

Long-Term Operation – Draft Environmental Impact Statement

# **Appendix Z – Evaluation of Delta Conveyance Project Operations**

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# Appendix Z Evaluation of Delta Conveyance Project Operations

## Z.1 Purpose of Appendix Z

Alternative 2 of this environmental impact statement (EIS) includes two programmatic components: (1) operations for the Delta Conveyance Project; and (2) operations of the Sites Reservoir Project.

The purpose of this appendix is to disclose the environmental effects of the approved Delta Conveyance Project Alternative 5 as described in Final Environmental Impact Report for the Delta Conveyance Project (Final EIR) with implementation of Alternative 2, which includes operation of both the Central Valley Project (CVP) and State Water Project (SWP), as described in Chapter 3, *Alternatives*. In compliance with the California Environmental Quality Act (CEQA), DWR performed an analysis of the ongoing operation of the SWP existing facilities and the Delta Conveyance Project in its Final EIR. DWR subsequently approved Alternative 5 as described and analyzed in the Final EIR. After regulatory approvals are obtained and construction is complete, the Delta Conveyance Project would be integrated into the SWP and would operate in “dual conveyance” with the existing SWP facilities in the south Delta; therefore, the California Department of Water Resources (DWR) would continue to divert from its export facilities in the south Delta in addition to diverting from the north Delta intakes.

The analysis in the Final EIR assumes the continued operation of existing SWP facilities as permitted under existing regulations that include the 2019 Biological Opinions and the 2020 Incidental Take Permit (ITP). Due to the timing of the Delta Conveyance Project environmental analysis, it was not possible to perform new modeling runs with the proposed change in the operation of existing SWP facilities as a result of implementation of Alternative 2 and Delta Conveyance Project; therefore, the analysis in this appendix is not quantifying potential additive effects of operating the CVP. Alternative 2 and Delta Conveyance Project. Future development of a combined modeling analysis will facilitate a better understanding of potential project interactions.

This appendix qualitatively discusses effects and, where appropriate, compares different operation of the existing SWP facilities under implementation of Alternative 2 (all phases) and Delta Conveyance Project. The Final EIR modeling results and impact analysis compares the operation of the Delta Conveyance Project to existing regulations described in the existing conditions/baseline. The EIS modeling results and the impact analysis for Alternative 2 capture the relative change as compared to the No Action Alternative. Under the No Action Alternative, Reclamation would operate the CVP consistent with the 2020 Record of Decision implementing the Proposed Action consulted upon for the 2019 Biological Opinions and the reasonable and prudent measures in the incidental take statements. DWR would operate the SWP consistent with the 2020 Record of Decision and the 2020 Incidental Take Permit for the SWP. The 2020 Record

of Decision for the CVP and SWP and the 2020 Incidental Take Permit for the SWP represent current management direction or intensity pursuant to 43 CFR Section 46.30.

Under the No Action Alternative, Reclamation and DWR would operate consistent with authorizing legislation, water rights, contracts, and agreements as described by common components. These include Water Quality Control Plans, the Coordinated Operation Agreement (COA), CVP and SWP Water Contracts, Settlement and Exchange Contracts, and Record of Decisions on independent related activities not proposed for modification and reinitiation of consultation under this effort. The No Action Alternative is summarized below.

The analysis in this appendix is reporting the relative changes from the basis of comparison for each action (i.e., Alternative 2 and Delta Conveyance Project Alternative 5) to describe potential changes to effects disclosed in the EIS, as well as disclosed potential combined effects with implementation of the Delta Conveyance Project. This analysis only provides a course assessment, which is appropriate for a programmatic analysis.

This programmatic analysis includes only operations, as the non-operational construction and maintenance of the CVP have separate environmental compliance. The summaries of effects use information from, and cross-referencing to, the published Final EIR on DWR's website: [deltaconveyanceproject.com](https://www.deltaconveyanceproject.com/) or available at <https://www.deltaconveyanceproject.com/>.

### **Z.1.1 Future Project Considerations and Regulatory Processes**

During the planning and construction period, DWR will implement its adaptive management plan, including its baseline study plan and monitoring. The results of these studies, as well as future permitting decisions, may result in further refinements to the proposed operation of the Delta Conveyance Project. Potential refinements, as well as environmental or regulatory changes that may occur during the planning and construction period prior to initial Delta Conveyance Project operations, will be considered in future project-level permitting consistent with the National Environmental Policy Act (NEPA) and the ESA. As new information/updates become available regarding SWP and Delta Conveyance Project operations, additional assessments relative to LTO of the CVP may be necessary. As proposed in the EIS, and as will be proposed at various times in the future, the operation of the SWP's existing facilities will likely change, and the combined effect of modified ongoing operations of the SWP and the operation of the Delta Conveyance Project will need to be determined.

## **Z.2 LTO and Delta Conveyance Project Alternatives Descriptions**

### **Z.2.1 LTO of the CVP Draft EIS Alternative 2 (All Phases) Description**

Alternative 2 represents actions developed with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, DWR and California Department of Fish and Wildlife . It includes actions and approaches for the CVP and SWP identified by the state and federal fish agencies, in addition to the objectives of Reclamation and DWR. Alternative 2 includes authorizing legislation, contracts, and agreements as described by common components. These include Water Quality Control Plans, the COA, CVP and SWP Water Contracts, Settlement and Exchange

Contracts, and Record of Decisions on independent related programs not proposed for modification and reinitiation of consultation under this effort.

See Chapter 3 in the EIS for more detailed information regarding the operational changes associated with Alternative 2.

### **Z.2.2 Final EIR and Delta Conveyance Project Bethany Reservoir Alignment Alternative (Alternative 5) Description**

On April 29, 2019, Governor Newsom signed Executive Order N-10-19 directing the California Natural Resources Agency, California Environmental Protection Agency, and California Department of Food and Agriculture to develop a comprehensive strategy to build a climate-resilient water system and ensure healthy waterways through the twenty-first century. After a public input period, Governor Newsom released the California Water Resilience Portfolio on July 28, 2020. The Water Resilience Portfolio identifies a suite of complementary actions to ensure safe and resilient water supplies, flood protection and healthy waterways for the state's communities, economy, and environment. One of the projects identified in the portfolio is new diversion and conveyance facilities in the Delta to safeguard the SWP, which was proposed as the Delta Conveyance Project. DWR proposed and evaluated the project consistent with the portfolio approach. As the lead agency under CEQA, DWR approved the Delta Conveyance Project Alternative 5 and certified the Final EIR on December 21, 2023. As the lead agency under -NEPA, the U.S. Army Corps of Engineers (USACE) issued a Draft EIS for the Delta Conveyance Project on December 16, 2022, for public review. USACE is currently preparing the Final EIS.

DWR's fundamental purpose in proposing to develop new diversion and conveyance facilities in the Delta is to restore and protect the reliability of SWP water deliveries south of the Delta, consistent with the state's Water Resilience Portfolio, in a cost-effective manner.

The above-stated purpose, in turn, gives rise to several related objectives of the Delta Conveyance Project, as follows:

- To help address anticipated rising sea levels and other reasonably foreseeable consequences of climate change and extreme weather events.
- To minimize the potential for public health and safety impacts from reduced quantity and quality of SWP water deliveries south of the Delta as a result of a major earthquake that could cause breaching of Delta levees and the inundation of brackish water into the areas where existing SWP and CVP pumping plants operate in the southern Delta.
- To protect the ability of the SWP to deliver water when hydrologic conditions result in the availability of sufficient amounts of water, consistent with the requirements of state and federal law, including the California and federal Endangered Species Acts and Delta Reform Act, as well as the terms and conditions of water delivery contracts and other existing applicable agreements.
- To provide operational flexibility to improve aquatic conditions in the Delta and better manage risks of further regulatory constraints on project operations.





Table Z-2. Delta Conveyance Project Preliminary Proposed Operations Criteria (North Delta Diversion Operations) <sup>1</sup>

Parameter	Delta Conveyance Project Criteria
NDD Operations	<ul style="list-style-type: none"> <li>• <b>Bypass Flow <sup>a</sup> Criteria (specifies bypass flow required to remain downstream of the north Delta intakes):</b> <ul style="list-style-type: none"> <li>• <i>October through November:</i> Minimum flow of 7,000 cfs required in river after diverting at the north Delta intakes.</li> <li>• <i>December through June:</i> Once the pulse protection (see below) ends, NDDs will not exceed Level 1 pumping unless specific criteria have been met to increase to Level 2 or Level 3. If those criteria are met, operations can proceed as defined in Table Z-3. Allowable diversion will be the greater of the following options: low-level pumping or the diversion allowed by the bypass flow rules in Table Z-3.</li> <li>• <i>July through September:</i> Minimum flow of 5,000 cfs required in river after diverting at the north Delta intakes.</li> </ul> </li> <li>• <b>Pulse Protection Criteria (October through June):</b> <ul style="list-style-type: none"> <li>• Low-level pumping is allowed when river conditions are adequate during the pulse protection period. <ul style="list-style-type: none"> <li>• <i>Definition:</i> Low-level pumping of up to 6% of total Sacramento River flow at Freeport such that diversions will not reduce bypass flow below 5,000 cfs. No more than a total of 900 cfs can be diverted by all the intakes combined. Low-level pumping can occur in October–November during a pulse protection event and in December–June as defined in Table 3-15 of the Delta Conveyance Project Final EIR Chapter 3. In addition, NDD levels at all the intakes will be subject to a maximum approach velocity of 0.2 feet per second and a minimum sweeping velocity of 0.4 feet per second at the proposed fish screens. Velocity compliance would be informed by real-time hydrological data measured at the intake locations.</li> </ul> </li> <li>• Pulse triggering, duration, and conclusion are determined based on the criteria defined in Table Z-3.</li> <li>• If the initial pulse begins before December 1, the bypass flow criteria for the month (October and November) when the pulse occurred would take effect, following a pulse protection period. On December 1, the Level 1 rules defined in Table Z-3 apply unless a second pulse occurs.</li> </ul> </li> <li>• <b>Real-Time Operations:</b> The proposed operations criteria and tidal restoration mitigation are intended to minimize and fully mitigate the potential impacts of the NDD operations. The real-time decision making specific to the NDD operations would be mainly associated with reviewing real-time abiotic and fish monitoring data and ensuring proposed weekly, daily and sub-daily operations are consistent with the permitted criteria and within the effects analyzed in the permits.</li> <li>• <b>Adaptive Management:</b> The OAMMP will be used to evaluate and consider changes in operational criteria based on information gained before and after the new facilities become operational. This program will be used to consider and address scientific uncertainty regarding the Delta ecosystem and to inform project operations.</li> </ul>

cfs = cubic feet per second; OAMMP = Operations Adaptive Management and Monitoring Plan; NDD = north Delta diversion.





The OAMMP is currently being developed in coordination with fisheries agencies and as part of the permitting processes. The OAMMP is not included in the Final EIR as a mitigation measure to reduce potentially significant impacts disclosed in Final EIR Chapter 12, *Fish and Aquatic Resources*. The OAMMP relies on established procedures used in SWP management that would occur on an ongoing basis consistent with current water diversion facility operations practice. DWR describes in the Final EIR that the studies identified through the OAMMP process are intended to inform real-time decision making. The OAMMP will address operational uncertainties and inform the operation and adaptive management of the north Delta intakes. The OAMMP describes the adaptive management process that will be used to inform studies targeting areas of uncertainty using a scientific approach and modify select operations and design elements of the NDD facilities to minimize effects on listed fish species, as necessary. Adaptive management allows the best available science to be incorporated into management decisions and actions in the future and to address uncertainties associated with those actions. Adaptive management allows and ensures best available science continues to be used. Specifically, adaptive management provides a means to evaluate the effectiveness of management actions in achieving biological resources objectives by comparing the outcomes to predicted responses and providing the scientific basis for continuing or modifying the action or implementing an alternative action. It is important to note that potential refinements to operational criteria, as informed by the OAMMP process, are designed to occur if project effects and impacts exceed what was analyzed and disclosed in the permitting documents.

The decisions made as part of the real-time decision making would be consistent with the operational criteria described in Chapter 3 of the Final EIR and modeled by CalSim 3. Real-time operations would not include any new or different operational criteria than those described in the project description and analyzed within the Final EIR. Real-time operations are not a mitigation measure, but rather a facet of system operations recognizing there are real-time decisions made during the daily operation of the SWP. DWR acknowledges additional operational considerations are possible based on fish data at the time operational decision making is occurring (i.e., when the NDD exists and can be operated). The Final EIR describes the process by which monitoring and real-time operations would be used under an adaptive management framework, including use of the OAMMP described above, to ensure operations of the NDDs minimize effects on aquatic resources as intended or refine operations criteria accordingly, if necessary. An example of real-time operations could be how the NDD would operate within the 3-day bypass flow averaging period to further minimize potential effects. The impact analysis provides sufficient text and modeled detail about the use of the 3-day bypass flow averaging period to analyze and disclose potential impacts of the project on fish and aquatic resources even with the acknowledgement that bypass flows may be modified in the future based on data gained through the OAMMP.

The Delta Conveyance Project is required to integrate with the adaptive management program included in the LTO of the CVP consultation. The DCP OAMMP is in alignment with the LTO of the CVP adaptive management program and includes the following key actions that are consistent with the LTO of the CVP.

- Cooperate with ongoing and planned monitoring programs conducted by resource agencies.
- Design studies to examine modifications of operations.

- Cooperate with resource agencies in evaluation of study findings, and determine if operational changes are needed.
- Integrate Delta Conveyance Project studies with existing monitoring programs.
- Commit to a decision-making process consistent with the LTO of the CVP management effort through the application of a structured decision-making framework.
- Coordinate OAMMP activities with the LTO of the CVP Adaptive Management Steering Committee, as necessary.

In the context of LTO of the CVP adaptive management, it is anticipated that OAMMP activities would be Bin 3 actions, i.e., adaptive management actions for which agencies evaluate data over longer periods of implementation (on the order of 10-15 years), potentially requiring a full structured decision-making process as described in further detail in Appendix B of the LTO of the CVP Adaptive Management Program.

### **Upstream Operation and Storage**

DWR would not change operations of upstream storage reservoirs. Final EIR Chapter 3, Section 3.16.3, *Integration of North Delta Intakes with South Delta Facilities*, describes that DWR would not increase storage withdrawal for exports under most circumstances, even as the Delta Conveyance Project would provide additional export capacity. Stored water resulting from more efficient system operation (e.g., less water required to meet the same water quality standards) could either remain in storage or be exported. This description reflects the modeling assumptions used for impact analyses and therefore is an accurate depiction of how the Delta Conveyance Project would be operated. DWR does not have authority to change operations of CVP facilities and does not plan to seek changes in regulations on CVP operations.

Historical SWP operations are based on SWP policy and limit release of upstream stored water in all but the wettest of years. Under the SWP policy, the first portion of stored water is used to meet regulatory and contractual obligations, the second portion of stored water is carried over into the following year for future obligations, and the remaining portion of stored water is managed for SWP long-term water supply contractor deliveries. The operations of the NDD do not require, and it is outside of DWR's authority to impose, any reoperation of Shasta, Trinity, or Folsom reservoirs or any San Joaquin River and tributary water storage facilities.

## **Z.3 Overall Approach**

As discussed in Section Z.1, *Purpose of Appendix Z*, this appendix qualitatively summarizes operational effects on resources that may occur under operation of Alternative 2 and Delta Conveyance Project, within the framework and noting the limitations previously discussed. This analysis qualitatively evaluates the direction and magnitude of effects by resource area relative to Delta Conveyance Project contributions, if any, to effects as identified in the EIS. Resource topics in this appendix were identified based on the resource topics evaluated in the EIS to be consistent with Reclamation's evaluation of the LTO of the CVP, while acknowledging the limited regional scope of the Delta Conveyance Project, which is the topic of this assessment. Effects, or effect mechanisms, under each resource topic were identified based on the effect

mechanisms identified in the associated EIS resource-specific appendices. As the Delta Conveyance Project will not increase storage withdrawals or change any operational rule or requirement for any upstream facility, this assessment does not discuss upstream reservoirs in detail, including Oroville Reservoir.

All technical content relative to the operation of Alternative 2 was obtained from resource-specific chapters or appendices to the EIS. All technical content relative to the operation of Final DCP EIR was obtained from the 2023 Delta Conveyance Project Final EIR. No new technical analyses were conducted for preparation of this appendix. Given Alternative 2 is comprised of different potential phases, all phases are considered within this appendix. If appropriate the appendix differentiates between phases and discloses effects. Otherwise, the term Alternative 2 is used throughout the appendix interchangeably to describe effects attributable to all phases.

Alternative 2 is compared to the No Action Alternative in the EIS pursuant to NEPA requirements. The No Action Alternative is described in detail in Chapter 3, Section 3.2, *No Action Alternative*, and Appendix E, *Draft Alternatives*.

Given the focus of this appendix is on potential Delta Conveyance Project contributions to LTO operational effects, effects associated with the implementation of a Compensatory Mitigation Plan (CMP) and mitigation measures related to Delta Conveyance Project are not discussed in this appendix. This appendix may reference approved CMP Measures and/or mitigation measures where implementation of these types of measures are required to reduce potentially significant operational effects of the Delta Conveyance Project. Finally, this appendix may discuss limited effects associated with maintenance of Delta Conveyance Project if the maintenance is closely related to operations or if the primary effect mechanisms on a resource were attributable to maintenance (e.g., hazardous materials).

### **Z.3.1 Study Area**

The study area for the EIS is described in Chapter 2, Section 2.2, *Study Area Location and Description*, and includes areas that could be affected directly or indirectly by Alternative 2. The study area includes CVP service areas and CVP dams, power plants, diversions, canals, gates, and related federal facilities upstream of the Delta, located on Clear Creek, the Trinity, Sacramento, American, as well as the Stanislaus, and San Joaquin Rivers, and in the Sacramento–San Joaquin Delta (Delta). The study area includes SWP service areas downstream of the Feather River and SWP facilities in the Delta, Cache Slough Complex, and Suisun Marsh. Operations of the Oroville Reservoir and Oroville Dam are not addressed as part of the study area.

The overall study area for Delta Conveyance Project, as described in Chapter 1 in the Delta Conveyance Project Final EIR, generally consists of the statutory borders of the Delta, south of Delta/SWP and CVP service area, and the project area itself (where Delta Conveyance Project facilities would be located). This appendix identifies the geographies or characteristics of the affected environment as described in the EIS and the Delta Conveyance Project Final EIR, and generally focuses on the geographic area(s) where operational effects of Delta Conveyance Project may change the magnitude or severity of Alternative 2 effects disclosed in the EIS. For example, this appendix focuses on effects related to changes in Sacramento River flows at the NDDs, and changes in flows and hydrodynamics through, and downstream of, the Delta at a

programmatic level, and considers operationally driven changes in flows in the context of the Sacramento River, Delta, and downstream aquatic ecosystems.

Where appropriate, this appendix describes why certain areas or geographies are not further evaluated or why operation of the Delta Conveyance Project would not result in a change to effects described in the EIS. For example, as described throughout the Final EIR the Delta Conveyance Project would have minimal to no effects upstream of the north Delta intakes. This is due to how the Delta Conveyance Project would be operated given operating criteria and hydrologic and regulatory conditions under which the SWP and CVP are operated (e.g., COA), given the SWP policy and historical operations described in Section Z.2, *LTO and Delta Conveyance Project Alternatives Descriptions*. The Delta Conveyance Project is not increasing deliveries (or exports) out of storage, as has been demonstrated through the use of modeling results contained in the Final EIR. The Delta Conveyance Project Final EIR demonstrates in multiple chapters and appendices limited or no modifications to upstream storage or reservoir conditions under modeled conditions. Chapters, sections, and impacts have been referenced throughout this appendix where appropriate, demonstrating limited to no effects on resources upstream of the north Delta intakes given the operating criteria and conditions of Delta Conveyance Project and the SWP and CVP.

## **Z.4 Affected Environment and Environmental Consequences**

### **Z.4.1 Water Quality**

This analysis regarding water quality does not include discussion of areas upstream of the Delta.

#### **Z.4.1.1 Potential Effects on Bay-Delta Electrical Conductivity**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, and the modeling results contained in Attachment G.1, *Electrical Conductivity Modeling Results*, Alternative 2 would not contribute to agricultural or fish and wildlife beneficial use impairments in the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay. Modeling results show slightly higher monthly average electrical conductivity (EC) levels at various Delta locations in September and October under Alternative 2 compared to the No Action Alternative, and monthly average EC levels similar to or less than those for the No Action Alternative in all other months. The modeled average EC increases are small in magnitude, and decreases in EC levels also occur during the irrigation season at many Delta locations. Such EC changes would not make existing Delta EC impairments discernibly worse.

##### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-5, operation of Delta Conveyance Project would not cause additional exceedance of applicable EC water quality criteria/objectives by frequency, magnitude, and geographic extent that would result in adverse effects on any beneficial uses of the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay. The Delta Conveyance Project would be operated to meet Bay-Delta WQCP objectives, and project operations would meet DWR/North Delta Water Agency contract requirements at the same

frequency that occurs under existing conditions. Thus, the resulting EC under project operations would not further degrade water quality by measurable levels on a long-term basis in any waterbody on the state's Clean Water Act (CWA) Section 303(d) list such that beneficial use impairment would be made discernibly worse.

### **Summary**

The monthly average Delta EC changes modeled for both projects are small in magnitude and would not result in increases in exceedances of applicable EC water quality standards as compared to the No Action Alternative. As such, it is anticipated that operation of the Delta Conveyance Project would not substantially worsen Delta EC or substantially change Delta EC, as identified in the EIS. Delta EC is expected to remain below levels that would make any CWA Section 303(d) EC impairments discernably worse or cause adverse effects on designated beneficial uses with the operation of both projects. Effects of operating both projects on EC levels in Suisun Marsh, Suisun Bay, and San Francisco Bay would be lesser than those that would occur in the Delta. As such, it is anticipated that operation of the Delta Conveyance Project would not substantially worsen EC in these areas or substantially change EC in these areas, as compared to the No Action Alternative, as identified in the EIS. Since the operation of both projects would not be expected to cause increased exceedances of EC objectives in these water bodies, operation of Alternative 2 with the Delta Conveyance Project would not adversely affect designated beneficial uses as compared to the No Action Alternative.

#### **Z.4.1.2 Potential Effects on Bay-Delta Chloride**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, and the modeling results contained in Attachment G.2, *Chloride Modeling Results*, Alternative 2 would not contribute substantially, if at all, to impairment of municipal and industrial (M&I) beneficial uses of Delta waters due to chloride concentrations. Modeling results show that monthly average changes in chloride concentrations in the Delta from Alternative 2 would be small in magnitude, and would include both increases and decreases, depending upon month and location. Because Suisun Marsh, Suisun Bay, and San Francisco Bay are not designated for municipal and domestic supply use, and seawater is the primary source of chloride in the western Delta, changes in chloride concentrations in Delta outflow to the marsh and bays are not of concern in these water bodies relative to drinking water supplies or other beneficial uses.

##### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-4, the operation of Delta Conveyance Project would not cause increased frequency of Bay-Delta WQCP chloride objective exceedances at any location and chloride degradation would be small in magnitude. Thus, project operations would not cause increased exceedance of applicable chloride objectives or criteria by frequency or magnitude that would result in adverse effect on any beneficial uses, nor would it substantially degrade water quality with regard to chloride. Project operations would not further degrade water quality in the CWA Section 303(d)-listed Delta water bodies of Tom Paine Slough and Mountain House Creek on a long-term basis such that the existing beneficial use impairment would be made discernibly worse. The small increases in chloride concentrations that could occur in the Delta and Suisun Marsh would not be expected to substantially degrade

water quality, adversely affect beneficial uses, or make any beneficial use impairment discernibly worse. For the same reasons discussed above, changes in chloride concentrations in Delta outflow to Suisun Bay and San Francisco Bay are not of concern in these water bodies relative to drinking water supplies or other beneficial uses. Implementation of Mitigation Measure WQ-4: *Contra Costa Water District Interconnection Facility* would further reduce chloride concentrations related to the Contra Costa Water District intakes.

### **Summary**

As described above, increases in Delta chloride concentrations from operating Alternative 2 or Delta Conveyance Project would typically be of small magnitude throughout the Delta, as compared to the No Action Alternative. Each project would have small effects on Delta chloride concentrations and under each project the SWP/CVP would be operated to comply with Bay-Delta WQCP chloride objectives. As such, it is anticipated that operation of Delta Conveyance Project would not substantially worsen Delta chloride concentrations or substantially change Delta chloride concentrations associated with the operation of Alternative 2, as identified in the EIS. Thus, existing CWA Section 303(d) listings for chloride would not be made discernably worse, or adversely affect the municipal and domestic supply beneficial use or any other beneficial uses of Delta waters. Effects on chloride concentrations would be even smaller in the downstream water bodies of Suisun Marsh, Suisun Bay, and San Francisco Bay during operations of both projects because seawater is the primary source of chloride to these water bodies and these water bodies do not have a designated municipal and domestic water supply beneficial use. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in a substantial increase in adverse effects, as compared to the No Action Alternative.

#### **Z.4.1.3 Potential Effects on Bay-Delta Bromide**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, and the modeled results contained in Attachment G.3, *Bromide Modeling Results*, Alternative 2 could cause small magnitude increases and decreases in bromide concentrations at Delta locations as compared to the No Action Alternative. Water supply treatment plants that use the Delta as a source for drinking water already experience highly variable bromide concentrations and, thus, must implement appropriate treatment technologies to ensure compliance with drinking water regulations for disinfection byproducts. Thus, despite the potential for slightly higher bromide concentrations under the Alternative 2 in some months, it is not expected that Alternative 2 would adversely affect drinking water treatment and compliance with drinking water regulations for disinfection byproducts. Because Suisun Marsh, Suisun Bay, and San Francisco Bay are not designated for municipal and domestic supply use, and seawater is the primary source of bromide, small magnitude changes in bromide concentrations in the Delta outflow that initially enters Suisun Marsh, Suisun Bay, and San Francisco Bay are not of concern relative to drinking water supplies or other beneficial uses in the marsh or bays.

## **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-3, operation of Delta Conveyance Project would not substantially degrade water quality at any Delta location with regard to bromide relative to existing conditions, given the modeled small increases in concentrations on a long-term average basis. In addition, the changes in bromide from project operations would not adversely affect drinking water treatment and compliance with drinking water regulations for disinfection byproducts. Project operations would not cause increased frequency of objective or criteria exceedances at any location because no objectives or criteria exist for bromide in the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay. The greatest magnitude increases in monthly average bromide concentrations were modeled to occur in the western Delta at times of the year when bromide concentrations are already high and thus not a suitable source for drinking water treatment plants. Because Suisun Marsh, Suisun Bay, and San Francisco Bay are not designated for municipal and domestic supply use, and seawater is the primary source of bromide, small magnitude changes in bromide concentrations in the Delta outflow that initially enters Suisun Marsh, Suisun Bay, and San Francisco Bay are not of concern relative to drinking water supplies or other beneficial uses in the marsh or bays.

### **Summary**

As described above, increases in Delta bromide concentrations from operation of Alternative 2 or Delta Conveyance Project would typically be of small magnitude throughout the Delta, as compared to the No Action Alternative. Each project would have small effects on Delta bromide concentrations. It is uncertain if effects of Alternative 2 and Delta Conveyance Project are additive. Given the purpose and limitations described in Section Z.1, it is anticipated that operation of Delta Conveyance Project would not substantially worsen Delta bromide concentrations or substantially change Delta bromide concentrations associated with the operation of Alternative 2, as identified in the EIS. Therefore, water purveyor compliance with drinking water regulations for disinfection byproducts is not expected to be substantially worse. Adverse effects on the municipal and domestic supply beneficial use, or any other beneficial uses, of Delta waters is not expected. The effects of operating both projects on bromide concentrations would be even smaller in the downstream water bodies of Suisun Marsh, Suisun Bay, and San Francisco Bay because seawater is the primary source of bromide to these water bodies, and these water bodies do not have a designated municipal and domestic water supply beneficial. Therefore, effects of operation of Alternative 2 with the Delta Conveyance Project would not be expected to result in a substantial increase in adverse effects, as compared to the No Action Alternative.

#### **Z.4.1.4 Potential Effects on Bay-Delta Methylmercury**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, and the modeled results contained in Attachment G.4, *Methylmercury Modeling Results*, modeled long-term average total methylmercury concentrations in the water column and largemouth bass in the Delta and Suisun Marsh for Alternative 2 would be about the same as those that would occur for the No Action Alternative at all Delta assessment locations. Hence, Alternative 2 would not contribute to additional water quality degradation with respect to water column methylmercury concentrations or increased methylmercury bioaccumulation in biota in the Delta or in Suisun Marsh.



Alternative 2 also would result in Delta outflow rates similar to those under the No Action Alternative. Thus, Alternative 2 would not contribute to measurable water quality degradation with respect to water column methylmercury concentrations or increased methylmercury bioaccumulation in biota in Suisun Bay and San Francisco Bay.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-6, average water column concentrations of total methylmercury under Delta Conveyance Project would differ little, if at all, from existing conditions in the Delta. The differences in water column concentrations of total methylmercury under would have little to no measurable effect on Delta fish tissue concentrations relative to existing conditions. Based on the modeled small changes in total methylmercury concentrations at all Delta assessment locations, project operations would not contribute to measurable water quality degradation with respect to methylmercury, and thus would not increase health risks to wildlife or humans consuming wildlife from the Delta, as compared to existing conditions. Thus, the differences in methylmercury in the Delta under Delta Conveyance Project would not make the existing beneficial use impairment from mercury discernibly worse. Because of the minor effect on methylmercury in Delta waters, project operations would not cause a substantial change in total methylmercury concentrations in Suisun Marsh, Suisun Bay, or San Francisco Bay. Minor changes that may occur would not increase the frequency with which applicable water quality criteria or objectives for methylmercury would be exceeded in these waters, would not substantially degrade the quality of these waters with regard to methylmercury, and would not make the CWA Section 303(d) impairment for mercury discernibly worse.

### **Summary**

As described above, operation of Alternative 2 or Delta Conveyance Project would have negligible effects on water column and fish tissue methylmercury concentrations in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not substantially worsen water column and fish tissue methylmercury concentrations or substantially change water column and fish tissue methylmercury concentrations in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not increase the frequency with which applicable water quality criteria or objectives for methylmercury would be exceeded in these waters, would not substantially degrade the quality of these waters with regard to methylmercury, and would not make the CWA Section 303(d) impairment for mercury discernibly.

#### **Z.4.1.5 Potential Effects on Bay-Delta Selenium**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, and the modeled results contained in Attachment G.5, *Selenium Modeling Results*, modeled long-term average water column concentrations of selenium and concentrations in whole-body fish, fish filets, and bird eggs in the Delta for Alternative 2 would be about the same as those that would occur for the No Action Alternative at all Delta assessment locations. Thus, Alternative 2 would not result in increased health risks to wildlife or humans consuming wildlife associated with whole-body fish, fish

fillets, and bird eggs. Thus, Alternative 2 would not contribute to additional water quality degradation with respect to selenium concentrations or increased selenium bioaccumulation in biota in Suisun Bay and San Francisco Bay.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-10, average water column concentrations of selenium under Delta Conveyance Project would not increase, relative to existing conditions, at any Delta assessment location. Negligible changes in water column concentrations of selenium under Delta Conveyance Project would not have a measurable effect on tissue concentrations of whole-body fish, fish fillets, or bird eggs in the Delta relative to existing conditions. Because project operations would cause negligible changes to selenium concentrations in Delta waters and biota, similarly negligible changes to water column and biota concentrations would occur in the downstream water bodies of Suisun Marsh, Suisun Bay, and San Francisco Bay. Based on the negligible changes in modeled selenium concentrations in surface water and biota, project operations would not substantially increase the frequency with which applicable water quality criteria, objectives, or tissue concentration benchmarks for selenium would be exceeded in Suisun Marsh, Suisun Bay, and San Francisco Bay, would not substantially degrade the quality of these waters with regard to selenium, and would not make the CWA Section 303(d) impairment for selenium in the North Bay discernibly worse.

### **Summary**

As described above, operation of Alternative 2 or Delta Conveyance Project would have negligible effects on water column and biota tissue selenium concentrations in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not substantially worsen selenium concentrations in water and biota tissues or substantially change selenium concentrations in water and biota tissues in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not increase the frequency with which applicable water quality criteria or objectives for selenium would be exceeded in these waters, would not substantially degrade the quality of these waters with regard to selenium, and would not make the CWA Section 303(d) impairment for selenium in the North Bay discernibly worse.

### **Z.4.1.6 Potential Effects on Bay-Delta Organic Carbon**

#### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, and the modeled results contained in Attachment G.6, *Dissolved Organic Carbon Modeling Results*, monthly average dissolved organic carbon concentrations at Delta assessment locations under Alternative 2 would be similar to concentrations under the No Action Alternative. A California Urban Water Agencies expert panel convened to review Delta water quality and disinfection formation potential found that total organic carbon concentrations ranging from 4 to 7 mg/L would allow continued flexibility in treatment technology necessary to achieve existing drinking water criteria for disinfection. Based on the modeling results, any increases in average dissolved organic carbon concentrations that may occur with Alternative 2 would be of sufficiently small magnitude that modifications to existing drinking water treatment plants to employ additional organic carbon removals would not

be necessary. The small changes in total organic carbon concentrations in the Delta and in Delta outflow to Suisun Marsh, Suisun Bay, and San Francisco Bay under Alternative 2 would not substantially degrade water quality with regard to dissolved organic carbon, cause increased frequency of exceeding water quality objectives (because none exist), contribute to adverse effects on organic enrichment conditions, or adversely affect beneficial uses within these water bodies.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-8, modeled monthly average concentrations of dissolved organic carbon at Delta assessment locations under Delta Conveyance Project are about the same as under existing conditions. Based on small differences in modeled concentrations, project operations would not result in increased Delta dissolved organic carbon concentrations that would substantially degrade water quality, cause increased frequency of exceeding water quality objectives (because none exist), or adversely affect designated beneficial uses relative to existing conditions. The small effects on Delta dissolved organic carbon concentrations would cause small, if any, changes in organic carbon concentrations in Suisun Marsh, Suisun Bay, and San Francisco Bay. Therefore, project operations would not substantially degrade the quality of these waterbodies with regard to organic carbon, would not cause increased exceedance of applicable DOC objectives or criteria (because none currently exist), and would not adversely affect beneficial uses of these water bodies.

### **Summary**

As described above, effects of Alternative 2 or Delta Conveyance Project operations on water column dissolved organic carbon concentrations in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay would be small in magnitude, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not substantially worsen organic carbon concentrations or substantially change organic carbon concentrations in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project on dissolved organic carbon concentrations would not substantially degrade the quality of these waterbodies with regard to organic carbon, would not cause increased exceedance of applicable objectives or criteria (because none currently exist for organic carbon), and would not adversely affect beneficial uses of these water bodies.

#### **Z.4.1.7 Potential Effects on Bay-Delta Trace Metals**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, trace metals, including aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, silver, and zinc, occur naturally in the river inflows to the Delta (Sacramento River and San Joaquin River, primarily). Trace metals concentrations in Delta inflows are typically below applicable water quality objectives/criteria for these trace metals. Also, typical concentrations of trace metals within the Delta are at levels that do not cause beneficial use impairments. The Delta inflows that would occur under Alternative 2 would not make the existing impairments discernably worse in the Delta, or any

impairments in Suisun Bay and Marsh, or San Francisco Bay discernably worse relative to the No Action Alternative.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-12, operation of Delta Conveyance Project would have negligible effects on trace metal concentrations in Delta waters. This is because Delta source water (i.e., inflow) trace metal concentrations are typically less than water quality criteria and are relatively similar to each other. Consequently, as the primary source waters to the Delta mix somewhat differently under project operations, relative to existing conditions, more frequent exceedances of aquatic life water quality criteria or objectives for aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, silver, and zinc in the Delta would not occur. For these same reasons, project operations would not substantially degrade the quality of water in the Delta with regard to trace metals, and resulting concentrations would not cause adverse effects on aquatic life or other beneficial uses of the Delta. Because the Delta Conveyance Project would not result in substantial increases in trace metal concentrations in Delta waters or in Delta outflows, there would not be a substantial change in trace metal concentrations in Suisun Marsh, Suisun Bay, or San Francisco Bay relative to existing conditions. As such, the Delta Conveyance Project would not substantially increase the frequency with which applicable water quality criteria or objectives would be exceeded or substantially degrade the quality of water with regard to trace metals in Suisun Marsh, Suisun Bay, or San Francisco Bay.

### **Summary**

As described above, effects of Alternative 2 or Delta Conveyance Project operations on trace metal concentrations in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay would be small in magnitude, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not substantially worsen trace metal concentrations or substantially change trace metal concentrations in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not substantially degrade the quality of these waterbodies with regard to trace metals, would not cause increased exceedance of applicable objectives or criteria, would not make any trace metal impairments that exist in these water bodies discernably worse, and would not adversely affect beneficial uses of these water bodies.

#### **Z.4.1.8 Potential Effects on Bay-Delta Nutrients**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, Alternative 2 would not contribute to differences in Delta nutrient concentrations or in nutrient distributions that would substantially degrade water quality with regard to nutrients or result in adverse effects on beneficial uses in the Delta because the small differences in Delta inflows would result in minimal changes in nutrient concentrations. Because nutrient concentrations in the Delta and under Alternative 2 are not expected to be substantially different from those that would occur under the No Action Alternative, Alternative 2 would not cause substantial differences in nutrient concentrations in Delta outflow to Suisun Marsh, Suisun Bay, and San Francisco Bay. Small differences in Delta

outflow volume may occur between Alternative 2 and the No Action Alternative. Resulting differences in total nitrogen and phosphorus loading that would occur in Suisun Bay and Marsh and San Francisco Bay due to differences in Delta outflow would be minor. These potential differences in Delta outflow would not result in water quality degradation to a degree that would adversely affect beneficial uses of Suisun Bay and Marsh or San Francisco Bay.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-7, total phosphorus and total nitrogen concentrations in Delta inflows would differ negligibly, if at all, under Delta Conveyance Project relative to existing conditions. Although project operations would create differences in the proportion of source water fractions at various Delta locations, these differences would be small and thus there would be no substantial differences in nutrient distributions from these changes in source water inputs relative to existing conditions. Potential minor increases or decreases in these nutrient concentrations that may occur at some locations and times within the Delta would have negligible, if any, effects on macrophyte and algae growth in the Delta. Hence, potential small changes in nutrient concentrations would be of magnitude that would not adversely affect beneficial uses or substantially degrade Delta water quality with regard to nutrients. The project would not result in substantial increases in nutrient concentrations in Delta waters, including Delta outflows. As such, project operations would not cause any substantial changes in nutrient concentrations in Suisun Marsh, Suisun Bay, or San Francisco Bay relative to existing conditions.

### **Summary**

As described above, effects of Alternative 2 or Delta Conveyance Project operations on nutrient concentrations in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay would be small in magnitude, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not substantially worsen nutrient concentrations or substantially change nutrient concentrations in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project and effects on nutrient concentrations would not substantially degrade the quality of these waterbodies with regard to nutrients, would not cause increased exceedance of applicable objectives or criteria (because none exist), and would not adversely affect beneficial uses of these water bodies.

#### **Z.4.1.9 Potential Effects on Bay-Delta Dissolved Oxygen**

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, dissolved oxygen levels in Delta, Suisun Bay and Marsh, and San Francisco Bay waters are primarily affected by water temperature, flow velocities, nutrients (e.g., phosphorus and nitrogen), and the photosynthesis, respiration, and decomposition of aquatic organisms. The sediment oxygen demand of organic material deposited in the low velocity channels also affects dissolved oxygen levels in Delta waters. The differences in Delta inflows that would occur under Alternative 2, relative to the No Action Alternative, would not result in water temperature differences of magnitudes that would lead to lower dissolved oxygen levels in the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay. The relative degree of tidal exchange, flows, and turbulence that contributes to exposure of Delta,

Suisun Bay and Marsh, and San Francisco Bay waters to the atmosphere for reaeration would not be substantially different from the No Action Alternative. Finally, Alternative 2 would not affect nutrient levels sufficiently to change aquatic plant or algae growth, organic material accumulation, or sediment oxygen demand within the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay sufficiently to affect dissolved oxygen levels. Some waterways in the eastern, southern, and western Delta are listed as impaired by low oxygen levels. Alternative 2 would not make these dissolved oxygen impairments in the Delta worse. Operations of the managed wetlands and associated discharges cause the current Suisun Marsh dissolved oxygen impairments. Changes in Delta flows into the marsh that could occur under Alternative 2 would not make this impairment worse.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-9, Delta Conveyance Project would not affect the primary factors that affect dissolved oxygen concentrations sufficiently to cause reductions in Delta dissolved oxygen levels. Because project operations would not cause substantial changes in Delta dissolved oxygen concentrations or concentrations of oxygen-consuming substances within the Delta or in Delta outflow, it would not affect factors that contribute to low dissolved oxygen conditions in Suisun Marsh, Suisun Bay, or San Francisco Bay. Project operations would not cause substantial changes in dissolved oxygen concentrations in any of these water bodies, increase the frequency with which applicable water quality criteria or objectives for dissolved oxygen would be exceeded in these water bodies, substantially degrade the quality of these waterbodies with regard to dissolved oxygen, or result in dissolved oxygen levels that adversely affect beneficial uses.

### **Summary**

As described above, Alternative 2 or Delta Conveyance Project operations would have little to no effect on dissolved oxygen levels in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay, as compared to the No Action Alternative. As such, as compared to the No Action Alternative, it is anticipated that operation of Alternative 2 with the Delta Conveyance Project would not substantially worsen dissolved oxygen levels or substantially change dissolved oxygen levels in these water bodies, as identified in the EIS.

#### ***Z.4.1.10 Potential Effects on Bay-Delta Legacy Contaminants***

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, the Delta is on the Water Board's CWA Section 303(d) list for impaired by dioxin and furan compounds, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Suisun Bay and San Francisco Bay are included on the CWA Section 303(d) list for dioxin and furan compounds, and PCBs. Dioxin and furan compounds, PCBs, and PAHs are identified as "legacy contaminants" because of their persistence in the environment long after use. The Delta's primary source of dioxin and furan compounds and PAHs is from stormwater runoff. The Delta's primary source of PCBs is the suspension and transport of Bay suspended sediment into the western Delta on flood tides. These mechanisms of deposition and transport of dioxins and furans, PCBs, and PAHs are independent of CVP/SWP operations. Thus, changes in river inflows to the Delta due to Alternative 2 implementation would not affect concentrations of dioxin and furan compounds, PCBs, and

PAHs in the Delta. For these same reasons, concentrations of dioxin and furan compounds and PCBs in Suisun Bay and San Francisco Bay would not be measurably changed by Alternative 2.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Appendix 9A, *Screening Analysis*, PAH, PCB, and dioxin and furan compound levels in surface waters within the Delta, Suisun Marsh, Suisun Bay, San Francisco Bay would not be substantially affected by Delta Conveyance Project, for the same reasons as discussed above for Alternative 2 (i.e., the sources and mechanisms of deposition and transport are independent of project operations).

### **Summary**

As described above, Alternative 2 or Delta Conveyance Project operations would not affect the legacy contaminants PAHs, PCBs, and dioxin and furan compounds in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not measurably worsen PAH, PCB, and dioxin and furan compounds levels or substantially change PAH, PCB, and dioxin and furan compounds levels in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not be expected to cause more frequent exceedances of relevant objectives/criteria, degrade water quality with regard to these legacy contaminants, or result in contaminant levels that would adversely affect beneficial uses in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay.

#### **Z.4.1.11 Potential Effects on Bay-Delta Pesticides**

### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, pesticide concentrations in the Delta, Suisun Bay and Marsh, and San Francisco Bay waters are primarily affected by surface water and stormwater discharges from agricultural and urban land use areas. Alternative 2 would not result in measurably higher pesticide concentrations in the Delta that would cause water quality degradation or increase the risk of pesticide-related toxicity to aquatic life as compared to conditions. Several primary factors external to CVP and SWP operation (e.g., land use and pesticide use factors) affect pesticide presence and concentrations in Delta inflows, throughout the Delta, and thus in Delta outflows. This coupled with state regulatory actions to control pesticide loading to surface waters mean that pesticide conditions in the Delta under Alternative 2 and the No Action Alternative would likely be similar. For the same reasons, it is expected that pesticide conditions in Suisun Bay and Marsh and San Francisco Bay under Alternative 2 would be similar to that for the No Action Alternative.

### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-11, Delta Conveyance Project operations would not affect in-Delta sources of pesticides from urban and agricultural runoff and discharges relative to existing conditions. As such, pesticide concentrations in Delta inflows would differ negligibly from existing conditions. This coupled with the generally small changes in flow fractions at Delta locations due to project operations would not measurably increase the frequency with which applicable water quality criteria or objectives for pesticides would be

exceeded in the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay, substantially degrade the quality of these waterbodies with regard to pesticides, or adversely affect any beneficial uses.

### **Summary**

As described above, operation of Alternative 2 or Delta Conveyance Project 5 would have small effects on pesticide levels in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay, as compared to the No Action Alternative. As such, it is anticipated that operation of the Delta Conveyance Project would not measurably worsen pesticide levels or measurably change pesticide levels in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not be expected to cause more frequent exceedances of pesticide objectives/criteria, degrade water quality with regard to pesticides, or result in pesticide levels that would adversely affect beneficial uses in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay.

#### ***Z.4.1.12 Potential Effects on Bay-Delta Cyanobacterial Harmful Algal Blooms***

##### **Alternative 2**

As described in EIS Appendix G, Section G.2.4, Alternative 2 is expected to have minor, if any, effect on irradiance, nutrients, water column turbulence and mixing, and temperature within Delta channels. The effects that Alternative 2 may have on residence time within the Delta throughout the June through November bloom season for cyanobacteria would generally be small in magnitude and thus not likely to cause an increase in the frequency or magnitude of Delta cyanobacterial harmful algal blooms (CHABs) relative to the No Action Alternative. Alternative 2 would not affect residence time, water temperature, channel turbulence and mixing, nutrients, water clarity, or salinity at levels that would create conditions more conducive to CHAB formation in Suisun Marsh, Suisun Bay, or San Francisco Bay. Small changes in these conditions that may potentially occur under Alternative 2 would not be of sufficient frequency and magnitude to cause CHABs to form more frequently, or grow to larger levels, than would occur in these water bodies for the No Action Alternative.

##### **Delta Conveyance Project**

As discussed in Final EIR Chapter 9, Section 9.3.3.2, Impact WQ-14, Delta Conveyance Project would not affect Delta water temperatures, nutrients, velocities and associated turbulence/mixing, or water clarity (and thus irradiance) at levels that would substantially affect, or affect at all, CHAB frequency or magnitude in the Delta. Project operations may result in small increases in residence time in some of the open water areas of the central portion of the Delta, but not the northern, southern, western, or eastern portions of the Delta, where residence times would be minimally affected relative to existing conditions. Project operations would not affect these five factors sufficiently to substantially increase the frequency or magnitude of CHABs or cyanotoxin levels in the Delta. Similarly, project operations would not affect water temperature, channel turbulence and mixing, residence time, nutrients, water clarity, or salinity in Suisun Marsh, Suisun Bay, or San Francisco Bay that would create conditions more conducive to CHAB formation relative to existing conditions. Hence, CHABs and their associated cyanotoxins levels in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay under Delta Conveyance Project would not adversely affect any beneficial uses or degrade water quality substantially, if even measurably relative to existing conditions.



## Summary

As described above, the five primary environmental factors of water temperatures, residence time, turbulence and mixing of the water column, nutrient levels, and water column irradiance and clarity that affect CHABs and their associated cyanotoxins in the Delta, Suisun Marsh, Suisun Bay, and San Francisco Bay would be affected little, if at all, by operation of Alternative 2 or Delta Conveyance Project, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not measurably worsen CHABs or change CHABs in these water bodies, as identified in the EIS. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not be expected to have substantial, if any, effect on the frequency and magnitude of CHABs in these water bodies or cyanotoxin levels and would not adversely affect any beneficial uses or degrade water quality substantially, if even measurably, with regard to CHABs and cyanotoxins.

## Z.4.2 Water Supply

### Z.4.2.1 Potential Changes in Water Supply Deliveries

#### Alternative 2

The maximum and minimum CVP and SWP contract deliveries in the Bay-Delta Region for all phases under Alternative 2 would increase or decrease slightly for CVP M&I water users, would decrease for CVP agricultural water users, and would increase for SWP M&I water users. The maximum reductions in average annual deliveries would average less than 5%. In dry and critical water year types, some maximum reductions in average deliveries would exceed this 5% level with CVP agricultural deliveries reduced by 17% under Alternative 2 Without TUCP Without VA.

For the CVP and SWP service area, SWP M&I deliveries would increase on average up to approximately 5% for the Central Coast Region under all phases of Alternative 2. In the Tulare Lake Region, all average annual contract delivery types, with exception of deliveries to CVP agricultural water users, would remain the same or increase under all phases of Alternative 2. Under Alternative 2 Without TUCP Delta VA, the largest decrease identified, average annual deliveries to CVP agricultural water users would be reduced by 11%. In dry and critical water year types, deliveries to CVP agricultural water users would be reduced by 19% under Alternative 2 Without TUCP Delta VA. The maximum and minimum SWP contract deliveries in the South Lahontan Region would increase on average up to approximately 5% for SWP M&I deliveries under all phases of Alternative 2. In the South Coast Region for all phases under Alternative 2, The maximum and minimum SWP contract deliveries would remain the same for SWP agricultural deliveries and would increase on average up to approximately 4% for SWP M&I deliveries.

#### Delta Conveyance Project

As discussed in the Delta Conveyance Project Final EIR Chapter 6, Section 6.3.2.2, *Project Alternatives*, under, average annual SWP deliveries would increase for the long-term average (15%) and dry and critical water years (13%). Average annual SWP Table A deliveries are expected to increase under the long-term average (13%) and dry and critical water years (23%). SWP Article 56 deliveries would increase under the long-term average (11%) and dry and critical

water years (29%). SWP Article 21 deliveries would increase under the long-term average (254%) and would remain the same during dry and critical water years. CVP deliveries would increase under the long-term average (1%) and during dry and critical water years (2%).

## **Summary**

Operation of Delta Conveyance Project would increase south-of-Delta water exports made by the CVP and SWP. As such, the Delta Conveyance Project could only improve potential changes in south-of-Delta water deliveries to SWP contractors under the EIS Alternative 2. Operation of Delta Conveyance Project would not affect regions where operation of Alternative 2 is shown to result in decreased water deliveries as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not change or further reduce the CVP or SWP water deliveries identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

## **Z.4.3 Groundwater**

### **Z.4.3.1 Potential Changes in Groundwater Pumping**

#### **Alternative 2**

As discussed in EIS Appendix I, *Groundwater Technical Appendix*, Section I.2.4, *Alternative 2*, effects analyses focus on changes that may occur from groundwater pumping, groundwater-surface water interaction, groundwater table elevation, and land subsistence.

In the Central Valley groundwater basin under Alternative 2, there could be an average annual increase in groundwater pumping ranging from 24 thousand acre-feet (TAF) to 67 TAF, with a maximum single year increase in groundwater pumping ranging from 209 TAF to 253 TAF and a maximum single year decrease in groundwater pumping ranging from 131 TAF to 146 TAF. Overall, the predicted change in groundwater table elevation ranges from a decrease of 30.6 feet to an increase of 3.5 feet.

In the Southern California groundwater basin under Alternative 2 changes in surface water supply delivered could result in changes in the amount of groundwater pumped. A conservative estimate would be that any decrease in surface water supply delivered to the Southern California Region would result in an equal increase in groundwater pumping. Increases in groundwater pumping have the potential to reduce groundwater table elevations. The decreases in surface water supply delivered are not expected to result in large increases in groundwater pumping; therefore, large decreases in groundwater table elevation are not expected. Increases in surface water supply delivery may result in a reduction in groundwater pumping and, therefore, an increase in groundwater table levels.

#### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 8, the Delta Conveyance Project would not change groundwater pumping upstream of the Delta or south of the Delta as a result of changes in surface water deliveries. Operation of the Delta Conveyance Project would not result in groundwater pumping for purposes of increasing south-of-Delta water deliveries, as described in the EIS under Alternative 2.

## Summary

As described above, Alternative 2 (all phases) would result in increases in groundwater pumping within the Central Valley, as compared to the No Action Alternative. Operation of Delta Conveyance Project would not result in groundwater pumping and an increase in south-of-Delta surface water deliveries would not adversely affect ground water supplies within the SWP service area such that a change (i.e., increase) in groundwater pumping would occur in that region. As such, it is anticipated that operation of Delta Conveyance Project would not change groundwater pumping, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.3.2 Potential Changes in Groundwater-Surface Water Interaction**

#### **Alternative 2**

As discussed in Appendix I, changes in groundwater-surface water interactions were assessed for the Central Valley and Southern California groundwater basins.

For the Central Valley, Alternative 2 would result in an estimated average annual change in flow from groundwater to surface water ranging from 1 TAF to 31 TAF. The maximum single year increase in flow from groundwater to surface would range from 233 TAF to 449 TAF and a maximum single year decrease in flow from surface water to groundwater would range from 331 TAF to 904 TAF.

In the Southern California Region, changes in surface water supply delivered to this region could result in changes in the amount of groundwater pumped,. All groundwater pumping would need to be conducted in accordance with any existing regulatory setting such as an adjudication or Groundwater Sustainability Plan (GSP).

#### **Delta Conveyance Project**

As described in the Delta Conveyance Project Final EIR Chapter 8, impacts of operating Delta Conveyance Project on groundwater surface water interactions would be limited to the Delta study area. Operation of Delta Conveyance Project would not affect hydrologic conditions upstream of the Delta and would increase south-of-Delta water deliveries and as such may benefit groundwater supplies in the San Joaquin Valley and Southern California Region. As described in Impact GW-1, modeled changes in interconnected Sacramento River flows, San Joaquin River flows, and Suisun Bay flows generally result in very minor variability and range from less than 0.5% to approximately 1.5% under operating conditions of the Delta Conveyance Project (refer to Table 8-3, *Annual Minimum, Maximum, and Average Change in Stream Aquifer Interaction Relative to Existing Conditions [CEQA Baseline] in the Sacramento River Reach in Model Subregion 4*; Table 8.4, *Annual Minimum, Maximum, and Average Change in Stream Aquifer Interaction Relative to Existing Conditions [CEQA Baseline] in the San Joaquin River Reach in Model Subregion 4*; and Table 8.5, *Annual Minimum, Maximum, and Average Change in Stream-Aquifer Interaction Relative to Existing Conditions [CEQA Baseline] in Suisun Bay reach in Model Subregion 1*). Given the minor variability in Sacramento River flows, San Joaquin River flows, and Suisun Bay flows, effects on groundwater-surface water interaction would not be substantial or adverse.

## **Summary**

As described above, Alternative 2 (all phases) would result, on average, in increases in flows from groundwater to surface water in the Central Valley, as compared to the No Action Alternative. Operation of Delta Conveyance Project would not change hydrologic conditions within the Delta, within Suisun Bay, or within the San Joaquin River, and therefore would not affect groundwater-surface water interactions. As such, it is anticipated that operation of Delta Conveyance Project would not change the groundwater to surface water interactions, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.3.3 Potential Changes in Groundwater Elevation**

#### **Alternative 2**

As discussed in EIS Appendix I, the predicted change in groundwater table elevation for Alternative 2 (all phases) within the Central Valley spans a range from a decrease of 30.6 feet to an increase of 3.5 feet. The greatest decreases would occur in the western Sacramento Valley and southwestern San Joaquin Valley. These changes would occur as a result in reductions in surface water deliveries occurring under Alternative 2 and a corresponding increase in groundwater pumping.

Alternative 2 would result in no measurable change in minimum water deliveries for SWP agricultural water users but possible improvements in average water deliveries for SWP M&I water users within Southern California. This improvement may result in reduced groundwater pumping and increased groundwater elevations.

#### **Delta Conveyance Project**

Operation of Delta Conveyance Project would increase south-of-Delta surface water deliveries. As discussed in Final EIR Chapter 8, Impact GW-2, the impacts of operations on groundwater elevations in the underlying subbasin are considered relatively minor because the maximum modeled change in ground water elevation of 2 feet would only occur at 12 wells within the Delta study area.

## **Summary**

As described above, operation of Alternative 2 (all phases) would result in potential decreases in groundwater elevations within the Central Valley with the greatest changes estimated to occur in the western Sacramento Valley and southwest San Joaquin Valley, as compared to the No Action Alternative. Operation of Delta Conveyance Project would not adversely affect groundwater levels within the SWP south of Delta export area. Operation of Delta Conveyance Project could result in a slight decrease in the groundwater elevations with the Delta, but these potential changes would be very small and isolated to a few sites within the Delta study area. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

#### **Z.4.3.4 Potential Changes in Land Subsidence**

##### **Alternative 2**

As discussed in EIS Appendix I, land subsidence is caused by the consolidation of certain subsurface soils when the pore pressure in those soils is reduced. In the Sacramento and San Joaquin Valleys, that reduction in pore pressure is usually caused by groundwater pumping that causes groundwater levels to fall below historical low levels. Average groundwater levels are simulated to decrease up to approximately 12 feet for Alternative 2 With TUCP Without VA and Alternative 2 Without TUCP Without VA in some water year types compared to the No Action Alternative. Groundwater levels may decrease closer to 20 feet for Alternative 2 Without TUCP Delta VA and Alternative 2 Without TUCP Systemwide VA compared to the No Action Alternative. Phases with larger decreases in groundwater levels have a higher likelihood of causing additional subsidence. The largest decreases in groundwater levels are simulated to occur along the western portion of the Central Valley in the Sacramento San Joaquin Valleys. Portions of these areas are known to have historic subsidence and further reductions in groundwater levels may cause additional subsidence. The location and amount of subsidence is highly dependent on the local soil conditions and historical low groundwater levels in the area. It is unlikely that there would be changes in land subsidence in the Southern California Region due to implementation of Alternative 2 (all phases) because these areas are not known to be susceptible to subsidence and no increases in groundwater pumping are expected in these areas.

##### **Delta Conveyance Project**

As described in the Delta Conveyance Project Final EIR Chapter 8, Impact GW-6, modeling simulations indicate that land subsidence from groundwater pumping would not occur because land subsidence within the Delta occurs predominantly as the result of the oxidation of organic soils and would therefore not be influenced by groundwater elevation changes from project operations.

##### **Summary**

As described above, Alternative 2 (all phases) would result in decreases in groundwater levels in the Central Valley, which could result in increased land subsidence, as compared to the No Action Alternative. The groundwater analysis presented in the Delta Conveyance Project Final EIR concluded that operation of Delta Conveyance Project operations would not result in potential changes in land subsidence in the Delta. As such, it is anticipated that operation of Delta Conveyance Project would not substantially change land subsidence within the Central Valley, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

#### **Z.4.4 Cultural Resources**

While the potentially affected environment includes areas upstream of the Delta for Alternative 2, as explained in Section Z.3.1, *Study Area*, DWR evaluated upstream areas in its Final EIR and determined that the Delta Conveyance Project would have either no or limited changes in reservoir elevation levels upstream of the Delta. Final EIR Chapter 19 Cultural Resources, Section 19.3.3.2, *Impacts of the Project Alternatives on Cultural Resources*, provides details of why Delta Conveyance Project would have no potential to disturb or destroy archaeological

historic properties and/or human remains as a result of surface water elevation and storage in upstream reservoirs. Therefore, this analysis regarding water supply does not include further discussion of cultural resources.

An analysis of Cultural Resources for Alternative 2 is located in EIS Appendix K.

## **Z.4.5 Air Quality**

### **Z.4.5.1 Potential Air Quality Effects from Changes in Emissions from Fossil-Fueled Powerplants (Hydropower Generation)**

#### **Alternative 2**

As discussed in Appendix L, Section L.2.4, *Alternative 2*, air quality effects from changes in emissions from fossil-fueled powerplants from hydropower generation would increase at varying levels for each phase of Alternative 2. This is because operation of Alternative 2 (all phases) would result in a net decrease in energy generation for the CVP and SWP. As a result, emissions from fossil-fueled powerplants on the grid would increase. While criteria pollutant emissions would increase with operation of Alternative 2, the relatively low magnitudes of the emissions increase suggests that any potential air quality impacts compared to the No Action Alternative would be small.

#### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 23, Section 23.3.3.2, *Impacts of the Project Alternatives on Air Quality*, long-term operation of the Delta Conveyance Project would add electric demand to the SWP and CVP, which could lead to increased emissions from fossil-fueled powerplants on the grid. However, these facilities are regulated and permitted at a maximum emissions level. Therefore, emissions associated with changes in the operation of fossil-fueled powerplants from project electricity consumption are not included in the Delta Conveyance Project Final EIR because these emissions have already been evaluated and accounted for in existing permit and environmental documents.

#### **Summary**

The EIS identified that operation of Alternative 2 (all phases) could reduce hydropower generation leading to increases in grid power generation and emissions resulting in decreased air quality, as compared to the No Action Alternative. However, the magnitude of decreases is expected to be small. The Delta Conveyance Project Final EIR determined that air quality effects from changes in hydropower generation would not be adverse because increases in criteria pollutants from fossil-fuel powerplants on the grid would be limited to the permitted maximum level for individual generating units. Furthermore, emissions associated with the Final EIR have already been evaluated and mitigated for pursuant to existing permits. Thus, operation of Delta Conveyance Project would not result in adverse air quality effects in those areas where the affected environment overlaps with Alternative 2 (i.e., Sacramento Valley Air Basin, San Francisco Bay Area Air Basin, and San Joaquin Valley Air Basin). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

#### **Z.4.5.2 Potential Air Quality Effects from Changes in Emissions from Fossil-Fueled Powerplants and Pump Engines (Groundwater Pumping)**

##### **Alternative 2**

As discussed in Appendix L, Section L.2.4, *Alternative 2*, air quality effects from changes in emissions from fossil-fueled powerplants and pump engines from groundwater pumping would increase at varying levels for each phase of Alternative 2. Alternative 2 (all phases) would change operation of the CVP and SWP, which could change river flows and reservoir levels. These changes could affect the amount of water available for agricultural irrigation. If surface water availability decreases, farmers could make up the difference in water supply by increasing groundwater pumping. Approximately 90% of groundwater pumps are powered by grid, so increased pumping would increase the demand for grid power. While criteria pollutant emissions would increase with operation of Alternative 2, the relatively low magnitudes of the emissions increase suggests that potential air quality impacts would be small.

##### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR, Chapter 23, Section 23.3.3.2, Delta Conveyance Project would not reduce water supply deliveries to irrigated land within the Central Valley as a result of operations (Final EIR Chapter 6, Section 6.3.2.2, and Chapter 17, *Socioeconomics*, Impact ECON-7). Therefore, Delta Conveyance Project would not have the same type of groundwater pumping effect mechanisms as described within the EIS and would not result in air quality (or greenhouse gas [GHG] emissions) as a result of groundwater pumping under operating conditions.

##### **Summary**

The EIS identified that operation of Alternative 2 (all phases) could increase emissions and decrease air quality, as compared to the No Action Alternative. The Delta Conveyance Project would not increase groundwater pumping under operating conditions because it would not decrease water supply to the Central Valley. Operation of Delta Conveyance Project would have no effect and, therefore, would have no potential to increase the severity in adverse air quality effects in those areas where the affected environment overlaps with Alternative 2 (i.e., Sacramento Valley Air Basin, San Francisco Bay Area Air Basin, and San Joaquin Valley Air Basin). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

#### **Z.4.6 Greenhouse Gas Emissions**

##### **Z.4.6.1 Potential GHG Effects from Changes in Emissions from Fossil-Fueled Powerplants (Hydropower Generation)**

##### **Alternative 2**

As discussed in EIS Appendix M, Section M.2.4, *Alternative 2*, GHG effects from changes in emissions from fossil-fueled powerplants from hydropower generation would increase at varying levels for each phase of Alternative 2. Operation of Alternative 2 (all phases) would result in a net decrease in energy generation for the CVP and SWP. As a result, emissions from fossil-fueled

powerplants on the grid would increase. While GHG emissions would increase with operation of Alternative 2, the relatively low magnitudes of the emissions increase suggests that potential adverse GHG impacts would be small.

### **Delta Conveyance Project**

As discussed in the Final EIR Chapter 23, Section 23.3.3.3, *Impacts of the Project Alternatives on Global Climate Change*, Delta Conveyance Project would not affect DWR's established emissions reduction goals and therefore would not result in a change in total DWR emissions that would be considered significant. Operation of Delta Conveyance Project would also result in a net decrease in energy generation for the CVP, which could increase indirect electricity emissions through 2045. While Delta Conveyance Project would continue to operate beyond 2045, indirect emissions from displaced purchases of CVP electricity within the state's electric grid would achieve carbon neutrality pursuant to Senate Bill 100. Operational GHG emissions generated prior to 2045, as well as any emissions generated after 2045 from fugitive sources, such as sulfur hexafluoride as part of electrical transmission, will be reduced to net-zero through implementation of Mitigation Measure AQ-9: *Develop and Implement a GHG Reduction Plan to Reduce GHG Emissions from Construction and Net CVP Operational Pumping to Net Zero*.

### **Summary**

The Delta Conveyance Project Final EIR determined that GHG emissions from displaced purchases of CVP electricity resulting from operation of the Delta Conveyance Project would not be adverse because Mitigation Measure AQ-9 would reduce these emissions to net zero. The EIS identified that operation of Alternative 2 (all phases) would increase GHG emissions from fossil-fueled powerplants, as compared to the No Action Alternative. Operation of Delta Conveyance Project would not increase the severity of this effect because operations emissions from Delta Conveyance Project would be either reduced to net zero or compliant with DWR's emissions reduction goals (which consider operation of the SWP). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

#### **Z.4.6.2 Potential GHG Effects from Changes in Emissions from Fossil-Fueled Powerplants and Pump Engines (Groundwater Pumping)**

### **Alternative 2**

As discussed in EIS Appendix M, Section M.2.4, *Alternative 2*, GHG effects from changes in emissions from fossil-fueled powerplants and pump engines from groundwater pumping would increase at varying levels for each phase of Alternative 2. Operation of Alternative 2 (all phases) in an average year would increase groundwater pumping. As a result, emissions from fossil-fueled powerplants on the grid and pump engines would increase. While GHG emissions would increase with operation of Alternative 2, the relatively low magnitudes of the emissions increase suggests that any potential adverse GHG impacts would be small.

### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 23, Section 23.3.3.3, Delta Conveyance Project would not reduce water supply deliveries to irrigated land within the Central Valley as a result of operations (Final EIR Chapter 6, Section 6.3.2.2, and Chapter 17, Impact



ECON-7). Therefore, Delta Conveyance Project would not have the same type of groundwater pumping effect mechanisms as described within the EIS and would not result in air quality (or GHG emissions) as a result of groundwater pumping under operating conditions. As discussed above, these emissions would comply with DWR's climate action plan or be reduced to net zero through implementation of Mitigation Measure AQ-9.

### **Summary**

The EIS identified that GHG emissions from changes in groundwater pumping under Alternative 2 (all phases) would result in increased GHG emission, as compared to the No Action Alternative. Delta Conveyance Project would not increase groundwater pumping under operating conditions because it would not decrease water supply to the Central Valley. Operation of Delta Conveyance Project would not increase the severity of this effect because operations emissions from Delta Conveyance Project would be either reduced to net zero or compliant with DWR's emissions reduction goals (which consider cumulative operation of the SWP) and would not increase groundwater pumping. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.7 Visual Resources**

While the potentially affected environment includes areas upstream of the Delta for Alternative 2, as explained in Section Z.3.1, DWR evaluated upstream areas in its Final EIR and determined that the Delta Conveyance Project would not increase deliveries (or exports) out of storage, and there are little to no effects on resources upstream of the Delta given that the operating criteria and conditions are unchanged under the operation of Delta Conveyance Project. As discussed in Final EIR Chapter 18, *Aesthetics and Visual Resources*, Section 18.1.1, *Study Area*, Delta Conveyance Project would not change operations upstream of the Delta; and operations would have very minimal effects on Shasta and Folsom reservoirs end-of-month storage. Trinity, Shasta, Folsom, New Melones, and San Luis reservoirs would experience slight changes, but these variations would be within the existing fluctuations in storage and elevation patterns. This analysis regarding visual resources does not include further discussion of areas upstream of the Delta.

#### **Z.4.7.1 Potential Changes in Vistas at Irrigated Agricultural Lands**

##### **Alternative 2**

As discussed in EIS Appendix N, Section N.2.4.2, *Potential changes in vistas at irrigated agricultural lands*, operation of Alternative 2 would result in a reduction of crop acreage due to the conversion of agricultural land into nonagricultural land in the long-term average and dry and critical year conditions in the San Joaquin River and Sacramento River regions. Some conversion of agricultural land to nonagricultural is expected to occur in the San Joaquin River and Sacramento River regions under Alternative 2. Alternative 2 would result in a reduction of active agriculture and an increase in fallowed land. Mitigation Measure AG-1: *Diversify Water Portfolios* is proposed in the EIS; however, it relies on entities other than Reclamation to implement the measure.

## **Delta Conveyance Project**

As discussed in Final EIR Chapter 18, Section 18.3, *Environmental Impacts*, operation of the whole Bethany Complex would not result in further substantial changes to the existing natural viewshed or terrain, alter existing visual quality of the region or eliminate visual resources, or obstruct or permanently reduce visually important features. Thus, operation of would not have an effect on existing visual quality and character in the study area. Furthermore, Delta Conveyance Project would not reduce water supply deliveries to irrigated land within the Central Valley as a result of operations (Final EIR Chapter 6, Section 6.3.2.2, and Chapter 17, ECON-7).

### **Summary**

As described above, Alternative 2 may lead to a reduction in active agriculture, leading to fallowed lands, and an overall reduction in agricultural lands, and a change in vistas at irrigated agricultural lands, as compared to the No Action Alternative. Delta Conveyance Project would not change vistas in irrigated agricultural areas under operating conditions because it would not decrease water supply to the Central Valley. Operation of Delta Conveyance Project would have no effect and therefore would have no potential to increase the severity of this effect because Delta Conveyance Project would not change vistas. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

## **Z.4.8 Fish and Aquatic Resources**

### **Z.4.8.1 Potential Effects on Winter-Run Chinook Salmon (Bay-Delta)**

#### **Alternative 2**

Analysis of potential changes to winter-run Chinook salmon rely on a variety of models with different focus (i.e., different life stages or type of effects), including multiple entrainment or survival lines of evidence (e.g., STARS, ECO PTM, IOS, DPM, OBAN) with the direction of their conclusions not always aligning because they rely on different input variables, time-steps, or performance metric thresholds. As discussed in Appendix O, *Alternative 2, Sacramento River Winter-Run Chinook Salmon ESU*, the four phases of Alternative 2 are expected to have either an adverse or beneficial effect and are best described by grouping the four phases into “With VA” (Alternative 2 Without TUCP Delta VA and Without TUCP Systemwide VA) and “Without VA” (Alternative 2 With TUCP Without VA and Without TUCP Without VA). The two phases of Alternative 2 With VA are expected to decrease entrainment of genetic and length-at-date (LAD) winter-run Chinook salmon except during a wet water year type while the two phases of Alternative 2 Without VA are expected to increase or decrease entrainment (Salvage Density, Negative Binomial) and have little to no effect on proportion of juveniles salvaged (coded wire tag [CWT]). The four phases of Alternative 2 are expected to have minor adverse or beneficial effects on outmigrating juveniles resulting from either increased or decreased survival based on secondary biological model, OMR grouping, and inflow grouping: the DPM and IOS models usually found minor adverse effects to no effect of Alternative 2 on through-Delta survival, while STARS, ECO PTM and OBAN found minor adverse to minor beneficial effects.

## **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, diversion at the north Delta diversions is not expected to have adverse near-field (e.g., entrainment) or water quality effects (Impact AQUA-2). However, it would negatively affect winter-run Chinook salmon through flow-survival and habitat impacts on juvenile rearing and outmigration. The Sacramento River is the main migration pathway through the Delta for juvenile winter-run and, therefore, a large proportion of the population would potentially be exposed to negative impacts. While there is uncertainty in the biological impacts, there is greater certainty regarding adverse effects on habitat-based indicators. Mitigation Measure CMP: *Compensatory Mitigation Plan*, and specifically CMP-25: *Tidal Habitat Restoration to Mitigate North Delta Hydrodynamic Effects on Chinook Salmon Juveniles* and CMP-26: *Channel Margin Habitat Restoration for Operations Impacts on Chinook Salmon Juveniles*, has been adopted by DWR and would reduce negative hydrodynamic effects on winter-run Chinook salmon through-Delta survival as a result of factors such as flow-related changes in migration speed and probability of entering the low-survival interior Delta migration pathway and restoring new bench habitat at elevations that would be inundated under reduced flows downstream of the north Delta intakes.

## **Summary**

Under the Delta Conveyance Project, entrainment risk for juveniles and adult winter-run Chinook salmon would be minimal at the proposed north Delta intakes (juveniles) and would generally be similar or slightly less at the existing south Delta intakes than under existing condition. Given the purpose and limitations describe in Section Z.1, it is not anticipated that operation of Delta Conveyance Project would worsen nor lessen potential entrainment effects of the Alternative 2 phases without VA. Delta Conveyance Project operations may affect winter-run Chinook salmon habitat or survival, but DWR will implement mitigation measures described in the Final EIR and the approved MMRP to reduce the magnitude of potential habitat or survival-related effects of Delta Conveyance Project operations. Depending on the phase of Alternative 2 and on the period considered, the Delta Conveyance Project effects on juvenile winter-run Chinook salmon outmigration cues and refuge rearing habitat could at times be additive to potential Alternative 2 adverse effects. Note, however, that for both Alternative 2 and Delta Conveyance Project, there were substantial variations in the magnitude and direction of effects, as compared to the No Action Alternative, indicated by the different life cycle models used (e.g., IOS and OBAN indicated possible negative effects of Delta Conveyance Project operations, while the Winter-run Chinook salmon Life Cycle Model suggested potential positive effects and the Central Valley Project Improvement Act [CVPIA] winter-run model indicated little to no effect). Potential additive effects described above would be reduced by Mitigation Measure CMP: *Compensatory Mitigation Plan*, including tidal habitat and channel margin restoration and north Delta intakes operating criteria under the Delta Conveyance Project. In addition, adaptive management would be available to address uncertainty, monitor and ensure effects are consistent with those analyzed, and provide a process to refine operations, if needed.

#### **Z.4.8.2 Potential Effects on Central Valley Spring-Run Chinook Salmon (Bay-Delta)**

##### **Alternative 2**

The analysis of potential changes to spring-run Chinook salmon rely on a variety of analyses and models with different focus (i.e., different life stages or type of effects), including multiple entrainment (*Salvage Density at Banks and Jones facilities, Negative Binomial at combined facilities*) or survival lines of evidence (ECO PTM, DPM) with the direction of their conclusions not always aligning because they rely on different input variables, time-steps or performance metric thresholds. As discussed in Appendix O, *Alternative 2, Central Valley Spring-Run Chinook Salmon ESU*, the four phases of Alternative 2 are expected to have beneficial and adverse effects resulting from a decrease in entrainment at the CVP facility and increase in entrainment at the SWP facility. Alternative 2 (all phases) is also expected to have adverse or beneficial effects of flow on survival depending on OMR grouping (ECO PTM) and no effect on outmigrating juveniles (DPM).

##### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-3, operations of the north Delta intakes would generally have similar effects on Central Valley spring-run Chinook salmon to what was discussed for winter-run Chinook salmon. Diversion at the NDD is not expected to have adverse near-field (e.g., entrainment) or water quality effects. The main period of potential effects on young-of-the-year juvenile spring-run Chinook salmon is later in the winter-spring than for winter-run Chinook salmon, resulting in somewhat lower potential effects on spring-run young-of-the-year juveniles than on winter-run because of more limitations on and less use of the north Delta intakes in the spring. The majority of returning adults emigrate as yearlings beginning in fall and, therefore, have the potential to overlap with periods of greater NDDs and potential effects on through-Delta survival. Approved Mitigation Measure CMP: *Compensatory Mitigation Plan*, and specifically CMP-25: *Tidal Habitat Restoration to Mitigate North Delta Hydrodynamic Effects on Chinook Salmon Juveniles* and CMP-26: *Channel Margin Habitat Restoration for Operations Impacts on Chinook Salmon Juveniles*, for winter-run Chinook salmon would also benefit Central Valley spring-run Chinook salmon and mitigate hydrodynamic effects such as flow reversals in the Sacramento River at Georgiana Slough (CMP-25) and effects from reduced inundation of riparian/wetland benches as a result of NDD operations (CMP-26).

##### **Summary**

Under operations of Delta Conveyance Project, entrainment risk for juveniles and adult spring-run Chinook salmon would be minimal. Effects of operations of the Delta Conveyance Project and Alternative 2 (all phases) would be limited to those described above for Alternative 2 (potential decrease at CVP intakes and potential increase at SWP intakes). Operations of Delta Conveyance Project and Alternative 2 operations could combine under certain conditions to affect juvenile outmigration, refuge habitat or survival, as compared to the No Action Alternative. Overall, the potential for adverse effects would be limited for spring-run Chinook salmon. Furthermore, Delta Conveyance Project mitigation measures and CMP would further reduce effects. In addition, adaptive management for both projects would be available to address uncertainty, monitor and ensure effects are consistent with those analyzed, and provide a process to refine operations, if needed.

### **Z.4.8.3 Potential Effects on California Central Valley Steelhead DPS (Bay-Delta)**

#### **Alternative 2**

Analysis of potential changes to California Central Valley steelhead (CCV steelhead) rely on a variety of analyses and models with different focus (i.e., different life stages or type of effects), including multiple entrainment (*Salvage Density at Banks and Jones facilities, Negative Binomial at combined facilities*) or survival lines of evidence (ECO PTM) with the direction of their conclusions not always aligning because they rely on different input variables, time-steps or performance metric thresholds. As discussed in Appendix O, *Alternative 2, California Central Valley Steelhead DPS*, the four phases of Alternative 2 are expected to have beneficial and adverse effects on juveniles, resulting from either an increase or decrease in entrainment at the export facilities depending on the phase and water year type. They are also expected to have minor adverse or minor beneficial effects of flow on outmigrating juveniles depending on OMR grouping. Alternative 2 would have negligible effects on flow into the Head of Old River. The Alternative 2 phases without Voluntary Agreements may have small decrease in flows into the CVP under OMR bin -2,000 cfs, while the effects of the phases with Voluntary Agreements on flow into the CVP may be negligible. Generally, the effects of diversion on flow and juvenile rearing and emigration are smaller at more upstream locations (Jersey Point) and greater at Turner Cut.

#### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-5, operations of the north Delta intakes on CCV steelhead generally would be similar in nature to those previously summarized for winter- and spring-run Chinook salmon. There would be minimal risk of juvenile entrainment and impingement at the north Delta intakes based on steelhead size distribution, further reduced by the use of cylindrical fish screens meeting fish agency standards. There is potential for negative effects on through-Delta migration survival (up to a 4% decrease). Approved compensatory mitigation, specifically CMP-25: *Tidal Habitat Restoration to Mitigate North Delta Hydrodynamic Effects on Chinook Salmon Juveniles* and CMP-26: *Channel Margin Habitat Restoration for Operations Impacts on Chinook Salmon Juveniles* for winter-run Chinook salmon would also benefit CCV steelhead to mitigate such effects.

#### **Summary**

Operation of Delta Conveyance Project would have minimal effects on entrainment risk for juveniles and adult CCV steelhead. Effects of operations of the Delta Conveyance Project and Alternative 2, as compared to the No Action Alternative, would be limited to those described above for Alternative 2 (potential minor decrease or increase depending on water year type). Delta Conveyance Project and Alternative 2 operations could combine under certain conditions to affect juvenile outmigration, refuge habitat in the Delta or survival. Furthermore, Delta Conveyance Project mitigation measures and CMP would further reduce effects. In addition, adaptive management for both projects would be available to address uncertainty, monitor and ensure effects are consistent with those analyzed, and provide a process to refine operations, if needed.

#### **Z.4.8.4 Potential Effects on Southern DPS Green Sturgeon (Bay-Delta)**

##### **Alternative 2**

As discussed in EIS Appendix O, *Alternative 2, Southern DPS Green Sturgeon*, potential changes in flow under Alternative 2 (all phases) are not expected to have effects on juvenile rearing and emigration (year-class strength), adult migration, or entrainment of either juveniles or adults (beneficial effects on entrainment are possible but difficult to confirm because salvage is overall rare).

##### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-8, near-field effects of operations of the north Delta intakes on green sturgeon would be limited and entrainment at the south Delta facilities would remain similar to existing conditions. Metals effects (selenium, methylmercury) on green sturgeon would also not change with operation of Delta Conveyance Project. Changes in Delta outflow as a result of Delta Conveyance Project operations are not expected to result in substantial effects on green sturgeon year-class strength, although there is some uncertainty.

##### **Summary**

Based on the analyses summarized above, operations of Alternative 2 (all phases) and Delta Conveyance Project are not anticipated to combine to impact Southern DPS green sturgeon within the Bay-Delta. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would be limited to those described above for the Delta Conveyance Project.

#### **Z.4.8.5 Potential Effects on Delta Smelt (Bay-Delta)**

##### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Delta Smelt*, the four phases of Alternative 2 are expected to have negative to beneficial effects on adults resulting from increased or decreased entrainment. Old and Middle River (OMR) flows were more negative during April and May for phases without VAs, more negative in May for phases with VAs, less negative during June for phases without VAs, March and June for the Delta VA phase and March, April, and June for the phase with systemwide VAs. Minor to negligible effects are expected to eggs and larvae resulting from minor to negligible changes in entrainment, and negligible to beneficial effects on juveniles resulting from negligible changes in to decreases in entrainment (OMR was less negative across all phases in June and generally similar to the No Action Alternative from July to November). For food availability and population growth rate, there are either no negative effects or minor negative effects on adults, minor negative to positive effects on larvae, and no to negligible negative effects on juveniles. Effects on low salinity habitat (as measured by X2 position) are expected to be negligible.

##### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-6, there is potential for negative effects from operations of the Delta Conveyance Project to a very small proportion of the Delta smelt population from near-field effects of the North Delta intakes. However, entrainment effects on adults, juveniles and larvae would be very limited because of

the low proportion of the population occurring in the area and because the north Delta intakes would generally be lower during the key spring months with greater entrainment risk. Effects of operations on the sediment load entering the Delta would be limited and not expected to affect Delta smelt through reduced turbidity. The extent of summer-fall low salinity rearing habitat for Delta smelt would be similar under the Delta Conveyance Project operations and existing conditions. Similarly, operation of Delta Conveyance Project is not anticipated to result in increased negative effects from changes in water quality (selenium bioaccumulation, cyanobacterial harmful algal blooms). While Delta outflow would generally be somewhat reduced under Delta Conveyance Project during spring throughfall as a result of less outflow being needed for meeting Delta salinity requirements, there is considerable uncertainty in the potential for negative effects on Delta smelt food availability, predation, and recruitment because these changes in Delta outflow are within the existing parameters of current regulations (e.g., D-1641; federal and state water project permits). Given the existing all-time low abundance indices of Delta smelt, any such effects are anticipated to be limited and will be mitigated through tidal habitat restoration of approximately 1,100 to 1,400 acres under the approved Mitigation Measure CMP: *Compensatory Mitigation Plan*, specifically CMP-27, *Tidal Habitat Restoration for Operations Impacts on Delta Smelt*.

### **Summary**

Operation of Delta Conveyance Project, there is potential for very limited increase in entrainment risk for Delta smelt, however the north Delta intake would rarely be operated during key spring months (e.g., median percentage diversion at Delta Conveyance Project north Delta intakes in April and May = 0%) during which the Alternative 2 phases without VAs could lead to more negative OMR flows, as compared to the No Action Alternative. As such, there is limited potential for operations of the two projects to combine and result in increased entrainment risk. Although uncertain, there is some potential for Delta Conveyance Project to negatively affect Delta smelt food availability due to decreases in summer Delta outflow, which could combine under some circumstances with occasional minor effects on prey abundances from Alternative 2 operations, as compared to the No Action Alternative. Furthermore, Delta Conveyance Project mitigation measures and CMP would further reduce effects. In addition, adaptive management for both projects would be available to address uncertainty, monitor and ensure effects are consistent with those analyzed, and provide a process to refine operations, if needed.

#### **Z.4.8.6 Potential Effects on Longfin Smelt (Bay-Delta)**

##### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Longfin Smelt*, Alternative 2 is expected to have negligible effects on entrainment of adults, variable effects on eggs and larvae resulting from increased or decreased entrainment depending on location of origin, inflow and OMR flow, and substantial adverse effects on juveniles under almost all phases and water year types. Effects on low salinity habitat (as measured by X2 position) are expected to be negligible. Under all phases of Alternative 2, juvenile longfin smelt abundance would generally be similar to the No Action Alternative, with some potential for limited increases during critically dry years or decreases during wet years. Longfin smelt prey abundance would either increase or decrease depending on species, season, water year type, and phase of Alternative 2.

## **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-7, near-field effects of the north Delta intakes, south Delta entrainment, and effects on food availability as a result of differences in spring Delta outflow are expected to be minimal and would affect only a very small portion of the longfin smelt population. However, population-level analyses indicate that there is potential for more substantial flow-related effects of Delta Conveyance Project operations on longfin smelt abundance (mean decreases of 4 to 10% depending on water year type), although there is uncertainty given the variability of longfin smelt abundance index estimates. Implementation of approved compensatory mitigation (Mitigation Measure CMP: *Compensatory Mitigation Plan*, and specifically CMP-28: *Tidal Habitat Restoration for Operations Impacts on Longfin Smelt*) would substantially reduce any such effect.

## **Summary**

Under operation of Delta Conveyance Project, entrainment risk and food availability effects on longfin smelt would be minimal. As such, it is not anticipated that operation of Delta Conveyance Project would worsen or lessen potential entrainment effects of Alternative 2, which are expected to remain mostly limited, as summarized above. There is potential for both projects to combine however, and to increase freshwater flow stressors with potential effects on longfin smelt abundances, as compared to the No Action Alternative. Such effects would be limited by DWR approved CMP measures described in the Final EIR and the MMRP, including tidal habitat restoration under the Delta Conveyance Project, in addition to various conservation measures under Alternative 2, and by integrating their respective planned adaptive management programs.

### **Z.4.8.7 Potential Effects on Fall-Run and Late Fall-Run Chinook Salmon ESU (Bay-Delta)**

#### **Alternative 2**

As discussed in EIS Appendix O, *Alternative 2, Fall-Run and Late Fall-Run Chinook Salmon ESU*, Alternative 2 is expected to have substantial adverse effects on fall-run Chinook salmon from entrainment at the Banks Pumping Plant, as well as moderate negative effects in critical water year and negligible effects in all other water year types at the Jones Pumping Plant. Late fall-run Chinook salmon entrainment at both facilities would be similar to the No Action Alternative. Negligible effects on outmigrating juvenile survival are expected in all water year types.

#### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-4, operations of the north Delta intakes would generally have similar effects on fall-run and late fall-run Chinook salmon to what was discussed for winter-run Chinook salmon. Diversion at the north Delta diversions is not expected to have adverse near-field (e.g., entrainment) or water quality effects. The main period of potential effects on the numerically dominant Sacramento River basin fall-run Chinook salmon is later in the winter-spring than for winter-run and spring-run Chinook salmon, when NDDs are more limited and therefore potential effects are more limited. Through-Delta migration survival effects on late fall-run Chinook salmon are more similar in magnitude to winter-run. There would not be substantial effects on San Joaquin fall-run Chinook salmon. Overall, it is not expected that operations of Delta



Conveyance Project would result in substantial effects on fall-run and late fall-run Chinook salmon. In addition, implementation of approved Mitigation Measure CMP: *Compensatory Mitigation Plan*, specifically CMP-25: *Tidal Habitat Restoration to Mitigate North Delta Hydrodynamic Effects on Chinook Salmon Juveniles* and CMP-26: *Channel Margin Habitat Restoration for Operations Impacts on Chinook Salmon Juveniles* proposed for winter-run Chinook salmon would benefit fall-run and late fall-run Chinook and further reduce effects.

### **Summary**

Under operation of Delta Conveyance Project, entrainment effects on fall-run and late fall-run Chinook salmon would be minimal. As such, it is not anticipated that operation of Delta Conveyance Project would worsen or lessen the potential entrainment effects of Alternative 2, as compared to the No Action Alternative, summarized above.

### **Z.4.8.8 Potential Effects on White Sturgeon (Bay-Delta)**

#### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Southern White Sturgeon*, potential changes in flow under the four phases of Alternative 2 are expected to have negligible to possibly minor beneficial effects on juvenile rearing and emigration and subadult and adult residency in the Bay-Delta (year-class strength). Similarly, potential changes in flows under Alternative 2 are not expected to have effects on the entrainment of juvenile or adult white sturgeon at any export facilities. Modeled results (salvage density model) show possible beneficial or adverse effects in various phases, months, and water year types, but since white sturgeon are salvaged so rarely, the numbers may not be representative.

#### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-9, near-field effects of operations of the north Delta intakes on white sturgeon would be limited, and entrainment at the south Delta facilities would remain similar to existing conditions. Metals effects (selenium, methylmercury) on white sturgeon would also not change with operation of Delta Conveyance Project. Changes in Delta outflow as a result of Delta Conveyance Project operations are not expected to result in substantial effects on white sturgeon year-class strength, although there is some uncertainty.

### **Summary**

Based on the analyses summarized above, operations of Alternative 2 would not result in adverse effects on white sturgeon and Delta Conveyance Project effects on white sturgeon affect white sturgeon within the Bay-Delta are expected to be limited. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would be limited to those described above for the Delta Conveyance Project.

#### **Z.4.8.9 Potential Effects on Native Minnows (Bay-Delta)**

##### **Alternative 2**

Certain species such as Sacramento splittail are known to utilize the Delta for many portions of their life history so flows into the Delta could have a strong effect on these fish by limiting habitat, prey availability, and access to spawning areas. As discussed in EIS Appendix O, *Alternative 2, Native Minnows*, differences in export flows under Alternative 2 compared to the No Action Alternative are minimal for most of the year, but increased exports in April and May would likely cause an increase in entrainment at a key time for juvenile migration of many native minnows into the Delta. Salvage density model results confirm this for all four phases of Alternative 2, with higher predicted average monthly losses for most months and water year types compared to the No Action Alternative.

##### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-11, hardhead, Sacramento hitch, and Central California roach are mostly distributed upstream of the Delta, with low abundance in the Delta, particularly for life stages most susceptible to entrainment. Although there is potential for Delta Conveyance Project to result in less inundation of riparian bench habitat availability for Sacramento splittail, such effects would be limited relative to the total floodplain availability that drives population dynamics, and the approved mitigation measures provided for Chinook salmon would further limit negative effects on riparian bench habitat availability. The effects of operations of Delta Conveyance Project are thus expected to be negligible for native minnows. This is because of factors including low spatial overlap with the north Delta intakes at sizes vulnerable to entrainment, screen design limiting the potential for entrainment, little difference in south Delta exports during periods of entrainment risk, little effect of changes in water operations to fish tissue selenium concentrations, and very limited effects of north Delta intake maintenance.

##### **Summary**

Under operations of Delta Conveyance Project, entrainment risk and habitat or water quality effects on native minnow populations would be minimal, so it is not expected that operations of Delta Conveyance Project would worsen nor lessen the anticipated effects, as compared to the No Action Alternative, described above for all four phases of Alternative 2 (potential adverse effects of flow on entrainment in most months, and particularly in April-May).

#### **Z.4.8.10 Potential Effects on Pacific Lamprey (Bay-Delta)**

##### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Pacific Lamprey*, differences in flow between Alternative 2 and the No Action Alternative are expected to have either minor beneficial or minor adverse effects on Pacific lamprey ammocoete rearing and emigration in the Bay-Delta depending on the month and phase of Alternative 2 considered. Moderate beneficial to minor adverse entrainment effects from Alternative 2 are expected, with either increases or decreases in losses at CVP export facilities depending on water year types and months. No substantial change in Pacific lamprey salvage at SWP export facilities is expected under Alternative 2.

## **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-10, the cylindrical tee screen design and north Delta intake operational criteria would limit the potential for negative effects of the north Delta intakes, including entrainment, on Pacific lamprey. Available information does not suggest that predation risk would be significantly elevated by the north Delta intakes, and any uncertainty will be addressed by fisheries studies described in the Final EIR. South Delta entrainment risk under operation of Delta Conveyance Project would be negligibly different from existing conditions, and approved compensatory mitigation would not have substantial negative effects on Pacific lamprey.

### **Summary**

Under Delta Conveyance Project, effects on Pacific lamprey would be minimal, so it is not expected that operations of Delta Conveyance Project would worsen nor lessen the anticipated effects, as compared to the No Action Alternative, described above for Alternative 2 (potential for moderate beneficial or minor adverse effects on entrainment at CVP facilities).

#### **Z.4.8.11 Potential Effects on Striped Bass (Bay-Delta)**

##### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Striped Bass*, limited effects on striped bass abundance are expected from all phases of Alternative 2 in most water year types except critically dry years, during which all phases except Alternative 2 Without TUCP Without VA would have beneficial effects on striped bass abundance (up to +15% for Alternative 2 Without TUCP Systemwide VA, based on Delta outflow – abundance model results). Salvage density model results indicate entrainment losses at SWP export facilities would generally be similar to the No Action Alternative for all phases of Alternative 2, except in below normal water years for all phases of Alternative 2 except Alternative 2 With TUCP Without VA, during which minor adverse effects are expected. At CVP export facilities, entrainment losses would remain mostly unchanged in most water year types or would decrease by up to 11% in below normal years (Alternative 2 Without TUCP Systemwide VA) or up to 12% in dry years (Alternative 2 With TUCP Without VA, Alternative 2 Without TUCP Without VA, Alternative 2 Without TUCP Delta VA).

## **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-14, potential negative near-field effects of Delta Conveyance Project on striped bass early life stages would be limited because of the north Delta intake cylindrical tee screen design and operation criteria limiting diversions during the spring striped bass spawning period. South Delta entrainment potential under Delta Conveyance Project would be similar or slightly lower than under existing conditions, and survival or abundance indices of juveniles generally would differ little between Delta Conveyance Project and existing conditions. Operation of Delta Conveyance Project is not expected to increase exceedances of water quality objectives pertaining to lower San Joaquin River striped bass spawning conditions. Overall, Delta Conveyance Project effects on striped bass would not be substantial.

## Summary

Under operation of Delta Conveyance Project, effects on striped bass would be minimal, so it is not expected that operation of Delta Conveyance Project would worsen negative nor lessen the anticipated beneficial effects, as compared to the No Action Alternative, described above for Alternative 2 (no effect to beneficial effects of flow in critically dry years on abundances, no effects to minor adverse effects in below normal years on entrainment at SWP intakes, and no effects to beneficial effects in below normal and dry years on entrainment at CVP intakes). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.8.12 Potential Effects on American Shad (Bay-Delta)**

#### **Alternative 2**

As discussed in Appendix O, *Alternative 2, American Shad*, minimal flow-related effects on American shad from all four phases of Alternative 2 are expected in most water year types. Minor beneficial effects on abundance are possible, particularly in dry and critically dry water years for all but Alternative 2 Without TUCP Without VA (up to +10% for Alternative 2 Without TUCP Systemwide VA). Salvage density analyses indicate possible minor decreases in entrainment losses at SWP intakes in critically dry water years and possible minor increases in entrainment losses at CVP intakes in dry water years for some phases of Alternative 2.

#### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-15, the potential effects of Delta Conveyance Project on American shad (i.e., near-field effects; south Delta entrainment risk; project operations reducing Delta outflow and, therefore, potentially negatively affecting abundance through X2-abundance relationships; maintenance activities; and compensatory mitigation) would be limited compared to existing conditions.

## Summary

Under operation of Delta Conveyance Project, effects on American shad would be minimal, so it is not expected that operations of Delta Conveyance Project would worsen nor lessen the anticipated minor effects, as compared to the No Action Alternative, described above for Alternative 2 (no to minor beneficial effects of flow on American shad abundance in drier years and possible minor positive or negative changes to entrainment at SWP and CVP facilities respectively in dry years). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in substantial adverse effects, as compared to the No Action Alternative.

### **Z.4.8.13 Potential Effects on Threadfin Shad (Bay-Delta)**

#### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Threadfin Shad*, changes in flow due to Alternative 2 operations are unlikely to have substantial effects on threadfin shad spawning and larval rearing, or on juvenile rearing and non-spawning adults. Salvage density analyses indicate possible increases or decreases in entrainment losses at SWP and CVP intakes depending on water year type and phase of Alternative 2 considered. Alternative 2 With TUCP Without VA is not expected

to affect entrainment risk at either facility, except for some potential decreases in losses at CVP Jones Pumping Plant in dry and critically dry years (up to 6% decrease). Alternative 2 Without TUCP Without VA would generally have little effect on entrainment, except in dry years when it could lead to minor decreases at SWP Banks Pumping Plant (up to 6%) and at CVP Jones Pumping Plant (up to 5%), or critically dry years when it could lead to minor increases (up to 10%) at CVP Jones Pumping Plant. Alternative 2 Without TUCP Delta VA could lead to minor increases in entrainment at SWP Banks Pumping Plant in dry years (up to 6%) and either minor increases in critically dry years (up to 5%) or decreases in entrainment in below normal and dry years (up to 5%) at CVP Jones Pumping Plant. Alternative 2 Without TUCP Delta VA could lead to minor increases in entrainment at SWP Banks Pumping Plant in dry years (up to 8%) and either minor increases in critically dry years (up to 5%) or decreases in entrainment in below normal years (up to 5%) at CVP Jones Pumping Plant.

### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-16, there would be limited effects of Delta Conveyance Project on threadfin shad, which are primarily distributed in the southeast Delta, well away from potential near-field effects of the north Delta intakes. South Delta entrainment risk, as indicated by south Delta exports, would not be greater either under operation of Delta Conveyance Project .

### **Summary**

Under operation of Delta Conveyance Project , effects on threadfin shad would be minimal, so it is not expected that operations of Delta Conveyance Project would worsen nor lessen the anticipated effects, as compared to the No Action Alternative, described above for Alternative 2 (positive or negative effects of flow on entrainment at the SWP and CVP facilities depending on the water year type and phase considered). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2

#### **Z.4.8.14 Potential Effects on Black Basses (Bay-Delta)**

##### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Black Basses*, non-spawning adults are present year-round in the Bay-Delta. Alternative 2 may have noteworthy favorable effects on black basses in generally 17% of the months and unfavorable effects generally 17% of the months, all with varying intensity depending on time of the year and location. Entrainment losses as a result of Alternative 2 operations are anticipated to vary greatly depending on the export facilities (SWP or CVP), water year type, and phase of Alternative 2 considered. For Alternative 2 With TUCP Without VA, largemouth bass losses would generally be similar to the No Action Alternative but could increase up to 20% compared to existing conditions in below normal years or decrease by up to 5% in critically dry water years at SWP Banks Pumping Plant, and decrease by up to 12% in dry years at CVP Jones Pumping Plant. For Alternative 2 Without TUCP Without VA, largemouth bass losses would generally be similar to the No Action Alternative but could increase up to 21% compared to existing conditions in below normal years at SWP Banks Pumping Plant and decrease by up to 11% in dry years at CVP Jones Pumping Plant. For Alternative 2 Without TUCP Delta VA, largemouth bass losses would generally be similar to the

No Action Alternative but could increase up to 109% compared to existing conditions in critically dry years at SWP Banks Pumping Plant, and decrease by up to 12% in dry years at CVP Jones Pumping Plant. For Alternative 2 With TUCP Systemwide VA, largemouth bass losses would generally be similar to the No Action Alternative but could increase up to 113% compared to No Action Alternative in critically dry years at SWP Banks Pumping Plant, and decrease by up to 11% in dry years at CVP Jones Pumping Plant.

### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-17, population-level effects of entrainment on black basses from Delta Conveyance Project operations would be minimal because the species are widespread in the Delta and the nearshore habitat they occupy makes them less susceptible to entrainment. South Delta exports would be relatively similar to existing conditions during the time periods that black bass are salvaged as indicated by the salvage-density method, and entrainment risk would be similar to existing conditions because overall hydrodynamic conditions are not well correlated with black bass salvage.

### **Summary**

Under operation of Delta Conveyance Project, effects on black basses would be minimal, so it is not expected that operations of Delta Conveyance Project would worsen nor lessen the anticipated effects, as compared to the No Action Alternative, described above for Alternative 2 (possible noteworthy beneficial or adverse effects of flow on abundance and on entrainment risk depending on the month considered, water year type, export facilities, and phase of Alternative 2). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

#### ***Z.4.8.15 Potential Effects on Starry Flounder (Bay-Delta)***

##### **Alternative 2**

As discussed in Appendix O, *Alternative 2, Starry Flounder*, starry flounders primarily inhabit coastal marine waters, with age-0 juveniles mostly found in Suisun Bay and San Pablo Bay and lower abundances in the west Delta. For Alternative 2 With TUCP Without VA and Alternative 2 Without TUCP Delta VA, no effect of flow on starry flounder abundance is expected, except in critically dry years during which a minor beneficial effect could be anticipated. Alternative 2 Without TUCP Without VA is not anticipated to have effects on starry flounder abundance. Alternative 2 Without TUCP Systemwide VA would potentially have more substantial positive effects on abundance in drier years. Historical loss of starry flounder at both CVP and SWP export facilities is infrequent, which results in generally low predicted loss from Alternative 2 operations based on the salvage density analysis. Some increases in entrainment could be expected at SWP facilities and some decreases in entrainment at CVP facilities depending on water year types and months considered, for all four phases of Alternative 2.

## **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 12, Impact AQUA-12, the north Delta intake facilities are upstream of areas where starry flounder typically occur so there would be very little to no near-field effects of the north Delta intakes. Delta Conveyance Project would have similar or slightly lower levels of south Delta exports and therefore similar or slightly lower entrainment risk compared to existing conditions, as indicated by the salvage-density method. Application of the X2-abundance index regression suggested that the abundance index of starry flounder would be similar or slightly lower under operation of Delta Conveyance Project compared to existing conditions as a result of small changes in mean March–June X2. Given the relatively small changes and because the starry flounder are wide-ranging and occur not just in the San Francisco Estuary but also broadly along the Pacific coast, the effect of Delta Conveyance Project on starry flounder would be minimal.

### **Summary**

Under operation of Delta Conveyance Project, effects on starry flounder would be minimal, so it is not expected that operation of Delta Conveyance Project would worsen nor lessen the anticipated effects, as compared to the No Action Alternative, described above for Alternative 2. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

## **Z.4.9 Terrestrial Biological Resources**

This analysis regarding terrestrial biological resources does not include further discussion of areas upstream of the Delta.

### **Z.4.9.1 Potential Changes to Critical Habitat from Seasonal Operations (Delta)**

#### **Alternative 2**

As discussed in EIS Appendix P, Section P.2.4, *Alternative 2*, effect mechanisms on special-status wildlife or plant species include direct harm to the species, direct alteration of habitat availability or quality, or vegetation changes that would alter habitat availability or quality due to flow changes under Alternative 2 (all phases). Proposed changes in operation of the Suisun Marsh Salinity Control Gates (SMSCG) to direct more fresh water into the Suisun Marsh is expected to have a beneficial effect on northwestern pond turtle and negligible adverse effects on soft bird's beak and Suisun thistle. Alternative 2 would not affect other special-status species in the Delta (Appendix P, Table P.1-1, *Special-Status Wildlife Species*, and Table P.1-2, *Special-Status Plant Species*).

#### **Delta Conveyance Project**

As discussed in the Final EIR Chapter 13, Section 13.3.1, *Methods for Analysis*, direct effects from operations that were considered for analysis include the diversion of water from the Sacramento River, the use of facilities to support water diversion, including aboveground supervisory control and data acquisition (SCADA) and power lines. The operational effect mechanisms include disturbance noise and permanent facility lighting, injury or mortality from electrical power and SCADA lines used to operate facilities and changes in river flows resulting in impacts on suitable habitat or injury or mortality from contaminants (methylmercury, microcystins associated with CHABs, pesticides, and selenium). As described in Final EIR

Chapter 24, *Noise and Vibration*, noise and vibration from operation of water conveyance facilities would not be discernably higher than existing conditions; therefore, effects on special-status terrestrial species are not anticipated. The Final EIR does not analyze effects on soft bird's beak, Suisun thistle, or foothill yellow-legged frog due to lack of suitable habitat and/or overlap with the species' current known range in the Delta Conveyance Project study area (Appendix 13A, *Special-Status Species with Potential to Occur in the Study Area*).

Delta Conveyance Project operations would not affect habitat for special-status vernal pool, alkaline seasonal wetland, grassland, or nontidal perennial aquatic plants because operations would not take place in these habitats (Impacts BIO-9, BIO-10, BIO-11, and BIO-13). In addition, operations would not substantially alter river flows on the Sacramento and San Joaquin rivers such that tidal freshwater emergent habitat for special-status plants would be affected (Impact BIO-12).

Delta Conveyance Project operations would not affect vernal pool aquatic invertebrates (Impact BIO-14), Conservancy fairy shrimp (Impact BIO-15), vernal pool terrestrial invertebrates (Impact BIO-16), valley elderberry longhorn beetle (Impact BIO-18), Delta green ground beetle (Impact BIO-19), curved-foot hygrotus diving beetle (Impact BIO-20), Crotch bumble bee (Impact BIO-21), Suisun song sparrow and saltmarsh common yellowthroat (Impact BIO-43), or riparian brush rabbit (Impact BIO-50) because operations would not involve disturbance or removal of habitat or effects on these species. In addition, Delta Conveyance Project would not substantially alter river flows on the Sacramento and San Joaquin Rivers such that effects on habitat for anthicid beetles (Impact BIO-17), other nesting special-status and non-special-status birds (Impact BIO-41), or salt marsh harvest mouse (Impact BIO-49) would occur.

Operation of permanent facility lighting under Delta Conveyance Project has the potential to affect California tiger salamander (Impact BIO-22); western spadefoot (Impact BIO-23); western yellow-billed cuckoo (Impact BIO-31); California black rail (Impact BIO-32); sandhill crane (Impact BIO-33); California least tern (Impact BIO-34); cormorants, herons, and egrets (Impact BIO-35); nesting raptors (Impact BIO-36); golden eagle and ferruginous hawk (Impact BIO-37); ground-nesting grassland birds (Impact BIO-38); Swainson's hawk (Impact BIO-39); burrowing owl (Impact BIO-40); other special-status and migratory birds (Impact BIO-41); least Bell's vireo (Impact BIO-42); tricolored blackbird (Impact BIO-44); and bats (Impact BIO-45). As stated in the Delta Conveyance Project Final EIR Chapter 3, Section 3.4.12, *Fencing and Lighting*, permanent facility lighting would be designed to be motion-activated, downcast, cutoff type fixtures with non-glare finishes that would remain dark the majority of the time at night, which would minimize the potential for effect. The analysis in Final EIR Chapter 18 (Impact AES-4) shows that with project designs the lighting would be shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes in light levels.

The presence of new electrical and SCADA lines under Delta Conveyance Project has the potential to affect bird species identified in the paragraph above. Mitigation Measure BIO-2c, *Electrical Power Line Support Placement*, would require DWR to work with electrical utilities to design and maintain electrical power lines to reduce the risk of collision or electrocution through bird-safe design in accordance with applicable Avian Power Line Interaction Committee recommendations and marking all aboveground power lines and towers with bird flight diverters.



The diversion of water from the Sacramento River under Delta Conveyance Project would not substantially increase exposure of northwestern pond turtle (Impact BIO-25); giant garter snake (Impact BIO-30); western yellow-billed cuckoo (Impact BIO-31); sandhill crane (Impact BIO-33); California least tern (Impact BIO-34); cormorants, herons, and egrets (Impact BIO-35); nesting raptors (Impact BIO-36); burrowing owl (Impact BIO-40); other nesting special-status and non-special-status birds (Impact BIO-41); least Bell's vireo (Impact BIO-42), Suisun song sparrow and saltmarsh common yellowthroat (Impact BIO-43); or tricolored blackbird (Impact BIO-44) to methylmercury, pesticides, or selenium, and would not increase conditions conducive to CHABs, relative to existing conditions.

### **Summary**

Implementation of Alternative 2 (all phases) would result in potential beneficial effects on northwestern pond turtle and negligible adverse effects on soft bird's beak and Suisun thistle, which are confined to Suisun Marsh, as compared to the No Action Alternative. Delta Conveyance Project study area for terrestrial biological resources does not include the Suisun Marsh; therefore, operation of Delta Conveyance Project would not contribute to potential effects on terrestrial biological resources, as compared to the No Action Alternative, which would result from implementation of Alternative 2 in Suisun Marsh, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in substantial adverse effects, as compared to the No Action Alternative.

Alternative 2 would not affect other special-status terrestrial species in the Delta region as compared to the No Action Alternative. Delta Conveyance Project would not substantially adversely affect special-status species identified in the discussion above in the Delta because effect mechanisms would not occur during operations on those species and mitigation measures approved by DWR in December of 2023 would reduce adverse effects. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in substantial adverse effects, as compared to the No Action Alternative.

### **Z.4.9.2 Potential Changes to Critical Habitat from Seasonal Operations**

#### **Alternative 2**

As discussed in Appendix P, Section P.2.4.2, *Potential changes to Critical Habitat from seasonal operations*, effects due to flow changes in the Delta through the SMSCG associated with Alternative 2 would likely be negligible to both soft bird's beak and Suisun thistle critical habitat.

#### **Delta Conveyance Project**

Critical habitat for soft bird's beak and Suisun thistle does not occur within the study area for terrestrial biological resources.

### **Summary**

As described above, Alternative 2 would not result in adverse effects on soft bird's beak or Suisun thistle critical habitat in the Suisun Marsh. Operation of Delta Conveyance Project would have no effect on designated critical habitat, including critical habitat for soft bird's beak and Suisun thistle. Therefore, effects of operations of Alternative 2 with the Delta Conveyance

Project would not be expected to result in substantial adverse effects, as compared to the No Action Alternative.

#### **Z.4.10 Regional Economics**

This analysis regarding regional economics does not include further discussion of areas upstream of the Delta.

##### **Z.4.10.1 Potential Changes in Regional Economics**

###### **Alternative 2**

For the San Joaquin River Region, Alternative 2 would increase water supply deliveries to M&I water contractors in the San Joaquin River Region under all phases. There would also be a reduction in water supply costs and, consequently, water rates would be lower than the No Action Alternative under all phases of Alternative 2. This would result in an increase in disposable income and could result in more discretionary spending in the regional economy. Average annual agricultural water supply deliveries are expected to decrease under all phases of Alternative 2 except under the With TUCP phases during average conditions. As summarized in Table Q.2-27, these decreases in annual agricultural water supplies are expected to result in decreases to irrigated acreage under average and dry conditions and resulting decreases in gross revenue associated with agriculture.

Alternative 2 would increase water supply deliveries to M&I water contractors in the San Francisco Bay Area Region under all phases. These increases in CVP and SWP M&I water supplies under Alternative 2 would help meet anticipated increases in future water demands and would reduce transfer costs, shortage costs, and excess water costs under the Without TUCP phases. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under the Without TUCP Alternative 2 phases, there would be a reduction in water supply costs and, consequently, water rates would be lower than under the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy. Alternative 2 phases are expected to decrease average annual agricultural water supply deliveries in the San Francisco Bay Area Region by up to 2,000 acre-feet per year (AFY) under average conditions and by up to 3,000 AFY under dry conditions. Decreases in agricultural water supply in the region could result in a decrease in irrigated acreage and agricultural revenues in the region. This decrease in irrigated acreage would result in less spending in the regional economy.

Alternative 2 would increase water supply deliveries to M&I water contractors in the Central Coast Region under all phases. These increases in CVP and SWP M&I water supplies under Alternative 2 would help meet future water demands with reduced reliance on groundwater use in the region. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under the Alternative 2 phases, there would be a reduction in water supply costs and, consequently, water rates would be lower than the No Action Alternative. This decrease in rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy. CVP and SWP water supply deliveries to the Central Coast Region affected by Alternative 2 are

primarily delivered to M&I water contractors. Therefore, there are no forecast changes in irrigated lands under the Alternative 2 phases. Consequently, there would be no impacts to the regional economy from changes in deliveries to agricultural contractors in the Central Coast Region under the Alternative 2 phases.

Alternative 2 would increase water supply deliveries to M&I water contractors in the South Coast Region under all phases. These increases in CVP and SWP water supplies would help meet future water demands without development of other alternative water supplies. Additionally, increased water supplies under Alternative 2 would reduce storage costs, groundwater pumping costs, and excess water costs under all phases. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under the Alternative 2 phases, there would be a reduction in water supply costs and, consequently, water rates would be lower than the No Action Alternative. This reduction would result in an increase in disposable income and could result in more discretionary spending in the regional economy. Alternative 2 phases are expected to have minimal impacts to annual agricultural deliveries in the South Coast Region. Resulting impacts to the regional economy would be minimal.

As discussed in Chapter 14, *Regional Economics*, annual average Chinook salmon abundance in the bay under Alternative 2 Without TUCP With Systemwide VA phase is expected to increase in comparison to the No Action Alternative. Annual average Chinook salmon abundance in the bay under the Alternative 2 With TUCP, Alternative 2 Without TUCP Without VA, Alternative 2 Without TUCP With Delta VA phases is expected to decrease in comparison to the No Action Alternative. Increases in salmon population could potentially increase commercial and recreational ocean salmon harvest. Increases in commercial ocean salmon harvest would increase revenues received by fisherman. Ocean fisheries support industries such as fish processors, boat manufacturers, repair and maintenance would also see an increase in revenue. Overall increased fisheries under Alternative 2 Without TUCP With Systemwide VA would be beneficial to the regional economy. Decrease in Chinook population under the other three Alternative 2 phases could result in an adverse impact to the regional economy along the SONCC.

As described in detail in Appendix U, *Power Technical Appendix*, the CVP net hydropower generation would be similar or slightly higher over the long-term and over dry and critically dry years under the Alternative 2 phases compared to the No Action Alternative. The hydropower generated by the CVP is marketed and transmitted by the Western Area Power Administration Sierra Nevada Region. As CVP annual and plant-in-service power costs increase (including Central Valley Project Improvement Act Environmental Restoration Funds), and available energy for sale decreases, the net unit cost of CVP power may slightly decrease. Typically, decreases in power costs would be passed on to customers through rate decreases. This decrease in rates would result in a slight increase in disposable income and could result in more discretionary spending in the regional economy.

Under Alternative 2 phases compared to the No Action Alternative, SWP net generation over the long-term would be slightly lower for both long-term average and in dry and critically dry years. Power generated by the SWP is transmitted by PG&E, Southern California Edison, and California ISO through other facilities (California Department of Water Resources 2022). The SWP also markets energy in excess of the SWP demands to a utility and members of the WSPPP,

formerly known as the Western Systems Power Pool. A decrease in SWP net generation would increase the need for the development of other alternative supplies, which could result in an overall increase in power cost. Typically, increases in power costs would be passed on to customers through rate increases. This increase in power rates would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

### **Delta Conveyance Project**

As discussed in the Final EIR Chapter 17, Section 17.3.3, *Socioeconomic Effects*, ECON-1, Delta Conveyance Project would create new permanent jobs related to the operation of new water conveyance facilities. As described in ECON-6, there would be agricultural employment and labor income losses during the operations phase of the project, attributed to farmland lost as part of the project footprint, which would continue to create socioeconomic effects. Although some areas would continue to experience losses in agriculture, these effects are not expected to be substantial as the losses in production and acreage would represent less than 1% of total in the statutory Delta (and surrounding parts of the project area).

Agricultural contributions to the character and culture of the statutory Delta may decline commensurate with the projected decline in agricultural-related employment and production. Loss of agricultural land would result in the continued closure of agriculture-dependent businesses or those catering to agricultural employees (although operations and maintenance activities would not directly lead to any new closures) (Impacts ECON-1 and ECON-6).

As discussed in Section 17.3.3.3, *Socioeconomic Analysis of Delta Region Communities*, ECON-2 and ECON-3, given the nature of new full-time project operations jobs, the existing water conveyance facilities already in the region, the large regional workforce, and the large water agencies with headquarters in the region, it is anticipated that these new jobs would be filled from within the labor force in the region. Because it is anticipated that jobs would be drawn from within the region, operation of Delta Conveyance Project would not result in increased population in the region or effects on housing demand in the region.

ECON-5 in the Delta Conveyance Final EIR discusses changes in recreational economics in the statutory Delta and project area, including potential effects associated with changes associated with recreational experiences and resources. The effects of the project on recreational activities are expected to be minimal and community influences associated with those hired to operate, repair, and maintain water conveyance facilities would grow. Seasonal flow patterns in the Delta waterways would be slightly different from current conditions, depending on throughputs in dry or wet years, but these changes as described in Final EIR Chapter 5 would be within the range of variability boaters in the Delta waterways experience currently and are not expected to affect recreationists' enjoyment in the various boating recreational opportunities. Flows and water quality conditions would be within the range of current seasonal and yearly conditions now experienced by boaters and other recreationists and no noticeable effects on the quality of recreationists' experience are expected as a result of the project. Accordingly, project operation would not lead to effects on recreational economics.

As described in ECON-4, any losses in property tax revenues would be offset, so Delta Conveyance Project would not affect local government fiscal conditions through changes in property tax revenues. California law requires "full mitigation of property tax or assessments

levied by local governments or special districts for land used in the construction, location, mitigation, or operation of new Delta conveyance facilities” (Wat. Code § 85089). Furthermore, as described in ECON-1, the changes in employment would have secondary effects on the regional economy. These secondary effects would include sales tax revenue changes correlated with changes in income and spending. The findings in ECON-1 are that only small changes in employment and labor income are expected during the operations and maintenance phase of all project alternatives. Therefore, only small effects on local government fiscal conditions during the operations and maintenance phase are anticipated.

As described in ECON-7, according to the water supply changes summarized in Final EIR Chapter 6, Table 6-2, south-of-Delta public water agencies would receive the large majority of water supply reliability improvements from project alternatives. Reliability improvements would be to both urban (M&I) and agricultural SWP though the exact splits have not been finalized. The project purpose is to restore and protect the reliability of SWP water deliveries, into the future when faced with multiple challenges. Counties in the SWP export service areas would realize some effects as a result of the project alternatives relative to the existing socioeconomic conditions, namely through stabilization of annual water deliveries. Long-term water supply reliability is an important component in supporting the economy and local community and in accommodating planned growth. Improved agricultural water supply and reliability can keep land in production, support the local economy and community, and reduce overall water supply cost and risk. However, these types of socioeconomic effects of increased water supply reliability would be spread out over a large area.

### **Summary**

Operations of Alternative 2 Without TUCP With Systemwide VA has potential to result in beneficial effects on the regional economy due to overall increased fisheries, and the other three Alternative 2 phases could result in an adverse impact on the regional economy due to a decrease in Chinook population. Impacts to coho salmon, fall-run and spring-run Chinook salmon under Alternative 2 (all phases) would be negligible. Therefore, there would be no adverse effects on revenue and disposable incomes. Consequently, there would be no related adverse effects on the regional economy, as compared to the No Action Alternative. All other economic effects are primarily related to changes in water rates passed to the customer and water supply, which may affect costs of agricultural goods and lead to changes in agriculture production. The operations of Delta Conveyance Project would lead to a limited increase in local jobs, as well as potential small reductions in agricultural production and minimal economic effects. Local governments’ taxes generated within the study area are not expected to change. The Delta Conveyance Project would not reduce water supply deliveries to SWP export areas and therefore would not have an adverse socioeconomic effect on agriculture in that area. Overall, Delta Conveyance Project would result in either minimal adverse changes to socioeconomic conditions or beneficial changes. The minimal adverse changes would not occur in the same regions as those attributable to Alternative 2 (i.e., San Francisco Bay Area Region or San Joaquin River Region related to agriculture, the SONCC related to fisheries). As such, Delta Conveyance Project operations would not contribute to Alternative 2 operational effects on regional economics, as compared to the No Action Alternative, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

## **Z.4.11 Land Use and Agricultural Resources**

### **Z.4.11.1 Potential Changes in Land Use**

#### **Alternative 2**

As discussed in Appendix R, Section R.2.1.1, *Land Use*, land uses in 2040 are assumed to be consistent with the future projections included in existing general plans within the study area. The general plans were developed assuming adequate water supplies to support the projected land uses. Changes in CVP and SWP operations Alternative 2 could change the availability of CVP and SWP water supplies. If the CVP and SWP water supplies were reduced to a level that would not support planned M&I water demands, development of future land uses may not occur.

Annual average water deliveries would increase across Alternative 2 (all phases) with the exception of the Sacramento Region under Alternative 2 Without TUCP Without VA which would have no change from the No Action and under Alternative 2 With TUCP Without VA which would have a slight decrease in average annual deliveries compared to the No Action Alternative costs. Under Alternative 2 Without TUCP Delta VA and Alternative 2 Without TUCP Systemwide VA, there would be an average annual reduction in cost across all regions. Under Alternative 2 Without TUCP Without VA, the Southern California Region would see increased annual costs while the other regions would experience a reduction in cost. Under Alternative 2 With TUCP Without VA, which would be implemented in times of drought, most of the regions would see a reduction in costs, with the Southern California Region receiving the greatest reduction, however, the San Francisco Bay Area Region would see an increase in average annual costs. It is anticipated that any additional water supplies would not result in changes in the general plan development plans without subsequent environmental documentation. The increased annual costs associated with receiving additional water supplies are anticipated to be afforded with implementation of Mitigation Measure AG-1, *Diversify Water Portfolios*, described in Section 15.2.1.3, *Mitigation Measures*, in the EIS. Therefore, adequate water supplies would be available to support future M&I land uses projected in existing general plans and urban water supply management plans.

#### **Delta Conveyance Project**

As discussed in Final EIR Chapter 14, *Land Use*, Section 14.3.3.2, *Impacts of the Project Alternatives on Land Use*, Impact LU-2 and Impact LU-3, operation of Delta Conveyance Project would not result in effects on existing land uses, conflicts with existing land use plans and policies, or physical division of existing communities. Operation of structures and facilities once built would not convert additional existing designated land uses to an incompatible use or conflict with existing land use plans and policies or physically divide communities. Operation of Delta Conveyance Project would not result in the inability for local jurisdictions to implement development under existing general plans. As discussed in Final EIR Chapter 6, operation of the Delta Conveyance Project would result in an increase in water supply reliability within the SWP service area and therefore would not result in an adverse change to land uses.

## Summary

As described above, operation of Delta Conveyance Project would not result in an inability for local jurisdictions to implement development under existing general plans and would not result in potential changes in land use. As described above, in general Alternative 2 would result in an increase in annual average water deliveries, as compared to the No Action Alternative; therefore, it is anticipated that adequate water supplies would be available under Alternative 2 to support projected land uses. As such, it is anticipated that operation of Delta Conveyance Project would not result in a substantial change in land use within the CVP or SWP service areas, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in a substantial change in land use within the CVP or SWP service areas, as compared to the No Action Alternative.

### **Z.4.11.2 Potential Changes in Irrigated Agricultural Land**

#### **Alternative 2**

As discussed in Appendix R, Section R.2.4.1, *Potential Changes in Land Use*, and Section R.2.8, *Summary of Impacts*, Table R.2-36, *Impact Summary*, the long-term average and dry and critical year average deliveries for agricultural uses would decrease across all phases of Alternative 2 for the Sacramento River, San Joaquin River, and San Francisco Bay Area regions. These decreases are not likely to result in the conversion of agricultural land to nonagricultural uses with the implementation of Mitigation Measure AG-1, *Diversify Water Portfolios*, described in Section 15.2.1.3, *Mitigation Measures*, in the EIS, which would reduce agricultural land use conversion by encouraging water users to develop alternative sources of water. The agricultural deliveries for the Southern California Region would be considered similar to the No Action Alternative. Therefore, there would be no changes in agricultural land use compared to the No Action Alternative.

In both the long-term average and dry and critical year conditions, overall crop acreage would primarily decrease in the San Joaquin River and Sacramento River regions under Alternative 2 (all phases) when compared to the No Action Alternative. Crop productivity would primarily decrease for the San Joaquin River Region under both conditions. Crop productivity in the Sacramento Region would be more variable, with smaller increases and decreases in productivity compared to the No Action Alternative. Therefore, some conversion of agricultural land to nonagricultural is expected to occur in both regions. Mitigation Measure AG-1, *Diversify Water Portfolios*, would help reduce some of the anticipated conversion of agricultural land.

#### **Delta Conveyance Project**

As discussed in Final EIR Chapter 15, *Agricultural Resources*, Section 15.3.3.2, *Impacts of the Project Alternatives on Land Use*, Impact AG-1 and AG-2, operation of structures and facilities would not result in the conversion of additional farmland to nonagricultural use beyond what would be converted during construction. As discussed in Impact AG-3, operation of the project would remain in compliance with all water quality standards set by the Water Board to be protective of Delta agricultural beneficial uses. None of the modeled changes to salinity during the times of year when the Bay-Delta WQCP does not identify EC targets for agricultural beneficial uses (i.e., post August 15) would be expected to trigger a substantial conversion of Important Farmland to nonagricultural use. As discussed in Final EIR Chapter 6, operation of

Delta Conveyance Project would result in an increase in water supply reliability within the SWP service area and, therefore, would not be expected to reduce existing agricultural land within the Central Valley.

### **Summary**

Given that operation of Delta Conveyance Project would not result in the conversion of agricultural land to nonagricultural use, operation of Delta Conveyance Project would not increase potential reductions in irrigated agricultural land that may result under implementation of Alternative 2, as compared to the No Action Alternative. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.12 Recreation**

The Delta Conveyance Final EIR primarily focuses on the Delta as the study area for recreational resources and includes portions of Alameda, Sacramento, Yolo, San Joaquin, and Contra Costa Counties. This area contains a variety of active and passive water-based recreational opportunities including boating, fishing, and wildlife viewing.

The potentially affected environment includes areas upstream of the Delta for Alternative 2, as explained in Section Z.3.1. However, as discussed in the Delta Conveyance Project Final EIR Chapter 16, *Recreation*, Section 16.1.1, *Study Area*, and Section 16.3.3.2, *Impacts of the Project Alternatives on Recreation Resources*, Impact REC-1, based on operational modeling, recreation use or resources in reservoirs upstream of the north Delta intakes would not be affected by limited or no changes in reservoir elevation levels. In addition, small changes in Sacramento River flows would be well within the range of existing variability and would not adversely affect recreation use such that recreationists would greatly change patterns or shift use to other recreation facilities in numbers that would cause degradation or physical changes to other recreation parks and facilities in the region. As discussed in Impact REC-2, operation of Delta Conveyance Project would not directly result in construction or operation of new recreation facilities because no new recreation facilities are planned, and existing recreation facilities have the capacity to handle increased use that could result from project operations. Therefore, no further analysis is included.

### **Z.4.13 Environmental Justice**

This analysis regarding environmental justice does not include any further discussion of areas upstream of the Delta.

#### **Z.4.13.1 Potential Disproportionate Economic Effects on Minority or Low-Income Populations**

##### **Alternative 2**

Changes in CVP and SWP operations under Alternative 2 (all phases) would increase M&I water supplies delivered to contractors in the San Joaquin Valley Region. Expected minor increases in labor income within multiple non-service related job sectors have the potential to have negligible to minor beneficial effects for all workers in those sectors within the region. Changes in CVP and SWP operations under Alternative 2 would decrease the average annual agricultural water supply



delivered to the San Joaquin Valley Region, which would decrease the irrigated acreage under average and dry conditions, resulting in loss of revenue, both agricultural and agriculture-supporting businesses. This alternative may result in a decrease of up to 2.3% in the total farm worker labor force or an increase of up to 0.3% in the total farm worker labor force during average conditions. During dry conditions, Alternative 2 may result in a decrease in the farm worker labor force by between 1.0% and 2.0%. While the jobs that would be lost or gained in the other sectors (not including agriculture) are primarily within the services sector, which includes jobs that are not predominantly held by low-income/minority populations, most agricultural jobs are held by minority and/or low-income populations. Thus, the loss of agricultural jobs and, to a lesser degree, the jobs within other sectors, under all phases of Alternative 2 could have disproportionately high and adverse effects on minority populations and localized populations of low-income people in these counties and throughout the region.

Changes in CVP and SWP operations under Alternative 2 (all phases) would increase M&I water supplies delivered to contractors in the San Francisco Bay Area Region. Most of the potential for employment and labor income decreases and increases identified with these changes in M&I water supply deliveries would occur in the services sector. The expected minor increases in labor income within other sectors have the potential to have small effects on any workers in those sectors within the region. Although job losses could adversely affect minority and/or low-income individuals, these effects are not expected to be disproportionately high and adverse since the majority of individuals that would be affected by job losses are workers in the service sector. Implementation of Alternative 2 is expected to decrease average annual agricultural water supply deliveries in the San Francisco Bay Area Region. This decrease in deliveries could decrease the irrigated acreage and agricultural revenues in the region, resulting in a loss of agricultural jobs and/or a decrease in the income of agricultural workers, which could result in disproportionately high and adverse effects on minority and/or low-income populations.

### **Delta Conveyance Project**

Delta Conveyance Project would not reduce water supply deliveries to irrigated land within the Central Valley as a result of operations (Final EIR Chapter 6, Section 6.3.2.2, and Chapter 17, Impact ECON-7). Therefore, Delta Conveyance Project would not have the same type of environmental justice effect mechanisms as described within the EIS related to the Central Valley.

### **Summary**

Alternative 2 would result in disproportionately adverse economic effects on minority populations and localized populations of low-income people, as compared to the No Action Alternative, throughout the Alternative 2 study area. These adverse economic effects are related to agriculture within the Central Valley, including San Joaquin County and the San Francisco Bay Region. As described above, the Delta Conveyance Project would not affect environmental justice populations related to agriculture in the Central Valley. The Delta Conveyance Project would result in disproportionate effects on environmental justice populations within the Delta (including Delta counties such as Sacramento and San Joaquin Counties) related to agricultural resources. Delta Conveyance Project would not contribute to these effects identified for Alternative 2 as occurring in the Delta region (i.e., Sacramento County and San Joaquin County). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, would not

be expected to combine to result in increased adverse effects as compared to the No Action Alternative.

#### **Z.4.13.2 Potential Disproportionate Effects on Health of Minority or Low-Income Populations**

##### **Alternative 2**

Alternative 2 would require chemical weed control and algae treatments involving the use of toxic herbicides at Clifton Court Forebay. However, these weed control and algae treatments would comply with relevant conditions required in the General Pesticide Permit issued for the work, and the same activities would be implemented under the No Action Alternative.

Alternative 2 is not expected to substantially reduce reservoir levels in the study area and is not expected to impair firefighting abilities in the study area. Thus, there would be no adverse effects related to human health on the population, including minority and low-income populations, within the study area.

##### **Delta Conveyance Project**

As discussed in Final EIR Chapter 29, Section 29.0.1, *Summary of Resource Impacts with Disproportionately High and Adverse Effects on Environmental Justice*, Delta Conveyance Project operations would not result in disproportionately high and adverse effects on health of minority or low-income populations within the study area.

##### **Summary**

No disproportionately adverse health effects on minority and low-income populations would occur under operation of Delta Conveyance Project. Similarly, implementation of Alternative 2 would not result in adverse effects related to human health, including minority and low-income populations, within the study area, as compared to the No Action Alternative. Therefore, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not be expected to result in disproportionately adverse health effects on minority and low-income populations.

#### **Z.4.14 Power**

##### **Z.4.14.1 Potential Changes in Central Valley Project Net Generation**

##### **Alternative 2**

As discussed in EIS Appendix U, under Alternative 2 Without TUCP Delta VA, there would be a 2% increase in average annual net power generation for all years, i.e., long-term average, and a 3% increase in net power generation in dry and critically dry years. For the other 3 phases of Alternative 2 there would be an increase in net power generation of less than 1% to 1% for the long-term average for CVP facilities, and of 2% to 3% in dry and critically dry years. Under Alternative 2 Without TUCP Delta VA, reductions in monthly average CVP net power generation for the long-term average greater than 5% would occur in August (5%) and in dry and critically dry years, there would be monthly average reductions greater than 5% in August (6%) and September (13%). At a monthly level for the other three Alternative 2 phases, reductions in average CVP net power generation in all years, greater than 5% would occur in September (5%)

under Alternative 2 Without TUCP Without VA and under Alternative 2 Without TUCP Systemwide VA. In dry and critically dry years, monthly reductions greater than 5% would occur in August (5%) and September (11%) under Alternative 2 Without TUCP Without VA, and in January (8%), August (6%), and September (12%) under Alternative 2 Without TUCP Systemwide VA. As described in Section U.2.7, *Mitigation Measures*, changes under Alternative 2 would result in decreased annual and/or monthly net energy generation and increased potential energy use by CVP water users for alternate water supplies. Therefore, there could be adverse impacts on energy resources and mitigation measures could be applicable. Section U.2.7 discusses potential mitigation measures to include potential efficiency modifications or upgrades or monitor the change in project use consumption as a share of the CVP resource when allocating CVP capital and annual costs. However, capital expense associated with making performance upgrades outside of normal operations and maintenance would make the upgrades infeasible and modifications would not be of sufficient magnitude to address the potential effects on net generation associated with Alternative 2 as indicated by the modeling.

### **Delta Conveyance Project**

As discussed in Delta Conveyance Project Final EIR Chapter 22 (Impact ENG-1), operation of Delta Conveyance Project is expected to result in a small increase in CVP energy generation relative to existing conditions. Operation of would not affect hydropower generation at CVP reservoirs upstream of the Delta. Operation of would not affect upstream hydrologic conditions, including storage in CVP reservoirs which generate hydropower.

### **Summary**

As described above, Alternative 2 hydropower production would increase under Alternative 2 Without TUCP Delta VA but decrease during the remaining phases. Operation of Delta Conveyance Project would not result in changes to upstream hydrologic conditions including the operation of CVP hydropower facilities. As such, it is anticipated that operation of Delta Conveyance Project in combination with the operation of Alternative 2 would not change the new generation of CVP net generation as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.14.2 Potential Changes in State Water Project Net Generation**

#### **Alternative 2**

As discussed in EIS Appendix U, under Alternative 2 Without TUCP Delta VA would result in a 5% decrease in average annual net generation for all years and a 4% decrease in dry and critically dry years at SWP facilities. For the other Alternative phases, a range of 5% to 6% decrease is estimated to occur over all years and a decrease of up to 5% in dry and critically dry years.

When estimated monthly, average SWP net generation would in all years decrease by 5% under Alternative 2 Without TUCP Delta VA, ranging from 6% in October to 21% in May. Under Alternative 2 Without TUCP Without VA would range from 5% in March to 23% in May. Under Alternative 2 Without TUCP Systemwide VA from 6% in October and March to 18% in February and May, and under Alternative 2 With TUCP Without VA from 6% in March to 23% in May.

In dry and critically dry years monthly reductions greater than 5% would occur under Alternative 2 Without TUCP Delta VA from 5% in September to 59% in July; under Alternative 2 Without TUCP Without VA from 5% in August to 26% in July; under Alternative 2 Without TUCP Systemwide VA from 11% in June to 60% in July; and under Alternative 2 With TUCP Without VA from 6% in April to 44% in July.

As described in Section U.2.7, changes under Alternative 2 would result in decreased annual and/or monthly net energy generation and increased potential energy use by SWP water users for alternate water supplies. Therefore, there could be adverse impacts on energy resources and mitigation measures could be applicable. Section U.2.7 discusses potential mitigation measures to include potential efficiency modifications or upgrades. However, capital expense associated with making performance upgrades outside of normal operations and maintenance would make the upgrades infeasible and modifications would not be of sufficient magnitude to address the potential effects on net generation associated with Alternative 2 as indicated by the modeling.

### **Delta Conveyance Project**

As discussed in Delta Conveyance Project Final EIR Chapter 22 (Impact ENG-1), operation of the Delta Conveyance Project facilities, including the intakes, is expected to result in an increase of average annual net SWP energy consumption over all water year types of approximately 32% relative to existing conditions. Operation of would not affect hydropower generation at SWP reservoirs upstream of the Delta. Operation of would not affect upstream hydrologic conditions, including storage in SWP reservoirs that generate hydropower.

### **Summary**

As described above, Alternative 2 net hydropower production would decrease under Alternative 2 (all phases) at SWP facilities. Operation of Delta Conveyance Project would not result in changes to upstream hydrologic conditions including the operation of SWP hydropower facilities. As such, it is anticipated that operation of Delta Conveyance Project in combination with the operation of Alternative 2 would not change the net generation of SWP, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### **Z.4.15 Hazards and Hazardous Materials**

This analysis regarding hazards, hazardous materials, and wildfires does not include any further discussion of areas upstream of the Delta.

#### **Z.4.15.1 Expose People or Structures to a Substantial Risk of Loss, Injury, or Death Involving Wildfires**

#### **Alternative 2**

As discussed in EIS Appendix V, Section V.2.4, *Alternative 2*, most of the study area, specifically the Sacramento and San Joaquin Valleys, is outside of an area designated as a Very High or High Fire Hazard Severity Zones, and given that there are multiple methods that are used in suppressing wildfires aside from drawing water from reservoirs via helicopter, including fire

retardants and suppressants and containment lines, implementation of Alternative 2 would not substantially impair the ability to suppress wildfires.

### **Delta Conveyance Project**

As discussed in Delta Conveyance Project Final EIR Chapter 25, Section 25.3.3.2, *Impacts of the Project Alternatives Related to Hazards and Hazardous Materials*, Delta Conveyance Project operations would require staff and the use of equipment and machinery and flammable materials (e.g., fuels and solvents); however, the use of flammable materials would comply with regulations enforced by local Certified Unified Program Agencies (CUPAs) and the California Division of Occupational Safety and Health (Cal/OSHA) and standard fire safety and prevention measures would be implemented. In addition, diverting water through the north Delta intakes under Delta Conveyance Project per operating criteria and under certain conditions (e.g., high flow events when Delta conditions are in excess) would not expose people or structures to a substantial risk of loss, injury or death involving wildfires.

### **Summary**

The Delta Conveyance Project Final EIR determined that there would not be an adverse effect on people and structures from wildfires due to Delta Conveyance Project operations. Similarly, the EIS concluded that implementation of Alternative 2 (all phases) would not result in adverse effects on people and structures from wildfires, as compared to the No Action Alternative. As such, it is anticipated that, as compared to the No Action Alternative, operation of Alternative 2 with the Delta Conveyance Project would not expose people or structures to a substantial risk of loss, injury or death involving wildfires, as identified in the EIS.

### **Z.4.15.2 Increase the Potential for Creating a Public or Environmental Hazard through the Use or Accidental Release of Hazardous Materials**

#### **Alternative 2**

Typically, impacts related to hazards and hazardous materials are predominantly related to construction activities (e.g., inadvertent chemical spills related to use of heavy construction equipment, wildfire resulting from spark(s) from use of construction equipment, physical interference with implementation of an emergency response plan or emergency evacuation plan due to traffic resulting from construction). Under Alternative 2 (all phases) there would be no new project-related construction. Implementation of Alternative 2 would not result in hazards or hazardous materials impacts as the result of operations-related activities because there would be no accidental release or changes in the use of hazardous material. Operations-related activities that require the use of hazardous materials (e.g., Clifton Court Forebay Weed Management) have already undergone separate environmental review and permitting.

### **Delta Conveyance Project**

As discussed in the Delta Conveyance Project Final EIR Chapter 25, Section 25.3.3.2, *Impacts of the Project Alternatives Related to Hazards and Hazardous Materials*, Delta Conveyance Project operations-related activities may involve using, handling, and disposing of materials that could be considered hazardous. The transport, handling, use, and disposal of these materials would comply with regulations enforced by regulatory agencies such as CUPAs and Cal/OSHA. In addition, Environmental Commitments EC-2: *Develop and Implement Hazardous Materials*

*Management Plans* and EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans* would further reduce the potential for accidental release of a material identified as hazardous or exposure of people to those materials. If project facilities are sited on or near a previously unknown hazardous materials site, workers, the public, or other sensitive receptors or the environment could be exposed to previously unknown hazardous materials sites. Implementation of Mitigation Measure HAZ-2: *Perform a Phase I Environmental Site Assessment Prior to Construction Activities and Remediate*, which would include a Phase I environmental site assessment before construction, the identification and evaluation of potential sites of concern within the construction footprint, and the development of a remediation plan before construction and operations commence, would minimize this potential effect. Finally, diverting water through the north Delta intakes under Delta Conveyance Project per operating criteria and under certain conditions (e.g., high flow events when Delta conditions are in excess) would not increase the potential for creating a public or environmental hazard through the use or accidental release of hazardous materials.

## **Summary**

The Delta Conveyance Project Final EIR determined that Delta Conveyance Project operations and maintenance would not increase the potential for creating a public or environmental hazard through the use or accidental release of hazardous materials because either there would not be transport, handling, or disposal of these types of materials through the operation of the north Delta intakes or transport, handling, use, and disposal of these materials would comply with regulations enforced by regulatory agencies such as CUPAs and Cal/OSHA, as well as EC-2, EC-3, and Mitigation Measure HAZ-2. Similarly, the EIS concluded that implementation of all phases of Alternative 2 would not result in adverse effects related to hazardous materials, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not increase the potential for creating a public or environmental hazard through the use or accidental release of hazardous materials, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in substantial adverse effects, as compared to the No Action Alternative

## **Z.4.16 Geology and Soils**

This analysis regarding soils does not include discussion of areas upstream of the Delta.

### **Z.4.16.1 Potential Changes in Soil Erosion**

#### **Alternative 2**

##### *San Joaquin River Region*

During dry periods, all phases of Alternative 2 would likely result in less mass-wasting and surface erosion in New Melones Reservoir relative to the No Action Alternative because there would be less drawdown. For wet periods, all phases of Alternative 2 have drawdown values that indicate a higher likelihood for mass-wasting and surface erosion than under the No Action Alternative. Releases to the Stanislaus River from New Melones Reservoir under all phases for both dry and wet periods would also have a greater likelihood for mass-wasting and surface erosion relative to the No Action Alternative.

There would be no change in CVP operations with respect to water storage in Millerton Reservoir or release of water to the San Joaquin River.

Relative to the No Action Alternative, all phases of Alternative 2 except Alternative 2 With TUCP Without VA would increase lands subject to fallowing in the San Joaquin River Region during both average water years and the average of dry and critical water year types, which would increase the potential for erosion. The greatest increase in lands subject to fallowing would occur under Alternative 2 Without TUCP Systemwide VA during average water years. When compared to the No Action Alternative, Alternative 2 With TUCP Without VA would decrease lands subject to fallowing in the San Joaquin River Region during average water years, which would decrease the potential for erosion. However, during the average of critical and dry water year types, there would be an increase in acreages of fallowed land, which would increase the potential for erosion.

#### *Bay-Delta Region*

Because there are no storage reservoirs associated with the Bay-Delta Region, no changes in reservoir water levels would occur that could result in shoreline erosion. No changes in peak flows are expected in the Bay-Delta under Alternative 2 (all phases), relative to the No Action Alternative; therefore, erosion related to peak flow events would not occur in this area. No changes in peak flows are expected in the Suisun Marsh or the San Francisco Bay under Alternative 2; therefore, there is no expected change to erosion rates.

Flows on average would decrease in this region under Alternative 2 (all phases) relative to the No Action Alternative in the Bay Delta. Therefore, an increase in fallowing of agricultural land is anticipated and the potential for soil erosion would increase compared to the No Action Alternative.

#### *CVP and SWP Service Areas*

There are no Reclamation reservoirs or affected stream reaches associated with the Central Coast or Southern California Regions. Therefore, erosion resulting from changes to flow is not a concern in these areas. With regards to changes in irrigated acreage, flows would increase in this region under Alternative 2 compared to the No Action Alternative. Therefore, no conversion of agricultural land or crop idling is anticipated, and soil erosion caused by these factors would not occur.

#### **Delta Conveyance Project**

Diverting water through the north Delta intakes under Delta Conveyance Project operating criteria and certain conditions (e.g., high flow events when Delta conditions are in excess) would not result in substantial accelerated water and wind erosion. As discussed in the Delta Conveyance Project Final EIR Chapter 7, *Flood Protection*, the footprint of the north Delta intakes includes riprap (along the intake structure, existing levee, and river bottom interface) and slope protection that is typically sufficient to mitigate localized scour and erosion forces. Furthermore, given the Delta Project Conveyance operations would have limited to no effects areas upstream of the north Delta intakes, there would be no potential to affect wind or water erosion at existing reservoirs.

## **Summary**

The EIS determined that Alternative 2 operations could result in increased potential for fallowed agricultural land in some water year types in the San Joaquin River Region, as compared to the No Action Alternative. The Delta Conveyance Project Final EIR determined that diverting water pursuant to operational criteria and under operating conditions would not substantially alter the potential for water or wind erosion in the Delta or upstream of the north Delta intakes. As such, diverting water through the north Delta intakes under Delta Conveyance Project operating conditions (i.e., high flow events when Delta conditions are in excess) would not substantially change soil erosion due to post-construction activities and the location of the diversions (in Delta), as disclosed within the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

### ***Z.4.16.2 Potential Changes in Land Subsidence Due to Increased Use in Groundwater***

#### **Alternative 2**

As discussed in EIS Appendix I, land subsidence is caused by the consolidation of certain subsurface soils when the pore pressure in those soils is reduced. In the San Joaquin Valley, that reduction in pore pressure is usually caused by groundwater pumping that causes groundwater levels to fall below historical low levels. Average groundwater levels are simulated to decrease up to approximately 12 to 20 feet depending on the Alternative 2 phase. Phases with larger decreases (e.g., Alternative 2 Without TUCP Delta VA and Alternative 2 Without TUCP Systemwide VA) would have a higher likelihood of causing additional subsidence. The largest decreases in groundwater levels are simulated to occur along the western portion of the Central Valley in the Sacramento San Joaquin Valleys. Portions of these areas are known to have historic subsidence and further reductions in groundwater levels may cause additional subsidence. The location and amount of subsidence is highly dependent on the local soil conditions and historical low groundwater levels in the area. It is unlikely that there would be changes in land subsidence in the Southern California Region due to implementation of Alternative 2 (all phases) because these areas are not known to be susceptible to subsidence, and no increases in groundwater pumping are expected in these areas.

#### **Delta Conveyance Project**

As described in Delta Conveyance Project Final EIR Chapter 8, land subsidence within the Delta occurs predominantly as the result of the oxidation of organic soils and would therefore not be influenced by groundwater elevation changes from project operations.

## **Summary**

The EIS concluded that implementation of all phases of Alternative 2 are generally expected to remain the same or result in decreases in average groundwater levels in the Central Valley, which could result in increased land subsidence, as compared to the No Action Alternative. The Delta Conveyance Project Final EIR determined that Delta Conveyance Project operations would not result in potential changes in land subsidence in the Delta. As such, diverting water through the north Delta intakes under Delta Conveyance Project operating conditions (i.e., high flow events when Delta conditions are in excess) would not result in subsidence in association with operation of Alternative 2, as disclosed within the EIS. Furthermore, the location of the effects associated



with LTO is not the same as the Delta Conveyance Project (in Delta). Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project, as compared to the No Action Alternative, would be limited to those described above for Alternative 2.

## **Z.4.17 Public Health and Safety**

### **Z.4.17.1 Potential Changes in the Potential for Valley Fever Related to Changes in Irrigated Agricultural Land**

#### **Alternative 2**

As discussed in EIS Appendix X, Section X.2.4, *Alternative 2*, there would be decrease in irrigated agricultural acreages in the Sacramento River and San Joaquin River regions over the long-term average condition for all phases of Alternative 2 except for the San Joaquin River under Alternative 2 With TUCP Without VA. For all Alternative 2 phases except Alternative 2 With TUCP Without VA over the long-term average condition, reductions would be greatest for the San Joaquin River Region. In dry and critical dry years under Alternative 2 (all phases), there would be decreases in irrigated agricultural acreages in both the Sacramento River Region and the San Joaquin River Region and reductions would be greatest for the San Joaquin River Region. Although there would be an overall reduction in irrigated agricultural land in the study area under Alternative 2, conversion of this land to nonagricultural use would not necessarily mean that the land would be fallowed or idled; land taken out of production could be converted to a different land use altogether that is not conducive to the growth of *Coccidioides*. Further, implementation of Mitigation Measure AG-1: *Diversify Water Portfolios* would help reduce the magnitude of irrigated agricultural land conversion by encouraging water users to develop alternative sources of water.

#### **Delta Conveyance Project**

As discussed in Delta Conveyance Project Final EIR Chapter 23, Impact AQ-7, exposure of sensitive receptors to the spores responsible for Valley fever would not be expected with operation of the project under Delta Conveyance Project because extensive soil disturbing activities would not occur during operations. Furthermore, reductions to irrigated land within the Central Valley as a result of operations are not expected because increased reliability of deliveries to agricultural uses would support more stable (and potentially larger) agricultural acreage, enable broader crop selection, and reduce cost and risk associated with uncertain water deliveries (Final EIR Chapter 17, ECON-7). During dry and critical water conditions, additional supply can reduce land idling and reduce the cost of replacement supply (Final EIR Chapter 17, ECON-7).

#### **Summary**

The Delta Conveyance Project Final EIR determined that Delta Conveyance Project operations would not increase the potential for Valley fever. Similarly, the EIS concluded that implementation of all phases of Alternative 2 would not measurably increase the potential for Valley fever, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not result in a substantial increase in the potential for Valley fever, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta

Conveyance Project would not be expected to result in a substantial increase in the potential for Valley fever, as compared to the No Action Alternative.

#### **Z.4.17.2 *Potential Changes in Methylmercury Production and Resultant Changes in Bioaccumulation in Fish for Human Consumption***

##### **Alternative 2**

As discussed in EIS Appendix X, modeled changes in water column concentrations of total methylmercury at Delta assessment locations, Alternative 2 (all phases) would have little to no measurable effect on Delta fish tissue concentrations relative to the No Action Alternative. Similarly, operations would not contribute to additional water quality degradation with respect to water column methylmercury concentrations or increased methylmercury bioaccumulation in biota in Suisun Bay and San Francisco Bay because Delta outflow rates in all months except June would be lower than the No Action Alternative. Therefore, Alternative 2 (all phases) would not result in increased health risks to humans consuming fish from the Delta, Suisun Bay, or San Francisco Bay.

##### **Delta Conveyance Project**

As discussed in the Delta Conveyance Final EIR Chapter 26 (Impact PH-3), based on the small, modeled changes in total mercury and aqueous and fish tissue methylmercury concentrations at all Delta assessment locations, Delta Conveyance Project would not contribute to measurable water quality degradation with respect to mercury and methylmercury. As such, Delta Conveyance Project operations would not increase public health risks from methylmercury due to the consumption of fish in the Delta.

##### **Summary**

The Delta Conveyance Project Final EIR determined that Delta Conveyance Project operations would not increase public health risks from methylmercury due to the consumption of fish from the Delta because small, modeled changes would not contribute to measurable water quality degradation from mercury or bioaccumulation of mercury in fish. Similarly, the EIS concluded that implementation of Alternative 2 (all phases) would not increase public health risks from methylmercury due to the consumption of fish from the Delta, Suisun Bay, or San Francisco Bay, as compared to the No Action Alternative. As such, it is anticipated that operation of Delta Conveyance Project would not increase health risks to humans consuming fish from the Delta, Suisun Bay, or San Francisco Bay, as identified in the EIS. Therefore, effects of operations of Alternative 2 with the Delta Conveyance Project would not be expected to result in a substantial increase in adverse effects, as compared to the No Action Alternative.

#### **Z.4.17.3 *Potential Changes in the Potential for Public Exposure to Cyanotoxins Due to an Increase in CHABs***

##### **Alternative 2**

As discussed in EIS Appendix X, Alternative 2 (all phases) is expected to have minor, if any, effect on the environmental variables (i.e., irradiance, nutrients, water column turbulence/mixing, temperature, and residence time) in the Delta, Suisun Marsh, Suisun Bay, or San Francisco Bay such that there would be an increase in the frequency or magnitude of CHABs, relative to the No



The potential for substantial adverse effects on Tribal cultural resources is discussed in Chapter 32, Tribal Cultural Resources, of the Delta Conveyance Project Final EIR (Impacts TCR-1 and TCR-2). As discussed in Final EIR Chapter 32, Delta Conveyance Project operations would adversely affect the Delta Tribal Cultural Landscape Tribal cultural resources.

An analysis of Cultural Resources for Alternative 2 is located in EIS Appendix K.

### **Z.5.2 Population and Housing**

As discussed in EIS Chapter 23, *Other NEPA Considerations*, a detailed analysis of population and housing was not included in this EIS because Alternative 2 (all phases) would not cause impacts on population and housing. Alternative 2 is comprised primarily of operational changes that would not directly or indirectly affect housing or residential populations or create new water supplies that are anticipated to accommodate growth. Alternative 2 would not create additional housing, provide infrastructure to support additional population, or displace existing populations necessitating the creation of housing in another location. Therefore, it is not anticipated that Alternative 2 would result in direct or indirect population growth as the result of operations-related activities.

As discussed in the Delta Conveyance Project Final EIR Chapter 31, *Growth Inducement*, operation of the Delta Conveyance Project is not anticipated to have substantial effects or change on potential for flooding in the study area and downstream areas. It is not anticipated there would be indirect effects of flood risk reduction on growth under Delta Conveyance Project because the alternative would not substantially alter levees in the study area and reduce the potential for study area flooding relative to the No Action Alternative. Operation of Delta Conveyance Project would increase the potential SWP annual delivery of water south of the Delta, but the total volume of additional water would not significantly induce population growth. Rather, increased water supply is likely to be used to provide improved supply reliability and restore amounts that agencies have previously received that have been reduced due to regulatory requirements. Further, increased delivery may simply restore average contract deliveries that have been affected because of regulatory rules and operational agreements or could be used to supplement or reduce groundwater use under the Sustainable Groundwater Management Act. Finally, there is not a strong discernable link between water deliveries and rate of population growth, and there are several factors outside of water delivery, such as housing and employment, that influence and drive population growth. Because the Delta Conveyance Project Final EIR determined that there would be no direct or indirect effects on population growth due to operation of Delta Conveyance Project and because there would be no effects on population and housing related to implementation of Alternative 2 (all phases), population and housing is not further addressed in this appendix.

### **Z.5.3 Traffic and Transportation**

As discussed in EIS Chapter 23, the alternatives evaluated in the EIS would not cause impacts on traffic and transportation because Alternative 2 (all phases) are comprised primarily of operational changes that would not directly or indirectly affect traffic. The operational changes would not induce additional traffic or interfere with existing traffic and transportation patterns. Therefore, it is not anticipated that Alternative 2 (all phases) would result in impacts on traffic and transportation as the result of operation-related activities.

As discussed in the Delta Conveyance Final EIR Chapter 20, *Transportation*, Delta Conveyance Project operations and maintenance of facilities would result in a small increase in the number of employees and trips; however, these types of activities are not directly related to diversions of water at the north Delta intakes. Similarly, as with LTO, diverting water through the north Delta intakes would not directly or indirectly affect traffic.

Because there would be no effects on transportation due to operation the Delta Conveyance Project and because there would be no effects on traffic and transportation related to implementation of Alternative 2 (all phases), traffic and transportation are not further addressed in this appendix.

#### **Z.5.4 Flood Control**

As discussed in EIS Chapter 23, CVP and SWP reservoirs provide flood control in addition to their other purposes. In theory, changing the operations of the facilities could have the potential to affect flood management; however, Reclamation and DWR are not proposing to alter flood control requirements. Each facility has a flood control curve that defines storage throughout the year that must be available to help manage high flows. Alternative 2 would not change these flood control curves or operational parameters established in cooperation with USACE to manage flood risk. Reclamation and DWR would continue to operate with the same flood management procedures under the action alternatives; therefore, Alternative 2 would not affect flood control.

As discussed in the Delta Conveyance Project Final EIR Chapter 7, there may be changes in water surface elevations (WSEs) in the Sacramento River (Sacramento River between the American River confluence and Sutter Slough) due to the Delta Conveyance Project intake structures extending into the river, which effectively constricts a portion of the conveyance capacity of the river along the respective length of each intake, potentially causing a rise in WSE upstream of the intakes. The potential effect on WSEs during Delta Conveyance Project operations is not directly related to diversions at the proposed north Delta intakes. Instead, effects are a result of the permanent facility footprint. The intake's protective log boom and debris fender pile system could also affect river hydraulics. However, as described in Final EIR Chapter 7, none of the permanent facilities would substantially increase WSEs of the Sacramento River near the intakes. As disclosed in Final EIR Chapter 7, during a 100-year flood event, the water surface of the Sacramento River at the intakes would only increase by 0.04 foot. This small increase would not change the flood protection provided by the levees upstream or downstream of the intakes. The operational criteria of the Delta Conveyance Project describes that the intakes would divert flows during high flow events (i.e., excess conditions) and thus would not substantially affect flood flows. Furthermore, similar to the Alternative 2, operation of the Delta Conveyance Project would not change flood control curves or operational parameters established in cooperation with USACE to manage flood risk upstream of the north Delta intakes.

Because the Delta Conveyance Project Final EIR determined Delta Conveyance Project would not result in adverse effects related to on- or off-site flooding, increases in WSEs, or impedances of flood flows, and because there would be no flood-related effects from the implementation of Alternative 2 (all phases), flood control is not further addressed in this appendix.

### **Z.5.5 Noise**

As discussed in EIS Chapter 23, typically, noise and vibration effects would be the result of construction activities. Alternative 2 (all phases) would not include construction activities for new infrastructure and, therefore, would not include operations or maintenance activities for newly constructed infrastructure.

As discussed in the Delta Conveyance Project Final EIR Chapter 24, long-term operation of Delta Conveyance Project would involve the periodic and sometimes continuous use of pumps and ventilation fans within various facilities; however, noise levels from long-term operation of Delta Conveyance Project would not exceed criteria for project operation noise.

Because the Delta Conveyance Project Final EIR determined that there would be no noise effects due to operation of Delta Conveyance Project , and because there would be no noise effects due to operation of Alternative 2 (all phases), noise is not further addressed in this appendix.