7.23 Cumulative Impact Analysis, Growth-Inducing Impacts, and Significant Irreversible Environmental Changes

This section describes the cumulative impacts associated with the proposed Plan amendments and Low Flow and High Flow Alternatives together with other projects (and programs) that could cause related impacts. The cumulative impacts associated with the proposed Voluntary Agreements (VAs) are discussed in Chapter 9, *Proposed Voluntary Agreements*.

This section also discusses the ways in which the proposed Plan amendments, Low Flow Alternative, High Flow Alternative, and No Project Alternative could directly or indirectly foster economic or population growth or the construction of additional projects. (Cal. Code Regs., tit. 14, §15126.2, subd. (d).) Chapter 9 discusses the ways in which the proposed VAs could directly or indirectly foster economic or population growth or the construction of additional projects.

Finally, this section discloses any significant irreversible environmental changes that could result from implementation of the proposed Plan amendments, Low Flow Alternative, High Flow Alternative, and No Project Alternative. (Cal. Code Regs., tit. 14, § 15126.2, subd. (c).) Chapter 9 discloses any significant irreversible environmental changes that could result from the proposed VAs.

7.23.1 Cumulative Impact Analysis

The State Water Board is considering updating the Bay-Delta Plan to require increased instream flows and other actions in the Sacramento River; its tributaries; the Delta; and the three eastside tributaries to the Delta, the Cosumnes, Mokelumne, and Calaveras Rivers (Sacramento/Delta) in order to reasonably protect fish and wildlife beneficial uses. Water from the Sacramento/Delta is delivered to and used in portions of the San Francisco Bay Area (Bay Area), San Joaquin Valley, Central Coast, and Southern California regions. A larger study area is divided into seven regions based on geography and water supply (Figure 2.8-1a) to ensure that environmental and economic impacts are addressed comprehensively.

Because California water resource management involves a myriad of individual and collective decisions, the study area represents a large portion of the state. In addition, the range of foreseeable compliance actions and potential responses to the project is already wide reaching and inherently cumulative in many regards. That makes this cumulative impact analysis unlike the cumulative impact analysis, for example, of a development project for a shopping mall on a distinct parcel or parcels that can easily be separated from other past, present, or reasonably foreseeable future projects. Here, the potentially significant impacts of many past, present, and future projects are already incorporated into the analyses, either by being embedded within the baseline analyses or evaluated as a potential response action. Where appropriate, this is indicated in the cumulative impact analysis for each resource area below.

7.23.1.1 Approach to Cumulative Analysis

The State CEQA Guidelines define *significant cumulative impacts* as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (Cal. Code Regs., tit. 14, § 15355). The individual effects may be changes resulting from a single project or more than one project. (Cal. Code Regs., tit. 14, § 15355(a)). Cumulative impacts may result from individually minor but collectively significant projects taking place over a period of time. (Cal. Code Regs., tit. 14, § 15355(b)). A project with a less-than-significant individual impact can nonetheless contribute to a significant cumulative impact. The cumulative analysis considers adverse effects of the proposed Plan amendments that are potentially significant or less than significant. If an impact has been determined to have no effect, it would not contribute to any cumulative effects and is not discussed in this section.

Due to the size and complexity of Sacramento/Delta water supply and use, the environmental analyses are necessarily broad to cover the wide range of foreseeable compliance measures and responses that may result from the proposed Plan amendments. A wide range of responses and associated environmental effects could occur as a result of the project due to the degree of flexibility included in the proposed Plan amendments and the scope and complexity of Sacramento/Delta water use. The proposed Plan amendments provide a framework that would allow stakeholders to implement complementary ecosystem restoration projects in addition to flow requirements.

Impact Mechanisms and Potential Impacts of Proposed Plan Amendments and Alternatives

The evaluation of reasonably foreseeable methods of compliance and actions that may be taken in response to the proposed Plan amendments are organized into the following categories:

- Changes in hydrology (e.g., changes in streamflows, changes in reservoir levels).
- Changes in water supply (e.g., reduced Sacramento/Delta supply for agricultural, municipal, and wildlife refuge use, increased groundwater pumping, other water management actions that do not involve construction [groundwater storage and recovery, water transfers, water recycling, and water conservation]).
- Habitat restoration and other complementary ecosystem actions (described in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*).
- New or modified facilities that involve construction (e.g., new or modified dams/reservoirs and points of diversion; groundwater wells and groundwater storage and recovery projects; new or modified drinking water treatment plants, including desalination plans and wastewater treatment plants) (described in Section 7.22, *New or Modified Facilities*).

Table 7.1-2 details potentially significant impacts and less-than-significant impacts from changes in hydrology and water supply (Sections 7.3 through 7.20). Tables 7.21-1 and 7.22-1 detail potentially significant impacts and less-than-significant impacts from construction of habitat restoration and other complementary ecosystem actions (Section 7.21, *Habitat Restoration and Other Ecosystem Projects*) and new or modified facilities (Section 7.22, *New or Modified Facilities*), respectively. All alternatives except for the No Project Alternative evaluate the types of projects considered in Sections 7.21 and 7.22.

Changes in Hydrology

Changes in hydrology (flows and reservoir levels) would result in potentially significant impacts on the following resource areas: aesthetics, agriculture and forest resources, biological resources (terrestrial and aquatic), cultural resources, energy, hydrology and water quality (surface water), recreation, and utilities and service systems. Changes in streamflows would substantially improve water quality from dilution and flushing of some contaminants and reduction in electrical conductivity (EC) (a measure of salinity), bromide, and chloride in the Delta associated with reduced seawater intrusion. Water quality for fish would be enhanced by increases in flow (e.g., increased low-salinity habitat in the Delta) and other beneficial effects associated with higher flows (e.g., reduced water temperature). However, streamflows could be lower on some Sacramento/Delta tributaries (including regulated tributaries), particularly in summer and early fall compared to artificially high baseline conditions due to export operations. In addition, streamflows could be reduced at times in some streams below export reservoirs. These reductions in streamflows could result in potentially significant environmental impacts, such as reducing dilution of local contaminants, either from wastewater treatment plant (WWTP) discharges, other types of contaminated discharges, or uncontrolled and natural sources of contaminants. Reduced streamflows during summer months would result in a decrease in hydropower generation in summer, which could be significant for an individual project or community.

Lower reservoir levels in some locations could result in potentially significant environmental impacts, such as exposure of more unvegetated ground (or "bathtub rings") and previously inundated cultural resources to increased wave action, erosion, and human activity; lower reservoir levels could affect boat ramp accessibility, reducing recreation opportunities. Changes in reservoir levels could exacerbate existing water quality issues associated with reservoirs, including bioaccumulation of methylmercury in fish and production of harmful algal blooms (HABs) in some locations. Changes in reservoir levels and lowered streamflows below reservoirs could result in increased temperature in some locations and times of year, particularly while specific cold water habitat implementation measures are refined. Although changes in hydrology would result in potentially significant environmental impacts, these changes in hydrology also would provide environmental benefits to native aquatic and aquatic-dependent species, aquatic and riparian habitats and natural communities, and ecosystem functions in the Sacramento/Delta that are supported by a natural flow regime.

Changes in Water Supply

Changes in water supply under the proposed Plan amendments would result in potentially significant impacts on the following resource areas: agriculture and forest resources, air quality, biological resources (terrestrial and aquatic), energy, geology and soils, greenhouse gas (GHG) emissions, hydrology and water quality (surface water and groundwater), noise, and utilities and service systems. Reduced Sacramento/Delta supply to agriculture could lead to changes in the distribution of crop types and acreage and conversion of farmland to nonagricultural use. Reduced Sacramento/Delta supply to wildlife refuges and agricultural lands could affect habitat for special-status species, including giant gartersnake, Swainson's hawk, greater sandhill crane, tricolored blackbird, and California black rail. In addition, reduced Sacramento/Delta supply for wildlife refuges and agricultural lands could decrease the amount of habitat available for resident and migratory waterfowl and shorebirds. Reduced municipal supply and increased indoor water conservation could lead to a decrease in the production of wastewater and increase chemical constituent concentrations in WWTP influent and effluent. Changes in water supply source could

result in temporary exceedances of maximum contaminant levels in municipal water supply. Changes in water supply could result in the use of other lower quality water supply sources that also affect WWTP influent and effluent, leading to construction to modify or expand existing treatment facilities.

Groundwater

Reduced Sacramento/Delta supply also could result in potentially significant impacts related to lower groundwater levels and groundwater quality from increased groundwater pumping as a substitute supply (where available and not locally restricted). Potential reductions in applied irrigation water, including from increased water use efficiencies, would reduce incidental groundwater recharge. Lower groundwater levels could reduce groundwater available for agricultural use and could affect water supplies for communities that rely on groundwater as their primary municipal water source, including disadvantaged communities. Lower groundwater levels could affect groundwater quality and potentially affect drinking water wells in some areas. Lower groundwater levels could have localized effects on groundwater quality by concentrating pollutants where groundwater contamination already exists. Additionally, in some locations, lower groundwater levels may concentrate salts and nutrients in groundwater over time through evaporative enrichment.

Lower groundwater levels could affect natural communities that are dependent on groundwater and sensitive species that are reliant on groundwater-dependent ecosystems. Lower groundwater levels also could affect riparian and wetland habitat, and sensitive groundwater-dependent natural communities and wetlands. Increased groundwater pumping from wells with diesel-powered pumps could generate additional GHG emissions and affect air quality.

Other Water Management Actions

In response to changes in Sacramento/Delta supply, water users may modify their water supply portfolios by increasing the use of other sources of water and maximizing the use of existing water supplies. These other water management actions include groundwater storage and recovery, water transfers, water recycling, and water conservation. Other water management actions could result in potentially significant impacts on following resource areas: agriculture and forest resources, biological resources (terrestrial and aquatic), energy, GHG emissions, hydrology and water quality (surface water and groundwater), and utilities and service systems. Diversion of flows for groundwater recharge, transfers, and recycling could diminish the instream ecological benefits of high-flow events that provide ecological and habitat functions (e.g., floodplain inundation) or diminish the ecological benefits of instream flows on riparian and wetland habitat, especially in dry seasons and in low-flow conditions where streamflow is dependent on wastewater discharges. Groundwater substitution water transfers and agriculture water conservation could result in lower groundwater levels, which could exacerbate groundwater quality impairments or contribute to contaminant loading in localized areas.

Groundwater recharge could enhance groundwater levels, including recharge using recycled water. Recharge with high-quality water may provide an effective strategy to maintain or improve groundwater quality. Conversely, recharge with poor-quality water could contribute to salt and nutrient loading or introduce contaminants to the underlying aquifer. Groundwater storage and recovery projects based on the capture of stormwater runoff could reduce streamflow during storm events to some extent but would improve surface water quality by reducing contaminants and trash. Agriculture to urban water transfers could further incentivize farmland conversion, particularly in

rapidly urbanizing areas. Water transfers based on cropland idling could affect special-status species that use agricultural fields and result in conversion of crop types that provide foraging habitat for migratory waterfowl and shorebirds. Groundwater recharge, water transfers, and water recycling could result in emissions associated with energy use. Water conservation could result in a reduction in energy use and GHG emissions. Reduced municipal supply and increased indoor water conservation could lead to a decrease in the production of wastewater and increase chemical constituent concentrations in WWTP influent.

Less-Than-Significant Impacts

Changes in hydrology and supply could have less-than-significant impacts on the following resources; however, these resource areas were considered in this cumulative impact analysis to determine whether the impacts of the proposed Plan amendments in combination with past, present and probable future projects could be cumulatively considerable: land use and planning, population and housing, and public services.

Habitat Restoration and Other Ecosystem Projects

The proposed Plan amendments provide a framework that would allow stakeholders to implement complementary ecosystem projects in addition to flow requirements and actions that other entities could take that would contribute to the overall goal of providing reasonable protection to fish and wildlife in the Sacramento/Delta. These actions include physical habitat restoration projects as well as predation and invasive species control measures. In addition, the narrative cold water habitat objective would address tributary-specific temperature needs by requiring that cold water flows from reservoirs be maintained and timed to provide for downstream temperatures to protect salmon species at critical times of year or that alternate protective measures are implemented to ensure that fish below dams are kept in good condition (consistent with Fish and Game Code section 5937). The cold water habitat objective could be implemented in part through certain construction projects such as reservoir temperature management facilities or fish passage projects. These types of habitat restoration and other ecosystem projects are described in detail and analyzed in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*. Table 7.21-1 details impacts and mitigation measures, including impacts and mitigation measures related to temporary construction impacts, from these types of actions. Impacts could be potentially significant on the following resource areas: aesthetics, agriculture and forest resources, air quality, biological resources hydrology and water quality, and noise.

In many cases, potentially significant impacts could be reduced to less-than-significant levels with mitigation incorporated. Tables 7.1-2, 7.21-1, and 7.22-1 identify the potentially significant impacts that would be reduced to less-than-significant levels with mitigation incorporated for mitigation activities within the State Water Board's jurisdiction. Because the State Water Board has authority to ensure that mitigation is implemented for these actions, these impacts would be reduced to less-than-significant levels with mitigation incorporated. However, other mitigation measures are largely within the jurisdiction and control of other agencies or depend on how water users respond to the proposed Plan amendments. The precise location and magnitude of habitat restoration actions are not known. Accordingly, the State Water Board cannot guarantee that measures will always be adopted or applied to fully mitigate potentially significant impacts. Therefore, unless and until the mitigation is fully implemented, the impacts remain potentially significant.

New or Modified Facilities

Response actions that could be undertaken by water users and other entities to expand water supplies also include large infrastructure projects such as new or modified reservoirs and points of diversion; new groundwater wells and groundwater storage and recovery projects; new or modified WWTPs for water recycling; and new or modified drinking water treatment facilities, including desalination facilities. Water users and other entities also may implement other actions in response to changes in hydrology and changes in water supply that would require construction activities (e.g., new or modified boat ramps, installing streamflow or temperature monitoring devices to monitor and report compliance with instream flow and cold water habitat requirements) and agricultural water conservation projects (e.g., canal lining and encasement). Other water management actions that involve construction of new or modification of existing infrastructure are described in detail and evaluated in Section 7.22, *New or Modified Facilities*. As detailed in Table 7.22-1, construction of new or modified facilities (Section 7.22) could have potentially significant impacts on the following resources: aesthetics, agriculture and forest resources, air quality, biological resources (terrestrial and aquatic), cultural resources, energy and GHG emissions, geology and soils, hazards and hazardous materials, hydrology and water quality (surface water and groundwater), land use and planning, mineral resources, noise, recreation, transportation and traffic, and utilities and service systems.

Low Flow Alternative (Alternative 2)

The Low Flow Alternative is similar to the proposed Plan amendments in that it would establish new and modified objectives and implementation measures for the protection of fish and wildlife for (1) inflows for the Sacramento/Delta tributaries; (2) cold water habitat; (3) Delta outflows; (4) interior Delta flows (flow and water project operational requirements); and (5) other monitoring, special studies, and other associated provisions. However, under the Low Flow Alternative, the new numeric inflow objective for the Sacramento/Delta tributaries would require flows between 35 percent and 45 percent unimpaired flow. This differs from the numeric inflow objective under the proposed Plan amendments, which would require flows of 55 percent unimpaired flow, with an adaptive range from 45 percent to 65 percent unimpaired flow. The numeric inflow objectives and Delta outflow objective under the Low Flow Alternative would require a smaller amount of inflow to the Delta, and required Delta outflows would be less than those required under the proposed Plan amendments.

Potential environmental impacts of the Low Flow Alternative are discussed in Section 7.24.3, *Low Flow Alternative (Alternative 2)*, and are detailed comprehensively in Table F-2 in Appendix F, *Impact Summary Tables for Alternatives 1, 2, and 3*. Table F-2 identifies the potentially significant, less-than-significant, and beneficial environmental impacts of changes in hydrology and supply under the Low Flow Alternative on various environmental resource areas. Table F-2 identifies whether the impact or benefit would be reduced, similar, or increased compared to the proposed Plan amendments. Table F-2 also identifies mitigation measures that could reduce potentially significant impacts of the Low Flow Alternative. In many cases, potentially significant impacts could be reduced to less-than-significant levels with mitigation incorporated. Table F-2 identifies the potentially significant impacts that would be reduced to less-than-significant levels with mitigation incorporated for mitigation activities within the State Water Board's jurisdiction. Because the State Water Board has authority to ensure that mitigation is implemented for these actions, these impacts would be reduced to less-than-significant levels with mitigation incorporated. However, other mitigation measures are largely within the jurisdiction and control of other agencies or depend on

how water users respond to the proposed Plan amendments. Accordingly, the State Water Board cannot guarantee that measures will always be adopted or applied to fully mitigate potentially significant impacts. Therefore, unless and until the mitigation is fully implemented, the impacts remain potentially significant. Additionally, Tables 7.21-1 and 7.22-1 detail potentially significant impacts, less-than-significant impacts, beneficial impacts, and mitigation measures related to construction and operation of habitat restoration and other complementary ecosystem actions (Section 7.21, *Habitat Restoration and Other Ecosystem Projects*) and new or modified facilities (Section 7.22, *New or Modified Facilities*).

Overall, the changes in hydrology and water supply that would occur under the Low Flow Alternative are similar to but less than those that would occur under the proposed Plan amendments. Compared to baseline conditions, the changes in hydrology that would occur under the Low Flow Alternative would generally be smaller and closer to baseline conditions than the changes that would occur under the proposed Plan amendments. The changes in water supply that would occur under the Low Flow Alternative also would generally be smaller and closer to baseline conditions than the changes that would occur under the proposed Plan amendments. At the same time, environmental benefits of the Low Flow Alternative would be expected to be less than those under the proposed Plan amendments. The increased use or accelerated development of new or modified facilities would be less under Alternative 2 than the proposed Plan amendments. Under Alternative 2, the impacts of habitat restoration and other ecosystem projects could be less compared to the proposed Plan amendments if habitat restoration and other ecosystem projects are not implemented in the Sacramento/Delta, or more if the lower numeric inflow requirement leads to an overall greater dependence on habitat restoration and other ecosystem projects to improve conditions for native fish. Environmental impact significance determinations from changes in hydrology, changes in water supply, habitat restoration and other complementary ecosystem actions, and construction of new or modified facilities under the Low Flow Alternative would remain similar to determinations for the proposed Plan amendments.

High Flow Alternative (Alternative 3)

The High Flow Alternative is similar to the proposed Plan amendments and the Low Flow Alternative (Alternative 2) in that it would establish new and modified objectives and implementation measures for the protection of fish and wildlife for (1) inflows for the Sacramento/Delta tributaries; (2) cold water habitat; (3) Delta outflows; (4) interior Delta flows (flow and water project operational requirements); and (5) other monitoring, special studies, and other associated provisions. However, under the High Flow Alternative, the new numeric inflow objective for the Sacramento/Delta tributaries would require flows between 65 percent and 75 percent unimpaired flow. This differs from the numeric inflow objective under the proposed Plan amendments, which would require flows of 55 percent unimpaired flow, with an adaptive range from 45 percent to 65 percent unimpaired flow. The numeric inflow objective and Delta outflow objective under the High Flow Alternative would require a larger amount of inflow to the Delta, and required Delta outflows would be greater than those under the proposed Plan amendments.

Potential environmental impacts of the High Flow Alternative are discussed in Section 7.24.4, *High Flow Alternative (Alternative 3)*, and are detailed comprehensively in Table F-3 in Appendix F, *Impact Summary Tables for Alternatives 1, 2, and 3*. Table F-3 identifies the potentially significant, less-than-significant, and beneficial environmental impacts of the High Flow Alternative on various environmental resource areas. Table F-3 also identifies whether the impact or benefit would be reduced, similar, or increased compared to the proposed Plan amendments. The mitigation

measures that could reduce potentially significant impacts of the High Flow Alternative are the same as the mitigation measures that could reduce potentially significant impacts of the proposed Plan amendments; these measures are detailed in Sections 7.3 through 7.20. Table F-3 identifies the potentially significant impacts that would be reduced to less-than-significant levels with mitigation incorporated for mitigation activities within the State Water Board's jurisdiction. Because the State Water Board has authority to ensure that mitigation is implemented for these actions, these impacts would be reduced to less-than-significant levels with mitigation incorporated. However, other mitigation measures are largely within the jurisdiction and control of other agencies or depend on how water users respond to the proposed Plan amendments. Accordingly, the State Water Board cannot guarantee that measures will always be adopted or applied to fully mitigate potentially significant impacts. Therefore, unless and until the mitigation is fully implemented, the impacts remain potentially significant. In addition, it may not be possible to fully mitigate all environmental impacts under the High Flow Alternative, even after mitigation is implemented. Tables 7.21-1 and 7.22-1 detail potentially significant impacts, less-than-significant impacts, beneficial impacts, and mitigation measures related to construction and operation of habitat restoration and other complementary ecosystem actions (Section 7.21, *Habitat Restoration and Other Ecosystem Projects*) and new or modified facilities (Section 7.22, *New or Modified Facilities*).

Overall, the changes in hydrology and water supply that would occur under the High Flow Alternative are similar to but greater than those that would occur under the proposed Plan amendments. Compared to baseline conditions, the changes in hydrology that would occur under the High Flow Alternative would generally be larger and further from baseline conditions than the changes that would occur under the proposed Plan amendments. With respect to carryover storage in rim reservoirs (needed for cold water habitat), with higher instream flow requirements, it would be difficult to maintain storage levels while maintaining even greater reduced levels of water supplies. The changes in water supply that would occur under the High Flow Alternative would be greater and further from baseline conditions than the changes that would occur under the proposed Plan amendments. Because environmental impacts would be greater under the High Flow Alternative than the proposed Plan amendments, many of the potentially significant impacts are not likely to be mitigated to less-than-significant levels. Although the required Delta inflows would be higher under the High Flow Alternative compared to the proposed Plan amendments and would provide ecosystem benefits, the beneficial environmental effects under the High Flow Alternative would be limited due to significant challenges in maintaining suitable water temperatures for cold water aquatic species and carryover storage for environmental and water supply purposes. Additionally, the increased use or accelerated development of new or modified facilities would be greater under Alternative 3 than the proposed Plan amendments. Under Alternative 3, the impacts of habitat restoration and other ecosystem projects could be less compared to the proposed Plan amendments if habitat restoration and other ecosystem projects are not implemented in the Sacramento/Delta. Environmental impact significance determinations from changes in hydrology, changes in water supply, habitat restoration and other complementary ecosystem actions, and construction of new or modified facilities under the High Flow Alternative would remain similar to determinations for the proposed Plan amendments.

7.23.1.2 Cumulative Project List

The cumulative project list includes relevant projects, programs, and categories of projects (referred to as *projects*); individual projects are detailed in Table 7.23-1. Project categories (e.g., Federal Energy Regulatory Commission [FERC] projects) group together similar types of projects that may

interact with the proposed Plan amendments in a way that could result in cumulatively significant impacts. This provides meaningful cumulative impact analyses on the same level and scale as the proposed project analyses without the need to list every specific known project on every single tributary. In addition, individual projects are included and evaluated that do not fit into an obvious category or have particular relevance and interaction with the proposed Plan amendments (e.g., the Sustainable Groundwater Management Act [SGMA]). The cumulative project list is not intended to be exhaustive but rather represent the types of projects that may interact with the proposed Plan amendments. Development of the list focused on projects that involve water supplies, actions in the Delta including restoration, projects that could affect agriculture or municipal water supply, and water quality. The list also focused on projects or project classes with similar goals, or that propose or have taken similar actions to achieve their goals, although some projects may have different goals for the same resources evaluated for the proposed Plan amendments. There are some redundancies between the projects included on the cumulative project list and those that are discussed in the existing environmental analyses, including in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*. Many of the projects or types of projects in the cumulative project list include reasonably foreseeable compliance methods and response actions to the proposed Plan amendments but also are considered as past, present, and probable future projects that need to be reviewed cumulatively.

As discussed in Section 13.7.21, *Cumulative Impacts, Growth-Inducing Impacts, and Significant Irreversible Environmental Changes,* several project descriptions below and in Table 7.23-1 have been updated for the final Staff Report to reflect current project information and respond to comments on the draft Staff Report. The edits to project descriptions do not affect the analysis of cumulative impacts presented in this section; Section 9.7.21, *Cumulative Impacts, Growth-Inducing Effects, and Significant Irreversible Environmental Changes*; and Section 13.7.21.

Federal Energy Regulatory Commission Projects

Any applicant seeking authorization to construct and operate a non-federal hydropower project must file an application with FERC. FERC staff then analyze the proposal and make recommendations to the Commission on whether to authorize the proposal and, if so, what measures to include in the authorization. An original license may be granted for a period of up to 50 years. A licensee can seek to relicense a facility for a period of 30 to 50 years. Licenses also can be surrendered to FERC, with FERC's agreement; transferred to a different entity, subject to FERC approval; or terminated by FERC for failure to begin construction on time or failure to make a good-faith effort to maintain and operate the project.

Pursuant to section 401 of the Clean Water Act, a FERC license applicant for a California facility must obtain certification (or a waiver of certification) from the State Water Board as the state water pollution control agency. The State Water Board's conditions of a water quality certification become mandatory conditions of any FERC license issued. The certification ensures that activities that discharge waste meet water quality standards and other appropriate requirements.

Multiple hydropower facilities are located on Sacramento/Delta tributaries and throughout the study area. Many projects have already relicensed with FERC and have received water quality certifications from the State Water Board (SWRCB 2026c). Current operations of hydropower projects in the Sacramento/Delta licensed by FERC are considered in the baseline of the analysis. Other projects are in the process or will be up for relicensing in the future (SWRCB 2025c). Table 7.23-1 lists several individual FERC projects in the study area, including the Feather River Project

(FERC Project Number 2100), the South Fork Feather Power Project (FERC Project Number 2088), and the Yuba River Development Project (FERC Project Number 2246).

New FERC licenses and accompanying water quality certifications can include terms and conditions for instream flow requirements, reservoir levels, and other recreation measures. In some cases, FERC projects involve construction associated with the project infrastructure (e.g., dam removal) or other significant construction projects to address fish passage issues and other ongoing water quality problems.

It is generally expected that FERC projects would improve water quality conditions in the stream reaches of the FERC project and therefore be consistent and complementary with the proposed Plan amendments. FERC relicensing is identified as an implementation mechanism for the Bay-Delta Plan, and several water quality certifications contain a provision requiring compliance with the Bay-Delta Plan once it is updated and adopted. Minimum instream flow requirements for stream segments previously dewatered for hydropower production would likely be consistent with the narrative and numeric flow objectives. Reservoir level requirements could stabilize fluctuations and drawdowns. Instream flows and reservoir level requirements could conflict with the proposed Plan amendments if numeric flow objectives require more water to be released downstream. As described in Chapter 5, *Proposed Changes to the Bay-Delta Plan for the Sacramento/Delta*, the proposed Plan amendments provide flexibility to tailor implementation options, including coordination with existing regulatory efforts on tributaries with hydropower projects undergoing FERC relicensing or other regulatory processes. Two or more tributaries can work together to meet numeric objectives downstream, which would preserve the interbasin diversions of some FERC projects so long as the narrative flow objective is met in upstream stream reaches. The proposed cold water habitat objective is intended to ensure that salmonids have access to cold water habitat at critical times and that adequate water is available for minimum instream flow purposes downstream of reservoirs. Although approaches may differ among tributaries, the effectiveness of cold water management will require ongoing coordination, collaboration, and technical review among water managers, stakeholders, and technical experts to facilitate both short-term and long-term planning and decision-making efforts.

Depending on the water quality conditions, new FERC licenses and accompanying water quality certifications could reduce the amount or timing of hydropower that is produced at an individual facility. There could be cumulative impacts on energy, biological resources, water quality, and recreation. FERC projects that involve construction would likely be similar to the fish passage projects discussed in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*. As indicated in Table 7.21-1, these projects have potentially significant impacts on a range of resource areas.

Flood Control Projects

Major floods are common in the Sacramento/Delta. Slow-rise flooding is the most common type of flooding, involving gradual inundation from heavy precipitation or snowmelt that causes waterways or lakes to overflow their banks. In addition, many miles of old and new levees have resulted in a high incidence of floods due to levee failure. Extreme rainfall events during winter result in rapid increases in flows and extremely high peak flows in river and stream channels. Flooding within the North Sacramento Valley subregion is also largely attributed to heavy winter rains. Flows to the Delta arrive through the Sacramento, San Joaquin, and Mokelumne Rivers, historically forming a natural floodplain at a lower elevation that now contains numerous flood control facilities such as levees, weirs, and flood bypasses. The Delta levees are vulnerable due to poor construction, and

levee failure could result from structural failure (e.g., caused by earthquakes, subsidence, and/or seepage) or overtopping of levees (e.g., due to high flow, high tides, high wind, and/or sea-level rise). As discussed under *Flood Risk, Erosion, and Channel Processes* in the environmental setting of Section 7.12.1, *Surface Water Quality*, since the building of levees, floods have become less frequent and more damaging.

California's extensive flood management system reduces risk and protects communities from potentially catastrophic flooding and loss of life and property. The flood system is operated by numerous entities, both public and private, and must be continually updated and improved upon through a series of projects that provide for public health and safety and protect the environment. Throughout California, flood management projects provide essential protections for urban, small community, rural lands, and public safety; they are increasingly becoming multi-benefit projects that can improve fisheries and wildlife habitats, water quality and supply, and recreation and open space opportunities.

Examples of flood control projects include the Lower Elkhorn Basin Levee Setback Project, Tisdale Weir Rehabilitation and Fish Passage Project, and Santa Anita Stormwater Flood Management and Seismic Strengthening Project. These projects generally involve modifications to improve the seismic safety and structural integrity of existing flood management facilities. Flood control projects also could contain multiple benefits for fish and wildlife habitat and groundwater recharge, which would be consistent and complementary to the proposed Plan amendments.

Because the flow requirements under the proposed Plan amendments would generally maintain or decrease baseline condition storage levels and would maintain the U.S. Army Corps of Engineers flood control space in reservoirs, flood control releases generally would not increase during major flood events. Based on the evaluation of high-flow conditions in Section 7.12.1, *Surface Water Quality*, the project under all flow scenarios would not substantially alter the existing drainage pattern in a manner that would cause increases in excessive erosion or deposition (siltation) and flooding (with the possible exception of Clear Creek, which historically has been dewatered). Similarly, these flows would not be expected to cause changes in levee erosion, compared to baseline conditions. However, flood control projects could result in cumulative construction impacts on aesthetics, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, and recreation, and could create GHG emissions, noise, and transportation impacts.

General Plans

The study area covers a large portion of the state and contains numerous types of land uses, from densely developed urban areas to large expanses of open space. Cities and counties in California have primary responsibility for land use control and regulation within their areas of jurisdiction. State planning and zoning law requires all California counties and incorporated cities to prepare, adopt, and implement a comprehensive general plan to guide the community's growth and development. General plans designate land for residential, commercial, industrial, public facility, agricultural, and other uses. These general plans contain policies for urban development, describe strategies to recognize and preserve areas of open space and natural resources, and identify measures for preservation of productive farm resources. The cumulative project list contains plans that currently are being updated and that could cause some impacts that interact with potential impacts of the proposed Plan amendments.

The land use elements of the general plans address future development of land for residential, recreation, conservation, and open space uses. To the extent that general plan elements plan for open space, conservation and recreational resources that would benefit from a healthy functioning Sacramento/Delta, general plans would be consistent and complementary with changes in hydrology under the proposed Plan amendments. Land surrounding reservoirs and rivers is generally not developed for urban, commercial, or industrial use. The 1992 Delta Protection Act designates the primary and secondary land management zones in the Delta that consist of portions of Contra Costa, Sacramento, San Joaquin, Solano, Yolo, and Alameda Counties; several cities; and unincorporated towns and communities (Wat. Code, § 12220). In areas close to or overlapping the Delta, general plans contain policies that apply specifically to management and protection of resources of the Delta and Suisun Marsh. For example, under Contra Costa County's general plan, all public and private land management and development activities within the Primary Zone of the Delta are required to be consistent with the goals, policies, and provisions of the *Land Use and Resource Management Plan for the Primary Zone of the Delta* as adopted and may be amended by the Delta Protection Commission (^Contra Costa County 2005). Similarly, Solano County is required to bring its general plan into conformity with the provisions of the Suisun Marsh Protection Act and the *Suisun Marsh Protection Plan* (Solano County 2008).

Other plans that apply in the Delta and surrounding area include the plans for State Recreation Areas (e.g., Brannan Island, Franks Tract) and State Wildlife Area Management Plans (e.g., Yolo Bypass, Lower Sherman Island). These plans and others like them will interact with the proposed project in a beneficial way.

Development in California must be consistent with both the general plan and zoning. General plans may result in conversion of land from agricultural uses to nonagricultural uses, for example by providing for infrastructure improvements that could induce population growth. That said, many general plans prioritize the preservation of agriculture and contain goals and associated policies to protect and maintain agricultural lands and productivity, and to promote and support farming and related industries as part of its economy. While general plans can direct locations for growth to minimize conversion of agriculture, impacts on agriculture may occur and result in cumulative impacts related to changes in water supply under the proposed Plan amendments. In addition to agricultural conversion, growth could result in significant impacts related to groundwater, traffic, air quality, GHG emissions, water quality, and noise. In areas that have historically relied on groundwater for municipal use, increased water demand likely would increase groundwater pumping, thereby affecting groundwater resources; reducing water availability for agricultural uses; and requiring utility service providers to meet the increased water demand through procurement of new water supplies, drilling deeper wells, or taking actions to reduce water demand. In addition, significant impacts may be related to construction of new or expanded infrastructure or facilities or development contemplated under the general plans. Construction could result in impacts affecting aesthetics, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, and noise, and other resource areas affected by construction.

Habitat Restoration

Projects in the habitat restoration class seek to restore ecosystems or to make ecosystem reconciliation efforts; these include fish conservation projects. Habitat restoration actions are taking place throughout California for various purposes. Some habitat restoration projects are developed to mitigate impacts from existing projects such as CVP and SWP, or future development projects such as a Habitat Conservation Plan/Natural Community Conservation Plan. Other habitat

restoration is conducted by local and state agencies or conservation organizations to generally restore degraded habitat and improve conditions for fish and wildlife. Changes in hydrology under the proposed Plan amendments can be considered habitat restoration as they restore streamflow to a more natural flow regime. The proposed Plan amendments also provide a framework for local cooperative solutions to incorporate both flow and complementary ecosystem projects, such as physical habitat restoration, and identify actions that other entities should take to address other ecosystem stressors. Implementation of the cold water habitat objective may include habitat restoration and fish passage projects. Habitat restoration projects are considered foreseeable methods of compliance with the proposed Plan amendments and may occur independently. Examples of habitat restoration projects include EcoRestore, the North Delta Flood Control and Ecosystem Restoration Project, the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project, and the Battle Creek Salmon and Steelhead Restoration Project.

Physical habitat restoration projects could result in environmental impacts, primarily during construction. Depending on their size, habitat restoration projects, may require significant amounts of construction using heavy equipment and may cause ground, bank, and channel disturbance as areas are recontoured and, in some cases, hydrologically reconnected to improve their ecological benefits. Construction activities could potentially temporarily affect air quality, biological resources, and recreation and potentially create GHG emissions, noise, and transportation impacts.

Overall, habitat restoration projects would be expected to have beneficial long-term effects for sensitive aquatic and terrestrial species. Habitat restoration projects that complement the flow actions under the proposed project generally would be expected to improve habitat conditions for native species such as Chinook salmon and steelhead. However, in addition to construction impacts, habitat restoration projects could negatively affect aesthetics, agriculture and forest resources, air quality, biological resources, cultural resources, energy, GHG emissions, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, recreation, transportation and traffic, and utilities and service systems. Habitat restoration projects also affect water supply to the extent that restoration requires an external source of supply.

Impacts of many of the projects in the habitat restoration class would be similar to those discussed in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*. As indicated in Table 7.21-1, these projects have potentially significant impacts on a range of resource areas. Please see Section 7.21.2, *Evaluation of Potential Environmental Impacts,* for more information on the impacts on specific resource areas.

Lower San Joaquin River/Southern Delta Update to Bay-Delta Plan

In December 2018, the State Water Board adopted new and revised flow objectives for the lower San Joaquin River and its tributaries, the Stanislaus, Tuolumne, and Merced Rivers, for the reasonable protection of fish and wildlife beneficial uses and revised salinity water quality objectives for the reasonable protection of southern Delta agricultural beneficial uses—as well as a program of implementation for these objectives (LSJR/southern Delta Plan amendments). The new and revised flow objectives require increased flows in February through June that can be adaptively implemented. Implementation of the LSJR/southern Delta Plan amendments would result in flows at Vernalis that contribute to Delta outflow, resulting in a cumulative beneficial effect on native anadromous, estuarine, and resident fish species, and winter-spring low-salinity habitat increases.

The revised salinity water quality objective for agriculture eliminated the seasonal element of the previous objective by increasing the allowed salinity in the southern Delta from 0.7 deciSiemens per

meter (dS/m) from April through August and 1.0 dS/m from September through March to 1.0 dS/m year-round as the year-round objective was found to reasonably protect agricultural beneficial uses. The proposed Sacramento/Delta Plan amendments make no changes to the water quality objective for agriculture in the southern Delta directly or indirectly. To the extent that the Sacramento/Delta Plan amendments would increase freshwater outflow above the existing baseline, the impact could be beneficial to southern Delta salinity.

The Substitute Environmental Document in support of the LSJR/Southern Delta Plan amendments indicates that the lower San Joaquin River flow objectives could reduce water supply annually between 149 thousand acre-feet and 465 thousand acre-feet on average at 30 percent unimpaired flow and 50 percent unimpaired flow, respectively. This corresponds to a 7-percent to 23-percent reduction in water supply (SWRCB 2018). This would affect water users that rely on supplies from the Lower San Joaquin River tributaries, such as agricultural lands on the east side of the San Joaquin Valley and municipal supplies to Stockton East Water District and the City and County of San Francisco.

The proposed Sacramento/Delta Plan amendments would apply on the Sacramento River, its tributaries, and in the Delta and could affect water supplies in those watersheds as well as water supplies that are exported out of the watershed, including supplies to the west side of the San Joaquin Valley and Central Coast that rely upon CVP exports, the SWP service areas in southern California and Kern County, and the portions of the Bay Area that rely upon CVP and SWP export supplies.

The SWP has no facilities on the lower San Joaquin River. The CVP has one facility, New Melones on the Stanislaus River (the CVP's Friant Unit is located on the upper San Joaquin River, which is not salmon bearing and therefore was not included in the LSJR/southern Delta update). This means that, for the most part, water users that rely on water supplies from the tributaries to the lower San Joaquin River do not receive supplies from the Sacramento/Delta; however, there are some exceptions. For example, Stockton East Water District receives water from both New Melones on the Stanislaus River and the Calaveras River, and the City of Tracy receives CVP water from the Delta-Mendota Canal and water from the Stanislaus River through a contract with South San Joaquin Irrigation District. Stockton East Water District and South San Joaquin Irrigation District provide surface water supplies for agricultural customers in the San Joaquin Valley (SEWD 2021; SSJID 2021). In addition, the Alameda County Water District receives some water supplies from Tuolumne River as a member of the Bay Area Water Supply & Conservation Agency (BAWSCA), which contracts with the San Francisco Public Utilities Commission but is also a contractor for SWP supplies from the Delta. Similarly, the Cities of Santa Clara, Mountain View, and Milpitas receive some water supplies from BAWSCA but also wholesale water supplies from Valley Water (previously known as the Santa Clara Valley Water District), which has contracts with both the CVP and SWP (SF Bay Area IRWMP 2013).

Implementation of the LSJR/southern Delta update could be a further constraint on supplies for water users that receive water from both the lower San Joaquin River tributaries and the Delta. Therefore, the impacts of implementing the LSJR/southern Delta update are potentially cumulatively considerable to the Sacramento/Delta Plan amendments in the resource areas of agricultural and forest resources, air quality, biological resources, cultural resources, energy and GHG emissions, hydrology and water quality, recreation, and utilities and service systems. Both projects could result in similar construction-related impacts, which would be potentially

cumulatively considerable in the areas of geology and soils, hazards and hazardous materials, noise, and transportation.

Sustainable Groundwater Management Act

The legislature passed the SGMA in 2014 to address groundwater overpumping and the physical, societal, and environmental consequences of that over-extraction, including overdraft, which are described as "undesirable results" under the statute (see SGMA discussion in Section 7.12.2.2, *Environmental Setting*). After SGMA's passage, local public agencies in basins subject to the Act developed, adopted, and began implementing groundwater sustainability plans (GSPs). As required by SGMA, GSPs are management plans to bring basins back into balance and achieve a *sustainable yield*, defined under SGMA as the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin, that can be withdrawn annually from a groundwater supply without causing an undesirable result (Wat. Code, § 10721(w)).

Once GSPs are adopted, SGMA requires that DWR review them to determine whether they provide adequate basin management. DWR has up to 2 years from the time of submittal to assess plans (Wat. Code, § 10733.4, subd. (d)). DWR evaluates GSPs based on required elements established in its regulations and issues determinations at the basin scale (Cal. Code Regs., tit. 23, §§ 355.2–355.4). SGMA states that, if local agencies in high- or medium-priority groundwater basins subject to SGMA are unwilling or unable to manage their groundwater resources, the State Water Board is authorized to intervene. Intervention is triggered three ways: by basins failing to form one or more groundwater sustainability agency (GSA) that covers the entire basin by the deadline or losing basin-wide coverage after the deadline; by basins failing to submit their GSPs by the applicable deadline; or by DWR determining, in consultation with the State Water Board, that the GSPs for a basin are inadequate or are not being implemented in a manner that will likely achieve the sustainability goals.

Consistent with the statute, 21 critically overdrafted basins submitted 46 GSPs to DWR by January 31, 2020 (basins can have more than one adopted GSP but those plans are required to be coordinated and to use the same assumptions). In January 2022, DWR issued assessments for 20 basins, approving 8 with corrective actions, indicating that another 12 were incomplete, and providing the incomplete basins an additional 180 days to correct their deficiencies. Also in January 2022, the remaining 63 basins subject to SGMA were required to submit their adopted GSPs and submitted 65 plans. As with the critically overdrafted basins, DWR has 2 years to complete its review of the remaining basins. In July 2022, the 12 critically overdrafted basins deemed incomplete resubmitted their GSPs for DWR re-review. In March 2023, DWR deemed six of those GSPs adequate and six inadequate, triggering State Water Board evaluation for intervention in the inadequate basins.

Fundamentally, SGMA is a statute designed to bring basin pumping within sustainable yield by locally implemented management actions, including demand management (i.e., implementing groundwater pumping reductions), projects (e.g., conservation efficiencies, importing water, increasing groundwater recharge), or a combination of both. Although some SGMA GSPs include groundwater pumping allocations as a management action, a key deficiency in many plans is a failure to address demand, which may need to be addressed during the state intervention process. Because SGMA implementation could result in potential groundwater pumping reductions, which would be a further constriction on local water supplies, it is a potential cumulative impact.

Local basin management under SGMA varies significantly. The following three basins help provide examples of the spectrum of GSP approaches, some of which include demand management.

- North Yuba Subbasin. In January 2020, three GSAs submitted one GSP covering the North Yuba Subbasin. On November 18, 2021, DWR found the GSP adequate. Specifically, DWR noted that the Yuba GSP states that groundwater levels in the subbasin have been generally stable since the mid to late 1940s (DWR 2021a). The GSP notes that stable groundwater levels are attributed to conjunctive use of surface water and groundwater beginning in the late 1970s (DWR 2021a). In addition, the GSAs have established several water management programs and monitoring networks to manage the subbasin's conjunctive use program and groundwater substitution transfers, including the Yuba Water Agency Measurement and Monitoring Program and the Lower Yuba River Accord (DWR 2021a).
- Westside Subbasin. In January 2020, one GSA submitted one GSP covering the Westside Subbasin. In January 2022, DWR found the GSP incomplete in that it did not satisfy SGMA's objectives (DWR 2022). In July 2022, the GSA resubmitted its plan, and on March 2, 2023, DWR issued a letter advising the GSA that it had taken sufficient action to correct the deficiencies that precluded initial approval of the plan (DWR 2023a). The Westside Subbasin GSP proposes five different groundwater management plans/actions. The GSP proposes surface water deliveries through CVP contracts and water transfer and exchange projects, equally allocating groundwater extraction based on land acreage, an aquifer storage and recovery program, required surface water substitution in certain areas near the San Luis Canal/California Aqueduct, and managed aquifer recharge through percolation basins (Westlands Water District GSA and County of Fresno GSA-Westside 2022).
- Kern Subbasin. In January 2020, 17 GSAs adopted 6 GSPs collectively covering the Kern Subbasin. In January 2022, DWR found the GSPs inadequate to manage the basin sustainably and provided an additional 180 days for the GSAs to revise their GSPs and resubmit. In July 2022, the 17 GSAs resubmitted 5 revised GSPs and 1 new GSP. On March 2, 2023, DWR found the resubmitted GSPs inadequate and transmitted the basin to the State Water Board for potential state intervention. As an example of the lack of required coordination among GSPs, basin management assumed an estimated over 324,000 acre-feet per year of overdraft would be offset when 180 various projects and management actions would be fully implemented. Of the 17 GSAs, only one proposed developing allocations that reduced agricultural and municipal pumping via conjunctive use efforts (DWR 2023b).

The proposed Plan amendments will reduce Sacramento/Delta supplies in the study area. The proposed Plan amendments may result in lower groundwater levels from increased pumping and from reduced incidental recharge from reduced Sacramento/Delta supply and agricultural conservation measures. Less Sacramento/Delta water will be available to alleviate declining groundwater levels through substitution, managed groundwater recharge (percolation or injection into the groundwater basin), or both. Additionally, in the past, irrigators, municipalities, and other surface water users with access to groundwater have responded to reductions in surface water supplies by substituting groundwater pumping for some or all of the reduced supply. The impacts of reduced Sacramento/Delta supplies are evaluated and mitigation identified in Sections 7.3 through 7.20, including implementation of SGMA as a mechanism to protect groundwater from over pumping.

Implementation of SGMA could restrict the amount of groundwater for agricultural and municipal beneficial use. It has been estimated that to achieve groundwater sustainability by 2040 under

SGMA, groundwater pumping may need to be reduced by 2.7 million acre-feet in the San Joaquin Valley (PPIC 2023a). While GSPs manage basins in various ways, some plans (e.g., the Westside Subbasin GSP) do implement groundwater demand management measures. This plan, as well as other GSPs that may or may not call for some form of groundwater demand reduction, could result in cumulative impacts on water supply. However, setting precise numbers for the amount of reduced water supply that may be attributable to SGMA is speculative.

Water Quality Projects

Projects included in the water quality class aim to improve water quality for municipal use, agricultural use, or the environment and include monitoring/assessment efforts centered on current water quality conditions. Narrative and numeric water quality objectives are established for constituents (e.g., bacteria, dissolved oxygen, pH, pesticides, EC, total dissolved solids, temperature, turbidity, trace metals) that are applicable to certain waterbodies or portions of waterbodies. Clean Water Act section 303(d) requires all states to identify waters that are not attaining water quality standards and include a priority ranking of such waters (State Water Board 2018a). The list of identified waterbodies and their impairments is referred to as the 303(d) list. Water quality impairments on the 303(d) list are addressed by developing total maximum daily loads, which set water quality objectives or targets and allocate allowable loads for sources of pollution. Total maximum daily loads have been adopted and are in the process of being implemented for various pollutants throughout California. The regional water boards have existing regulatory programs that control discharges of wastes from wastewater treatment facilities, industrial facilities, urban areas, irrigated agricultural lands, and other sources of wastewater. Regional water boards implement the basin plans in part by issuing waste discharge requirements (WDRs) or National Pollutant Discharge Elimination System (NPDES) permits for discharges of waste. In addition, all drinking water must meet MCLs for multiple health concern constituents that are tracked by the state and federal environmental protection agencies. (Water quality regulation is discussed in more detail in Section 7.12.1.2, *Surface Water, Environmental Setting*, Section 7.12.2.2, *Groundwater, Environmental Setting*, and Section 7.20.2, *Utilities, Environmental Setting*.)

WWTPs and drinking water treatment facilities sometimes must undergo expansion in order to comply with existing or new effluent limits or MCLs. Wastewater treatment districts and agencies generally undertake construction of facility expansions, upgrades, and improvements in substantial increments in response to a variety of factors, including anticipated population growth, age and expected remaining life of existing facilities, new technology, and changing environmental and community standards. Large municipalities and wastewater treatment service providers are upgrading existing WWTPs to support the development of recycled water sources to augment water supply (e.g., Sacramento, Los Angeles, San Diego). For example, the Sacramento Regional County Sanitation District (Regional San) upgraded and expanded its facilities for biological nutrient removal and to add advanced tertiary-level treatment in response to more stringent permit requirements through their EchoWater Project. Another example of a water quality project is the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) and Central Valley-Wide Salt and Nitrate Management Plan (SNMP). Elevated salinity and nitrates in surface water and groundwater are increasing problems affecting much of California, other western states, and arid regions throughout the world. As surface water and groundwater supplies become scarcer, and as wastewater streams become more concentrated, salinity and nitrate impairments are occurring with greater frequency and magnitude. Under the SNMP program, dischargers of nitrate must reduce nitrate loading and ultimately not cause or contribute to the exceedance of water quality

objectives in the receiving water. Early Action plans include outreach and coordination with communities whose wells are affected by nitrates.

Water quality programs and facility upgrades are expected to continue to improve water quality and supply conditions in the study area and in the Delta and therefore would be consistent and complementary to the proposed Plan amendments. However, significant upgrades also can result in construction impacts, with impacts on aesthetics, air quality, biological resources, energy, GHG emissions, geology and soils, hazards and hazardous materials, hydrology and water quality, recreation, and utilities and service systems.

In general, impacts of projects in the water quality class would likely be similar to those discussed in Section 7.22, *New or Modified Facilities*. As indicated in Table 7.22-1, new or modified water treatment facilities have potentially significant impacts on a range of resource areas. Please see Section 7.22.2, *Evaluation of Potential Environmental Impacts*, for more information on the impacts on specific resource areas.

Water Supply Projects

The water supply class includes projects that develop, construct, or modify dams, reservoirs, water conveyance systems and facilities, and new groundwater wells. Other water sources already are being developed and utilized in response to water shortages that occur as a result of many factors. Some locations have been identified where new, large-scale reservoirs may be developed, including the proposed Sites Reservoir in the Sacramento Valley. New water supply projects could enhance California's water resiliency if designed and operated in a manner that does not exacerbate existing pressures on the Delta ecosystem. Other proposals involve modification and expansion of existing reservoirs. New or changed points of diversion also may be independent of a reservoir to make water delivery more accessible and efficient. For example, DWR and Reclamation previously submitted petitions to add points of diversion of water on the Sacramento River associated with the California WaterFix Project (now titled Delta Conveyance Project). Project proponents state that the Delta Conveyance Project could improve hydrologic conditions for aquatic species as both fish and food production are not drawn toward the southern Delta, where chances of survival for at-risk native fish species diminish.

Water supply projects could have varied effects on biological resources, including changes in the flow regime (timing and magnitude) and downstream temperature, changes in geomorphic processes, delaying or impeding the migration or movement of special-status fish species in surface waters influenced by reservoir operation, and loss of salmonid redds to riverbed scour and entombment in deposited sediment. Flow changes in tributaries to the Delta also could affect flow and currents, as well as alter temperature and salinity gradients in the Delta. This could have a cumulative effect on surface hydrology and water quality, aquatic biological resources, agricultural resources, and utilities. Additionally, construction-related impacts could be associated with construction of diversion structure(s), tunnel, dams, and other water supply project components. Examples of construction impacts include noise, GHG emissions, and loss of sensitive tribal resources. Although implementation of compensatory mitigation is proposed for many of these types of projects, these measures may not reduce impacts or the loss of habitat to less-than-significant levels.

Although new or expanded water supplies as a result of water supply projects could encourage some growth in some locations, these water supplies would not significantly induce population growth statewide. Population growth is known to occur in California in the absence of new surface

water sources. For example, numerous water suppliers in southern California currently implement water use efficiency programs, water recycling programs, groundwater desalination facilities, and seawater desalination facilities to meet a portion of their water supply needs. Water recycling also has been used successfully in southern California since the 1960s. Although urban water suppliers in southern California have not acquired substantial new surface water supplies in recent decades, the population of southern California has grown substantially, and the region's existing water supplies and use of other water management actions such as water conservation have been sufficient to support the region's urban and residential water supply needs. Additional information is provided in Section 7.23.2, *Growth-Inducing Impacts*, which contains an evaluation of potential growth-inducing effects for each project alternative.

Impacts of projects in the water supply class would likely be similar to those discussed in Section 7.22, *New or Modified Facilities*. As indicated in Table 7.22-1, new and modified dams, reservoirs, and points of diversion have potentially significant impacts on a range of resource areas. Impacts from increased groundwater pumping from existing or new groundwater wells is already evaluated extensively in Sections 7.3 through 7.20. Please see Table 7.1-2 for more information on the impacts on specific resource areas.

California High-Speed Rail Project

The California High-Speed Rail Authority's California High-Speed Rail Project would involve planning, design, construction, and operation of a high-speed rail system connecting major population centers across California. Phase 1 of the project would run from San Francisco to the Los Angeles Basin via the Central Valley (projected completion 2029). Phase 2 of the project would extend the system to Sacramento and San Diego (no scheduled completion date). Construction of Phase 1 is currently under way. Once completed, the system would have up to 24 stations covering 800 miles. Construction of the system could create thousands of jobs and boost economic development across the state, encouraging population growth. Once completed, the project would improve environmental quality by reducing GHG emissions from other forms of transportation.

This project is expected to encourage population growth. This could increase water use in the region, which historically has relied on groundwater supplies. Therefore, it can be presumed that increased water demand would increase groundwater pumping, thereby affecting groundwater resources, reducing water availability for agricultural uses, and requiring service providers to meet the increased water demand. In addition, while the completed project is expected to reduce GHG emissions, construction would rely on considerable use of heavy equipment and construction vehicle trips, which could lead to increased GHG emissions. Thus, in addition to construction impacts on air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, noise, and transportation, the project could have related effects to those of the proposed Plan amendments on agriculture, groundwater, energy and GHGs, and utilities.

Federal Endangered Species Act Biological Opinions on Long-Term Operations of the CVP and SWP Delta Facilities and California Endangered Species Act Incidental Take Permit on SWP Delta Facilities

Section 7 of the federal Endangered Species Act (ESA) requires any federal agencies whose activities could take species listed pursuant to the Act to consult with the National Marine Fisheries Service (NMFS) regarding marine species and the U.S. Fish and Wildlife Service (USFWS) regarding all other listed species. In 2008, the USFWS issued a biological opinion (BiOp) that the long-term operations

of the CVP and SWP, as described in the biological assessment (BA) submitted by Reclamation, were likely to jeopardize the continued existence and adversely modify the critical habitat of federally listed Delta smelt. In 2009, NMFS issued a BiOp and determined that the CVP/SWP operations, as described in the BA, were likely to jeopardize the continued existence and adversely modify the critical habitat of federally listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and the Southern Distinct Population Segment of North American green sturgeon. As a result, NMFS and USFWS (collectively, *the Services*) were required to issue Reasonable and Prudent Alternatives to the CVP/SWP operations as described in the BA and include protective measures for the fishery, such as reductions to export pumping at critical times, other operational changes, and habitat restoration.

On January 31, 2019, Reclamation (operator of the CVP) issued a new BA. The BA described the project as proposing "to maximize water deliveries and optimize marketable power generation" (USDOI 2019). The 2019 BA relaxed standards established under the 2008 USFWS BiOp and the 2009 BiOp to maximize water exports from the Delta. In response to the BA, NMFS and USFWS completed consultation and issued new BiOps on a greatly expedited time frame. In the 2019 BiOps, NMFS and USFWS determined that the BA would not jeopardize Delta smelt or salmonid species, despite less protective standards than the 2008/2009 BiOps.

Historically, the DWR has derived its SWP ESA coverage from Reclamation's Section 7 consultation and obtained California Endangered Species Act (CESA) coverage for species listed under both acts through a determination by the California Department of Fish and Wildlife (CDFW) that the federal permit is also "consistent" with state law requirements such that no further permitting is necessary. For species listed exclusively under CESA, DWR derives coverage for listed species through a determination by CDFW and an incidental take permit (ITP). Due to concerns about the integrity of the federal reconsultation process and sufficient protections for co-listed species, DWR announced in April 2019 that it would be seeking independent CESA coverage for the SWP from CDFW based on its own operational description. DWR received an ITP for the SWP from CDFW on March 31, 2020. The permit is set to expire on March 31, 2030, unless it is renewed by CDFW. This BiOp/ITP Project could affect aquatic biological resources by reducing export pumping constraints and changing Delta Cross Channel gate operations, thereby affecting Delta hydrodynamics and increasing entrainment and impingement of threatened and endangered species. In addition, increased export pumping by the CVP could increase salinity in the southern Delta due to the proximity of the Jones Pumping Plant to the lower San Joaquin River, which receives extensive agricultural drainage from CVP-irrigated lands. The existing 2019 BiOp and 2020 ITP are incorporated into baseline, with some modifications that extend ITP requirements. Alternatives 4A (Exclusion of Interior Delta Flow and Fall Delta Outflow Related Amendments) and 4B (Head of Old River Barrier Alternative) contain sensitivity analyses to evaluate the effects of various aspects of the BiOp/ITP Project in detail (see Section 7.2.3.5, *Modular Alternatives for Interior Delta Flows/Fall Delta Outflow* [*Alternatives 4a, 4b, and 4c*] and Section 7.24, *Alternatives Analysis*).

The federal 2019 BiOps have faced litigation challenging that they failed to provide adequate protections for endangered species. The court issued a preliminary injunction on May 11, 2020, temporarily prohibiting Reclamation from implementing the operational changes. In 2021, Reclamation and DWR requested reinitiation of ESA consultation with USFWS and NMFS. In the interim, the CVP operated to an Interim Operations Plan that included near-term criteria for CVP operations and adopted criteria consistent with the CDFW 2020 ITP. The Interim Operations Plan was renewed in September 2022 and remained in place through late 2024. In late 2024, NMFS and USFWS issued new BiOps, and CDFW issued a new ITP.

On December 4, 2025, pursuant to direction included in Action 5 of federal Executive Order 14181, Reclamation modified operational constraints included in the Record of Decision (ROD) for the LTO of the CVP and SWP. These modifications included adding flexibility to reduce Old and Middle River (OMR) reverse flow restrictions and elimination of fall X2 requirements. In addition to the 2025 ROD changes, two amendments to the CDFW ITP issued for SWP operations pursuant to the CESA were approved by CDFW in 2025 to change requirements for SWP operations, including (1) a one-year modification to remove the requirements for fall X2 in exchange for a summer food and habitat action and (2) flexibility to reduce OMR flow restrictions at certain times. DWR has also submitted a 2026 ITP amendment request to CDFW to permanently remove the requirements for fall X2. In July 2026, CDFW approved an additional one-year modification to the ITP. CDFW is continuing to process the request for a permanent amendment to the ITP and expects to make its decision on the request by December 2026.

Table 7.23-1. Projects Considered for Cumulative Impact Analysis

Project	Lead Agency	Status	Description
Federal Energy Regulatory Commission Projects			
Feather River Project/Oroville Facilities (FERC Project Number 2100)	California Department of Water Resources	Relicensing in progress	The principal features of this project include Oroville Dam and Reservoir as well as Edward Hyatt Powerplant; Thermalito facilities; Feather River Fish Hatchery; and associated recreational, fish and wildlife preservation and enhancement facilities. The hydropower facilities of this project have a combined license capacity of approximately 762 megawatts (MW) that produce an average of 2.2 billion kilowatt-hours of electricity each year (DWR 2023e).
South Fork Feather Power Project (FERC Project Number 2088)	South Feather Water and Power Agency	Relicensing in progress	The South Fork Feather Power Project includes four hydropower developments located on the South Fork Feather River, Lost Creek (tributary to the South Fork Feather River), and Slate Creek (tributary to the North Yuba River). The project consists of four powerhouses, three diversion impoundments, and five reservoirs (Little Grass Valley Reservoir, Sly Creek Reservoir, Lost Creek Reservoir, Miners Ranch Reservoir, and Ponderosa Reservoir). The project stores 171,986 acre-feet of water and generates an average of 514.1 gigawatt hours of power annually. The proposed project will increase minimum streamflows; implement measures to improve aquatic habitat and protect sensitive species; and implement measures to maintain and enhance existing recreational opportunities, including new whitewater boating opportunities (SWRCB 2024a).
Yuba River Development Project (FERC Project Number 2246)	Yuba County Water Agency	Relicensing in progress	This project would relicense the Yuba River Development Project (YRDP) for an additional 50 years. The YRDP consists of one reservoir, two diversion dams, two diversion tunnels, three powerhouses, and various recreation facilities. The proposed project anticipates several changes to the project. (1) addition of a tailwater depression system at New Colgate Powerhouse; (2) addition of an auxiliary flood control outlet at New Bullards Bar; (3) modification to the Our House Diversion Dam fish release outlet; (4) modification to the Log Cabin Diversion Dam fish release outlet; (5) modification to the Lohman Ridge Diversion Tunnel Intake; (6) modifications to and addition of recreation facilities; and (7) modifications to and addition of project roads (SWRCB 2026a).

Project	Lead Agency	Status	Description
Bucks Creek Hydroelectric Project (FERC Project Number 619)	Pacific Gas & Electric Company, Inc. (PG&E) and the City of Santa Clara	Relicensed on June 16, 2022	The Bucks Creek Hydroelectric Project is an 84.8-MW project located in Plumas County, California. The project consists of the Bucks Creek Powerhouse, Grizzly Powerhouse, Bucks Lake, Lower Bucks Lake, Grizzly Forebay, and Three Lakes along with associated conveyances and other facilities. The project was relicensed on June 16, 2022 (FERC 2022a).
PG&E "Stairway of Power" (FERC Project Numbers 1962, 2105, and 2107)	PG&E	Relicensing in progress	Three projects are operated as one system and known as PG&E's "Stairway of Power" (seven dams/reservoirs and eight powerhouses—690.13 MW). The uppermost project is Upper North Fork Feather (FERC Project No. 2105) (362.3 MW), next is Rock Creek-Cresta (FERC Project No. 1962) (185 MW); and finally Poe (FERC Project No. 2107) (142.83 MW) (NOAA Fisheries West Coast Regional Office 2025). Rock Creek-Cresta and Poe were relicensed in 2001 and 2018, respectively. Relicensing of Upper North Fork Feather is in progress (PG&E and Pacific Generation 2022). In 2022, PG&E applied to transfer Project No. 1962, Project No. 2105, and Project No. 2107 to Pacific Generation (PG&E and Pacific Generation 2022). The application was publicly noticed on June 13, 2023, with a comment deadline of July 13, 2023. The comment deadline was later extended to August 13, 2023 (FERC 2023a). The application was denied by the California Public Utilities Commission in May 2024 (CPUC 2024).
Desabla-Centerville Hydroelectric Project (FERC Project Number 803)	PG&E	Relicensing in progress	The project is located on Butte Creek and the West Branch Feather River. The project consists of three developments (Toadtown, DeSabla, and Centerville), which collectively include 3 reservoirs, 3 powerhouses, 14 diversion and feeder dams, 5 canals, and associated equipment and transmission facilities (SWRCB 2021). In 2022, PG&E applied to transfer Project No. 803 to Pacific Generation (PG&E and Pacific Generation 2022). The application was publicly noticed on June 13, 2023, with a comment deadline of July 13, 2023. The comment deadline was later extended to August 13, 2023 (FERC 2023a). The application was denied by the California Public Utilities Commission in May 2024 (CPUC 2024).
McCloud-Pit Hydroelectric Project (FERC	PG&E	Relicensing in progress	The McCloud-Pit Hydroelectric Project is located on the McCloud and Pit Rivers in Shasta County, California. The 368-MW project consists of three power-generating developments. These developments collectively include two storage reservoirs (McCloud and Iron Canyon), two regulating

Project	Lead Agency	Status	Description
Project Number 2106)			reservoirs (Pit 6 and Pit 7), one afterbay (Pit 7), three powerhouses (James B. Black, Pit 6, and Pit 7), five dams (Pit 6, Pit 7, Pit 7 afterbay, Iron Canyon, and McCloud), two tunnels, and associated equipment and transmission facilities. The average annual energy generated from 1979 through 2004 for the James B. Black, Pit 6, and Pit 7 powerhouses is 656.3, 373.8, and 512.1 gigawatt-hours, respectively (SWRCB 2026b). PG&E's final license application from 2009 proposes two new hydropower developments, which would add about 45.4 additional acres in the project boundary. At this time, it is State Water Board staff's understanding that PG&E has decided to wait until it receives the new FERC license before it determines whether to pursue the two additional hydropower developments (SWRCB 2019). In 2022 PG&E applied to transfer Project No. 2106 to Pacific Generation (PG&E and Pacific Generation 2022). The application was publicly noticed on June 13, 2023, with a comment deadline of July 13, 2023. The comment deadline was later extended to August 13, 2023 (FERC 2023a). The application was denied by the California Public Utilities Commission in May 2024 (CPUC 2024).
Middle Fork American River Project (FERC Project Number 2079)	Placer County Water Agency	Relicensed on June 8, 2020	The Middle Fork American River Project (FERC No. 2079-069) is in Placer and El Dorado Counties, California. The existing project consists of two major storage reservoirs, five smaller regulating reservoirs and diversion pools, five powerhouses, and recreation facilities (SWRCB 2025a). This project was issued a new license on June 8, 2020 (FERC 2020).
Upper Drum-Spaulding Hydroelectric Project (FERC Project Number 2310), Lower Drum Hydroelectric Project (FERC Project Number 14531), Deer Creek Hydroelectric Project (FERC	PG&E and Nevada Irrigation District (NID)	Relicensing in progress	The Drum Spaulding Hydroelectric Project (175.7 MW) is located on the Yuba River and Bear River in Nevada County and Placer County (PG&E and Pacific Generation 2022). On May 31, 2013, PG&E filed a license application amendment that proposed to split the Drum-Spaulding Hydroelectric Project into three new licensed projects: Upper Drum-Spaulding Hydroelectric Project (FERC Project No. 2310), Lower Drum Hydroelectric Project (FERC Project No. 14531), and Deer Creek Hydroelectric Project (FERC Project No. 14530). PG&E's most recent application for a water quality certification, dated February 4, 2020, did not include the Deer Creek Hydroelectric Project. PG&E and NID filed a joint application to transfer the Deer Creek Hydroelectric Project facilities and license from PG&E to NID on January 22, 2019. On October 10, 2019, the California Public Utilities

Project	Lead Agency	Status	Description
Project Number 14530), and Yuba-Bear Hydroelectric Project (FERC Project Number 2266)			Commission approved the sale of the Deer Creek Hydroelectric Project, which is awaiting FERC's final approval. NID will be responsible for CEQA compliance for relicensing of, or other actions regarding, the Deer Creek Hydroelectric Project (SWRCB 2024c). PG&E closely coordinates operations of the Drum-Spaulding Project with NID's Yuba-Bear Hydroelectric Project (FERC Project No. 2266). The two projects overlap in part in the Yuba River and Bear River basins. Many of the projects' facilities are hydraulically interconnected, including facilities that are used to meet water supply demands in Nevada and Placer Counties. Licenses for both projects expired on April 30, 2013. FERC recognized the interrelated operations of the two projects and intends to prepare a multi-project environmental impact statement that FERC will use to determine whether, and under what conditions, to issue new hydropower licenses to each project. Additionally, PG&E has requested that the term of its project's new license be the same as the new license term for NID's Yuba-Bear Hydroelectric Project, to continue to facilitate the coordination of operations and relicensing (SWRCB 2024c). In 2022 PG&E applied to transfer Project No. 2310 and Project No. 14531 to Pacific Generation (PG&E and Pacific Generation 2022). The application was publicly noticed on June 13, 2023, with a comment deadline of July 13, 2023. The comment deadline was later extended to August 13, 2023 (FERC 2023a). The application was denied by the California Public Utilities Commission in May 2024 (CPUC 2024). A partial transfer of Project No. 14530 to NID was approved in 2021, and the project is not proposed to be transferred to Pacific Generation (PG&E and Pacific Generation 2022). The license for Project No. 2266 expired in 2013, and the project is currently in the licensing process (SWRCB 2025b).
Lassen Lodge Hydroelectric (FERC Project Number 12496-002)	Rugraw, LLC	License application in progress	Rugraw, LLC, the project applicant, filed an application for a license for construction, operation, and maintenance of a 5.0-MW hydroelectric project on April 21, 2014. The proposed Lassen Lodge Project would include the following new facilities: (1) a diversion dam located at river mile 23 of South Fork Battle Creek; (2) a 0.4-acre reservoir at a normal pool elevation of 4,310 feet; (3) an enclosed concrete intake; (4) a control/fish screen structure attached to the intake; (5) a pipeline and a penstock; (6) a powerhouse containing a single Pelton-type turbine and generator with an installed capacity of 5.0 MW; (7) a buried concrete box culvert discharging

Project	Lead Agency	Status	Description
			back to South Fork Battle Creek; and (8) transmission facilities (FERC 2018).
Lake Elsinore Advanced Pump Storage (LEAPS) Project /Bluewater Renewable Energy Storage Project (FERC Project Number 14227)	Nevada Hydro Company, Inc.	License application dismissed	On October 2, 2017, Nevada Hydro Company, Inc. (Nevada Hydro) submitted an application for a license for the LEAPS Project LEAPS would be located on Lake Elsinore and San Joaquin Creek and would consist of a new upper reservoir, a concrete power shaft and power tunnel with two penstocks, a 500 -MW underground powerhouse, and 32 miles of transmission line, and would use Lake Elsinore as a lower reservoir (FERC 2022b). The License Application for the LEAPS Project was dismissed on December 9, 2021. Nevada Hydro requested a rehearing or, in the alternative, a motion for a temporary stay of the dismissal of their license application on January 7, 2022. On March 24, 2022, FERC sustained their December 9, 2021 order and denied Nevada Hydro's request for a stay (FERC 2022b). On October 21, 2022, Nevada Hydro submitted an amended application for a license for the LEAPS Project, now renamed the Bluewater Renewable Energy Storage (Bluewater) Project. FERC dismissed the application on February 21, 2023 (FERC 2023b).
Flood Control Projects			
Santa Anita Stormwater Flood Management and Seismic Strengthening Project	Los Angeles County Flood Control District	In progress	The project would modify existing flood management and water conservation facilities along the Santa Anita Canyon watershed, including the Santa Anita Dam, Santa Anita Headworks, and Santa Anita Debris Dam. The modifications should improve the seismic safety and structural integrity of Los Angeles County Flood Control District's facilities and should improve their ability to manage stormwater runoff. Construction of parts of the project are already complete, with the final two portions scheduled to begin in spring/summer 2023 (Los Angeles County Public Works 2023).
Lower Elkhorn Basin Levee Setback Project	California Department of Water Resources (DWR)	In progress	The Lower Elkhorn Basin Levee Setback Project is the first phase of implementation of recommendations from the 2012 Central Valley Flood Protection Plan. The project consists of 7 miles of setback levees in the Lower Elkhorn Basin along the east side of the Yolo Bypass and the north side of the Sacramento Bypass. This involves removing all or portions of existing levees that will be set back, removing portions of local reclamation district cross levees, and improving or relocating related infrastructure. Construction began in summer 2020 (DWR 2023f).

Project	Lead Agency	Status	Description
Tisdale Weir Rehabilitation and Fish Passage Project	California Department of Water Resources (DWR)	In progress	The Tisdale Weir is one of five major overflow weirs in the Sacramento River Flood Control Project. Due to aged concrete, the weir needs structural rehabilitation. The weir also causes fish stranding when flows from the Sacramento River recede below the weir crest. The project would improve the structural integrity of and fish passage through the Tisdale Weir. The project is scheduled to be completed in 2026 (DWR 2023g; ESA 2026).
General Plans			
Alameda East County General Plan	Alameda County Community Development Agency Planning Department	General Plan last updated in 2002	The Alameda East County General Plan guides development and resource conservation in the East County Area. The East County General Plan was adopted in 1994 and was most recently amended in 2000, with modifications adopted in 2002. It is unclear when the General Plan will receive its next update (Alameda County Community Development Agency Planning Department 2000). Other area general plans in Alameda County have been updated more recently, with the Castro Valley General Plan receiving a major revision in 2012 and the Eden Area General Plan revised in 2010 (Alameda County Community Development Agency Planning Department 2020).
Contra Costa County General Plan	Contra Costa County	Updated in 2024	The Contra Costa County General Plan establishes goals for physical growth, conservation, and community life in unincorporated areas, and contains policies and actions to achieve those goals. Although it has been reconsolidated twice (1990–2005 and 2005–2020), Contra Costa County's current general plan was adopted in 1991 and was last updated in 2024 (Contra Costa County 2024).
Sacramento County General Plan	Sacramento County	Updated in 2011	The Sacramento County General Plan acts as a blueprint for the physical development of unincorporated parts of Sacramento County. The plan addresses growth, housing, and environmental protection. The 2030 General Plan was adopted in 2011 (Sacramento County 2026).
San Joaquin County General Plan	San Joaquin County	Updated in 2016	The general plan for San Joaquin County provides a framework for the county's physical, economic, and social development as well as environmental resource preservation. It addresses the unincorporated areas of the county and provides planning guidance up to 2035 (San Joaquin County 2016).
Solano County General Plan	Solano County	Updated in 2008	The Solano County General Plan guides land development and conservation in the unincorporated parts of Solano County (Solano County 2008). The current general plan was adopted in 2008 (Solano County 2023).

Project	Lead Agency	Status	Description
Yolo County General Plan	Yolo County	Updated in 2009	The 2030 Countywide General Plan was adopted in 2009. The general plan determines land use planning through the unincorporated area of Yolo County (Yolo County 2023a).
Butte County General Plan	Butte County	Updated in 2023	The Butte County General Plan 2040 was updated in 2023 (Butte County 2023b). The general plan provides guidance on how the county will manage future growth and development. This includes land use, circulation and transportation, open space, natural resources and conservation, public facilities and services, safety, and noise (Butte County 2023a).
Fresno County General Plan	Fresno County	Update is in progress	The Fresno County General Plan serves as a guide for future decisions concerning land use, infrastructure, public services, and resource conservation (Fresno County2023). The Department of Public Works and Planning is currently in the process of reviewing and revising the General Plan and Zoning Ordinance (Fresno County 2026).
Kern County General Plan	Kern County	Adopted in 2004, most recent amendments adopted in 2009	The Kern County General Plan provides guidance on decisions affecting the growth and resources of the unincorporated parts of Kern County (^Kern County 2009).
Merced County General Plan	Merced County	Updated in 2013	The 2030 Merced County General plan guides land use, housing, transportation, infrastructure, community design, and other policy decisions (Merced County 2023).
San Bernardino County Policy Plan	San Bernardino County	Updated in 2022	The San Bernardino County Policy Plan is part of the Countywide Plan and serves as the county's general plan (San Bernardino County 2023). In addition to serving as the county's general plan for its unincorporated areas, it includes direction for adult and child supportive services, healthcare, public safety, and other regional services in incorporated and unincorporated areas (San Bernardino County 2026).
Stanislaus County General Plan	Stanislaus County	Update in progress	The Stanislaus County General Plan guides the physical development, preservation, and conservation of the unincorporated areas of the county (Stanislaus County 2023a).
Tulare County General Plan	Tulare County	Updated in 2012	The Tulare County General Plan 2030 provides a plan for the future land use and physical development of the county through 2030 (Tulare County 2023).
City of Folsom General Plan	City of Folsom	Amended in 2021	The City of Folsom General Plan contains the goals and policies that the city council and planning commission base their land use decisions. The Folsom

Project	Lead Agency	Status	Description
			2035 General Plan was approved in 2018 and was amended in 2021 (City of Folsom 2021).
City of Sacramento General Plan	City of Sacramento	Updated in 2024; amended in 2025	Adopted in 2024, the current version of the City of Sacramento General Plan provides a framework for land use decision-making (City of Sacramento 2024).
City of Chino General Plan	City of Chino	Updated in 2025	The General Plan guides development and conservation within the City of Chino jurisdiction,; it was updated in 2025 (City of Chino 2025).
Habitat Restoration Projects			
California EcoRestore	Multi-agency	In progress	EcoRestore is a multi-agency project with the stated goal of restoring at least 30,000 acres of Delta habitat, including 3,500 acres of tidal wetlands, 17,500 acres of floodplain, 9,000 acres of tidal and sub-tidal habitat, and over 1,000 acres of other restoration. The EcoRestore program comprises many projects at various stages of planning, permitting, construction, and completion (DWR 2023h).
North Delta Flood Control and Ecosystem Restoration Project	Reclamation District 348	In progress	The North Delta Flood Control and Ecosystem Restoration Project consists of flood control and habitat improvements where the Mokelumne River, Cosumnes River, Dry Creek, and Morrison Creek converge. The project proposes to modify levees on McCormack-Williamson Tract and Grizzly Slough to reduce flooding and improve aquatic and floodplain habitat on part of the Cosumnes River Preserve (DWR 2026a).
Three Creeks Parkway Restoration Project	Contra Costa Resource Conservation District	Completed	The Three Creeks Parkway Restoration Project consists of flood control and public access improvements as well as creek restoration actions. With construction completed in 2021, the project involved widening the Marsh Creek channel and creating a floodplain bench. Planting of native vegetation began in 2021 and continued until spring 2023. The project should improve recreational and educational opportunities along the Marsh Creek Regional Trail and should provide habitat for Chinook salmon and Swainson's hawk (CCRCD 2023).
Agricultural Road Crossing 4 Modification Project	DWR, U.S. Bureau of Reclamation (Reclamation)	In progress	Agricultural Road Crossing 4 spans Tule Canal and controls irrigation for agricultural and waterfowl purposes but blocks fish passage. DWR and Reclamation propose to replace the road crossing with a permanent bridge structure that spans Tule Canal (DWR 2021b). Construction on the project is in progress (DWR 2026b).

Project	Lead Agency	Status	Description
Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project	DWR, Reclamation	Completed 2025	The proposed project is required for continued operation of the SWP and CVP under the 2009 and the 2019 National Marine Fisheries Service biological opinion. Implementation of this project also is required by the 2020 California Department of Fish and Wildlife Service's Incidental Take Permit (Maven's Notebook 2022). The project consists of a new Fremont Weir Headworks structure, a new outlet channel, and downstream channel improvements (Reclamation 2021; DWR 2026b).
Hamilton City Flood Damage Reduction and Ecosystem Restoration Project	U.S. Army Corps of Engineers	In progress	The Hamilton City Flood Damage Reduction and Ecosystem Restoration Project improves flood protection in the Hamilton City area and will restore approximately 1,400 acres of native habitat. Phase 2B levee construction was completed in November 2022, although additional construction activities are yet to be completed. Phase 2 ecosystem restoration is estimated to be completed in 2027 (USACE 2026).
Battle Creek Salmon and Steelhead Restoration Project	Multi-agency, including Reclamation, PG&E, State Water Resources Control Board, and others	In progress	The Battle Creek Salmon and Steelhead Restoration Project aims to reestablish 42 miles of salmon and steelhead habitat on Battle Creek in Shasta and Tehama Counties near the town of Manton. The project also would restore 6 miles of habitat on tributaries to Battle Creek. The project involves the modification of hydropower facilities in three phases, including removal of diversion dams, construction of fish screens and ladders, construction of powerhouse bypass and tailrace connectors, construction of a fish barrier weir, and dedicating water rights for instream purposes at dam removal sites. This project would benefit Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and Central Valley steelhead (Reclamation 2022a; Reclamation 2022b).
Stand-Alone Projects			
Lower San Joaquin River/southern Delta update to the Bay-Delta Plan (LSJR/southern Delta Plan amendments)	State Water Resources Control Board (State Water Board)	Implementation ongoing	In December 2018, the State Water Board adopted new and revised flow objectives for the lower San Joaquin River and its tributaries, the Stanislaus, Tuolumne, and Merced Rivers, for the reasonable protection of fish and wildlife beneficial uses and revised salinity water quality objectives for the reasonable protection of southern Delta agricultural beneficial uses, as well as a program of implementation for these objectives (LSJR/southern Delta Plan amendments). The new and revised flow objectives require increased flows in February through June that can be adaptively implemented. Implementation of the LSJR/southern Delta Plan amendments would result

Project	Lead Agency	Status	Description
			in flows at Vernalis that contribute to Delta outflow, resulting in a cumulative beneficial effect on native anadromous, estuarine, and resident fish species and winter-spring increases in low-salinity habitat.
Sustainable Groundwater Management Act (SGMA)	Multi-Agency	Signed into law September 2014; implementation is ongoing through GSA-led plan management, with DWR responsible for evaluating plans and progress	The Sustainable Groundwater Management Act (SGMA) was passed in 2014 to address groundwater overpumping. SGMA requires local public agencies in basins subject to the Act to develop, adopt, and implement groundwater sustainability plans (GSPs). In January 2020, 21 critically overdrafted basins submitted 46 GSPs. DWR issued assessments for 20 of these basins in January 2022, approving 8 with corrective actions and determining that 12 were incomplete. During this same month, the 63 remaining basins subject to SGMA submitted 65 GSPs. In July 2022, the 12 critically overdrafted basins that were deemed "incomplete" resubmitted their GSPs. In March 2023, DWR determined that six of the resubmitted GSPs were adequate and six were inadequate. This triggered State Water Board evaluation for intervention in the inadequate basins. Since 2023, four basins were returned to DWR's jurisdiction and two have been designated probationary by the State Water Board. GSAs are currently implementing GSPs, submitting annual reports, and undergoing periodic evaluations to demonstrate progress toward groundwater sustainability.[1]
Water Quality Projects			
EchoWater Project/EchoWater Facility	Sacramento Regional County Sanitation District (Regional San) [now SacSewer]	Completed in 2023	To comply with discharge requirements, Regional San (now Sacramento Area Sewer District [SacSewer]) began the EchoWater Project. The project included design and construction of new treatment infrastructure, upgrades to the existing secondary treatment process, and addition of a tertiary level of treatment. The EchoWater Facility was completed in spring 2023 (SacSewer 2024).
Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) and the Central Valley-	State and federal agencies; permittees from agriculture, dairy, and others; and environmental and	Active	Elevated salinity and nitrates in surface water and groundwater are increasing problems affecting much of California, other western states, and arid regions throughout the world. In California, as surface water and groundwater supplies become scarcer, and as wastewater streams become more concentrated, salinity and nitrate impairments are occurring with greater frequency and magnitude. In 2006, the Central Valley Water Board, the State Water Board, and stakeholders began a joint effort to address the

[1] SGMA implementation status reflected in this table was last updated in June 2026.

Project	Lead Agency	Status	Description
Wide Salt and Nitrate Management Plan (SNMP)	environmental justice organizations		issues and initiated CV-SALTS. In 2017, the Central Valley-Wide Salt and Nitrate Management Plan (SNMP) was submitted by CV-SALTS to the Central Valley Water Board. The SNMP was implemented by the Central Valley Water Board through a Salt and Nitrate Control Program. This program was approved by the State Water Board and the Office of Administrative Law. The U.S. Environmental Protection Agency approved most of the surface water provisions of the SNMP (SWRCB 2026d).
Yolo County Stormwater Management Program (SWMP)	Yolo County	Program adopted in 2004	The Yolo County SWMP has six program elements: public education and outreach, public involvement and participation, illicit discharges (a program to eliminate illicit discharges to the storm drain system), construction activities (a program to control pollutants from construction activities), new development and redevelopment (a program requiring permanent stormwater best management practices for new development and redevelopment projects), and county operations (implementation of better control measures at county facility and field operations in the permitted urban area). Each element covers permit requirements, control measures to address those requirements, and related control measures in other program elements (Yolo County 2004). The Yolo County SWMP was adopted on December 7, 2004 (Yolo County 2023b).
Chromium-6 Water Treatment Facilities Project	Coachella Valley Water District (CVWD)	Chromium-6 MCL regulation adopted 2024	The project initially involved construction and operation of domestic water treatment facilities to comply with the State of California's drinking water maximum contaminant level (MCL) for chromium-6. The chromium-6 MCL of 10 parts per billion became effective on July 1, 2014. In 2016, CVWD was planning on building a conventional ion exchange treatment system that would have required construction of buildings at 29 well sites and a central facility for regenerating resin used in the treatment process, as well as pipelines to service the system. Before construction began, an alternative treatment method using stannous chloride was found (CVWD 2023). In October 2016, construction of the ion exchange facilities was temporarily halted and a pilot study to evaluate the feasibility and effectiveness of stannous chloride at a CVWD well in Palm Desert was approved. The pilot study and a 2018 demonstration project found stannous chloride to be effective at reducing chromium-6 levels (CVWD 2023). The State Water Board adopted a chromium-6 MCL regulation in 2024 (SWRCB 2024b; SWRCB 2024). On October 13, 2025, CVWD submitted a treatment facilities

Project	Lead Agency	Status	Description
			compliance and implementation plan, including a timeline, to the State Water Board's Division of Drinking Water for approval(CVWD 2026).
Antioch Brackish Water Desalination Plant	City of Antioch	Completed September 2025	The City of Antioch finished construction and inaugurated the plant in September 2025. The facility, includes a 6-million-gallons-per-day (MGD) desalination facility within the city's existing water treatment plant. The project consists of a new river intake pump, a new pipeline connecting Antioch's existing raw water pipeline to their water treatment plant, a new desalination facility, and a new brine disposal pipeline (City of Antioch n.d.).
Harvest Water Program	Regional San [now SacSewer]	In progress	The Harvest Water Program (formerly named the South Sacramento County Agriculture and Habitat Lands Recycled Water, Groundwater Storage, and Conjunctive Use Program) is being implemented by Regional San (now SacSewer) to increase the use of recycled water by providing tertiary-treated wastewater for farmers and wildlife refuges. In 2016, Regional San filed a wastewater change petition (WW0092) to reduce the discharge of treated wastewater from the Sacramento Regional Wastewater Treatment Plant into the Sacramento River by up to 50 thousand acre-feet (TAF) annually and direct that water for the Harvest Water Program. Recycled water provided from the Harvest Water Program will be used to irrigate up to 16,000 acres of agriculture and habitat lands in Sacramento County near the lower Cosumnes River and Stone Lakes National Wildlife Refuge. Regional San's wastewater change petition was approved in 2019 (SWRCB 2023). Infrastructure construction is now underway and scheduled to be completed in 2026. Outreach and funding efforts for this project are still underway; the system is anticipated to be operational in 2027 (SacSewer 2026).
Chino Basin Conjunctive Use Environmental Water Storage/Exchange Program (CBEWP)	Inland Empire Utilities Agency	In progress	The CBEWP would construct an advanced water treatment facility that could be used to store up to 15 TAF of treated wastewater in the Chino Basin Water Bank (CBWB). Blocks of water would be dedicated to enhance instream flows in the Feather River below Oroville Dam during the first 25 years of operation of the CBEWP. After this period, the water stored in the CBWB would no longer be used for ecosystem benefits and would be used only for local, non-public water supply. The Inland Empire Utilities Agency is currently working on preliminary design reports (Maven's Notebook 2023; CWC 2026a).

Project	Lead Agency	Status	Description
Willow Springs Water Bank Conjunctive Use Project	Southern California Water Bank Authority	In progress	The Willow Springs Water Bank Conjunctive Use Project is a conjunctive use and reservoir reoperation project that would utilize 500 TAF of existing groundwater storage facilities to operate conjunctively with the SWP. The Southern California Water Bank Authority is still in the process of identifying a SWP contractor to partner with (Maven's Notebook 2023; CWC 2025a).
Water Supply Projects			
B.F. Sisk Dam Raise and Reservoir Expansion Project	Reclamation and San Luis & Delta-Mendota Water Authority (SLDMWA)	In progress	Reclamation and SLDMWA propose to raise the dam embankment of B.F. Sisk Dam by 10 feet. This would increase reservoir storage capacity by 130 TAF (Reclamation 2020a). A Draft EIR/SEIS was released in August 2020 and a Final EIR/SEIS was released in December 2020. In October 2023, Reclamation issued a Record of Decision indicating that the decision is to implement the Dam Raise Alternative, as described in the Final EIR/SEIS (Reclamation 2023).
El Dorado Water Reliability Project	El Dorado County Water Agency (EDCWA)	In progress	The El Dorado Water Reliability Project proposes to secure the partial assignments of two state-filed applications for up to 40 TAF from the Upper American River and its tributaries. This water would be used to support land use and economic development and would be stored and diverted at Sacramento Municipal Utility District's White Rock Powerhouse Penstock and the El Dorado County area of Folsom Reservoir (EDCWA 2024).
Del Puerto Canyon Reservoir	Del Puerto Water District and San Joaquin River Exchange Contractors Water Authority	In progress	The Del Puerto Water District and the San Joaquin River Exchange Contractors Water Authority propose to construct and operate the Del Puerto Canyon Reservoir. The proposed reservoir would provide up to 82 TAF of off-stream storage to the CVP. Water for the reservoir would be supplied from the Delta-Mendota Canal. The project would require construction of the reservoir, water conveyance facilities to and from the Delta-Mendota Canal, electrical facilities, relocation of Del Puerto Canyon Road, and relocation of existing and proposed utilities in the project area. The Final Environmental Impact Report (EIR) for the project was released in October 2020 (Del Puerto Water District 2020). The Stanislaus County Superior Court later determined that the Final EIR was deficient, and Del Puerto Water District was ordered to decertify the EIR and vacate approval of the project (Superior Court of California, County of Stanislaus 2022). Del Puerto Water District released the partially recirculated Draft EIR in December 2025 (DPWD 2026).

Project	Lead Agency	Status	Description
Delta Conveyance Project (Previously "WaterFix")	DWR	In progress	Previously known as WaterFix, the Delta Conveyance Project (DCP) is a project proposed by DWR to develop new SWP infrastructure. This would involve construction of two 3,000-cubic feet per second intake facilities in the north Delta, one underground tunnel that conveys water from the intake facilities to the south Delta, a pumping plant, and a connection to Bethany Reservoir. The final EIR for the Delta Conveyance Project was certified by DWR on December 21, 2023 (DWR 2023i; DWR 2023d).
Doheny Ocean Desalination Project	South Coast Water District	In progress	The South Coast Water District proposes to develop an ocean water desalination facility at Doheny State Beach. The proposed desalination facility would have a capacity of up to 5 MGD. The desalination facility would be located on existing South Coast Water District property, and the subsurface intake wells would be located at Doheny State Beach (South Coast Water District n.d.).
Pacheco Reservoir Expansion (PRE) Project	Santa Clara Valley Water District (Valley Water)	Suspended August 2025	The PRE Project would enlarge the existing reservoir located in southeast Santa Clara County, from 6 TAF to 140 TAF. The PRE Project would construct new conveyance infrastructure to segments of the CVP San Felipe Division in Merced and Santa Clara Counties and deliver water supply to up to eight south-of-Delta wildlife refuges in Merced County. The primary water sources to fill the expanded reservoir would be natural inflows from the North and East Forks of Pacheco Creek. Supplemental flows to the expanded reservoir would arrive from the Valley Water's and San Benito County Water District's share of contracted CVP pumped water from San Luis Reservoir. Valley Water released a Draft EIR for this project in 2021 and has not yet filed a water right application and water right petition for the project (SWRCB 2023; Valley Water 2023). On August 26, 2025, Valley Water suspended development of the proposed Pacheco Reservoir Expansion Project.
Shasta Dam and Reservoir Enlargement Project	Reclamation	In progress	This project proposes to raise Shasta Dam by up to 18.5 feet. An 18.5-foot raise would increase storage in Shasta Reservoir by 634 TAF (Reclamation 2020b). The effects of the alternatives to raise Shasta Dam were evaluated in Reclamation's feasibility study and reports as a part of the Shasta Lake Water Resources Investigation. In 2020, a Draft and Final Supplemental Environmental Impact Statement were released (Reclamation 2022c).
Sites Reservoir	Sites Project Authority	In progress	The project would include construction and operation of a major new offstream surface storage reservoir (Sites Reservoir) in the Sacramento

Project	Lead Agency	Status	Description
			Valley, with two main dams, up to nine saddle dams and dikes, and two primary recreation areas and a day-use boat ramp. Up to 1.5 million acre-feet (MAF) per year would be diverted from the Sacramento River using existing infrastructure at Red Bluff and Hamilton City at a rate not to exceed 4,200 cubic feet per second. The proposed project's conveyance would use an existing Tehama Colusa Canal and Glenn-Colusa Irrigation District Canal diversion and conveyance facilities, plus a new inlet diversion/outlet structure and discharge pipeline to release water to the Sacramento River. Water conveyance between the reservoir and the canals and pipeline would be facilitated by two regulating reservoirs (one existing and one new). Pumping/electrical generating facilities and new roads also would be constructed (Sites Project Authority 2021). A Revised Draft EIR/Supplemental Draft Environmental Impact Statement for the project was released on November 12, 2021. After receiving public comments, the Final EIR/Environmental Impact Statement was released, certified, and Notice of Determination was filed with the State Clearinghouse in November 2023.
Centennial Water Supply Project	NID	On hold	The Centennial Water Supply Project would involve construction of a 110-TAF reservoir on the Bear River between the Rollins and Combie Reservoirs. There is currently no budget for this project, and property purchases related to the project are suspended (NID 2024).
LeLand Reservoir Replacement Project	East Bay Municipal Utility District (EBMUD)	In progress	The project involves replacing LeLand Reservoir, an 18 million-gallon reservoir/tank, with two smaller tanks. A Final EIR was released in November 2018. Construction may occur from 2035 to 2038 (EBMUD 2026).
Isabella Lake Dam Safety Modification Project	U.S. Army Corps of Engineers	In progress	Isabella Reservoir, completed in 1953, is located 40 miles northeast of Bakersfield, California. In 2006, the U.S. Army Corps of Engineers began a study to address safety issues with the dam. Pre-construction engineering and design of the project began in 2013, and construction of Phase II dam and spillway modifications began in 2017. Much of the construction for Phase II of the project was completed in late 2022. Various elements of the project are still in progress (USACE 2023).
Los Vaqueros Reservoir Expansion Project	Contra Costa Water District (CCWD)	Withdrawn in 2024	The Los Vaqueros Dam and Reservoir initially had a capacity of 100 TAF. Phase 1 of the Los Vaqueros Expansion Project increased capacity to 160 TAF and was completed in 2012. The proposed expansion would further

Project	Lead Agency	Status	Description
			increase the capacity of the Los Vaqueros Reservoir to 275 TAF and would involve construction of a regional intertie and improved pump stations and pipelines. Contra Costa Water District withdrew from this project in 2024 (CCWD 2026; Los Vaqueros Reservoir Joint Powers Authority 2023).
Temperance Flat Reservoir	Temperance Flat Reservoir Authority	On deferral status	The Temperance Flat Reservoir project is a proposed 1.8-MAF reservoir that would be located on Millerton Lake on the San Joaquin River. Due to a lack of a final operating plan, Reclamation was unable to develop a final feasibility report. The Temperance Flat Reservoir Authority requested that Reclamation place the study in deferral status until an operating plan is developed (Maven's Notebook 2020). In October 2020, the project was withdrawn from the Water Storage Investment Program (CDFW 2023).
Kern Fan Project	Groundwater Banking Joint Powers Authority	In progress	The Kern Fan Project proposes to develop a regional water bank in the Kern Fan area to recharge the Kern County Groundwater Subbasin. The proposed water bank would store up to 100 TAF of unallocated Article 21 water from the SWP, with 25 percent of the stored water being used for ecosystem benefits. Design efforts are still underway, with a final funding award hearing estimated to occur early in 2028 (Maven's Notebook 2023; CWC 2026b).
Stand-Alone Projects			
California High-Speed Rail Project (High-Speed Rail)	California High-Speed Rail Authority	In progress	High-Speed Rail would create a high-speed train system in California. Phase 1 of the project would run from San Francisco to the Los Angeles Basin via the Central Valley. Phase 2 of the project would extend the system to Sacramento and San Diego. Construction of Phase 1 is currently under way (California High-Speed Rail Authority 2023).
Federal Endangered Species Act Biological Opinions on Long-Term Operations of the CVP and SWP Delta Facilities (BiOp Project)	National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS)	2025 Record of Decision	Section 7 of the federal Endangered Species Act (ESA) requires any federal agencies whose activities could take species listed pursuant to the Act to consult with NMFS regarding marine species and USFWS regarding all other listed species. In 2008, USFWS issued a biological opinion (BiOp) that the long-term CVP/SWP operations, as described in the biological assessment (BA) submitted by Reclamation, were likely to jeopardize the continued existence and adversely modify the critical habitat of federally listed Delta smelt. In 2009, NMFS issued a BiOp and determined that the CVP/SWP operations, as described in the BA, were likely to jeopardize the continued existence and adversely modify the critical habitat of federally listed Sacramento River winter-run Chinook salmon, Central Valley spring-run

Project	Lead Agency	Status	Description
			Chinook salmon, Central Valley steelhead, and the Southern Distinct Population Segment of North American green sturgeon. As a result, NMFS and USFWS were required to issue Reasonable and Prudent Alternatives to the CVP/SWP operations as described in the BA and include protective measures for the fishery, such as reductions to export pumping at critical times, other operational changes, and habitat restoration. On January 31, 2019, Reclamation (operator of the CVP) issued a new BA. Corresponding BiOps were issued by NMFS and USFWS in October 2019. The federal 2019 BiOps have faced litigation challenging that they failed to provide adequate protections for endangered species. The court issued a preliminary injunction on May 11, 2020, temporarily prohibiting Reclamation from implementing the operational changes. In September 2021, Reclamation and DWR requested a reinitiation of consultation, which often takes 2–3 years to complete. While the reconsultation took place, the CVP operated based on an Interim Operations Plan. In late 2024, NMFS and USFWS issued new BiOps. In December 2025, pursuant to direction included in Action 5 of federal Executive Order 14181, Reclamation modified operational constraints included in the ROD for the LTO of the CVP and SWP.
California Endangered Species Act Incidental Take Permit on SWP Delta Facilities (ITP Project)	DWR	2025 Incidental Take Permit and 2026 Incidental Take Permit Amendment Request	Historically, DWR has derived its ESA coverage for the SWP from Reclamation's Section 7 consultation (described above and in more detail in Section 7.23.1.2, *Federal Endangered Species Act Biological Opinions on the Long-Term Operations of the CVP and SWP Delta Facilities and California Endangered Species Act Incidental Take Permit on SWP Delta Facilities Incidental Take Permit*) and obtained California Endangered Species Act (CESA) coverage for species listed under both acts through a determination by CDFW that the federal permit is also "consistent" with state-law requirements such that no further permitting is necessary. However, due to concerns about the integrity of the federal reconsultation process, DWR announced in April 2019 that it would be seeking independent CESA coverage for the SWP from CDFW based on its own operational description. DWR received an incidental take permit for the SWP from CDFW on March 31, 2020. Two amendments to the CDFW ITP issued for SWP operations pursuant to the CESA were approved in 2025 to change requirements for SWP operations. DWR has also submitted a 2026 ITP amendment request to CDFW to permanently remove the requirements for fall X2.

7.23.1.3 Cumulative Impacts

This section describes and analyzes the potential cumulative impacts of changes in hydrology and water supply under the proposed Plan amendments, as appropriate for each resource area, and the projects and project categories described above and detailed in Table 7.23-1. In addition, impacts from construction and operation of habitat and other ecosystem projects and new or modified facilities evaluated in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities,* that could result from implementation of the proposed Plan amendments are described and analyzed in combination with the projects and project categories described above and detailed in Table 7.23-1. Potential impacts from changes in hydrology and water supply under the Low Flow Alternative generally would be smaller and closer to baseline conditions compared to the changes that would occur under the proposed Plan amendments. Potential impacts from changes in hydrology and water supply under the High Flow Alternative would generally be larger and further from baseline conditions compared to the changes that would occur under the proposed Plan amendments. Similarly, the increased use or accelerated development of new or modified facilities would be less under the Low Flow Alternative and greater under the High Flow Alternative than the proposed Plan amendments. Habitat restoration and other ecosystem projects under the Low Flow Alternative could be less or more depending on whether the lower numeric inflow requirement leads to an overall greater dependence on habitat restoration and other ecosystem projects to improve conditions for native fish. Habitat restoration and other ecosystem projects could be less under the High Flow Alternative. Cumulative impacts under the Low Flow and High Flow Alternatives would be similar to those for the proposed Plan amendments and therefore are not specifically repeated in the resource areas below. Cumulative impact conclusions for the proposed Plan amendments also apply to these two alternatives.

Aesthetics

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on aesthetic resources described in Sections 7.3, *Aesthetics,* 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology could result in reservoir level changes that may result in exposure of more unvegetated ground or bathtub rings. Projects listed in Table 7.23-1 that could alter reservoir levels (FERC Projects, Water Supply Projects, Flood Control Projects, Habitat Restoration Projects, SGMA, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts on aesthetic resources.

Changes in water supply could result in agriculture land conversion, which could affect aesthetic resources if properties are developed or neglected. This could interact with the projects in Table 7.23-1 (e.g., General Plans, Habitat Restoration Projects, LSJR/Southern Delta Plan Amendments, SGMA, Water Supply Projects, BiOp/ITP Projects), resulting in cumulative impacts on aesthetic resources associated with agricultural conversion.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects,* and 7.22, *New or Modified Facilities*, may physically damage scenic resources (e.g., alter natural landscape contours), introduce large construction equipment, remove vegetation, stockpile

materials (e.g., excavated soil), create dust, or add new sources of lighting (e.g., nighttime lighting) and glare. Permanent installation of artificial elements (e.g., riprap), solar panels, and/or security and safety lighting could affect aesthetics. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments resulting in cumulative impacts on aesthetic resources from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, long-term changes to the quality of visual resources could occur from the addition of hardscape elements (e.g., fence, bench, erosion control structures), additional or modified water infrastructure (e.g., water storage structures and associated delivery lines), or gravel augmentation. Dam removal also could change scenic vistas, and reservoir drawdown and removal can expose large areas of bare sediment and rock that were previously inundated. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative impacts on aesthetic resources depending on the location.

Under *New or Modified Facilities*, onstream reservoirs could flood land and convert natural river canyon scenery to lacustrine scenery, affecting a scenic vista, damaging scenic resources, or degrading the visual character or quality of the site. Depending on the location, the siting of new wells and groundwater storage and recovery projects could change the visual quality or character of an urban or suburban area and introduce new sources of light or glare. Introducing new or expanded built facilities for water treatment (e.g., large buildings, water conveyance infrastructure) to an area could affect the existing visual character and quality of that area. Canal lining or encasement projects also could result in permanent landscape-level changes to the visual environment. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Water Supply Projects and Water Quality Projects that could result in cumulative impacts on aesthetic resources depending on the location.

These impacts could be significant. Mitigation measures to avoid or reduce impacts on aesthetic resources similar to the mitigation measures found in the *Aesthetics* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Agriculture and Forest Resources

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on agriculture and forest resources described in Sections 7.4, *Agriculture and Forest Resources*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology could reduce streamflow and water levels at some locations, which could affect the ability of existing diversion intakes to divert water for agricultural use. Projects listed in Table 7.23-1 that could lower streamflows (FERC Projects, Flood Control Projects, Water Supply Projects) could interact with the proposed Plan amendments, resulting in cumulative impacts on agriculture and forest resources.

Changes in water supply would reduce Sacramento/Delta supply to agriculture and could lead to changes in distribution of crop types and acreage and conversion of farmland to nonagricultural use. Increased use of water transfers could further incentivize farmland conversion, particularly in

rapidly urbanizing areas. Increased inundation in the Sutter and Yolo Bypasses during the planting season could affect crop acreage. Projects listed in Table 7.23-1 that affect agriculture, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (Habitat Restoration Projects, SGMA, LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts on agriculture and forest resources.

Lower groundwater levels could reduce groundwater available for agricultural use. Projects listed in Table 7.23-1 that may result in lower groundwater levels, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts on agriculture and forest resources.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could result in removal of vegetation and/or topsoil, introduction of invasive weeds, restriction of access to or interference with use of agricultural land, disturbance of existing utilities and infrastructure serving agriculture, or disturbance of soil in development footprints borrow/spoils areas or staging areas (e.g., soil compaction resulting from heavy equipment storage or soil stockpiling), which could affect agricultural resources. Agricultural or forested areas cleared for buildings and other facilities (e.g., power supply facilities), roads, and other project features could result in direct permanent conversion of important farmland, conflict with agricultural zoning or Williamson Act-contracted land, result in loss or conversion of forest land, or conflict with existing zoning for forest land or timberland. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative agriculture and forest resource impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, long-term or permanent changes to agriculture resources could occur due to project siting (i.e., converting the land to nonagricultural uses or conflict with existing zoning) and incidental impacts could occur on adjacent agricultural lands (e.g., seepage issues on adjacent land, herbicide use on invasive plant species). Dam removal projects could reduce or alter availability of water supplies for crop irrigation. Agricultural diversion headworks downstream of a dam also could experience siltation or otherwise be affected during reservoir drawdown. Invasive aquatic vegetation control actions could affect adjacent agricultural lands from herbicide use. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative agriculture and forest resource impacts depending on the location.

Under *New or Modified Facilities*, filling a new reservoir or expanding an existing reservoir footprint could permanently convert important farmland or forest land, conflict with agricultural zoning or Williamson Act-contracted land, or conflict with existing zoning for forest land or timberland if the reservoir was sited in whole or in part on these land types. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Water Supply Projects and Water Quality Projects that could result in cumulative agriculture and forest resource impacts depending on the location.

These impacts could be significant. Mitigation measures to avoid or reduce agriculture and forest resource impacts similar to the mitigation measures found in the *Agriculture and Forest Resources*

sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Air Quality

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on air quality described in Sections 7.5, *Air Quality*, 7.21, *Habitat Restoration and Other Ecosystem Projects,* and 7.22, *New or Modified Facilities*.

Increased groundwater wells and pumping in response to reduced Sacramento/Delta supply under the proposed Plan amendments could result in emissions from using diesel pumps and generators. Projects listed in Table 7.23-1 that may result in increased groundwater pumping, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative air quality impacts.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could generate fugitive dust and emissions from fuel combustion of heavy construction equipment and vehicles, and inadvertent dispersal of *Coccidioides* spores (responsible for Valley Fever) and asbestos into the environment. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative air quality impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, objectionable odors sometimes associated with wetlands could affect nearby land uses, such as the closest recreational facilities and residential uses. Dam removal could result in earthy or hydrogen sulfide odors during or immediately following reservoir drawdown and windblown dust from exposure of sediment deposits remaining in the reservoir footprint after dam removal. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative air quality impacts, depending on the location.

Under *New or Modified Facilities*, operation of recreational facilities associated with a new reservoir could result in generation of emissions from vehicle trips and motorized recreational vehicles (e.g., boats, jet skis). Operation of new WWTPs may result in a new source of odors. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Water Supply Projects and Water Quality Projects that could result in cumulative air quality impacts, depending on the location.

Less-than-significant impacts include exposure to increased fugitive dust from agricultural land fallowing. Projects listed in Table 7.23-1 that could lead to decreases in land under irrigation, which could lead to fallowing, idling, or conversion to nonagricultural uses, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (SGMA, LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts from fugitive dust emissions— especially if in the same air basin.

These impacts could be significant. Mitigation measures to avoid or reduce air quality impacts similar to the mitigation measures found in the *Air Quality* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Biological Resources

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on biological resources described in Sections 7.6, *Biological Resources*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in reservoir levels and streamflow below reservoirs could affect associated riparian and wetland habitat, and could affect water temperatures below some reservoirs that could affect fish and other species. Increased inundation in flood bypasses during the planting season could affect crop acreage, which could affect special-status wildlife species that use croplands as habitat. Projects listed in Table 7.23-1 that could change streamflows and reservoir levels (FERC Projects, Flood Control Projects, Water Supply Projects) could interact with the proposed Plan amendments, resulting in cumulative biological impacts.

Changes in water supply may reduce Sacramento/Delta supply to municipal use. This, as well as increased use of water recycling and indoor conservation, could alter the flow and chemical constituent concentrations of WWTP influent and subsequently could affect WWTP effluent discharges to receiving waters. This could result in effects on special-status plant and wildlife species. Potential effects on wildlife refuges and agricultural lands from reduced supply could affect habitat for special-status species, including giant gartersnake, Swainson's hawk, greater sandhill crane, tricolored blackbird, and California black rail, and decrease the amount of habitat available for resident and migratory waterfowl and shorebirds. Reductions in supply refuges also could decrease wetland area and affect water quality. Projects listed in Table 7.23-1 that affect agriculture, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that could reduce water supply (Habitat Restoration Projects, SGMA, LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative biological impacts associated with agricultural habitats.

Some water management actions could diminish instream ecological benefits. For example, increased use of recycled water that would otherwise discharge to streams could diminish ecological benefits of instream flows, especially in dry seasons and in low-flow conditions where streamflow is dependent on wastewater discharges, and diverting surface water for groundwater storage and recovery. Water transfers could alter hydrologic patterns, affect aquatic biological resources in some locations, and affect special-status species that use agricultural fields if the transfer is based on cropland idling. Projects listed in Table 7.23-1 that could change streamflows and reservoir levels (FERC Projects, Flood Control Projects, Water Supply Projects) could interact with the proposed Plan amendments, resulting in cumulative biological impacts.

Lower groundwater levels from increased groundwater pumping and reduced incidental recharge could affect stream-aquifer interactions and streamflows in some locations, riparian and wetland habitat and other natural communities that are dependent on groundwater, and sensitive species that are reliant on groundwater-dependent ecosystems. Projects listed in Table 7.23-1 that may result in increased groundwater pumping, including projects that are growth inducing (General

Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative biological impacts associated with lower groundwater levels.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could be located in a sensitive natural community, habitat for special-status species, wetlands, wildlife corridors, or waterways. Direct or indirect harm (including mortality) to special-status species and associated habitat may occur from movement of heavy machinery where such species occur and from construction noise and physical vibration. Introduction or spread of invasive vegetative species may occur through the movement of topsoil, fill, gravel, and construction equipment. Removal of riparian vegetation and disturbance to wetlands may occur to facilitate heavy equipment movement and other construction activities, and release of sediment and possibly hazardous materials (e.g., oil or gas from construction equipment) into waterbodies could result from construction on or near waterways. Creation of noise and vibration could harm fish from activities such as pile driving, blasting, or use of other construction equipment; and release of concrete particles from blasting to surface waters could disturb terrestrial wildlife and harm fish. Take of special-status fish species could occur from construction and installation of cofferdams (resulting in fish stranding) or fish rescue in a dewatered area (seining, electrofishing). Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative biological impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, physical habitat restoration projects could adversely affect species by changing habitat types (e.g., non-tidal aquatic habitats to tidal aquatic habitats, conversion of agriculture land to native riparian habitat), creating barriers such as shallow puddles leading to fish stranding from floodplain drainage, facilitating methylmercury production and subsequent bioaccumulation in fish and other wildlife species from the creation of freshwater wetlands and floodplains, increasing predation on sensitive fish species that use shallow-water floodplain habitats from floodplain restoration, applying toxic herbicides and pesticides due to increased invasive plant species, and creating mosquito habitat that could adversely affect aquatic and terrestrial species. Gravel augmentation projects could cause mortality of salmon and steelhead embryos and alevins and could increase turbidity and sedimentation, which could affect salmon and salmon redds. Fish passage improvements could obstruct, injure, or kill fish species if designed improperly; introduce special-status species to inhospitable habitat; create conditions to allow previously blocked invasive species upstream from fishways and dam removal projects; elevate suspended sediment concentrations that can adversely affect or cause mortality of sensitive life stages of special-status fish, amphibians, and reptiles; and increase levels of sediment and turbidity that can adversely affect aquatic ecosystems by reducing photosynthetic activity, reducing food availability, burying habitat, and directly harming organisms. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative biological resource impacts, depending on the location.

Under *New or Modified Facilities*, new reservoirs would create aquatic lake habitat and replace existing habitats through flooding, which would result in a change in the flow regime and potentially alter temperature downstream. On-stream reservoir/dams or changed points of diversion could interfere with movement of native resident or migratory fish, and impingement and entrainment may occur at surface water diversions. Operation of a new reservoir could support the establishment and spread of invasive aquatic species, and recreation activities associated with

reservoirs could disrupt wildlife movement patterns. Impingement and entrainment may occur at water diversions for treatment facilities, and seawater desalination could affect benthic ecosystems on the ocean floor and can expose aquatic species to toxic concentrations of brine. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Water Supply Projects and Water Quality Projects that could result in cumulative biological resource impacts, depending on the location.

Less-than-significant impacts include changes to habitat due to increased winter flows on the Sacramento and Feather Rivers; erosion caused by changes to geomorphic flows on regulated tributaries in the Sacramento/Delta; and changes in reservoir levels, streamflow, and groundwater levels. These changes could affect candidate, sensitive, or special-status species or movement of native resident or migratory fish or wildlife species. Projects listed in Table 7.23-1 that could change streamflows, reservoir levels, and groundwater (FERC Projects, Flood Control Projects, Water Supply Projects, General Plans, High-Speed Rail, LJSR/Southern Delta Plan Amendments, BiOp/ITP Project) could interact with the proposed Plan amendments, resulting in cumulative biological impacts.

Another less-than-significant impact identified is reduced water supply that may conflict with the provisions of an adopted habitat conservation plan (HCP); natural community conservation plan (NCCP); or other approved local, regional, or state HCP. As explained in Section 7.6.2, *Aquatic Biological Resources*, the proposed Plan amendments would not create adjacent incompatible land uses, develop land, or otherwise result in actions incompatible with conservation plans or activities; however, reduced Sacramento/Delta water supply could frustrate certain efforts identified in an HCP or NCCP if Sacramento/Delta water supplies are used to support management actions. It is possible that projects listed in Table 7.23-1 that affect water supply, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (SGMA, LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative biological impacts associated with HCPs and NCCPs that rely on imported water supplies to support management goals.

These impacts could be significant. Mitigation measures to avoid or reduce biological impacts similar to the mitigation measures found in the *Biological Resources* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Cultural Resources

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on cultural resources described in Sections 7.7, *Cultural Resources*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology could expose previously inundated cultural resources and/or significant historic or archaeological resources to increased wave action, erosion, and human activity from changes in reservoir levels. Similarly, changes in reservoir levels could expose previously inundated land containing human burials, which could result in disturbance of the burial and impacts from human activity. These same impacts are identified as less-than-significant impacts for changes in streamflows. Projects listed in Table 7.23-1 that could change streamflows and reservoir levels

(FERC Projects, Flood Control Projects, Water Supply Projects) could interact with the proposed Plan amendments, resulting in cumulative cultural impacts.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could affect cultural resources. Ground-disturbing activities during construction, including deep excavation, could damage archaeological sites or historic built environment resources; degrade unknown buried or near-surface cultural resources; degrade or otherwise affect near-surface archaeological or built environment resources; and alter the appearance of a historic resource from dust interacting with an object's surface, which could cause damage or chemical alteration. Temporary or permanent visual obstructions (i.e., large-scale equipment, machinery, vehicles) could diminish the integrity of cultural resources, and unauthorized removal or vandalism of cultural resources could occur if construction enables access to cultural sites that were not previously known or accessible. Access to cultural resources during construction could be reduced and thereby prevent or impair visits to cultural resources by people with a religious or cultural connection to the resource. Vegetation clearing, generation of dust, and visual obstructions could result in impacts on cultural resources with an associated landscape or other visual component that contributes to their significance, such as a sacred landscape or historic trail. Pile driving during construction could cause vibration that could physically damage or alter nearby historic built environment resources or linear features. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative cultural impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Measures*, older structures could be removed or modified from temperature control device (TCD) and dam removal projects that could be eligible for listing in the National Register of Historic Places or California Register of Historic Places; and reservoir drawdown prior to dam removal could result in shifting, erosion, and exposure of known or as-yet-unrecorded previously submerged cultural resources or human remains. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative cultural impacts, depending on the location.

Under *New or Modified Facilities*, new reservoirs could permanently flood areas that have unique paleontological resources or sites or a unique geologic feature, and reservoir drawdown could expose paleontological resources. Changing water levels and erosion as a result of shoreline wave action and wet-dry cycles could damage paleontological resources and expose previously inundated land containing human burials, which could result in disturbance of the burial and impacts from human activity. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Water Supply Projects that could result in cumulative cultural impacts, depending on the location.

These impacts could be significant. Mitigation measures to avoid or reduce cultural resource impacts similar to the mitigation measures found in the *Cultural Resources* sections of Tables 7.1-2, 7.21-1, and 7.22-1 be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Energy

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to

the impacts on energy described in Sections 7.8, *Energy*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology would result in a decrease in hydropower generation in summer that could be significant for an individual project or community. Projects listed in Table 7.23-1 that could change hydropower generation (FERC Projects, Water Supply Projects) could interact with the proposed Plan amendments, resulting in cumulative energy impacts.

Changes in water supply could cause an increase in energy use to replace Sacramento/Delta supplies from actions such as increased groundwater pumping and other water management actions. Projects listed in Table 7.23-1 that could increase energy use (FERC Projects, Water Quality Projects, Water Supply Projects, High-Speed Rail) could interact with the proposed Plan amendments, resulting in cumulative energy impacts.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities,* could temporarily increase energy demand from heavy construction equipment (e.g., trucks or barges, earthmoving equipment, power tools) for actions such as excavating, grading, transporting materials, and transporting construction workers to and from the work sites. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative cultural impacts from construction depending on the proximity of construction projects.

Under *New or Modified Facilities*, new reservoirs, points of diversion, and water treatment facilities could increase energy use for water diversion, conveyance, and water treatment. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects that could result in cumulative energy impacts, depending on the location.

These impacts could be significant. Mitigation measures to avoid or reduce energy impacts similar to the mitigation measures found in the *Energy* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Geology and Soils

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on geology and soils described in Sections 7.9, *Geology and Soils*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Lower groundwater levels could exacerbate existing problems associated with groundwater subsistence. Projects listed in Table 7.23-1 that may result in increased groundwater pumping, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts on geology and soils associated with lower groundwater levels.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could occur in areas known to have seismic activity or experience landslides, or could be located on expansive soil or on a geologic unit or soil that is

unstable or would become unstable due to construction. Construction also could occur in areas underlain by soft or loose soils, where high groundwater or seepage may be present, and on sloping grounds. Ground disturbance could expose geologic materials or soil, destabilize the material, and cause soil erosion or loss of topsoil. Construction activity that involves blasting could trigger landslides on unstable slopes and expose construction workers or members of the public to the risk of injury or death. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative impact on geology and soils from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, intended levee breaching could result in loss of topsoil and soil erosion. Large dam removal projects could result in hillslope instability in reservoir rim areas and erosion of slope sediments during reservoir drawdown. The rate of reservoir drawdown also could induce potential landslides along the reservoir margins or a slope failure of an embankment dam and cause additional erosion and sedimentation downstream. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative impacts on geology and soils, depending on the location.

Under *New or Modified Facilities*, new reservoirs, dams, points of diversion, and groundwater wells could fail or be damaged due to seismic-related ground shaking, fault movements, liquefaction, and lateral spreading. Surface springs and seeps due to operation of a new reservoir also could result in unstable soils, landslides, lateral spreading, subsidence, liquefaction, or collapse. Groundwater wells also could make the water table shallow, which could make areas of poorly consolidated geologic material prone to liquefaction. If recharge water is applied at too high of a rate or volume, there is also potential for substantial erosion and/or loss of topsoil. Siting desalination facilities in coastal areas could expose people or structures to potential adverse geology and soil effects. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects that could result in cumulative impacts on geology and soils depending on the location.

Less-than-significant impacts include a temporary increase in erosion and sedimentation as a result of agriculture fallowing. Projects listed in Table 7.23-1 that could lead to decreases in land under irrigation (which could lead to fallowing, idling, or conversion to nonagricultural uses), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (SGMA, LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts on geology and soils.

These impacts could be significant. Mitigation measures to avoid or reduce geology and soil impacts similar to the mitigation measures found in the *Geology and Soils* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Greenhouse Gas Emissions

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on GHG emissions described in Sections 7.10, *Greenhouse Gas Emissions*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in water supply could result in generation of additional GHG emissions from increased groundwater pumping from wells with diesel-powered pumps as well as emissions associated with energy use for groundwater storage and recovery, water transfers, and water recycling. These emissions could exceed existing thresholds or conflict with the state's long-term emission reduction trajectory. Projects listed in Table 7.23-1 that may result in increased groundwater pumping and water transfers, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), projects that reduce water supply (LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects), and projects that could increase water recycling (Water Quality Projects), could interact with the proposed Plan amendments, resulting in cumulative GHG impacts.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could result in generation of GHG emissions from heavy construction equipment, haul trucks, and worker vehicles. Construction activities also could remove vegetation that acts to sequester GHGs, such as trees. GHG emissions from construction could conflict with an applicable GHG plan, policy, or regulation. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative GHG impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, removing a hydropower dam could result in increased GHG emissions from replacing the renewable source of power with a non-renewable source. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative GHG impacts, depending on the location.

Under *New or Modified Facilities*, new reservoirs, points of diversion, and water treatment facilities could increase GHG generation and emissions from water diversions, conveyance, and water treatment. If vegetation is present in newly inundated areas, vegetation decay (which produces carbon dioxide and methane gases) could occur. GHG emissions from facility operation also could conflict with an applicable GHG plan, policy, or regulation. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects that could result in cumulative GHG impacts, depending on the location.

Less-than-significant impacts under the proposed Plan amendments include additional energy generation at fossil-fuel facilities as a result of reductions in hydropower generation. Projects listed in Table 7.23-1 that could lead to reductions in hydropower generation (e.g., FERC Projects, Habitat Restoration Projects, LJSR/Southern Delta Plan Amendments, and BiOp/ITP Projects) could interact with the proposed Plan amendments, resulting in cumulative GHG impacts.

These impacts could be significant. Mitigation measures to avoid or reduce GHG impacts similar to the mitigation measures found in the *Greenhouse Gas Emissions* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Hazards and Hazardous Materials

When the impacts of the proposed Plan and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on hazards and hazardous materials described in Sections 7.11, *Hazards and Hazardous*

Materials, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could result in the accidental release of hazardous materials from construction activities requiring the transport, use, or disposal of hazardous materials (e.g., fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, paint, paint thinner). Excavation during construction can result in possible damage to underground infrastructure and exposure to or spread of toxic chemicals from areas with existing soil or groundwater contamination, and soils containing *Coccidioides* spores may expose workers and people adjacent to construction sites to fungal spores in fugitive dust. Construction also could lead to accidental hazardous materials spills from airborne materials (e.g., gases, asbestos particles) or ignition of flammable liquids or vapors during construction activities within 0.25 mile of a school. Emergency response services' access or emergency evacuation routing could be impaired or interfered with during construction. Due to accidental releases of hazardous materials, work site fires, and vehicular accidents from construction-related changes in traffic, there could be an increased need for emergency service providers during construction. Electrical or gas-powered equipment and flammable materials used during construction also pose a wildfire risk. Construction project components may encroach on the airspace of airport runways. Construction also can lead to the creation of new disease vector habitat (i.e., mosquito habitat) that can then lead to application of pesticides from stagnant water present in construction areas during the wet season. Faulty installation or inadequate operation and maintenance of underground or aboveground storage tanks for bulk fuel storage may result in surface water and groundwater contamination, potential for fire and explosion, exposure of the public to raw sewage, and daylighting of wastewater at the ground surface. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative hazards and hazardous materials impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, physical habitat restoration could expose application crews and the public to toxic chemicals from the accidental release or improper use or storage of herbicides, increase transmission of mosquito-borne diseases (e.g., West Nile virus), and expose application crews and the public to pesticides used to control mosquitos. Increased vegetation could create favorable conditions to mosquitos, increase the risk of wildland fire by increasing the fuel load, and increase wildfire risk due to an increased number of cars and people visiting larger habitat restoration projects. Restoration of floodplain, riparian, and tidal habitat in proximity to existing airport flight zones also could increase bird-aircraft strikes. Regarding fish passage improvements, thermal curtains and associated structures could pose a physical safety hazard (e.g., collision) to recreationists in the vicinity of TCDs, and remaining portions of a dam after dam removal could represent hazards to the public. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects that could result in cumulative impacts related to hazards and hazardous materials, depending on the location.

Under *New or Modified Facilities*, some new reservoirs and points of diversion may require the use of hazardous materials for operations and maintenance (e.g., use of petroleum-based lubricants for machinery, solvents and paints, herbicide control of invasive weeds as part of landscape maintenance, pesticide for control of mosquitoes). Improper use or storage of herbicides could result in exposure of the application crews and general public (including children, for sites located within 0.25 mile of a school) to toxic chemicals. Operation and maintenance of new reservoirs could

involve removal of contaminated sediment from dredging that could accidentally be released to areas and surface waters. New reservoirs also may release cyanotoxins from HABs; may cause an increase in surface water methylmercury; and may create conditions favorable to mosquitos, which could lead to increased transmission of mosquito-borne diseases (e.g., West Nile virus). Reservoirs constructed close to an airport could create a safety hazard for people (e.g., recreationists) by placing them in proximity to hazards associated with airport operations. Reservoirs close to an airport also may create potential safety hazards (e.g., aircraft and waterfowl collisions) for air traffic. New reservoirs may pose wildfire risks from the use of vehicles, fire pits and grills, and electrical or gas-powered maintenance equipment. Groundwater wells and groundwater storage and recovery may result in the accidental release of hazardous materials during transport and use where chemical treatment of water may be required at new groundwater wells, during disposal of water treatment waste (e.g., used granular activated carbon filters) if water treatment occurs at new groundwater wells, where diesel-powered pumps are used for groundwater wells, and where water treatment is implemented prior to injection for groundwater storage and recovery. Similar to reservoirs, wells and groundwater storage and recovery operations may increase the potential for transmission of mosquito-borne diseases from the potential creation of mosquito habitat in groundwater recharge ponds or spreading basins. Operation of wastewater treatment facilities also can result in the accidental release of hazardous materials. During transport, use, storage for facility operation, and during disposal of hazardous waste (e.g., used granular activated carbon filters, biosolids) from water treatment. There is also a wildfire risk from improper storage or use of flammable/combustible or incompatible chemicals for facility operation, and use of electrical or gas-powered equipment during maintenance activities. These impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects that could result in cumulative impacts related to hazards and hazardous materials, depending on the location.

Less-than-significant impacts include possible changes to wildland fire suppression practices as a result of changes in reservoir levels in areas likely to continue experiencing forest fires. Projects listed in Table 7.23-1 that could lead to changes in reservoir levels include projects that reduce water supply (SGMA, LJSR/Southern Delta Plan Amendments, BiOp/ITP Projects) and projects that affect reservoirs and reservoir levels (Flood Control Projects and Habitat Restoration Projects). These could interact with the proposed Plan amendments, resulting in cumulative impacts related to hazards and hazardous materials.

These impacts could be significant. Mitigation measures to avoid or reduce hazards and hazardous materials impacts similar to the mitigation measures found in the *Hazards and Hazardous Materials* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Hydrology and Water Quality

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on hydrology and water quality described in Sections 7.12, *Hydrology and Water Quality,* 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology could decrease or increase flow, which has the potential to increase concentration of contaminants below some reservoirs and increase input of mercury and

methylmercury production downstream, respectively. Increases in Clear Creek flow downstream of Whiskeytown Lake could increase the risk of erosion and flooding in this area. Production of HABs also could increase due to lower summer and fall flows in some Delta channels and changes in reservoir levels. Reservoir levels changes also could result in bioaccumulation of methylmercury in fish and increase water temperature in some locations. Projects listed in Table 7.23-1 that could alter streamflow and reservoir levels (FERC Projects, Water Supply Projects, Flood Control Projects, Habitat Restoration Projects, SGMA, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), could interact with the proposed Plan amendments, resulting in cumulative hydrology and water quality impacts.

Changes in water supply could result in temporary exceedances of maximum contaminant levels in municipal water supply and site-specific exceedances of waste discharge requirements due to changes in WWTP influent and effluent quality and quantity. Reductions in delivery of Sacramento/Delta supplies to wildlife refuges and managed wetlands also could affect water quality. Some water management actions, such as increased use of water transfers and water recycling, could affect water quality in some locations. Changes in groundwater accretions and diversions of surface water for groundwater storage and recovery could decrease surface water quality associated with lower streamflows, higher temperatures, and limited dilution of existing flows. Projects listed in Table 7.23-1 that could change water supply (Habitat Restoration Projects, SGMA, Water Supply Projects, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), could interact with the proposed Plan amendments, resulting in cumulative hydrology and water quality impacts.

Increased groundwater pumping and reductions in incidental groundwater recharge from applied irrigation could lower groundwater levels and contribute to groundwater overdraft. Lower groundwater levels also could affect groundwater quality and potentially affect drinking water wells and result in an increase in frequency and severity of critical shortages or dry wells occurring in some areas for communities that rely on groundwater, including economically disadvantaged communities. Lower groundwater levels also can result in changes in groundwater flow direction and gradients in localized areas, which could exacerbate the migration of contaminants, may concentrate salts and nutrients in groundwater over time through evaporative enrichment, and can concentrate pollutants where groundwater contamination already exists. Additionally, surface water transfers through groundwater substitution and reduced incidental groundwater recharge due to agricultural conservation measures could result in lower groundwater levels. Lower groundwater levels could exacerbate groundwater quality impairments or contribute to contaminant loading in localized areas. Reductions in Sacramento/Delta supplies also could have localized impacts on groundwater storage in areas where Sacramento/Delta supplies are used for groundwater banking. Projects listed in Table 7.23-1 that may result in increased groundwater pumping, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative hydrology and water quality impacts associated with lower groundwater levels.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could contribute polluted runoff and sediment to nearby waterbodies. In-water construction can cause temporary sediment disturbance and resuspension, which may cause increased turbidity, siltation, and bioavailability of sediment-associated pollutants.

Pollutants, such as petroleum products (fuel, oil, grease from vehicles and equipment), paving materials such as concrete and asphalt and other materials used or stored onsite (e.g., paint, adhesives, solvents), and project waste (e.g., litter, debris, hazardous and liquid waste) may accidentally be released and could enter storm drains or streams. Herbicides used to control invasive plant species, if improperly applied or stored, and concrete and other particles released into surface waters from blasting, saw-cutting, and hydraulic hammering could affect water quality and may violate water quality standards. Construction activities also may lower local groundwater through dewatering. Dewatered groundwater of poor quality could increase turbidity, dissolved solids, nutrients, metals, or other constituents if discharged to a surface waterway. Construction could substantially alter drainage patterns of a project site and thereby cause erosion or siltation, or flooding, onsite or offsite. Construction activities could change the on-site land slopes across which drainage flows, which could alter the flow rates, directions, water surface elevations, or velocities of runoff that enters or originates on the construction site. Activities such as grading, vegetation removal, soil compacting, or paving could increase land surface imperviousness and affect water quality by creating surfaces where pollutants (e.g., petroleum products from vehicles) can accumulate and later be washed into waterways. Project sites also may be located within a 100-year flood hazard area or in areas subject to inundation by seiche, tsunami, or mudflow. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments resulting in cumulative hydrology and water quality impacts from construction, depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, geomorphic changes from habitat restoration could increase long-term rates of erosion or sedimentation. Placement of fill and gravel and gravel mining have the potential to release turbidity and existing contaminants from in-channel sediment into the water column. Habitat restoration projects could alter the existing drainage pattern of the site or area and, if improperly designed, alter hydrology and/or increase erosion and sedimentation. Physical habitat restoration also may alter salinity from tidal restoration, form HABs from algae produced at restoration project sites, mobilize potentially contaminated sediment from dredging activities, and increase methylmercury formation or temperature effects from increased floodplain inundation. Fishways aligned in a straight line without bends have high velocities down the center at moderate to high flows, which can cause erosion downstream of the fishway if the channel is narrow or if the fishway is aligned toward a bank. TCDs could change the distribution of water temperature in reservoirs and dissolved oxygen concentration of water discharged downstream. Dam removal can decrease groundwater levels; increase sediment, contaminants (e.g., PCBs, chlorinated pesticides, mercury), erosion, and turbidity; reduce dissolved oxygen levels downstream, change downstream channel geometry, reduce conveyance capacity, or destabilize infrastructure due to increases in deposition and erosion. Dam removal also can lead to a substantial increase in flood flows and release of sediments and a short-term increase in flooding. Removal of large dams or reservoirs also may increase the 100-year floodplain. Herbicides used for invasive aquatic vegetation control may directly affect water quality. Depending on the location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects and could result in cumulative hydrology and water quality impacts.

Under *New or Modified Facilities*, new dams and points of diversion can alter flow regimes and reduce or eliminate important geomorphic processes and floodplain inundation, decrease habitat connectivity, alter temperatures to the detriment of cold water species, and alter salinity gradients and circulation patterns in the Delta. Dams and points of diversion also reduce stream flows, which

could injure water right holders, alter water quality, and affect surface water-groundwater interactions and groundwater recharge. The ability of waste discharger or drinking water providers to comply with waste discharge requirements and/or water quality standards may be affected by changes to instream chemical constituent concentrations caused by changes in instream dilution from changes to streamflow. Reservoirs create conditions conducive to HABs, growth of invasive aquatic vegetation, and methylation of mercury. Reservoirs also could affect channel erosion, sedimentation, and morphology as a result of long-term changes in the sediment balance. Sediment accumulation at the bottom of a reservoir may contribute to anoxic conditions and reduced water quality, and reduced sediment supply to downstream waterways due to capture of sediment behind dams could affect habitat and alter the balance between erosion and sedimentation. Construction and modification of reservoirs also may result in impacts on water quality due to dredging, grading, or preparation of land. New groundwater wells located where multiple aquifer zones of varying water quality are cross-connected could cause a general degradation of groundwater quality. Accidental release of water treatment chemicals used at groundwater wells could cause degradation of surface water and/or groundwater quality. Water treatment facilities could violate standards or waste discharge requirements if discharges do not comply with all regulations pertaining to water quality standards and regulations to prevent degradation of water quality in receiving waters. Operation of subsurface or open water intakes at desalination facilities can result in significant intake and mortality of all forms of marine life from impingement and entrainment. Depending on location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects and could result in cumulative hydrology and water quality impacts.

Less-than-significant impacts include moderately elevated turbidity and total suspended solids levels in some areas as a result in changes in flow. Increased floodplain inundation could affect nutrients, organic material, invasive aquatic plants, and HABs. Reduced flows downstream of reservoirs could affect stream-aquifer interactions, and increased water recycling and municipal water conservation measures that reduce incidental groundwater recharge could affect groundwater levels. Projects listed in Table 7.23-1 that could change streamflows (FERC Projects, Flood Control Projects, Water Supply Projects, Habitat Restoration Projects) could interact with the proposed Plan amendments, resulting in cumulative hydrology and water quality impacts.

These impacts could be significant. Mitigation measures to avoid or reduce hydrology and water quality impacts similar to the mitigation measures found in the *Hydrology and Water Quality* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Land Use and Planning

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on land use described in Sections 7.13, *Land Use and Planning,* 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, may have temporary effects on existing land uses from activities such as ground clearing, increased traffic, noise, dust, and human activity, as well as by changes in the visual landscape. Construction may temporarily physically divide an established community

primarily by cutting off access to roadways or bridges, and siting permanent facilities within an established community (e.g., distribution pipelines, other infrastructure) could create physical barriers that could divide the community. Siting and construction could result in a permanent change in land use that could conflict with land use plans, policies, or regulations, depending on the location, configuration, and magnitude of the project. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative land use and planning impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, projects could include actions, such as levee breaching and road removal, that could isolate communities from services and markets or cut off access to properties. Some habitat restoration projects could be incompatible with land use designations, such as plans with exclusive agricultural designations. Removal of dams could physically divide communities, and new land use and zoning designations may need to be determined for areas previously inundated by the reservoirs. Depending on the location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects and could result in cumulative land use and planning impacts.

Under *New or Modified Facilities*, the siting of reservoirs or points of diversion and associated facilities may conflict with existing land uses and require changes to the land use designations in local general and specific plans. Removal of bridges and roads also may result in permanent physical division of an established community. Depending on location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects and could result in cumulative land use and planning impacts.

These impacts could be significant. Mitigation measures to avoid or reduce land use and planning impacts similar to the mitigation measures found in the *Land Use and Planning* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Mineral Resources

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on mineral resources described in Sections 7.14, *Minerals*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, may restrict access to areas with active natural gas, oil, or aggregate production or with the potential to contain untapped reserves of those resources. Construction demand for aggregate and/or cement for construction projects could exceed local supplies. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative mineral resource impacts from construction depending on the proximity of construction projects.

These impacts could be significant. Mitigation measures to avoid or reduce mineral resources impacts similar to the mitigation measures found in the *Mineral Resources* sections of Tables 7.1-2,

7.21-1, and 7.22-1 should be considered for these other projects as well as the proposed Plan amendments and alternatives.

Noise

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts related to noise described in Sections 7.15, *Noise*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Increased groundwater pumping for replacement water supply, groundwater storage and recovery, or groundwater substitution transfers could result in higher noise levels. Projects listed in Table 7.23-1 that may result in increased groundwater pumping, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), could interact with the proposed Plan amendments, resulting in cumulative noise impacts.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, would result in temporary noise and groundborne vibration from the use of heavy construction equipment (e.g., excavators, bulldozers, pile drivers, jackhammers), drilling, and blasting. Noise-sensitive receptors may be exposed to noise levels that exceed established standards or to a substantial increase in ambient noise. Project sites may be located near a public or private airport or airstrip and temporarily expose construction crews to excessive noise levels. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative noise impacts from construction depending on the proximity of construction projects.

Under *New or Modified Facilities*, operation and maintenance could generate noise, including permanent or periodic increased ambient noise from intakes and conveyance facilities; use of transformers, generators, fans, groundwater well and other pumps, and alarms; and increased traffic, particularly for new reservoirs allowing recreation. Depending on location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects and could result in cumulative noise impacts.

These impacts could be significant. Mitigation measures to avoid or reduce noise-related impacts similar to the mitigation measures found in the *Noise* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Population and Housing

The proposed Plan amendments and alternatives do not involve construction of new homes or businesses, extension of roads, other infrastructure, or other actions that may directly or indirectly induce substantial population growth in an area. Population and housing impacts from actions related to the proposed Plan amendments and alternatives would not be significant.

Public Services

The proposed Plan amendments and alternatives do not necessitate the need for new or physically altered schools, parks, public facilities, or governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for any public services. Public service impacts from actions related to the proposed Plan amendments and alternatives would not be significant.

Recreation

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on recreation described in Sections 7.18, *Recreation*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology include changes in reservoir levels that could affect boat ramp accessibility, affecting recreation opportunities at some reservoirs, and could lead to modification of existing or development of new boat ramps in some locations. Projects listed in Table 7.23-1 that could alter reservoir levels (FERC Projects, Water Supply Projects, Habitat Restoration Projects, SGMA, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), could interact with the proposed Plan amendments, resulting in cumulative recreation impacts.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could affect recreationists by creating construction-related traffic, visual impacts, water quality effects, noise, fugitive dust, and exhaust emissions from heavy equipment or by short-term or long-term access restrictions that could result in physical deterioration of alternative locations and facilities. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative recreation impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, habitat restoration projects that require levee breaching, construction of setback levees, and floodplain expansion could adversely affect marinas and other land-based recreational facilities and infrastructure. Permanent removal of marinas and other recreation facilities could displace recreationists to other locations. Dam removal projects could result in the long-term loss of existing opportunities for reservoir-based recreation activities and could affect flow-dependent activities such as whitewater rafting in river reaches downstream of a reservoir's removal location. Dam removal projects could displace recreationists to other locations. Depending on the location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects and could result in cumulative recreation impacts.

Under *New or Modified Facilities*, larger reservoirs and points of diversion facilities could restrict recreation in the area around them because of a need for a safety zone around the facility. Reservoirs and points of diversion may alter water levels and flow, which could adversely affect boating and fishing areas, public and private recreational facilities, or waterways used for recreation. They also could inundate areas previously used for recreation. The displacement of recreationists to other locations could result in accelerated physical deterioration of some recreational facilities over time. Due to odor from new WWTPs, recreationists may choose other

recreational locations. This could ultimately result in accelerated physical deterioration of these alternative locations and facilities over time. Depending on location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects and could result in cumulative recreation impacts.

Less-than-significant impacts include changes in flows that could affect the boating difficulty of rapids for rafting and kayaking and reduced opportunities for swimming or wading in rivers at some locations. An incremental increase in potential HABs could cause closures to recreation in some waterbodies. Changes in reservoir water surface area and elevation could affect sportfish populations and reduce fishing opportunities at some locations. Reduced deliveries to wildlife refuges also could affect recreational opportunities (e.g., wildlife viewing). Reduced municipal water supply could affect municipal recreational opportunities at parks, playfields, and swimming pools. Projects listed in Table 7.23-1 that could change streamflows (FERC Projects, Flood Control Projects, Water Supply Projects, Habitat Restoration Projects) and reservoir levels, including projects that reduce water supply (SGMA, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects) and projects that directly affect reservoirs and reservoir levels (Flood Control Projects and Habitat Restoration Projects), could interact with the proposed Plan amendments, resulting in cumulative recreation impacts.

These impacts could be significant. Mitigation measures to avoid or reduce recreation impacts similar to the mitigation measures found in the *Recreation* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Transportation and Traffic

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on transportation and traffic as described in Sections 7.19, *Transportation/Traffic*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could result in temporary and short-term increases in traffic due to additional vehicles on roads near project sites and relocating roads, which could cause new rerouted traffic at an intersection not designed to accommodate additional traffic. Roads also may be temporary blocked, rerouted, or altered, which could affect emergency access. Construction activities may result in degradation of roads from haul trucks or trips required for fill transport. Temporary relocation, closure, or complete removal of existing bicycle and pedestrian paths and trails also could occur during construction. Projects requiring in-channel construction activities could temporarily obstruct boat navigation and cause boat traffic delays. Construction equipment, such as dredges and cofferdams, also could temporarily obstruct boat traffic. Permanent relocation of road segments could require changes that could increase or introduce a hazard to vehicles traveling on that segment. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative transportation and traffic impacts from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, larger habitat restoration projects, including floodplain restoration, could result in inundation of roads that could impede use and cause

traffic congestion at intersections or on certain roadway segments. Construction-related traffic from dam removal projects may affect local residential and recreational traffic and existing transportation infrastructure (e.g., roadways, bridges, culverts) enroute to the dam sites and may require improvements to their current conditions. Removal of dams that provide river crossings may require construction of a new bridge to meet local traffic demands upon its removal. Depending on the location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects, resulting in cumulative transportation and traffic impacts.

Under *New or Modified Facilities*, reservoirs could require dredging operations, which would increase traffic related to trucking dredged material to another location for reuse or disposal. Operation of reservoirs with recreational facilities also could attract a substantial number of recreationists, which could cause periodic traffic congestion as well as unplanned wear and tear on rural roads. Depending on location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water Supply Projects, and Water Quality Projects and could result in cumulative transportation and traffic impacts.

These impacts could be significant. Mitigation measures to avoid or reduce transportation and traffic impacts similar to the mitigation measures found in the *Transportation/Traffic* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

Utilities and Service Systems

When the impacts of the proposed Plan amendments and the reasonably foreseeable compliance actions are considered in connection with the potential impacts of the projects listed in Table 7.23-1, the combination could result in potentially significant adverse cumulative impacts that are similar to the impacts on utilities described in Sections 7.20, *Utilities and Service Systems*, 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*.

Changes in hydrology could alter the assimilative capacity of some streams where treated wastewater is discharged and could result in construction to modify or expand existing treatment facilities in order to prevent or mitigate exceedances of drinking water standards and wastewater discharge water quality objectives. Reduced streamflow and water levels at some locations could affect the ability of existing diversion intakes to divert water, which could affect municipal water supplies. Projects listed in Table 7.23-1 that could alter streamflow and reservoir levels (FERC Projects, Water Supply Projects, Flood Control Projects, Habitat Restoration Projects, SGMA, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts on utilities and service systems.

Changes in water supply could result in the use of other lower quality water supply sources that affect WWTP influent and effluent. Reduced municipal supply and increased indoor water conservation could lead to a decrease in the production of wastewater and increase chemical constituent concentrations in WWTP influent. Changes in supply could result in construction to modify or expand existing treatment facilities in order to prevent or mitigate exceedances of drinking water standards and wastewater discharge water quality objectives. Reduced Sacramento/Delta supply to municipal use also could affect municipal water supplies in a manner that would cause water suppliers to need new or expanded water entitlements. Projects listed in Table 7.23-1 that could affect water supply (Habitat Restoration Projects, SGMA, Water Supply

Projects, LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects), including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects), could interact with the proposed Plan amendments, resulting in cumulative impacts to utilities and service systems.

Reduced groundwater levels could affect water supplies for communities that rely on groundwater as their primary municipal water source, including economically disadvantaged communities. Additionally, if the source of stored groundwater or surface water for water transfer is of lower quality, groundwater storage and recovery or water transfers could increase concentrations of some pollutants of concern in WWTP influent. Projects listed in Table 7.23-1 that may result in increased groundwater pumping, including projects that are growth inducing (General Plans, High-Speed Rail, Water Supply Projects) and projects that reduce water supply (LSJR/Southern Delta Plan Amendments, BiOp/ITP Projects) could interact with the proposed Plan amendments, resulting in cumulative impacts to utilities and service systems.

Construction projects identified in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, could generate stormwater runoff that discharges sediment and other pollutants, and wastewater from construction could include wastewater from sanitation facilities used by construction crews or wastewater generated directly from construction-related activities. Construction activities also require water supplies for construction workers onsite, manufacture and curing of concrete and mortar, testing for waterproofing, cleaning, dust control, and other activities. Construction activities could temporarily increase the volume of solid waste (e.g., soil, vegetative material, construction debris) disposed of at landfills. Construction activities also could temporarily disrupt existing electric and natural gas utilities and telecommunication lines and damage utility poles or snag suspended utility lines. Projects listed in Table 7.23-1 that contemplate construction could interact with the proposed Plan amendments, resulting in cumulative impacts on utilities and service systems from construction depending on the proximity of construction projects.

Under *Habitat Restoration and Other Ecosystem Projects*, dam removal projects could affect public utilities if water pipelines or electrical transmission lines cross the dam or reservoir or through the loss of a source of hydropower. Dam removal would generate substantial volumes of solid waste, including excavated material and demolition debris (e.g., concrete, treated wood, other waste), that would require landfill disposal. Depending on the location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for Flood Control Projects and Habitat Restoration Projects, resulting in cumulative impacts on utilities and service systems.

Under *New or Modified Facilities*, expansion of existing reservoirs through dredging may result in dredged material that cannot be reused for beneficial purposes and thus would require disposal at an appropriate landfill facility. New reservoirs and points of diversion also would require State Water Board approval of a new water right or a change to an existing right. A new groundwater well would require a valid groundwater right, either overlying or appropriative and, depending on the location, would need to be consistent with any relevant GSP. Groundwater storage and recovery of surface water would capture a new supply that generally is not subject to existing entitlements; therefore, new entitlement could be required in the form of water right permits from the State Water Board. Drinking water treatment plants would require a valid water right if drawing surface water or groundwater as a source; and groundwater withdrawal may require consistency with a GSP, depending on the location. Depending on location, these impacts are the same as or could interact with similar impacts from the projects listed in Table 7.23-1 for FERC Projects, Water

Supply Projects, and Water Quality Projects and could result in cumulative impacts on utilities and service systems.

These impacts could be significant. Mitigation measures to avoid or reduce impacts on utilities and service systems similar to the mitigation measures found in the *Utilities and Service Systems* sections of Tables 7.1-2, 7.21-1, and 7.22-1 should be considered for the referenced cumulative projects as well as the proposed Plan amendments and alternatives.

7.23.2 Growth-Inducing Impacts

CEQA requires a discussion of "the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." (Cal. Code Regs., tit. 14, § 15126.2, subd. (d).) Growth-inducing projects include projects that have the potential to remove obstacles that inhibit population growth or encourage and facilitate other activities that can significantly affect the environment, either individually or cumulatively.

Induced growth is any growth that exceeds planned growth and results from new development that would not have taken place without implementation of the proposed project. Growth or population concentration that exceeds those levels included in pertinent master plans, land use plans, or projections made by regional planning authorities could contribute to significant environmental effects.

The evaluation of potential growth-inducing effects in this section qualitatively discusses the possible ways the proposed Plan amendments, Low Flow Alternative, High Flow Alternative, and No Project Alternative could foster economic, population, or housing growth; remove obstacles to growth; or encourage and facilitate activities that could significantly affect the environment, either individually or cumulatively. (Cal. Code Regs., tit. 14, § 15126.2, subd. (d).) The evaluation of potential growth-inducing effects for the proposed VAs is provided in Chapter 9, *Proposed Voluntary Agreements*. Growth-inducing impacts are not to be construed as necessarily beneficial, detrimental, or of little significance to the environment.

A proposed project may have "direct" or "indirect" growth inducement potential. Direct growth inducement would result if a project involves construction of a substantial amount of new housing that would support increased population in a community. This additional population would, in turn, increase demands for public utilities, public services, roads, and other infrastructure. A project may result in indirect growth if it establishes substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises). Indirect growth inducement also would result if a project stimulates economic activity that requires physical development or removes an obstacle to growth and development (e.g., increasing infrastructure capacity that would enable new or additional development).

If the induced growth is consistent with or provided for by adopted land use plans and growth management policies for the area affected (e.g., city and county general plans, specific plans, transportation management plans), those plans may identify measures to ensure that environmental impacts are avoided or mitigated to the extent feasible.

7.23.2.1 California Growth Trends

A variety of factors may influence new development or population growth. These factors include (1) economic conditions such as job growth within California and outside of California, income growth, changing demographics, mortgage interest rates, and available housing stock and developable land; and (2) factors affecting demand for housing, including location environmental attributes, affordability, proximity to job centers, adopted land use plans and growth management policies, and the availability of adequate infrastructure (LAO 2015). Economic conditions are generally the primary factor. However, water supply is an important public service that supports urban development and affects the growth potential of a community. Lack of a reliable water supply could constrain future development. Conversely, improving reliability of water supplies serving an area could make that area more likely to develop in the future (^DSC 2011, Section 24).

Urban water use accounts for 10 percent of the three main sectors of water use in California (^PPIC 2023). The total amount of urban water use has plateaued even though the state's population grew by 5.5 million from 2000 to 2020 (^PPIC 2023). Prior to the 2012–2016 drought, the per-capita water use began to fall and has continued to decline in more recent years, including during the 2020–2022 drought (^PPIC 2023).

California is the nation's most populous state. In 2019, California became the first state to reach a population of 40 million, and the population is currently over 39 million people (PPIC 2020; PPIC 2023b). Although California's population has continued to grow in recent decades, the rate of growth has slowed dramatically since 2000. Nonetheless, the number of people added to the state's population in recent years has been substantial—300,000 each year, on average, from 2010 through 2019 (PPIC 2020). California's population is projected to be almost 42 million by 2030 (PPIC 2023b). Chapter 8, *Economic Analysis and Other Considerations*, contains population data and economic profiles of various regions in the study area. (See also Section 7.16, *Population and Housing*.)

The study area includes the fastest growing areas of the state within its seven regions: the Sacramento metropolitan area (Sacramento River watershed, Delta eastside tributaries, and Delta regions), the agricultural area of the San Joaquin Valley region, and the Inland Empire (in the highly urbanized manufacturing and commerce area of Southern California). The remaining two regions represent the high-technology manufacturing center of the San Francisco Bay Area and the less-urbanized Central Coast.

7.23.2.2 Proposed Plan Amendments

The proposed Plan amendments are based on the 2018 State Water Board *Framework for Possible Sacramento/Delta Updates to the Bay-Delta Plan.* The proposed Plan amendments include the following objectives and implementation measures for the protection of fish and wildlife.

1. Inflows from the Sacramento River, its tributaries, and Delta eastside tributaries (the Cosumnes, Mokelumne, and Calaveras Rivers) that would require 55 percent unimpaired flow, with an adaptive range from 45 percent to 65 percent unimpaired flow.
2. Inflow-based Delta outflows that would require inflows required as part of the Bay-Delta Plan, including from the Sacramento/Delta tributaries and San Joaquin River and tributaries, to be provided as outflows.

3. Cold water habitat provisions that would require reservoirs to be operated in a manner that provides needed cold water habitat for salmonids, or other measures to provide cold water habitat.
4. Interior Delta flows to reasonably protect native fish populations migrating through and rearing in the Delta, including expanding the existing Bay-Delta Plan exports constraints based on San Joaquin River inflows to include all of April and May and variable exports based on hydrologic conditions; incorporation of Old and Middle River flow constraints; and addition of October to the possible period when the Delta Cross Channel Gate is required to be closed.
5. Monitoring, reporting, and evaluation measures and other provisions.

The proposed Plan amendments do not require construction of new housing or commercial or industrial development and would not directly induce growth. Therefore, this section qualitatively discusses whether the proposed Plan amendments, along with reasonably foreseeable actions that water managers, users, or other individual entities may implement in response to the proposed Plan amendments, may indirectly induce growth by removing obstacles to growth. The evaluation of reasonably foreseeable methods of compliance and response actions that may be taken in response to changed flow requirements are organized into four main categories: (1) changes in hydrology; (2) changes in water supply; (3) physical habitat restoration and other complementary ecosystem projects; and (4) new or modified facilities.

Below is a discussion of whether each of these categories could potentially induce growth indirectly by removing obstacles to growth or encourage and facilitate other activities that can significantly affect the environment, either individually or cumulatively.

Changes in Hydrology

The proposed Plan amendments would result in changes in hydrology, including changes in streamflows and reservoir levels. These changes would not result in the provision of any new housing, businesses, or infrastructure to support or induce economic, population, or housing growth. Therefore, changes in hydrology, including changes in streamflows and reservoir storage levels, would not result in indirect growth inducement or remove any obstacles to growth.

Changes in Water Supply

As discussed in Chapter 6, *Changes in Hydrology and Water Supply*, implementation of the proposed Plan amendments would result in changes in Sacramento/Delta water supply, including reductions in water provided to agricultural and municipal uses and refuges. Reductions in Sacramento/Delta water supply to wildlife refuges would not directly or indirectly affect growth. Reductions in Sacramento/Delta water supply to municipal uses would not directly or indirectly encourage growth.

Reductions in Sacramento/Delta water supply to agricultural uses could result in some agricultural lands being taken out of production, and it is possible that such lands could then be converted to housing or other economic uses. However, conversion of agricultural lands to nonagricultural uses are governed by many factors, including the proximity of land to a developed area and other factors that affect its potential profitability as housing development. Local general plan and zoning patterns make it probable that a new housing use would require discretionary decisions by local agencies, such as general plan amendments, rezoning, subdivisions, or conditional use permits. Given the uncertainty and individual and governmental decisions involved, the possibility that the proposed

Plan amendments would lead agricultural lands to be converted to housing or other economic uses that would indirectly induce growth is speculative.

Groundwater

In response to reduced Sacramento/Delta surface water supply, individual water users could respond by increasing groundwater pumping as a substitute supply, where available and not locally restricted. Such a change in water supply source would not directly or indirectly affect growth as the increased pumping would replace the Sacramento/Delta supply. Therefore, a reduction in Sacramento/Delta surface water supply and the subsequent changes in groundwater pumping would not result in growth-inducing effects.

Other Water Management Actions

Water users throughout the state are currently pursuing other water management actions that provide a buffer against limited Sacramento/Delta surface water supplies, including during periods of drought. While the proposed Plan amendments are not the driving impetus for sustainable management and water supply diversification efforts, the proposed Plan amendments may accelerate and increase the need for such efforts to manage water more sustainably and plan more carefully. These actions include groundwater storage and recovery, water transfers, water recycling, and water conservation.

The use of other water management actions would likely result in an increase in the reliability of users' existing water supply portfolios rather than an overall increase in water supply. These actions therefore would not result in growth-inducing effects.

Habitat Restoration and Other Ecosystem Projects

Habitat restoration and other ecosystem projects include physical habitat restoration projects, as well as predation and invasive species control measures. They also could include certain activities related to cold water management such as reservoir temperature management facilities or fish passage facilities. These types of projects are described in detail and analyzed in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*.

Habitat restoration and other ecosystem projects would not result in growth-inducing effects. Habitat restoration and other ecosystem projects could result in short-term employment opportunities for construction and operation of these projects; however, the work would be largely temporary and seasonal. Project features would not lead to population growth or remove potential obstacles to future development. Moreover, habitat restoration or other ecosystem projects would not result in additional infrastructure that would create new sources of water that would foster population or housing growth or remove obstacles to such growth.

New or Modified Facilities

Actions that could be undertaken by water users and other entities to expand water supplies include infrastructure projects involving construction such as new or modified reservoirs and points of diversion; new groundwater wells and groundwater storage and recovery projects; new or modified WWTPs for water recycling; and new or modified drinking water treatment facilities, including desalination facilities. Other water management actions that involve construction of new or

modification of existing infrastructure are described in detail and evaluated in Section 7.22, *New or Modified Facilities*.

Implementation of the proposed Plan amendments would reduce Sacramento/Delta water supplies for agriculture, municipal, and refuge uses. In response, water users could increase efforts to prioritize limited available supplies and develop other water supply sources. New or modified facilities could be developed in response to reduced Sacramento/Delta water supplies. Other water sources already are being developed and utilized in response to water shortages that occur as a result of many factors. While the proposed Plan amendments are not the driving impetus for sustainable management and water supply diversification efforts, the proposed Plan amendments may accelerate and increase the need for such efforts.

New or modified facilities do not involve construction of new homes or businesses, extension of roads, other infrastructure, or other actions that may directly or indirectly induce substantial population growth in an area. Further, these projects would not develop amenities (e.g., malls, amusement parks, hotels) that would attract a substantial number of people to an area.

Some new or modified facilities could result in increased water supply to specific areas that could encourage some growth in some locations. However, this response would not significantly induce population growth statewide. Water availability is not the limiting factor preventing or slowing population growth in California, with the exception of a few, mostly coastal, areas that have imposed development or water connection moratoria because of limited municipal water supply. The 2012–2016 drought set records for lowest river flows, smallest snowpack, and highest temperatures, yet California's population continued to grow at approximately 300,000 people per year on average from 2010 to 2019 (PPIC 2020). Any additional water supply resulting from new or modified facilities is more likely to result in an increase in the reliability of existing water supply portfolios than an increase in water supply that would foster growth. Construction of new or modified facilities would result in employment opportunities for construction and operation of the facilities, but these employment opportunities would be unlikely to significantly induce population growth. Construction work would be largely short-term, temporary, and seasonal. Additional employment opportunities for the continued operations and maintenance of these facilities may last longer term but would not be expected to significantly induce population growth. Therefore, job creation is not expected to cause substantial population growth because new or modified facility projects do not require extensive staff and would add few jobs.

Overall, although new or modified facilities could encourage some growth in some locations, they would not cause substantial population growth.

7.23.2.3 Alternatives

Additional alternatives also are being evaluated and may be considered for adoption by the State Water Board, including both stand-alone alternatives and modular alternatives that could be layered onto the stand-alone alternatives. The stand-alone alternatives include the proposed Plan amendments, a No Project Alternative (Alternative 1), a Low Flow Alternative (Alternative 2), a High Flow Alternative (Alternative 3), and the Proposed Voluntary Agreement Alternative (Alternative 6).

The modular alternatives include three interior Delta flow and fall Delta outflow variations (Alternatives 4a, 4b, and 4c), two variations that could help to address limited water supplies during drought (Alternatives 5a and 5b), and a modular alternative for Protection of VA flows (Alternative 6a). Alternatives 4a, 4b, and 4c could be adopted in combination with the proposed Plan

amendments or other flow alternatives. Alternatives 5a and 5b could be adopted in combination with the proposed Plan amendments, other flow alternatives, or the Proposed Voluntary Agreement Alternative. Modular Alternative 6a (Protection of Voluntary Agreement Flows Alternative) would identify as part of the program of implementation additional measures to protect the base upon which the VA flows are intended to be added from new or expanded water diversions and could be adopted in combination with the proposed VAs. These alternatives are varying approaches to implementing the proposed Plan amendments or one of the stand-alone alternatives (except for the No Action Alternative). The modular alternatives therefore would not have growth-inducing impacts distinct from those of the stand-alone alternatives analyzed below.

Alternative 1, No Project Alternative

Alternative 1 is the No Project Alternative. The No Project Alternative assumes the continued implementation of the State Water Board's 2006 Bay-Delta Plan, as implemented by State Water Board Water Right Decision 1641 (D-1641)[2] (revised March 15, 2000). The No Project Alternative differs from existing conditions because existing flows in the Sacramento/Delta, including baseline Delta inflows and outflows, are generally substantially higher than the minimum flows required under D-1641 and other regulatory requirements. Under the No Project Alternative, it is expected that inflows and outflows would decrease over time due to continuation of increasing water demands in the absence of additional regulatory requirements.

Although increased diversions in the Sacramento/Delta are reasonably expected to occur in the future under the No Project Alternative it is not possible to precisely quantify the expected increase. The degree to which increased diversions would occur would depend on the types, amounts, and timing of additional water diversions and any constraints placed upon those diversions.

Under the No Project Alternative, water infrastructure projects could result in new or expanded water supplies. However, increased water supplies would not significantly induce population growth statewide. As explained under *New or Modified Facilities* in Section 7.23.2.2, *Proposed Plan Amendments*, water availability generally is not the limiting factor preventing or slowing population growth in California, with the exception of a few, mostly coastal, areas (such as part of Monterey County or Bolinas) that have imposed development or water connection moratoria because of limited municipal supplies.

Alternatives 2 and 3, Low Flow and High Flow Alternatives

Alternative 2 is the Low Flow Alternative and Alternative 3 is the High Flow Alternative. Each is similar to the proposed Plan amendments in that the alternative would establish new and modified objectives and implementation measures for the protection of fish and wildlife for: (1) inflows for the Sacramento/Delta tributaries; (2) cold water habitat; (3) Delta outflows; (4) interior Delta flows (flow and water project operational requirements); and (5) other monitoring, special studies, and other associated provisions. Under the Low Flow Alternative, the new numeric inflow objective for the Sacramento/Delta tributaries would require between 35 percent and 45 percent unimpaired

[2] In December 2018, the State Water Board revised the Bay-Delta Plan to include new and revised southern Delta salinity and lower San Joaquin River flow objectives and a revised program of implementation to achieve those objectives. It did not amend elements of the Bay-Delta Plan that are now being considered for revision in this Staff Report. For ease of reference in this discussion, this section refers to the 2006 Bay-Delta Plan instead of the 2018 Bay-Delta Plan because D-1641 implements the Sacramento River and Delta elements of the 2006 Bay-Delta Plan that have been carried forward unchanged in the 2018 Bay-Delta Plan.

flow. Under the High Flow Alternative, the new numeric inflow objective for the Sacramento/Delta tributaries would require between 65 percent and 75 percent unimpaired flow This differs from the numeric inflow objective under the proposed Plan amendments, which would require flows of 55 percent unimpaired flow, with an adaptive range from 45 percent to 65 percent unimpaired flow. The numeric inflow objectives and Delta outflow objective under the Low Flow Alternative would require a smaller amount of inflow to the Delta, and required Delta outflows would be less than those required under the proposed Plan amendments. The numeric inflow objective and Delta outflow objective under the High Flow Alternative would require a larger amount of inflow to the Delta, and required Delta outflows would be greater than those under the proposed Plan amendments.

The evaluation of reasonably foreseeable methods of compliance and response actions that may be taken in response to the Low Flow and High Flow Alternatives are organized into four main categories: (1) changes in hydrology; (2) changes in water supply; (3) physical habitat restoration and other complementary ecosystem projects; and (4) new or modified facilities. As discussed in Section 7.23.2.2, *Proposed Plan Amendments*, under *Changes in Hydrology*, changes in water supply (including reduced Sacramento/Delta supplies, groundwater pumping, and other water management actions that do not involve construction), and habitat restoration and other ecosystem projects would not significantly induce growth.

Under Alternatives 2 and 3, as under the proposed Plan amendments, some new or modified facilities could result in increased employment opportunities and increased water supply to specific areas that could encourage some growth in some locations. These effects may be slightly greater under Alternative 3 than under the proposed Plan amendments, and slightly less under Alternative 2, because of the differences in Sacramento/Delta water availability and the impetus for replacement supplies under the respective alternatives. However, for the reasons explained above in Section 7.23.2.2, under either Alternative 2 or Alternative 3, this response would not significantly induce population growth statewide.

7.23.3 Significant Irreversible Environmental Changes

Section 15126.2(c) of the State CEQA guidelines directs a discussion of the significant irreversible environmental changes that would be caused by a proposed project. Section 15127(a) of the State CEQA guidelines requires information about irreversible changes to be included in connection with the adoption, amendment, or enactment of a plan of a public agency.

A significant irreversible environmental change to resources is the permanent loss or damage of resources for future or alternative purposes. Irreversible changes to resources result in resources that cannot be recovered or recycled, or those that are consumed or reduced to unrecoverable forms. These impacts can be caused by the use of natural resources, so that they cannot be restored or returned to their original condition.

This section identifies the significant irreversible changes that could result directly from implementing the proposed Plan amendments and indirectly through potential related habitat restoration projects and/or new or modified facilities. It also identifies how the Delta itself constitutes an irreversible resource.

7.23.3.1 Proposed Plan Amendments

The primary purpose of the proposed Plan amendments is to improve flow and water quality conditions for fish and wildlife beneficial uses in the Sacramento River watershed, Delta eastside tributaries, and Delta regions (Sacramento/Delta). Overall, implementation of the proposed Plan amendments would result in changes in hydrology and water supply that could lead to conditions or other actions that (1) could result in the permanent loss or damage of resources for future or alternative purposes; or (2) could use natural resources associated with agriculture, cultural resources, energy, geology and soils, and groundwater resources such that they may not be recovered or recycled or may be used or affected such that they cannot be restored or returned to their original condition.

- *Agriculture:* Changes in hydrology and water supply could lead to conversion of land from an agricultural use to a nonagricultural use. If agricultural land is converted to a new land use such as housing, industrial, or another nonagricultural use, this change could be irreversible.
- *Cultural Resources:* Changes in hydrology could result in reductions in water surface levels at some reservoirs. If reservoir levels decrease and expose cultural resources, damage to those resources could cause a significant irreversible environmental change if there is a substantial adverse change in the significance of the resource.
- *Energy*: Changes in hydrology would result in an increase in hydropower generation during spring and a reduction during summer, typically a period of peak energy demand, but changes in annual hydropower generation would be relatively small. Changes in water supply could result in a reduction in CVP and SWP water exports and a reduction in the amount of energy needed to move water to consumers. The net energy effect of a reduction in exports would largely be dictated by responses in the regions expected to experience the largest reductions in supplies: the Sacramento River watershed and the San Joaquin Valley and Southern California regions. Should the energy to replace water supplies exceed the energy savings associated with reduced exports, individual communities may seek alternate nonrenewable energy supply solutions, such as natural gas. The use of nonrenewable energy resources could result in potentially significant irreversible environmental changes to energy resources.
- *Geology and Soils:* Changes in water supply have the potential to affect groundwater levels due to changes in groundwater pumping and changes in incidental recharge from applied irrigation water. Reduced groundwater levels may lead to or exacerbate existing subsidence conditions, which could represent a significant irreversible environmental change to geology and soil resources.
- *Groundwater Resources:* Changes in hydrology and water supply have the potential to affect groundwater levels due to increased groundwater pumping in response to reduced Sacramento/Delta supply and changes in incidental recharge from applied irrigation water. Reduced groundwater levels could result in significant irreversible environmental changes to groundwater resources.

7.23.3.2 Alternatives

Section 7.24, *Alternative Analysis,* considers alternatives to the proposed Plan amendments: a No Project Alternative (Alternative 1); alternatives to the flow level, a Low Flow Alternative (Alternative 2) and a High Flow Alternative (Alternative 3); and modular alternatives that include three interior Delta flow and fall Delta outflow variations (Alternatives 4a, 4b, and 4c) and drought

alternatives (Alternatives 5a and 5b). Similar to the significant and irreversible environmental changes identified in Section 7.23.3.1, each of these alternatives to the proposed Plan amendments would lead to conditions or other actions that (1) could similarly result in the permanent loss or damage of resources for future or alternative purposes; or (2) could similarly use natural resources associated with agriculture, cultural resources, energy, geology and soils, and groundwater resources such that they may not be recovered or recycled or may be used or affected such that they cannot be restored or returned to their original condition. In some cases, the level of loss or consumption of the resource would be incrementally less or more; Section 7.24, *Alternatives Analysis*, provides more detail on the magnitude of the changes in impacts under each alternative.

Changes in hydrology and water supply under the Low Flow Alternative would generally be smaller and closer to baseline conditions compared to the changes that would occur under the proposed Plan amendments. Changes in hydrology and water supply under the High Flow Alternative would generally be larger and further from baseline conditions compared to the changes that would occur under the proposed Plan amendments.

The increased use or accelerated development of new or modified facilities would be less under the Low Flow Alternative than the proposed Plan amendments and greater under the High Flow Alternative than the proposed Plan amendments.

The impacts of construction from habitat restoration and other ecosystem projects under the Low Flow Alternative could be more or less compared to the proposed Plan amendments, depending on whether the lower numeric inflow requirements lead to an overall greater dependence on habitat restoration and other ecosystem projects to improve conditions for native fish. Under the High Flow Alternative, the impacts of habitat restoration and other ecosystem projects could be less compared to the proposed Plan amendments if habitat restoration and other ecosystem projects are not implemented in the Sacramento/Delta.

The modular alternatives include varying approaches to implementing the proposed Plan amendments or one of the flow alternatives and are designed to be added onto one of those. Therefore, they could have similar irreversible environmental changes as the alternatives discussed above.

7.23.3.3 Other Potential Irreversible Environmental Changes

As discussed in Sections 7.21, *Habitat Restoration and Other Ecosystem Projects*, and 7.22, *New or Modified Facilities*, in response to the proposed Plan amendments, entities may undertake other projects. These may include habitat restoration projects, fish passage improvements, predatory fish control, and invasive aquatic vegetation control projects, as well as modification or construction of new facilities or infrastructure to supplement surface water supplies or other construction projects. Development of related projects may include demolition and/or relocation of roads, utilities, and other existing structures; excavation of levee breaches; levee lowering; grading of river–floodplain connections and floodplain surfaces; dredging; stockpiling of equipment and materials; and installation of irrigation systems and restoration plantings. Depending on the scale and size of these actions, construction and/or operation could result in potentially significant irreversible environmental changes to several resources such that they cannot be restored or returned to their original conditions. Resources that could be affected are aesthetics, agriculture and forest resources, biological resources, cultural resources, energy and GHG emissions, geology and soils, hydrology and water quality, land use, and mineral resources. These projects also would require the use of

nonrenewable or slowly renewed resources that may not be recovered or recycled, or may be used such that they cannot be restored or returned to their original condition, including the following.

- Energy for construction in the form of electricity, gasoline, diesel fuel, and oil to power construction equipment and vehicles and to manufacture and produce construction products such as concrete, finished metals, and plastics.
- Energy for operations in the form of electricity, gasoline, diesel fuel, and oil to power maintenance vehicles, pumps, fish screen mechanisms, facility lighting, and other routine maintenance and operations.
- Wood products.
- Mined materials such as sand, gravel, aggregate (to produce concrete), steel, lead, copper, other metals, and other potential petroleum-based products, such as asphalt or plastic.

Irreversible impacts that may occur to specific resources as a result of construction or operation of related projects include the following.

- *Aesthetics:* Depending on the location, projects could permanently alter scenic vistas or degrade the visual quality of an area to an extent that they would result in irreversible changes to scenic resources.
- *Agriculture and Forest Resources:* Depending on the location, projects could convert important farmland, conflict with existing zoning for agricultural use and forest land, or conflict with a Williamson Act contract. Irreversible environmental change could result from a loss or conversion of farmland or forest land.
- *Biological Resources:* Impacts from construction activities could include potential loss or modification of sensitive habitat or conversion of riparian or wetland habitat.
- *Cultural Resources:* Siting of projects in areas where cultural resources may be present could result in significant irreversible impacts on those resources.
- *Energy:* Alternative mechanisms to store, replace, and convey water supplies as a result of these projects (e.g., dam removal, groundwater pumping and management, water transfers, wastewater treatment plants) could result in a net increase in energy use. An increase in GHG emissions could occur if an existing renewable source of power was replaced by other regional power sources that, in part, could be generated from fossil fuels.
- *Mineral Resources:* Depending on location, projects could result in the loss of availability of a mineral resource with either regional or local importance by making the resource inaccessible or by substantially depleting the resource.
- *Land Use*: To the extent that entities would decide to modify or construct new facilities (e.g., desalination facilities), those facilities likely would be constructed on lands already committed to commercial, industrial, and institutional uses. However, if facilities are not constructed near or adjacent to existing facilities, those types of facilities could result in a change to land use such that it cannot be restored or returned to its original condition.

7.23.3.4 The Delta

The Delta, which is formed by the confluence of the Sacramento and San Joaquin Rivers and covers approximately 1,150 square miles, is the largest estuary on the West Coast and contains a variety of

habitat types for over 700 species of fish and wildlife. In addition, many of the state's native fish species migrate through the Delta. As a result, the Delta is important for maintaining biodiversity in California. The Delta, however, qualifies as a resource with finite use capacity, particularly on an annual basis.

The Delta is experiencing an ecological crisis in the watershed and the prolonged and precipitous decline in numerous native species of spring-run and winter-run Chinook salmon, longfin smelt, Delta smelt, Sacramento splittail, and other species, and the factors involved in those declines. (See Appendix B, *Scientific Basis Report in Support of New and Modified Requirements for Inflows from the Sacramento River and its Tributaries and Eastside Tributaries to the Delta, Delta Outflows, Cold Water Habitat, and Interior Delta Flows [2017]*). While it is not possible to replicate original/natural flows or the natural landscapes in which those flows occurred and interacted in the Bay-Delta, it is possible to take actions to provide more natural functional flows in coordination with other complementary actions to improve and restore habitat functions to support a resilient ecosystem.

Failing to take actions proposed by the proposed Plan amendments could result in the loss of Delta function beyond restoration of its original function and, therefore, would result in a significant irreversible environmental change.

In addition to the biological species affected by the loss of Delta flows, the Delta itself is recognized as a "unique cultural, recreational, [and] natural resource." (Pub. Res. Code § 29702, subd. (a).) It is a major recreational destination and "a place for people, homes and businesses, and a place filled with human history, cultural richness and diversity" (^Visit CA Delta 2017). These characteristics not only help define the "Delta as an evolving place" concept, as identified in the Sacramento-San Joaquin Delta Reform Act of 2009 (Wat. Code, § 85000 et seq.), but they also help establish the unique visual quality and character of much of the Delta. The landscape is characterized by low-lying islands and tracts, many below the water level, that have been shaped by sloughs, tidal influences, levees, and other water controls. Because of its unique geography, rich natural resources, and mix of agricultural and recreational activities, the Delta is a unique spot in which to live or visit. Recognizing the value of the region's cultural, historic, and natural resources, in March 2019 the Delta Protection Commission designated the Delta—including Suisun Marsh and part of the San Francisco Bay—as California's first National Heritage Area (Figure 7.3-1a) (^DPC 2019). The National Heritage Area designation further acknowledges the unique role of the Delta in California. Changes to the Delta beyond its characteristics that define it as a National Heritage Area also would result in a significant environmental change.

7.23.4 References Cited

7.23.4.1 Common References

^Contra Costa County. 2005. *Contra Costa County General Plan 2005-2020*. January 18. Contra Costa County, Department of Conservation and Development, Martinez, California.

^Delta Protection Commission (DPC). 2019. Press Release: *President Signs Bill Establishing Sacramento-San Joaquin Delta National Heritage Area*.

^Delta Stewardship Council (DSC). 2011. *Delta Plan Program Environmental Impact Report*. Draft. Sacramento, CA.

^Kern County. 2009. *Kern County General Plan*. September 22.

^Public Policy Institute of California (PPIC). 2023. *Water Use in California*. April.

^Visit CA Delta. 2017. *About Visit CA Delta*. Available: https://visitcadelta.com/about/. Accessed: September 29, 2018.

7.23.4.2 Section References

Alameda County Community Development Agency Planning Department. 2000. *East County Area Plan*. Vol. 1.

Alameda County Community Development Agency Planning Department. 2020. *General Plan Annual Report and Housing Element Annual Report for 2020.*

Butte County. 2023a. *Butte County General Plan 2040*.

Butte County. 2023b. *Butte County General Plan 2040*. Last revised: n.d. Available: https://www.buttecounty.net/367/Butte-County-General-Plan-2040. Accessed: June 12, 2023.

California Department of Fish and Wildlife (CDFW). 2023. *Water Storage Investment Program (WSIP)*. Last revised: n.d. Available: https://wildlife.ca.gov/Conservation/Watersheds/WSIP. Accessed: June 29, 2023.

California Department of Water Resources (DWR). 2020a. *Final EIR for State Water Project Long-Term Operations Appendix C – Modeling Attachment 2-1 – Storage and Elevation Results*.

California Department of Water Resources (DWR). 2020b. *Final EIR for State Water Project Long-Term Operations Appendix C – Modeling Attachment 3-1 – Storage and Elevation Results*.

California Department of Water Resources (DWR). 2021a. Statement of Findings Regarding the Approval of the North Yuba Subbasin Groundwater Sustainability Plan. Sent to Scott Matyac, Yuba Water Agency, by Paul Gosselin, Deputy Director for Sustainable Groundwater Management, November 18.

California Department of Water Resources (DWR). 2021b. Agricultural Road Crossing 4 Fish Passage Project Notice of Exemption.

California Department of Water Resources (DWR). 2022. Letter to Kiti Campbell, Westlands Water District, from Paul Gosselin, Deputy Director for Sustainable Groundwater Management. RE: Incomplete Determination of the 2020 Westside Subbasin Groundwater Sustainability Plan, January 21.

California Department of Water Resources (DWR). 2023a. Letter to Kiti Campbell, Westlands Water District, from Paul Gosselin, Deputy Director for Sustainable Groundwater Management. Re: Westside Subbasin -- Response to 2022 Incomplete Determinations. March 2.

California Department of Water Resources (DWR). 2023b. Letter to Patricia Poire, Kern Groundwater Authority, from Paul Gosselin, Deputy Director for Sustainable Groundwater Management. Re: Inadequate Determination of the Revised 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kern County Subbasin. March 2.

California Department of Water Resources (DWR). 2023c. *Delta Conveyance Project Final Environmental Impact Report: Appendix 5A, Section B Modeling Technical Appendix – Attachment 3 – CalSim 3 Model Results for Existing Condition and Alternatives at 2020*.California Department

of Water Resources (DWR). 2023d.*The Delta Conveyance Project*. Last revised: n.d. Available: https://storymaps.arcgis.com/stories/52dc0a1a3ded44c9b6d33a804fdd260f. Accessed: June 14, 2023.

California Department of Water Resources (DWR). 2023e. *Oroville Facilities (P-2100).* Last revised: n.d. Available: https://water.ca.gov/Programs/State-Water-Project/SWP-Facilities/Oroville/HLPCO-Oroville-Facilities-Project-2100. Accessed: April 10, 2023.

California Department of Water Resources (DWR). 2023f. *Lower Elkhorn Basin Levee Setback Project*. Last revised: n.d. Available: https://water.ca.gov/Programs/Flood-Management/Flood-Projects/Lower-Elkhorn-Basin. Accessed: April 13, 2023.

California Department of Water Resources (DWR). 2023 g. *Tisdale Weir Rehabilitation and Fish Passage Project*. Last revised: n.d. Available: https://water.ca.gov/Programs/Flood-Management/Flood-Projects/Tisdale-Weir. Accessed: April 13, 2023.

California Department of Water Resources (DWR). 2023 h. *California EcoRestore*. Last revised: n.d. Available: https://water.ca.gov/Programs/All-Programs/EcoRestore. Accessed: April 4, 2023.

California Department of Water Resources (DWR). 2023i. *Delta Conveyance*. Last revised: n.d. Available: https://water.ca.gov/Programs/State-Water-Project/Delta-Conveyance. Accessed: June 14, 2023.

California Department of Water Resources (DWR). 2024. *Long-Term Operations of the State Water Project Final Environmental Impact Report: Appendix 4B Attachment 2b: Flow Results (CalSim 3).*

California Department of Water Resources (DWR). 2026a. The Delta Conveyance Project. Last revised: n.d. Available: https://water.ca.gov/Programs/Flood-Management/Delta-Conveyance-And-Flood-Protection/North-Delta-Program Accessed: June 25, 2026.

California Department of Water Resources (DWR). 2026b. *Riverine Habitat Restoration Projects.* Last revised: n.d. Available: https://water.ca.gov/Programs/Integrated-Science-and-Engineering/Restoration-Mitigation-Compliance/Yolo-Bypass-Projects. Accessed: June 26, 2026.

California High-Speed Rail Authority. 2023. *Connecting California, Expanding the Economy and Transforming Travel*. March 16.

California Public Utilities Commission (CPUC). 2024. Decision 24-05-004. *Decision Denying Application*. Application 22-09-018. May 10.

California Water Commission (CWC). 2026a. *Chino Basin Conjunctive Use Environmental Water Storage/Exchange Program*. Last revised: April 30, 2026. Available: https://cwc.ca.gov/Water-Storage/WSIP-Project-Review-Portal/All-Projects/Chino-Basin-Conjunctive-Use-Environmental-Water-Storage-Exchange-Program. Accessed: June 26, 2026.

California Water Commission (CWC). 2026b. *Kern Fan Project*. Last revised: n.d. Available: https://cwc.ca.gov/Water-Storage/WSIP-Project-Review-Portal/All-Projects/Kern-Fan-Project. Accessed: May 12, 2026.

California Water Commission (CWC). 2026c. *Water Storage Investment Program: Funding the Public Benefits of Water Storage Projects*. Last revised: January 30. Available: https://cwc.ca.gov/Water-Storage. Accessed: June 26, 2026.

City of Antioch. 2026. *Water Treatment (Antioch Brackish Water Desalination Plant)*. Last revised: n.d. Available: https://www.antiochca.gov/583/Water-Treatment. Accessed: May 12, 2026.

City of Chino. 2025. *City of Chino 2045 General Plan*. Introduction. September.

City of Folsom. 2021. F*olsom General Plan 2035*. Amended August 24, 2021.

City of Sacramento. 2024. *2040 General Plan and Climate Action & Adaptation Plan*. February 27. Amended November 18, 2025. Available: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan. Accessed: June 17, 2026.

Coachella Valley Water District (CVWD). 2023 *Chromium-6*. Last revised: n.d. Available: http://www.cvwd.org/159/Chromium-6. Accessed: April 6, 2023.

Coachella Valley Water District (CVWD). 2026. *Chromium-6 Information*. Last revised: n.d. Available: http://www.cvwd.org/159/Chromium-6. Accessed: May 12, 2026.

Contra Costa County. 2024. *Contra Costa County 2045 General Plan*. November 5. Available: https://www.contracosta.ca.gov/4732/General-Plan. Accessed: May 12, 2026.

Contra Costa Resource Conservation District (CCRCD). 2023. *Marsh Creek Watershed*. Last revised: n.d. Available: https://www.ccrcd.org/marsh-creek-watershed. Accessed: June 20, 2023.

Contra Costa Water District (CCWD)2026. *Los Vaqueros Reservoir Project History*. Last revised: n.d. Available: https://www.ccwater.com/435/Los-Vaqueros-Project-History. Accessed: May 12, 2026.

Del Puerto Water District. 2020. *Del Puerto Canyon Reservoir Final Environmental Impact Report*. Volume 1. Prepared for Del Puerto Water District (Patterson, CA).

Del Puerto Water District (DPWD). 2026. Del Puerto Canyon Reservoir Know the Facts. Last revised: n.d. Available: https://delpuertocanyonreservoir.com/. Accessed: June 26, 2026.

East Bay Municipal Utility District (EBMUD). 2026. *Leland Reservoir Replacement Project*. Available: https://www.ebmud.com/about-us/construction-and-maintenance/construction-my-neighborhood/leland-reservoir-and-pipeline-replacement. Accessed: May 12, 2026.

El Dorado County Water Agency (EDCWA). 2024. *El Dorado Water Reliability Project Environmental Impact Report.* Draft. SCH# 2014032038. Prepared for El Dorado County Water Agency. October.

Environmental Science Associates (ESA). 2026. Tisdale Weir Rehabilitation and Fish Passage Project. Available: https://esassoc.com/projects/tisdale-weir-rehabilitation-and-fish-passage-project/. Accessed: 11 July 2026.

Federal Energy Regulatory Commission (FERC). 2018. *Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project* – FERC Project No. 12496-002 – California. FERC/EIS-0276. July.

Federal Energy Regulatory Commission (FERC). 2020. Order Issuing New License. Prepared for Placer County Water Agency Project No. 2079-069. June.

Federal Energy Regulatory Commission (FERC). 2022a. Order Issuing New License. Prepared for Pacific Gas and Electric Company and City of Santa Clara. Project No. 619-164. June.

Federal Energy Regulatory Commission (FERC). 2022b. Order Addressing Arguments Raised on Rehearing and Denying Motion for Temporary Stay.

Federal Energy Regulatory Commission (FERC). 2023a. Notice Extending Comment Period. Pacific Gas & Electric Company. Project Nos.77-316, 96-050, 1370216, 175-030, 233-245, 606-041, 619-175, 803-119, 1061-105, 11210137, 13450033, 1962-221, 1988-102, 2105-129, 2106-077, 2107-051, 2130-125, 2310-252, 2661-094, 2687-189, 2735-102, and 14531-002. July 14.

Federal Energy Regulatory Commission (FERC). 2023b. Letter to The Nevada Hydro Company from Vincent Yearick, Director, Division of Hydropower Licensing, Reference: Dismissal of License Application. Project No. 14227-006 – California Bluewater Renewable Energy Storage Project, The Nevada Hydro Company, Inc. February 21.

Fresno County. 2023. *What is a General Plan?* Last revised: n.d. Available: https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/divisions-of-public-works-and-planning/development-services-division/planning-and-land-use/general-plan-review-zoning-ordinance-update/what-is-a-general-plan. Accessed: June 12, 2023.

Fresno County. 2026 *General Plan Review & Zoning Ordinance Updates*. Last revised: n.d. Available: https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/divisions-of-public-works-and-planning/development-services-division/planning-and-land-use/general-plan-review-zoning-ordinance-update. Accessed: May 12, 2026.

Legislative Analyst Office (LAO). 2015. *California's High Housing Costs Causes and Consequences*. March 17.

Los Angeles County Public Works. 2023. *Santa Anita Stormwater Flood Management and Seismic Strengthening Project*. Last Revised: September 21, 2023. Available: https://dpw.lacounty.gov/wrd/Projects/SantaAnita/index.cfm#explore. Accessed: May 12, 2026.

Los Vaqueros Reservoir Joint Powers Authority. 2023. *Los Vaqueros Reservoir Expansion Project*. March.

Maven's Notebook. 2020. *Water Storage Investment Program: Temperance Flat Reservoir Project Status Update*. Last revised: October 26, 2020. Available: https://mavensnotebook.com/2020/10/26/water-storage-investment-program-temperance-flat-reservoir-project-status-update/. Accessed: June 29, 2023.

Maven's Notebook. 2022. *CA Water Commission: Update on the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Big Notch)*. Last revised: January 25, 2022. Available: https://mavensnotebook.com/2022/01/25/ca-water-commission-update-on-the-yolo-bypass-salmonid-habitat-restoration-and-fish-passage-project-big-notch/?doing_wp_cron=1670517267.3220660686492919921875. Accessed: June 14, 2023.

Maven's Notebook. 2023. *CA Water Commission: Water Storage Investment Program Project Update*. Last revised: March 29, 2023. Available: https://mavensnotebook.com/2023/03/29/ca-water-commission-water-storage-investment-program-project-update/#:~:text=Chino%20Basin%20Conjunctive%20Use%20Environmental,the%20Chino%20Basin%20Water%20Bank. Accessed: June 29, 2023.

Merced County. 2023. *General Plan*. Last revised: n.d. Available: https://www.countyofmerced.com/100/General-Plan. Accessed: April 14, 2023.

National Oceanic and Atmospheric Administration (NOAA) Fisheries West Coast Regional Office. 2025. *West Coast Federal Energy Regulatory Commission (FERC) Licensed Hydroelectric Projects: Feather River*. Last revised: April 17, 2025. Available: https://www.fisheries.noaa.gov/west-coast/habitat-conservation/west-coast-federal-energy-regulatory-commission-ferc-licensed-1#rock-creek-cresta-hydroelectric-project-(p-1962). Accessed: May 8, 2026.

Nevada Irrigation District (NID). 2024. *Centennial Water Supply Project*. Last revised September 26, 2024. Available: https://www.nidwater.com/nid-moves-forward-to-meet-future-water-needs-of-the-community. Accessed: May 12, 2026.

Pacific Gas and Electric Company (PG&E) and Pacific Generation LLC (Pacific Generation). 2022. Joint Application for Approval of Transfer of Licenses. Prepared for Federal Energy Regulatory Commission. Document Accession #20221213-5187. Filed December 13.

Public Policy Institute of California (PPIC). 2020. *An Accurate 2020 Census Is Important for California.* January.

Public Policy Institute of California (PPIC). 2023a. *The Future of Agriculture in the San Joaquin Valley*. February.

Public Policy Institute of California (PPIC). 2023b. *California's Population. Fact Sheet.* January.

Sacramento Area Sewer District (SacSewer). 2024. *Water Recycling Program*. Available: https://www.sacsewer.com/water-recycling-program/. Accessed: April 16, 2026.

Sacramento Area Sewer District (SacSewer). 2026. *Harvest Water.* Last revised: April 27, 2026. Available: https://www.regionalsan.com/harvest-water. Accessed: June 9, 2026.

Sacramento County. 2026. *2030 General Plan*. Last revised: n.d. Available: https://landuse.saccounty.gov/gp/0_about/. Accessed: May 12, 2026.

San Bernardino County. 2023. *General Plan*. Last revised: n.d. Available: https://lus.sbcounty.gov/planning-home/general-plan/. Accessed: April 14, 2023.

San Bernardino County. 2026. *About the Policy Plan.* Last revised: n.d. Available: https://countywideplan.sbcounty.gov/policy-plan/. Accessed: May 12, 2026.

San Francisco Bay Area Integrated Regional Water Management Plan (SF Bay Area IRWMP). 2013. September.

San Joaquin County. 2016. *San Joaquin County General Plan*. December.

Santa Clara Valley Water District (Valley Water). 2023. *Pacheco Reservoir Expansion Project Draft Environmental Impact Report*. Last revised: n.d. Available: https://www.valleywater.org/node/1898. Accessed: June 12, 2023.

Sites Project Authority. 2021. *Sites Reservoir Project Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement*. Chapter 2. Project Description and Alternatives.

Sites Project Authority. 2023. *Sites Reservoir Project Final Environmental Impact Report/ Environmental Impact Statement: Appendix 5B3 Delta Operations*.

Sites Project Authority. n.d. *Environmental Review*. Last revised: n.d. Available: https://sitesproject.org/environmental-review/. Accessed: June 13, 2023.

Solano County. 2008. *Solano County General Plan*. Chapters 1 (Introduction) and 4 (Resources).

Solano County. 2023. *Solano County General Plan*. Last revised: n.d. Available: https://www.solanocounty.com/depts/rm/planning/general_plan.asp. Accessed: April 13, 2023.

South Coast Water District. 2023. *Doheny Ocean Desalination Project*. Last revised: n.d. Available: https://scwd.org/about/district_projects/doheny_ocean_desalination_project/index.php. Accessed: April 6, 2023.

South San Joaquin Irrigation District (SSJID). 2021. *2020 Urban Water Management Plan for South San Joaquin Irrigation District*. June.

Stanislaus County. 2023a. *General Plan*. Last revised: n.d. Available: https://www.stancounty.com/planning/pl/general-plan.shtm. Accessed: April 14, 2023.

Stanislaus County. 2023b *6th Cycle Housing Element Update*. Last revised: n.d. Available: https://www.stancounty.com/planning/pl/housing-element.shtm. Accessed: April 14, 2023.

State Water Resources Control Board (SWRCB). 2018. *Final Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento San Joaquin Delta Estuary San Joaquin River Flows and Southern Delta Water Quality Executive Summary*.

State Water Resources Control Board (SWRCB). 2019. Water Quality Certification for Federal Permit or License. In the Matter of Water Quality Certification for the Pacific Gas and Electric Company McCloud-Pit Hydroelectric Project Federal Energy Regulatory Commission Project No. 2106.

State Water Resources Control Board (SWRCB). 2021. *Federal Energy Regulatory Commission (FERC) Project No. 803*. Last revised: May 24, 2021. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/desabla_ferc803.html. Accessed: April 10, 2023.

State Water Resources Control Board (SWRCB). 2023. *Water Storage Investment Program (WSIP)*. Last revised: September 8, 2023. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/wsip/. Accessed: September 19, 2023.

State Water Resources Control Board (SWRCB). 2024a. *South Feather Power Project: Federal Energy Regulatory Commission (FERC) Project No. 2088*. Last revised: April 22, 2024. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/southfeather_ferc2088.html. Accessed: May 12, 2026.

State Water Resources Control Board (SWRCB). 2024b. *Hexavalent Chromium (Chromium-6)*. Last revised: November 1, 2024. Available: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chromium6.html. Accessed: May 12, 2026.

State Water Resources Control Board (SWRCB). 2024c. *Federal Energy Regulatory Commission (FERC) Project Nos. 2310 and 14531*. Last revised: July 30, 2024. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/drum_spaulding_ferc2310.html. Accessed: May 8, 2026.

State Water Resources Control Board (SWRCB). 2025a. *Middle Fork American River Project: Federal Energy Regulatory Commission Project No. 2079.* Last revised: May 25, 2025. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/middlefork_american_river_ferc2079.html. Accessed: May 8, 2026.

State Water Resources Control Board (SWRCB). 2025b. *Federal Energy Regulatory Commission (FERC) Project No. 2266*. Last revised: September 15, 2025. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/yubabear_ferc2266.html. Accessed: May 8, 2026.

State Water Resources Control Board (SWRCB). 2025c. *Water Quality Certification – Current Projects*. Last revised: October 30, 2025. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/current_projects.html. Accessed: May 12, 2026.

State Water Resources Control Board (SWRCB). 2026a. *Federal Energy Regulatory Commission (FERC) Project No. 2246.* Last revised: June 10, 2026. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/yubariver_ferc2246.html. Accessed: June 26, 2026.

State Water Resources Control Board (SWRCB). 2026b. *Federal Energy Regulatory Commission (FERC) Project. No. 2106*. Last revised: May 6, 2026. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/mccloudpit_ferc2106.html. Accessed: May 8, 2026.

State water Resources Control Board (SWRCB). 2026c. *Division of Water Rights Water Quality Certifications Issues Under Section 401 of Clean Program Water Act*. Last revised: May 7, 2026. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/401_certifications.html. Accessed: May 12, 2026.

State Water Resources Control Board (SWRCB). 2026d. *Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS)*. Last revised: July 7, 2026. Available: https://www.waterboards.ca.gov/centralvalley/water_issues/salinity/. Accessed: August 10, 2026.

Stockton East Water District (SEWD). 2021. *Urban Water Management Plan 2020 Update*. June.

Superior Court of California, County of Stanislaus. 2022. Ruling. Case Nos.CV-20-5164 and CV-20-5193. October 31.

Tulare County. 2023. *Tulare County General Plan Update*. Last revised: n.d. Available: http://generalplan.co.tulare.ca.us/. Accessed: April 14, 2023.

U.S. Army Corps of Engineers (USACE). 2026. *Hamilton City Flood Damage Reduction and Ecosystem Restoration*. Last revised: n.d. Available: https://www.spk.usace.army.mil/Missions/Civil-Works/Hamilton-City/. Accessed: June 26, 2026.

U.S. Army Corps of Engineers (USACE). 2023. *Isabella Lake Dam Safety Modification Project*. Last revised: n.d. Available: https://www.spk.usace.army.mil/Missions/Civil-Works/Isabella-Dam/. Accessed: June 13, 2023.

U.S. Bureau of Reclamation (Reclamation). 2020a. *B.F. Sisk Dam Raise and Reservoir Expansion Project Environmental Impact Report/Supplemental Environmental Impact Statement.* Draft. SCH# 2009091004.

U.S. Bureau of Reclamation (Reclamation). 2020b. *Final Supplemental Environmental Impact Statement Shasta Lake Water Resources Investigation.* Final. Prepared by U.S. Department of the Interior Region 10 California-Great Basin Bureau of Reclamation.

U.S. Bureau of Reclamation (Reclamation). 2021. *Yolo Bypass Salmonid Habitat Restoration and Fish Passage*. Last revised: June 7, 2021. Available: https://www.usbr.gov/mp/bdo/yolo-bypass.html. Accessed: June 14, 2023.

U.S. Bureau of Reclamation (Reclamation). 2022a. *Battle Creek Salmon and Steelhead Restoration Project*. Last revised: July 13, 2022. Available: https://www.usbr.gov/mp/battlecreek/. Accessed: June 14, 2023.

U.S. Bureau of Reclamation (Reclamation). 2022b. *About the Project*. Last revised: July 13, 2022. Available: https://www.usbr.gov/mp/battlecreek/about.html. Accessed: June 14, 2023.

U.S. Bureau of Reclamation (Reclamation). 2022c. *Shasta Dam and Reservoir Enlargement Project.* Last revised: March 24, 2022. Available: https://www.usbr.gov/mp/ncao/shasta-enlargement.html. Accessed: January 8, 2025.

U.S. Bureau of Reclamation (Reclamation). 2023. *Record of Decision B.F. Sisk Dam Raise and Reservoir Expansion Project*. October.

U.S. Department of the Interior (USDOI). 2019. *Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Velley Project and State Water Project – Final Biological Assessment*.

Westlands Water District GSA and County of Fresno GSA-Westside. 2022. *Westside Subbasin Groundwater Sustainability Plan (Clarified and Amended GSP)*. Prepared by Luhdorff & Scalmanini Consulting Engineers.

Yolo County. 2004. *Yolo County Stormwater Management Program (SWMP) Planning Document*. Revised October 2004.

Yolo County. 2023a. *General Plan.* Last revised: n.d. Available: https://www.yolocounty.org/government/general-government-departments/county-administrator/general-plan. Accessed: April 13, 2023.

Yolo County.2023b. *Storm Water Management*. Last revised: n.d. Available: https://www.yolocounty.org/government/general-government-departments/community-services/public-works-division/storm-water-management. Accessed: April 6, 2023.