4.3 Impacts of Alternative 4A

4.3.1 Water Supply

Facilities construction under Alternative 4A would be identical to that described under Alternative 4. Alternative 4A water conveyance operations would be similar to the range of possible operations for the spring Delta outflow requirements that would occur under Alternative 4 H3 and Alternative 4 H4.

Model simulation results for Alternative 4A Early Long-term (ELT), which are represented by the range of Alternative 4 H3 (ELT) and Alternative 4 H4 (ELT), are summarized in Tables B.1-1 through B.1-3 in Appendix B of the RDEIR/SDEIS. Model simulation results for Alternative 4A at Late Long-term (LLT) which are similar to the range of Alternative 4 H3 (LLT) and Alternative 4 H4 (LLT) are summarized in Tables 5-7 through 5-9 in the Draft EIR/EIS.

As indicated in Section 5.3.2, *Determination of Effects*, of the Draft EIR/EIS, NEPA adverse effect and CEQA significant impact conclusions are not provided for the impacts discussed in this water supply sections.

4.3.1.1 Summary of Water Supply Operations under Alternative 4A

Change in Delta Outflow

Changes in long-term average Delta outflow under Alternative 4A (ELT) as compared to the No Action Alternative (ELT) and Existing Conditions are shown in Figures 4.3.1-1 through 4.3.1-3 in this RDEIR/SDEIS and Tables B.1-1 through B.1-3 in Appendix B of this RDEIR/SDEIS.

Changes in long-term average Delta outflow under Alternative 4A (LLT) (similar to range of Alternative 4 H3 [LLT] and Alternative 4 H4 [LLT]) as compared to the No Action Alternative (LLT) and Existing Conditions are shown in Figures 5-3 through 5-5 and Tables 5-7 through 5-9 of the Draft EIR/EIS.

Late-fall and winter outflows remain similar or show minor reductions in Alternative 4A compared to No Action Alternative. In the spring months, outflow would increase under Alternative 4A as compared to No Action Alternative. SWP and CVP exports in summer months would increase and result in lower outflow as compared to No Action Alternative. In the fall months, outflow under Alternative 4A as compared to No Action Alternative would be similar because of the Fall X2 requirement in wet and above-normal years, and increased or similar outflow in September and October months of all year types due to OMR flow requirements and export reductions.

Long-term average and wet year peak outflows would increase in winter months with a corresponding decrease in spring months because of the shift in system inflows caused by climate change and increased Delta exports as compared to Existing Conditions. In other year types, Alternative 4A would result in higher or similar outflow because of the spring outflow requirements. In summer and fall months, Alternative 4A would result in similar or higher outflow because of changes in export patterns and OMR flow requirements and export reductions in fall months, and also because of the Fall X2 requirements in wet and above normal years. The incremental changes in Delta outflow between Alternative 4A and Existing Conditions would be a function of both the

facility and operations assumptions (including north Delta intakes capacity of 9,000 cfs, less negative OMR flow requirements, enhanced spring outflow and/or Fall X2 requirements) and the reduction in water supply availability due to increased north of Delta urban demands, sea level rise and climate change.

Delta outflow under Alternative 4A would likely decrease in winter and summer months, or remain similar or increase in other months, compared to the conditions without the project.

Results for the range of changes in Delta Outflow under Alternative 4A (LLT), which is similar to range of Alternative 4 H3 (LLT) and Alternative 4 H4 (LLT), are presented in more detail in Appendix 5A, *BDCP EIR/S Modeling Technical Appendix*, of the Draft EIR/EIS.

Change in SWP and CVP Reservoir Storage

Changes in May and September reservoir storage under Alternative 4A (ELT) as compared to the No Action Alternative (ELT) and Existing Conditions are shown in Figures 4.3.1-4 through 4.3.1-10 and Tables B.1-1 through B.1-3 in Appendix B of this RDEIR/SDEIS for Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake. SWP and CVP San Luis Reservoir storages are presented in Figures 4.3.1-11 through 4.3.1-14 for completeness.

Changes in May and September reservoir storage under Alternative 4A (LLT) as compared to the No Action Alternative (LLT) and Existing Conditions are shown in Figures 5-6 through 5-12 and Tables 5-7 through 5-9 of the Draft EIR/EIS for Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake. SWP and CVP San Luis Reservoir storages are presented in Figures 5-13 through 5-16 of the Draft EIR/EIS for completeness.

Results for changes in SWP and CVP reservoir storages under Alternative 4A (LLT), which is similar to range of Alternative 4 H3 (LLT) and Alternative 4 H4 (LLT), are presented in more detail in Appendix 5A, *BDCP EIR/S Modeling Technical Appendix*, of the Draft EIR/EIS.

Trinity Lake

Under Alternative 4A, average annual end of September Trinity Lake storage as compared to No Action Alternative would increase or remain similar in most years.

Under Alternative 4A, average annual end of September Trinity Lake storage as compared to Existing Conditions would decrease or remain similar. This decrease would occur due to sea level rise, climate change, and increased north of Delta demands.

A comparison with storages under the No Action Alternative provides an indication of the potential change due to Alternative 4A and the results show that average annual end of September Trinity Lake storage could increase or remain similar under Alternative 4A as compared to the conditions without the project.

Shasta Lake

Under Alternative 4A, average annual end of September Shasta Lake storage as compared to No Action Alternative would remain similar at ELT and decrease (up to 3%) at LLT.

Under Alternative 4A, average annual end of September Shasta Lake storage as compared to Existing Conditions would decrease. This decrease would occur due to sea level rise, climate change, and increased north of Delta demands.

A comparison with storages under the No Action Alternative provides an indication of the potential change due to Alternative 4A and the results show that average annual end of September Shasta Lake storage could remain similar or decrease under Alternative 4A as compared to the conditions without the project.

Lake Oroville

Under Alternative 4A, average annual end of September Lake Oroville storage as compared to No Action Alternative would increase.

Under Alternative 4A, average annual end of September Lake Oroville storage as compared to Existing Conditions would decrease in all years. This decrease would occur due to sea level rise, climate change, and increased north of Delta demands.

A comparison with storages under the No Action Alternative provides an indication of the potential change due to Alternative 4A and the results show that average annual end of September Lake Oroville storage would increase under Alternative 4A as compared to the conditions without the project.

Folsom Lake

Under Alternative 4A, average annual end of September Folsom Lake storage as compared to No Action Alternative would remain similar at ELT and decrease (2%) at LLT.

Under Alternative 4A, average annual end of September Folsom Lake storage as compared to Existing Conditions decrease. This decrease primarily would occur due to sea level rise, climate change, and increased north of Delta demands.

A comparison with storages under the No Action Alternative provides an indication of the potential change due to Alternative 4A and the results show that average annual end of September Folsom Lake storage could decrease or remain similar under Alternative 4A as compared to the conditions without the project.

San Luis Reservoir

Under Alternative 4A, average annual end of September San Luis Reservoir storage as compared to the No Action Alternative would mostly decrease, due to changes in export patterns.

Under Alternative 4A, average annual end of September San Luis Reservoir storage as compared to Existing Conditions would decrease. This decrease primarily would occur due to sea level rise, climate change, and increased north of Delta demands.

A comparison with storages under the No Action Alternative provides an indication of the potential change due to Alternative 4A and the results show that average annual end of September San Luis Reservoir storage would generally decrease under Alternative 4A as compared to the conditions without the project.

Change in Delta Exports

Changes in average annual Delta exports under Alternative 4A (ELT) as compared to the No Action Alternative (ELT) and Existing Conditions are shown in Tables B.1-1 through B.1-3 in Appendix B and Figures 4.3.1-15 through 4.3.1-18 of this RDEIR/SDEIS.

Changes in average annual Delta exports under Alternative 4A (LLT) (similar to range of Alternative 4 H3 [LLT] and Alternative 4 H4 [LLT]) as compared to the No Action Alternative (LLT) and Existing Conditions are shown in Figures 5-17 through 5-20 and Tables 5-7 through 5-9 of the Draft EIR/EIS.

The addition of the north Delta intakes and changes to Delta regulatory requirements under Alternative 4A change SWP and CVP Delta exports as compared to Delta exports under Existing Conditions and the No Action Alternative.

Delta exports would either remain similar or increase in wetter years and decrease in drier years under Alternative 4A as compared to exports under No Action Alternative depending on the capability to divert water at the north Delta intakes during winter and spring months.

Total long-term average annual Delta exports under Alternative 4A would decrease as compared to exports under Existing Conditions reflecting changes in operations due to less negative OMR flows, implementation of Fall X2 and/or spring outflow under Alternative 4A, and sea level rise and climate change.

The incremental change in Delta exports under Alternative 4A as compared to No Action Alternative would be caused by the facility and operations assumptions of Alternative 4A. Delta exports would either remain similar or increase in wetter years and remain similar or decrease in the drier years under Alternative 4A as compared to the conditions without the project.

Change in SWP and CVP Deliveries

Impact WS-1: Changes in SWP CVP Water Deliveries during Construction

NEPA Effects: During construction of water conveyance facilities associated with Alternative 4A, operation of existing SWP and CVP water conveyance would continue. Construction would not affect the timing or amount of water exported from the Delta through SWP and CVP facilities.

***CEQA Conclusion*:** Constructing Alternative 4A water conveyance facilities would not impact operation of existing SWP or CVP facilities.

Impact WS-2: Change in SWP and CVP Deliveries

The addition of the north Delta intakes under Alternative 4A provides operational flexibility compared to deliveries under Existing Conditions and the No Action Alternative.

Changes in SWP and CVP Deliveries under Alternative 4A (ELT) as compared to the No Action Alternative (ELT) and Existing Conditions are shown in Tables B.1-1 through B.1-3 in Appendix B and Figures 4.3.1-22 through 4.3.1-28 of this RDEIR/SDEIS.

Changes in SWP and CVP Deliveries under Alternative 4A (LLT) (similar to range of Alternative 4 H3 [LLT] and Alternative 4 H4 [LLT]) as compared to the No Action Alternative (LLT) and Existing Conditions are shown in Figures 5-6 through 5-12 and Tables 5-7 through 5-9 of the Draft EIR/EIS.

Results for SWP and CVP deliveries at LLT are presented in more detail in Appendix 5A, *BDCP EIR/S Modeling Technical Appendix*, of the Draft EIR/EIS.

Total CVP Deliveries

Under Alternative 4A, average annual total CVP deliveries as compared to No Action Alternative, would increase by up to 3% at ELT and by up to 2% at LLT. Under Alternative 4A, average annual total south of Delta CVP deliveries as compared to No Action Alternative, would increase by about 5%.

Under Alternative 4A, average annual total CVP deliveries as compared to Existing Conditions, would increase by up to 3% at ELT and decrease by up to 2% at LLT. Under Alternative 4A, average annual total south of Delta CVP deliveries as compared to Existing Conditions, would decrease by up to 4% at ELT and by up to 9% at LLT. However, the decrease would occur due to sea level rise and climate change, and increased north of Delta demands.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change, and the results show that average annual total CVP deliveries and average annual total CVP south of Delta deliveries would increase or remain similar under Alternative 4A as compared to the conditions without the project.

CVP North of Delta Agricultural Deliveries

Under Alternative 4A, average annual CVP north of Delta agricultural deliveries would increase by up to 4% at ELT and by up to 2% at LLT as compared to No Action Alternative.

Under Alternative 4A, average annual CVP north of Delta agricultural deliveries as compared to Existing Conditions, would decrease by up to 18% at ELT and by up to 31% at LLT. However, this decrease primarily would occur due to sea level rise and climate change, and increased north of Delta demands.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in, the absence of the effects of increased north of delta demands and sea level rise and climate change, and the results show that average annual CVP north of Delta agricultural deliveries as compared to No Action Alternative would generally increase. Therefore, average annual CVP north of Delta agricultural deliveries would generally increase or remain similar under Alternative 4A as compared to the conditions without the project.

CVP South of Delta Agricultural Deliveries

Under Alternative 4A, average annual CVP south of Delta agricultural deliveries as compared to No Action Alternative would increase by up to 12% at ELT and by up to 13% at LLT.

Under Alternative 4A, average annual CVP south of Delta agricultural deliveries as compared to Existing Conditions would decrease by up to 6% at ELT and 18% at LLT. However, this decrease primarily would occur due to sea level rise and climate change, and increased north of Delta demands.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change and the results show that average annual CVP south of Delta agricultural deliveries as compared to No Action Alternative would generally increase. Therefore, average annual CVP south of Delta agricultural deliveries would increase or remain similar under Alternative 4A as compared to the conditions without the project.

CVP Settlement and Exchange Contract Deliveries

There would be negligible change to CVP Settlement Contract deliveries during dry and critical years under Alternative 4A as compared to deliveries under the No Action Alternative.

There would be negligible change to CVP Settlement Contract deliveries during dry and critical years under Alternative 4A at ELT as compared to deliveries under the Existing Conditions. Under Alternative 4A at LLT, CVP Settlement Contract deliveries during dry and critical years as compared to Existing Conditions would decrease. This is due to Shasta Lake storage declining to dead pool more frequently, as described previously, under increased north-of Delta demands and climate change and sea level rise conditions. As described in the methods section of Chapter 5, *Water Supply*, in the Draft EIR/EIS, model results and potential changes under these extreme reservoir storage conditions may not be representative of actual future conditions because changes in assumed operations may be implemented to avoid these conditions.

There would be no changes in deliveries to CVP Exchange Contractors under Alternative 4A.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change and the results show that CVP Settlement Contract and CVP Exchange Contractors deliveries during dry and critical years would remain similar. Therefore, CVP Settlement Contract and CVP Exchange Contractors deliveries during dry and critical years under Alternative 4A would be similar to the deliveries under the conditions without the project.

CVP North of Delta Municipal and Industrial Deliveries

Under Alternative 4A, average CVP north of Delta M&I deliveries as compared to No Action Alternative would remain similar of result in minor increase.

Under Alternative 4A, average annual CVP north of Delta M&I deliveries as compared to Existing Conditions would increase by up to 88% at ELT and 82% at LLT. However, this increase primarily would occur because there would be an increase in north of Delta M&I water rights demands under Alternative 4A and No Action Alternative as compared to demands under Existing Conditions.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change and the results show that average annual CVP north of Delta M&I deliveries would remain similar or show minor increase under Alternative 4A as compared to the deliveries under the No Action Alternative. Therefore, average annual CVP north of Delta M&I deliveries would remain similar or increase under Alternative 4A as compared to the conditions without the project.

CVP South of Delta Municipal and Industrial Deliveries

Under Alternative 4A, average CVP south of Delta M&I deliveries as compared to No Action Alternative, would increase by about 4%.

Under Alternative 4A, average annual CVP south of Delta M&I deliveries as compared to Existing Conditions would decrease by up to 2% at ELT and by up to 7% at LLT. However, this decrease primarily would occur due to sea level rise and climate change, and increased north of Delta demands.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change and the results show that average annual CVP south of Delta M&I deliveries would remain similar or increase under Alternative 4A as compared to the deliveries under the No Action Alternative. Therefore, average annual CVP south of Delta M&I deliveries would increase or remain similar under Alternative 4A as compared to the conditions without the project.

Total SWP Deliveries

Under Alternative 4A, average annual total SWP deliveries as compared to No Action Alternative, would decrease (by about 3%) or increase (by about 12%) depending upon range of spring outflow requirements. Under Alternative 4A, average annual total south of Delta SWP deliveries as compared to No Action Alternative, would decrease (by about 4%) or increase (by about 16%) depending upon range of spring outflow requirements.

Under Alternative 4A, average annual total SWP deliveries as compared to Existing Conditions, would decrease (9%)or increase (5%) at ELT and remain similar or decrease (13%) at LLT depending upon range of spring outflow requirements. Under Alternative 4A, average annual total south of Delta SWP deliveries as compared to Existing Conditions, would decrease (12%) or increase (7%) at ELT and would decrease (17%) or remain similar at LLT depending upon range of spring outflow requirements. However, the decrease in deliveries primarily would occur due to sea level rise and climate change.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A without the effects of sea level rise and climate change and the results show that under Alternative 4A average annual total SWP deliveries would decrease and increase. Therefore, average annual total SWP deliveries and average annual total SWP south of Delta deliveries under Alternative 4A would show a decrease or an increase as compared to the conditions without the project depending upon the range of spring Delta outflow requirements.

SWP Table A Deliveries

Under Alternative 4A, average annual total SWP Table A deliveries with Article 56 (without Article 21) as compared to No Action Alternative, would decrease (by about 7%) or increase (by about 13%) depending upon range of spring outflow requirements. Under Alternative 4A scenarios, average annual total south of Delta SWP Table A deliveries with Article 56 (without Article 21) as compared to No Action Alternative, would decrease (by about 7%) or increase (by about 13%) depending upon range of spring outflow requirements.

Under Alternative 4A, average annual total SWP Table A deliveries with Article 56 (without Article 21) as compared to Existing Conditions, would decrease (11%) and increase (8%) at ELT and would decrease (17%) and increase (3%) at LLT depending upon range of spring outflow requirements. Under Alternative 4A, average annual total south of Delta SWP Table A deliveries with Article 56 (without Article 21) as compared to Existing Conditions, would decrease (12%) and increase (8%) at ELT and would decrease (17%) and increase (2%) at LLT depending upon range of spring outflow requirements. However, the decrease in deliveries primarily would occur due to sea level rise and climate change.

Deliveries under the No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise

and climate change and the results show that under Alternative 4A average annual total SWP Table A deliveries with Article 56 (without Article 21) would decrease or increase depending upon range of spring outflow requirements.

SWP Article 21 Deliveries

Under Alternative 4A, average annual total SWP Article 21 deliveries as compared to No Action Alternative, would increase by about 164%.

Under Alternative 4A, average annual total SWP Article 21 deliveries as compared to Existing Conditions, would decrease by up to 20% at ELT and by up to 32% at LLT. However, this decrease primarily would occur due to sea level rise and climate change.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change and the results show that average annual Article 21 deliveries would increase under Alternative 4A as compared to the deliveries under the No Action Alternative. Therefore, average annual Article 21 deliveries would increase under Alternative 4A as compared to the conditions without the project.

SWP Feather River Service Area

Under Alternative 4A, average annual total SWP Feather River Service Area deliveries during dry and critical years as compared to No Action Alternative would increase or remain similar.

Under Alternative 4A, average annual total SWP Feather River Service Area deliveries during dry and critical years as compared to Existing Conditions, would decrease by up to 4% at ELT and by up to 6% at LLT. The primary cause of this reduction would be change in SWP operations due to sea level rise and climate change.

Deliveries compared to No Action Alternative are an indication of the potential change due to Alternative 4A in the absence of the effects of increased north of delta demands and sea level rise and climate change and the results show that average annual SWP Feather River Service Area deliveries would increase or remain similar under Alternative 4A as compared to the deliveries under No Action Alternative. Therefore, average annual SWP Feather River Service Area deliveries would remain similar under Alternative 4A as compared to the conditions without the project.

NEPA Effects: SWP and CVP deliveries under Alternative 4A as compared to deliveries under No Action Alternative would increase or remain similar. Indirect effects of changes in water deliveries in addition to potential effects on urban areas caused by changes in SWP and CVP water supply deliveries under Alternative 4A, are addressed in Section 4.3.26, *Growth Inducement and Other Indirect Effects,* and other sections of this RDEIR/SDEIS addressing specific resources.

CEQA Conclusion: SWP and CVP deliveries under Alternative 4A would decline as compared to deliveries under Existing Conditions. The primary cause of the reduction is increased north of Delta water demands that would occur under No Action Alternative and Alternative 4A and changes in SWP and CVP operations due to sea level rise and climate change. As shown above in the NEPA analysis, SWP and CVP deliveries would generally increase or remain similar under Alternative 4A as compared to deliveries under conditions in 2025 and 2060 without Alternative 4A if sea level rise and climate change conditions are considered the same under both scenarios (Alternative 4A and No Action Alternative). SWP and CVP deliveries under Alternative 4A would generally increase or

remain similar as compared to deliveries under Existing Conditions without the effects of increased north of Delta water demands, sea level rise, and climate change. Some reductions in the SWP south of Delta deliveries could occur under Alternative 4A with higher spring outflow requirements. Indirect effects of changes in water deliveries including potential effects on urban areas caused by changes in SWP and CVP water supply deliveries are addressed in Section 4.3.26, *Growth Inducement and Other Indirect Effects,* and other sections of this RDEIR/SDEIS addressing specific resources.

Impact WS-3: Effects of Water Transfers on Water Supply

Alternative 4A increases project water supply allocations as compared to the No Action Alternative, and consequently will decrease cross-Delta water transfer demand compared to the No Action Alternative. Alternative 4A would change the combined SWP Table A and CVP south-of-Delta agricultural water supply allocations as compared to Existing Conditions, and the frequency of years in which cross-Delta transfers are assumed to be triggered would change as well, assuming an estimated cross-Delta transfer supply of 600,000 acre-feet in any one year.

Under Alternative 4A as compared to Existing Conditions, the frequency of years in which cross-Delta transfers would increase, and the average annual volume of those transfers would increase. Under Alternative 4A as compared to the No Action Alternative, the frequency of years in which cross-Delta transfers would occur would decrease.

Alternative 4A provides a separate cross-Delta facility with additional capacity to move transfer water from areas upstream of the Delta to export service areas and provides a longer transfer window than allowed under current regulatory constraints. In addition, the facility provides conveyance that would not be restricted by Delta reverse flow concerns or south Delta water level concerns. As a result of avoiding those restrictions, transfer water could be moved at any time of the year that capacity exists in the combined cross-Delta channels, the new cross-Delta facility, and the export pumps, depending on operational and regulatory constraints, including criteria guiding the operation of water conveyance facilities under Alternative 4A.

NEPA Effects: Alternative 4A would decrease water transfer demand compared to existing conditions. Alternative 4A would decrease conveyance capacity, enabling additional cross-Delta water transfers that could lead to increases in Delta exports when compared to No Action Alternative. Prior to approval, each transfer must go through NEPA review and be evaluated by the export facility agency, and may also be subject to CEQA review and/or SWRCB process. Indirect effects of changes in Delta exports or water deliveries are addressed in Section 4.2.29, *Growth Inducement and Other Indirect Effects*, and other sections addressing specific resources.

CEQA Conclusion: Alternative 4A would increase water transfer demand compared to existing conditions. Alternative 4A would increase conveyance capacity, enabling additional cross-Delta water transfers that could lead to increases in Delta exports when compared to existing conditions. Prior to approval, each transfer must go through the CEQA and/or SWRCB process and be evaluated by the export facility agency, and may also be subject to NEPA review. Indirect effects of changes in Delta exports or water deliveries are addressed in Section 4.2.29, *Growth Inducement and Other Indirect Effects,* and other sections addressing specific resources.