrease in each of the rivers; therefore, changes in the exposure of fish to stressful water temperatures would not occur.	No Impact – See AQUA-3.	No Impact – See AQUA-3.
AQUA-5 : Changes in exposure to pollutants resulting from changes in flow (dilution/mobilization effects)	Significant and unavoidable - The exposure to pollutants resulting from changes in flow would not increase on the Stanislaus or Tuolumne Rivers because the Tuolumne River would experience flow conditions similar to baseline conditions and the Stanislaus River flows would be increased. However, the reduction in flow on the Merced River when compared to the baseline would likely increase pollutant exposure to fish on this river during lower flow periods.	Significant and unavoidable - Lower flows and increased thermal stress is anticipated on the Stanislaus River, therefore, substantially low dilution effects would be expected resulting in an increased vulnerability of fish to the effects of pollutants. The monthly median flow or the overall volume of water February–June would not substantially decrease on the Tuolumne and Merced Rivers and the LSJR; therefore, substantially low dilution effects would not be expected and there would not be an increased vulnerability of fish to the effects of pollutants.	Less than Significant - The overall volume of water February– June would be similar to baseline conditions on the Stanislaus River; therefore, substantially low dilution effects are not expected and there would not be an increased vulnerability of fish to the effects of pollutants because there would be sufficient water during the spring period to adaptively manage flows. Flows are expected to generally increase on the Tuolumne and Merced Rivers and not substantially change on the LSJR from baseline conditions; therefore, substantially low dilution effects are not expected and there would not be an increased vulnerability of fish to the effects of pollutants.	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 (mobilization)	Less than significant - Peak flows are not expected to affect the frequency of overbank or bed mobilization flows on the Stanislaus River. Similar but fewer impacts, as those described above, would occur on the Tuolumne because flows would be similar to baseline conditions, and flows on the Merced River would not be more than baseline. Therefore, the change in flows would not mobilize more suspended sediment.	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	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-7: Changes in redd dewatering and fish stranding losses resulting from flow fluctuations	Less than significant - Redd dewatering on the Stanislaus, Tuolumne, and Merced Rivers would be similar to baseline conditions. All of these rivers have operational controls at the reservoirs that require establishing flow conditions that reduce redd dewatering. These conditions would not be expected to change under the No Project Alternative.	Significant and unavoidable - Increases in the frequency of flow reductions of 1 foot or more by 14 percent in March could substantially increase the frequency of dewatering and stranding impacts on steelhead redds and Chinook salmon fry in the Stanislaus River. Redd dewatering would be similar to baseline conditions on the Tuolumne and Merced.	Less than significant - The potential for significant redd dewatering and fish stranding impacts would be similar to baseline conditions or would be reduced when compared to baseline conditions. Although the potential for significant impacts exist on the Stanislaus River in March (e.g., increases in the frequency of flow reductions of 1 foot or more by 15%), the overall volume of water February—June would be similar to baseline conditions such that there would be sufficient water to adaptively manage flows to minimize potential redd dewatering and stranding impacts. All other rivers would either result in no change from the baseline with respect to redd dewatering or a reduction in the potential for redd dewatering.	Less than significant - The potential for significant redd dewatering and fish stranding impacts would be similar to baseline conditions or would be reduced when compared to baseline conditions. Although the potential for significant impacts exist on the Stanislaus River in March (e.g., increases in the frequency of flow reductions of 1 foot or more by 11%), the overall volume of water February—June would be similar to baseline conditions such that there would be sufficient water to adaptively manage flows to minimize potential redd dewatering and stranding impacts. All other rivers would either result in no change from the baseline with respect to redd dewatering or a reduction in the potential for redd dewatering.	No Impact - See AQUA-3.	No Impact - See AQUA-3.
AQUA-8: Changes in spawning habitat quality resulting from changes in flood flows	Less than significant - Higher peak flows are expected to occur, as described in AQUA-6; however, they would not be expected to occur with the frequency or duration such that they would damage existing spawning habitat on the Stanislaus River because flows would generally be limited at the higher flows on the Stanislaus that cause damage (e.g., 5,000–8,000 cfs) and similar peak flows would occur. Additionally, similar peak flows would occur on the Merced and Tuolumne Rivers because they would be associated with flood flows that currently occur.	Less than significant - Changes in the frequency of peak flows are not expected to be substantially modified from baseline conditions, therefore, there would be no substantial impact on spawning habitat quality resulting from changes in peak flow.	Less than significant - Changes in the frequency of peak flows are not expected to be substantially modified from baseline conditions, therefore, there would be no substantial impact on spawning habitat quality resulting from changes in peak flow.	Less than significant - Changes in the frequency of peak flows are not expected to be substantially modified from baseline conditions, therefore, there would be no substantial impact on spawning habitat quality resulting from changes in peak flow.	No Impact - See AQUA-3	No Impact - See AQUA-3
AQUA-9: Changes in food availability resulting from changes in flow, nutrient transport, and water quality (food web support)	Less than significant - Changes in the primary processes (i.e. bed mobilizing flows, and floodplain inundating flows see AQUA-6) that alter food web support would not be substantial because these peak flows would continue to occur as they do under the baseline, therefore, there would be no substantial impact to food availability.	Less than significant - Changes in the primary processes (i.e. bed mobilizing flows, and floodplain inundating flows) that alter food web support would not be substantial, therefore, there would be no substantial impact to food availability.	Less than significant - Changes in the primary processes (i.e. bed mobilizing flows, and floodplain inundating flows) that alter food web support would not be substantial, therefore, there would be no substantial impact to food availability.	Less than significant - Changes in the primary processes (i.e. bed mobilizing flows, and floodplain inundating flows) that alter food web support would not be substantial, therefore, there would be no substantial impact to food availability.	No Impact - See AQUA-3.	No Impact - See AQUA-3.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-10: Changes in predation risk resulting from changes in flow and water temperature	Significant and unavoidable - Flow on the Stanislaus and Tuolumne Rivers would not change the predation risk because it would be greater than, or similar to, the baseline. However, the reduction in flow on the Merced River when compared to the baseline would likely result in substantial change and increase in predation risk to fish on this river.	Significant and unavoidable - Lower flows and higher temperatures are expected on the Stanislaus River when compared to baseline conditions; therefore, it is expected that there would be an increase predation risk . Flows and temperatures would remain unchanged compared to baseline conditions on the Tuolumne River, and the overall volume of water available February-June would be similar to baseline conditions on the Merced River and the LSJR; therefore, it is expected that there would not be an increase in predation risk.	Less than significant - The overall volume of water February- June would be similar to baseline conditions on the Stanislaus River; therefore, there would be sufficient water during the spring period to adaptively manage flows and as a result there would not be an increase in predation risk. Flows are expected to generally increase on the Tuolumne and Merced Rivers and not substantially change on the LSJR from baseline conditions; therefore, it is expected there would not be an increase in predation risk.	Less than significant - Changes in flow and temperatures are not anticipated to result in stress to fish; therefore, it is expected that there would not be an increase in predation risk.	No Impact - See AQUA-3.	No Impact - See AQUA-3.
AQUA-11: Changes in disease risk resulting from changes in flow, water temperature, and water quality	Significant and unavoidable - Flow on the Stanislaus and Tuolumne Rivers would not change the exposure to disease risk because it would be greater to, or similar to, the baseline. However, the reduction in flow on the Merced River when compared to the baseline would likely result in reduced flows, increased temperatures, and a potential increase in disease risk to fish on this river.	Significant and unavoidable - In April, water temperatures exceeding 59°F at the confluence of the Stanislaus River are predicted to occur 91% of the time when compared to baseline conditions; therefore; there is the potential for a substantial increase in disease risk in the Stanislaus River. Monthly median flows and the overall volume of water February-June would not substantially decrease on the Tuolumne and Merced Rivers and the LSJR; therefore, an increase in occurrence of disease above 59°F is not expected to exceed 20%, and the risk of disease is not expected to increase.	Less than significant - The overall volume of water February-June would be similar to baseline conditions on the Stanislaus River. An increase in occurrence of disease above 59°F is not expected to exceed 12%. Therefore, there would be sufficient water during the spring period to adaptively manage flows and a substantial increase in disease risk is not expected. Monthly median flows and the overall volume of water February-June would not substantially decrease on the Tuolumne and Merced Rivers and the LSJR; therefore, an increase in occurrence of disease above 59°F is not expected to exceed 20%, and the risk of disease is not expected to increase.	Less than significant - An increase in the occurrence of temperatures above 59°F would be less than 1%; therefore, there would be no substantial increase in the risk of disease.	No Impact - See AQUA-3	No Impact - See AQUA-3

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
AQUA-12: Changes in fish transport resulting from changes in flow	Significant and unavoidable - Flow on the Stanislaus River would be higher than baseline so fish transport would increase. The Tuolumne River flow would not change and fish transport would not change. However, the reduction in flow on the Merced River when compared to the baseline would likely result in a reduced fish transport on this river.	Significant and unavoidable - Flows would be lower during the outmigrating period on the Stanislaus River; furthermore, insufficient water would be available in the spring period (February–June) when compared to baseline conditions for adaptive management. Therefore, there it is expected that travel times of juveniles to the Bay-Delta would be significantly impacted. The monthly median flow or the overall volume of water February–June would not substantially decrease on the Tuolumne, Merced, and LSJR during salmonid rearing and outmigrating periods; furthermore, the overall volume of water during this time period would be similar to baseline conditions on the Merced River and, therefore, there would be sufficient water during the spring period to adaptively manage flows. Thus, it is not expected fish transport would decrease relative to baseline conditions.	Less than significant - The overall volume of water February–June would be similar to baseline conditions on the Stanislaus River; therefore, there would be sufficient water during the spring period to adaptively manage flows. Thus, it is not expected fish transport flows would decrease relative to baseline conditions. Monthly median flows and the overall volume of water February–June would not substantially decrease on the Tuolumne and Merced Rivers and the LSJR; therefore, it is not expected fish transport flows would decrease relative to baseline conditions	Less than significant - Changes in flows are expected to decrease average travel times to the Bay-Delta and as a result, fish transport would increase. .	No Impact - See AQUA-3.	No Impact - See AQUA-3.
AQUA-13: Changes in southern Delta and estuarine habitat resulting from changes in SJR inflows and export effects	Less than significant - 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. Although potential substantial increases in southern Delta pumping could be expected in June based on the increase in Stanislaus River flows, no long-term changes in the inflow/outflow ratio would occur as described under LSJR Alternative 4 because of higher SJR flows at Vernalis. Consequently, no long-term significant impacts on juvenile salmonids or other special-status fish species are expected.	Less than significant –No substantial change in export pumping or the direction or magnitude of flows in the southern Delta is expected. The combination of monthly increases and decreases in pumping rates would not have substantial long-term effects on export pumping or 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 (OMR) flows to protect listed fish species from direct and indirect impacts of southern Delta operations. Therefore, changes in southern Delta and estuarine habitat are expected to be less than significant.	Less than significant –. No substantial change in export pumping or the direction or magnitude of flows in the southern Delta is expected. The combination of monthly increases and decreases in pumping rates would not have substantial long-term effects on export pumping or 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 (OMR) flows to protect listed fish species from direct and indirect impacts of southern Delta operations. Therefore, changes in southern Delta and estuarine habitat are expected to be less than significant.	Less than significant –. No substantial change in export pumping or the direction or magnitude of flows in the southern Delta is expected. The combination of monthly increases and decreases in pumping rates would not have substantial long-term effects on export pumping or 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 (OMR) flows to protect listed fish species from direct and indirect impacts of southern Delta operations. Therefore, changes in southern Delta and estuarine habitat are expected to be less than significant.	No Impact - See AQUA-3.	No Impact - See AQUA-3.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 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 Department of Fish and Game (DFG) and U.S. Fish and Wildlife Service (USFWS)	Significant and unavoidable - Flow on the Stanislaus and Tuolumne Rivers would not substantially alter the riparian habitat because flows would be similar to baseline conditions on the Tuolumne and would be greater than baseline conditions on the Stanislaus and, therefore, support existing riparian habitat. However, the reduction in flow on the Merced River when compared to the baseline would likely result in a substantial alteration of riparian habitat or other sensitive terrestrial communities on this river.	Significant and unavoidable - The lower spring median monthly flows and overall cumulative distribution of flows on the Stanislaus River would substantially affect existing riparian or sensitive terrestrial communities. Changes to median monthly flows and the overall cumulative distribution of flows on the Merced and Tuolumne Rivers and the LSJR would not substantially affect riparian or sensitive terrestrial communities because those flows would be within the historical range of existing flow variations. Fluctuations in reservoir elevations would not be substantially different than those that currently occur.	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	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 would not substantially effect riparian habitat or other sensitive terrestrial communities because those 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.	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. 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 - 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. 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.
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.	Less than significant - Flow on the Stanislaus, Tuolumne, and Merced Rivers would not substantially alter wetland communities resulting from changes in flow on these rivers. The Stanislaus River is not expected to have reductions in flow that would substantially alter wetland communities when compared to baseline conditions. The Tuolumne River would experience flow conditions similar to baseline conditions. While flows are expected to be reduced on the Merced River, which may change community composition and wetland habitat location as a result, emergent wetlands typically occur in the river bed adjacent to the low-flow river channels. Furthermore, wetlands are highly resilient ecosystems that are able to withstand a range of hydrologic conditions. Therefore, a substantial adverse effect on wetlands communities would not occur.	Less than significant - Community composition and wetland habitat location may change as a result of reduced monthly median flows on the Stanislaus River, Merced River, and LSJR; however, emergent wetlands typically occur in the river bed adjacent to the low-flow river channels and wetlands are highly resilient ecosystems that are able to withstand a range of hydrologic conditions. Therefore, a substantial adverse effect on wetlands communities would not occur. Monthly median flows on the Tuolumne River are expected to be similar to baseline conditions and, thus, would not pose a substantial adverse effect to wetland communities.	Less than significant - Community composition and wetland habitat location may change as a result of reduced monthly median flows on the Stanislaus River; however, emergent wetlands typically occur in the river bed adjacent to the low-flow river channels and wetlands are highly resilient ecosystems that are able to withstand a range of hydrologic conditions. Therefore, substantial impacts on wetlands communities would not occur. Monthly median flows and the cumulative distribution of flows on the 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. Therefore, a 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 and 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. Therefore, substantial adverse effects on wetland communities would not occur.	No Impact - See BIO-1.	No Impact – See BIO-1.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
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. While some alteration of vegetation patterns at specific locations, there is no information available to suggest that increased flows would substantially alter or facilitate the establishment of invasive plant or animal species.	Less than significant - Changes in flows and reservoir elevations may result in alteration of vegetation patterns in specific locations, but there is no information to suggest increased flows would substantially increase the distribution and abundance of invasive plant species.	Less than significant - Changes in flows and reservoir elevations may result in alteration of vegetation patterns in specific locations, but there is no information to suggest increased flows would substantially increase the distribution and abundance of invasive plant species.	Less than significant - Changes in flows and reservoir elevations may result in alteration of vegetation patterns in specific locations, but there is no information to suggest increased flows would substantially increase the distribution and abundance of invasive plant species.	No Impact - See BIO-1.	No Impact - See BIO-1.
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 DFG and USFWS	Significant and unavoidable – Impacts on special-status animal species dependent on riparian habitat and impacts on riparian habitat would be the same as those described above for BIO-1. Therefore, it is expected that special-status animal species would be adversely affected.	Significant and unavoidable - The special-status animal species present in the area of potential effects are dependent on riparian habitat. Reduced flows on the Stanislaus River would have a substantial adverse effect on riparian habitat, as described above for BIO-1; therefore, it is expected that special-status animal species would be adversely affected.	Less than significant - 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. Therefore, it is not expected that special-status animal species would be adversely affected.	Less than significant - 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. Therefore, it is not expected that special-status animal species would be adversely affected.	No Impact - See BIO-1.	No Impact - See BIO-1.
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 and unavoidable – Impacts on biological resources would be significant on the Merced River. By impacting habitat value, there would be a potential to conflict with habitat conservation plans or natural community conservation plans, therefore, conflicts with plans protecting biological resources would occur.	Significant and unavoidable - The lower spring median monthly flows and overall cumulative distribution of flows on the Stanislaus River would substantially affect existing riparian or sensitive terrestrial communities (BIO-1 and BIO-4). Therefore, impacts on biological resources would be significant on the Stanislaus River. By impacting habitat value, there would be a potential to conflict with plans protecting biological resources. Changes to median monthly flows and the overall cumulative distribution of flows on the Merced and Tuolumne Rivers and the LSJR would not substantially affect riparian or sensitive terrestrial communities because those flows would be within the historical range of existing flow variations. Therefore, impacts to 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 would not substantially effect riparian habitat or other sensitive terrestrial communities or the special-status animal species dependent on them (BIO-1 and BIO-4). Therefore, impacts to 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 would not substantially effect riparian habitat or other sensitive terrestrial communities or the special-status animal species dependent on them (BIO-1 and BIO-4). Therefore, impacts to 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.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
Chapter 9: Groundwater Resources						
Impact GW-1: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge	Significant and unavoidable - An increase in groundwater pumping would be needed to potentially offset the expected reduction in surface water diversions on the Stanislaus River. The reduction in surface water diversions would be greater than those expected for LSJR Alternative 4. Therefore, it is expected that a substantial depletion of groundwater supplies or substantial interference with groundwater recharge would occur. The surface water diversions on the Tuolumne and Merced Rivers would not be expected to be reduced significantly and, therefore, it is anticipated that a substantial increase in groundwater pumping would not occur when compared to baseline conditions.	Less than significant - Groundwater pumping to replace reduction in surface water diversions is expected to increase less than 5% of existing pumping. Therefore, a substantial depletion of groundwater supplies or substantial interference with groundwater recharge would not occur.	Significant and unavoidable - Groundwater pumping to replace reduction in surface water diversion is expected to be more than 5% of existing pumping in three subbasins (Modesto, Turlock, and Merced). Therefore, it is expected that a substantial depletion of groundwater supplies or substantial interference with groundwater recharge would occur.	Significant and unavoidable - Groundwater pumping to replace reduction in surface water diversion is expected to be more than 5% of existing pumping in four subbasins (Eastern San Joaquin, Modesto, Turlock, and Merced). Therefore, it is expected that a substantial depletion of groundwater supplies or substantial interference with groundwater recharge would occur.	No Impact – a change in groundwater pumping would not occur as a result of this alternative because there is no ability for this alternative to affect groundwater.	No Impact – a change in groundwater pumping would not occur as a result of this alternative because there is no ability for this alternative to affect groundwater.
Chapter 10: Recreational Resources and Visual Quality						
REC-1: Substantially reduce the use of existing recreation facilities or opportunities on rivers or at reservoirs	Less than significant - Reservoir elevations at are expected to remain relatively constant, not significantly reduced, when compared to baseline conditions. Therefore, changes to recreation facilities or opportunities at the reservoirs are not expected. Since the modeled Stanislaus River flows are expected to be greater than LSJR Alternative 3, but less than LSJR Alternative 4, it is not expected that these flows would substantially reduce the use of existing recreation facilities or opportunities on the rivers and reservoirs since neither of these alternatives would result in significant impacts. The Tuolumne and Merced Rivers would experience similar higher flows when compared to baseline conditions; therefore, it is not expected the use of existing recreation facilities or opportunities on the rivers and reservoirs would be substantially reduced.	Less than significant - The modeled seasonal average frequency of river flows that support recreation would not be reduced by more than 10%. The change in reservoir elevations would not be greater than 10 feet or decrease below designated recreational elevations. Therefore, it is expected that recreational opportunities would not be substantially reduced.	Significant and unavoidable – There would be a change in river flow such that the modeled average seasonal frequency of lower flows on the Merced and Tuolumne would be reduced by more than 10% and, therefore, it is expected that low-flow recreation opportunities (e.g., swimming, wading, floating) would be substantially reduced.	Significant and unavoidable – There would be a change in river flow such that the modeled average seasonal frequency of lower flows on the Merced and Tuolumne and mid-range flows on Tuolumne would be reduced by more than 10% and, therefore, it is expected that low-flow recreation opportunities (e.g., swimming, wading, floating) would be substantially reduced.	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	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
REC-2: Substantially degrade the functionality of existing recreation facilities on the rivers or at reservoirs	Less than significant – There would be no change in the frequency or magnitude of the highest river flows or increase in reservoir elevations above capacity; thus, the functionality of existing recreational facilities would not be degraded.	Less than significant –There would be no change in the frequency or magnitude of the highest river flows or increase in reservoir elevations above capacity; thus the functionality of existing recreational facilities would not be degraded.	Less than significant – There would be no change in the frequency or magnitude of the highest river flows or increase in reservoir elevations above capacity; thus the functionality of existing recreational facilities would not be degraded.	Less than significant – There would be no change in the frequency or magnitude of the highest river flows or increase in reservoir elevations above capacity; thus the functionality of existing recreational facilities would not be degraded.	No Impact – See REC-1.	No Impact – See REC-1.
REC-3: Substantially degrade the existing visual character or quality of the reservoirs	Less than significant - Reservoir elevations at New Melones, New Don Pedro, and Lake McClure are expected to remain relatively constant, and not substantially reduced, when compared to baseline conditions. Therefore, a substantial degradation of the visual character and quality of the area surrounding the reservoirs is not expected.	Less than significant - No decrease in reservoir elevation levels such that a substantial degradation of existing visual character or quality would occur.	Less than significant - No decrease in reservoir elevation levels such that a substantial degradation of existing visual character or quality would occur.	Less than significant - No decrease in reservoir elevation levels such that a substantial degradation of existing visual character or quality would occur.	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: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses	Significant and unavoidable - Substantial reductions in crop acreage as a result of the reductions in surface water diversions on the Stanislaus River is expected. The reduction in surface water diversions would be greater than that expected for LSJR Alternative 4 on the Stanislaus River, and LSJR Alternative 4 would result in significant impacts to agricultural resources. The surface water diversions on the Tuolumne and Merced Rivers are not expected to be reduced significantly and, therefore, it is anticipated that a substantial reduction in crop acreage would not occur in these watersheds.	Less than significant - Surface water diversions in the LSJR area of potential effects are expected to be similar to past and present diversions, and no significant reduction in surface water supply is expected; therefore, conversion of Prime or Unique farmland or farmland of Statewide Importance to nonagricultural uses would not occur.	Significant and unavoidable - Reductions in surface water diversions are expected to result in a 10% (or greater) reduction in acres of irrigated land for Corn, Field, Pasture, and Rice. Approximately 81,858 acres of Prime or Unique farmland or farmland of Statewide Importance requiring irrigation in 8 out of every 10 years could potentially be converted to nonagricultural use.	Significant and unavoidable - Reductions in surface water diversions are expected to result in a 10% (or greater) reduction in acres of irrigated land for Alfalfa, Corn, Field, Pasture, and Rice. Approximately 210,812 acres of Prime or Unique Farmland, or farmland of Statewide Importance requiring irrigation in 8 out of 10 years could potentially be converted to nonagricultural use.	Less than significant - 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. No reduction or conversion of agricultural acreage is likely.	Less than significant - 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. No reduction or conversion of agricultural acreage is likely.
AG-2: Other changes in the existing environment which, due to their location or nature, could result in a conversion of farmland to nonagricultural use	Significant and unavoidable - It is expected that the significant reduction in agricultural acreage described in AG-1 would result in the conversion of farmland to nonagricultural uses.	Less than significant - No significant reduction in surface water supply and corresponding reduction in agricultural acreage is expected; therefore, no conversion of farmland to nonagricultural uses is likely. Impacts on irrigated agriculture from a high water table resulting from increased river flows on the Stanislaus River are expected to occur on less than 0.01% of irrigated acreage therefore crop production would not be substantially reduced.	Less than significant - The total irrigated acreage is likely to be reduced due to reduction in surface water supply, however acreage could be rotated through alternate year irrigated production on approximately 40,000 acres, such that less than 10% of the remaining acreage could be converted to nonagricultural uses. Impacts on irrigated agriculture from a high water table resulting from increased river flows on the Stanislaus River are expected to occur on less than 0.01% of irrigated acreage therefore, crop production would not be substantially reduced.	Significant and unavoidable - The total irrigated acreage potentially reduced, due to surface water supply reductions, would be too great to maintain less than a 10% reduction through the use of dryland farming in alternating years and the acreage could be converted to nonagricultural uses. Impacts on irrigated agriculture from a high water table resulting from increased river flows on the Stanislaus River are expected to occur on less than 0.01% of irrigated acreage therefore, crop production would not be substantially reduced.	Less than significant –Water quality within the southern Delta is expected to remain unchanged as USBR will be responsible for complying with the same salinity requirements that currently exist at Vernalis. This is not expected to result in the conversion of farmland to non-agricultural use.	Less than significant –Water quality within the southern Delta is expected to remain unchanged as USBR will be responsible for complying with the same salinity requirements that currently exist at Vernalis. This is not expected to result in the conversion of farmland to non-agricultural use.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
Chapter 12: Cultural Resources						
CUL-1: Substantial adverse change in the significance of a historical or archaeological resource	Less than 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. Reservoir elevations at New Melones, New Don Pedro, and Lake McClure are expected to remain relatively constant or generally greater, not significantly reduced, when compared to baseline conditions. Therefore, substantial adverse changes in the significance of historical or archeological resources are not expected.	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. 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. 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. 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 – This alternative would not result in activities that could affect cultural resources.	No Impact - This alternative would not result in activities that could affect cultural resources.
CUL-2: Disturbance of human remains, including those interred outside formal cemeteries	Less than significant - The potential for the presence of undocumented human remains within and adjacent to the LSJR and the Stanislaus, Tuolumne, and Merced Rivers is considered low due to prior disturbance of the riparian corridors by natural and historic-era anthropogenic processes. Any human remains discovered within and adjacent to the LSJR and the three tributaries outside of formal cemeteries would also have been treated in accordance with state or federal regulations. Reservoir elevations at New Melones, New Don Pedro, and Lake McClure are expected to remain relatively constant or generally greater, not significantly reduced, when compared to baseline conditions. Therefore, a disturbance of human remains as a result of reservoir elevation changes is not expected.	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 and prior treatment under existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant - The expected changes in reservoir elevations are within historical fluctuations and are not expected to affect human remains due to low potential and prior treatment under existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	Less than significant - The expected changes in reservoir elevations are within historical fluctuations and are not expected to affect human remains due to low potential and prior treatment under existing state and federal regulations. Changes in river flows are not expected to alter the low potential for undocumented human remains to exist along rivers due to previous natural and anthropogenic disturbances.	No Impact – See CUL-1.	No Impact – See CUL-1.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
CUL-3: Disturbance or destruction of a unique paleontological resource or site or unique geologic feature	Less than 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 Melones, New Don Pedro, and Lake McClure are expected to remain relatively constant or generally greater, not significantly reduced, when compared to baseline conditions. Therefore, disturbance of unique paleontological resources is not expected.	Less than significant - The expected changes in reservoir elevations are within historical fluctuations, and caves are expected to continue to be inundated and exposed as they currently are under operations. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers due to depth of occurrence or previous natural and anthropogenic disturbances.	Less than significant - The expected changes in reservoir elevations are within historical fluctuations, and caves are expected to continue to be inundated and exposed as they currently are under operations. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers due to depth of occurrence or previous natural and anthropogenic disturbances.	Less than significant - The expected changes in reservoir elevations are within historical fluctuations, and caves are expected to continue to be inundated and exposed as they currently are under operations. Changes in river flows are not expected to alter the low potential for paleontological resources to exist along rivers due to depth of occurrence or previous natural and anthropogenic disturbances.	No Impact – See CUL-1.	No Impact – See CUL-1.
Chapter 13: Service Providers						
SP-1: Substantially degrade water quality for municipal drinking water purposes	Less than significant – Flows would result in compliance with the existing salinity objectives in the southern Delta. Thus, water quality would not be substantially degraded such that service providers diverting drinking water from the southern Delta would be affected.	Less than significant - The resulting inflow from the LSJR would not substantially modify the historical range of salinity (0.2 dS/m–1.2 dS/m) in the southern Delta; therefore, a substantial degradation of water quality affecting service providers that divert drinking water from the southern Delta would not occur.	Less than significant - The resulting inflow from the LSJR would not substantially modify the historical range of salinity (0.2 dS/m–1.2 dS/m) 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 resulting inflow from the LSJR would not substantially modify the historical range of salinity (0.2 dS/m–1.2 dS/m) 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 Vernalis salinity requirement contained in the program of implementation would maintain the historical range of salinity in the southern Delta. Furthermore, the objectives would be under the upper limit for the secondary drinking water maximum contaminant level (MCL) for EC. 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 Vernalis salinity requirement contained in the program of implementation would maintain the historical range of salinity in the southern Delta. Furthermore, the objectives would be under the upper limit for the secondary drinking water maximum contaminant level (MCL) for EC. Therefore, a substantial degradation of water quality affecting service providers diverting drinking water from the southern Delta would not occur.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
SP-2: Require or result in the construction of new or expanded water treatment facilities or water supply infrastructure, the construction of which could cause significant environmental effects	Significant and unavoidable - The surface water reductions expected on the Stanislaus River would likely result in insufficient water supplies for service providers that primarily rely on surface water sources because they would generally be greater than those described in LSJR Alternative 4 on the Stanislaus River. The construction and operation of new water supply facilities or infrastructure may be needed to provide alternative sources of water supply, which could cause significant environmental effects.	Less than significant - Surface water diversions would be similar to baseline conditions on the Stanislaus, Tuolumne, and Merced Rivers; therefore, it is not expected that service providers would construct or operate new water treatment facilities or water supply facilities or infrastructure.	Significant and unavoidable - Surface water diversion reductions on the Tuolumne and Merced Rivers are expected to be approximately 20% and 17%, respectively; the reductions in surface water diversions on the Tuolumne and Merced Rivers could result in the construction of new or expanded water treatment facilities or water supply infrastructure, the construction of which could result in significant environmental effects. Surface water diversions on the Stanislaus River would be similar to baseline conditions; therefore, the construction of new or expanded water treatment facilities or water supply facilities would not occur.	Significant and unavoidable - Surface water diversion reductions on the Stanislaus, Tuolumne, and Merced Rivers are expected to be approximately 20%, 37%, and 31%, respectively; the reductions in surface water diversions could result in the construction of new or expanded water treatment facilities or water supply infrastructure, which could result in significant environmental effects.	Less than significant - The USBR Vernalis salinity requirement contained in the program of implementation would not change and thus would maintain the general historical range of salinity in the southern Delta. Therefore, it is not expected that service providers would need to construct or modify water treatment or water supply facilities. Facilities that could be constructed as a result of wastewater treatment providers complying with new NPDES effluent limitations are discussed under SP-4.	Less than significant - The USBR Vernalis salinity requirement contained in the program of implementation would not change and thus would maintain the general historical range of salinity in the southern Delta. Therefore, it is not expected that service providers would need to construct or modify water treatment or water supply facilities. Facilities that could be constructed as a result of wastewater treatment providers complying with new NPDES effluent limitations are discussed under SP-4.
SP-3: Result in substantial changes to San Joaquin River inflows to the Delta such that insufficient water supplies would be available to service providers relying on CVP/SWP exports.	Less than significant – Exports are not anticipated to result in a substantial change from baseline conditions. Vernalis flows are expected to increase and thus a reduction of exports would not occur.	Less than significant - Annual average exports would not change from baseline conditions and annual average exports would be reduced by approximately 2% in February–June; insufficient water supplies to service providers relying on exports would not occur.	Less than significant - Annual average exports would not decrease from baseline conditions; insufficient water supplies to service providers relying on exports would not occur.	Less than significant - Annual average exports would not decrease from baseline conditions; insufficient water supplies to service providers relying on exports would not occur.	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.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
SP-4: Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities or infrastructure, the construction or operation of which could cause significant environmental effects	Significant and unavoidable - The existing EC objectives for the southern Delta and Vernalis would be enforced and adopted by the State Water Board as the wastewater treatment requirements. While the increase in flow expected would reduce the salinity in the southern Delta at the interior compliance stations and would achieve compliance at these stations, existing wastewater treatment plant dischargers (service providers), such as The City of Tracy, City of Stockton, and City of Manteca, would likely be unable to meet the current 2006 Bay-Delta Plan salinity objective of 0.7 dS/m April–August. The City of Tracy and City of Stockton would also likely not meet the current 2006 Bay-Delta Plan salinity objective of 1.0 dS/m. Therefore, it is expected that these service providers would exceed wastewater treatment requirements during some parts of the year such that new wastewater treatment facilities, or expansion of existing facilities or infrastructure could result, the construction or operation of which could cause significant environmental effects.	Wastewater treatment facilities and infrastructure associated with water supply facilities and infrastructure are discussed above under SP-2.	Wastewater treatment facilities and infrastructure associated with water supply facilities and infrastructure are discussed above under SP-2.	Wastewater treatment facilities and infrastructure associated with water supply facilities and infrastructure are discussed above under SP-2.	Significant and unavoidable - Tracy and Stockton may need to construct new wastewater treatment facilities or expand existing facilities to comply with changes to NPDES effluent limitation implementing a 1.0 dS/m salinity objective, set by the Central Valley Water Board. A change in baseline conditions with respect to Deuel would not result from this alternative.	Less than significant - The construction of new wastewater treatment facilities or expanding existing facilities are not expected in order to comply with changes to NPDES effluent limitations implementing a 1.4 dS/m objective for salinity, set by the Central Valley Water Board. This is because, with the exception of Deuel Vocational Institution (Deuel), their existing discharges are already below this objective. A change in baseline conditions with respect to Deuel would not result from this alternative.
Chapter 14: Energy Resources and Climate Change						
ECC-1: Adversely affect the reliability of California's electric grid	Less than significant - LSJR Alternatives 3 and 4 are not anticipated to result in an adverse effect on the reliability of California's electric grid. The No Project Alternative flows on the Stanislaus River would be somewhat greater than LSJR Alternative 3 flows; however, they are less than LSJR Alternative 4 flows. Therefore, it is expected that the electric grid would be maintained under the No Project Alternative. Furthermore, reservoir elevations at New Melones, New Don Pedro, and Lake McClure are expected to remain relatively constant or generally greater, not significantly reduced, when compared to baseline conditions. Therefore, adverse effects on the reliability of California's electric grid would not occur.	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 electric grid would not occur.	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 electric grid would not occur.	Less than significant - Transmission line loadings would not exceed the limits under contingency outage conditions after redispatch of generator facilities to correct a minor violation between Borden and Gregg substations and Gregg and Storey substations. Re-dispatches are regular occurrences in the California energy grid, and they provide a solution to redistribute power based on the redispatch. Therefore, adverse effects on the reliability of California's electric grid would not occur.	No Impact - The water quality objective for salinity could not affect energy resources or climate change.	No Impact - The water quality objective for salinity could not affect energy resources or climate change.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
ECC-2: Result in inefficient, wasteful, and unnecessary energy consumption	Less than significant - Additional energy consumption could occur as a result of groundwater pumping, it would not result in inefficient, wasteful, and unnecessary consumption of energy because the groundwater pumping is necessary to maintain water supply irrigation demand. Furthermore, it is anticipated that if new groundwater wells were to be installed, they would be efficient. Additional energy generation could be needed at other facilities to compensate for a potential loss of hydropower that could occur. 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 - Very little additional energy would be consumed under this alternative when compared to baseline conditions. 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 because the groundwater pumping is necessary to maintain water supply irrigation demand. 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 because the groundwater pumping is necessary to maintain water supply irrigation demand. 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 – See ECC-1.	No Impact – See ECC-1.
ECC-3: Generate GHG emissions, either directly or indirectly, that have a significant impact on the environment	Significant and unavoidable - An increase in groundwater pumping and a potential shift from hydropower to nonhydropower 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 emissions greater than the threshold of 10,000 megatons (MT) of GHGs, as described for both LSJR Alternative 3 and 4.	Less than significant - Emissions would not exceed the 10,000 MT carbon dioxide equivalent (CO ₂ e) threshold. Therefore, GHG emissions would not have a significant impact on the environment.	Significant and unavoidable - Emissions exceed the 10,000 MT CO ₂ e threshold. Therefore, GHG emissions would have a significant impact on the environment.	Significant and unavoidable - Emissions exceed the 10,000 MT CO ₂ e threshold. Therefore, GHG emissions would have a significant impact on the environment.	No Impact – See ECC-1.	No Impact – See ECC-1.
ECC-4: Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing the GHG emissions	Significant and unavoidable - Since the No Project Alternative would be expected to 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.	Less than significant - Since GHG emissions would not exceed the 10,000 MT CO ₂ e threshold it is expected 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 CO ₂ e threshold it is expected 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 CO ₂ e threshold it is expected there would be a conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHGs.	No Impact – See ECC-1.	No Impact – See ECC-1.

Impact	LSJR Alternative 1 and SDWQ Alternative 1 (No Project Alternative)	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4	SDWQ Alternative 2	SDWQ Alternative 3
ECC-5: Effect of global climate change on the LSJR and SDWQ alternatives	Less than significant - The State Water Board is required to prepare Water Quality Control Plans (WQCPs) and regularly review the plans 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, it is anticipated that the effect of global climate change on the No Project Alternative would be less than significant.	Less than significant - Climate change would not affect the impacts of the LSJR alternatives because of the adaptive management framework required to respond to changing circumstances with respect to flow and water quality that might arise due to climate change. Furthermore, the State Water Board is required to regularly review the WQCPs. The planning process continually accounts for changing conditions related to water quality, and water planning such as climate change.	Less than significant - Climate change would not affect the impacts of the LSJR alternatives because of the adaptive management framework required to respond to changing circumstances with respect to flow and water quality that might arise due to climate change. Furthermore, the State Water Board is required to regularly review the WQCPs. The planning process continually accounts for changing conditions related to water quality and water planning, such as climate change.	Less than significant - Climate change would not affect the impacts of the LSJR alternatives because of the adaptive management framework required to respond to changing circumstances with respect to flow and water quality that might arise due to climate change and because the State Water Board is required to regularly review the WQCPs. The planning process continually accounts for changing conditions related to water quality and water planning, such as climate change.	Less than significant - Climate change would not affect the impacts of the SDWQ alternatives since the State Water Board is required to regularly review the WQCPs. The planning process continually accounts for changing conditions related to water quality and water planning, such as climate change.	Less than significant - Climate change would not affect the impacts of the SDWQ alternatives since the State Water Board is required to regularly review the WQCPs. The planning process continually accounts for changing conditions related to water quality and water planning, such as climate change.
EC =	electrical conductivity (salinity)					
dS/m =	deciSiemens per meter					
USBR =	United States Bureau of Reclamation					
NPDES =	National Pollution Discharge Elimination System					
GHG =	greenhouse gas					
AB32 =	Assembly Bill 32, California Global Warming Solutions Act					