Chapter 2

Project Update/Activities since Publication of the Draft EIR/EIS

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This chapter is intended to provide an update on various aspects of the project that have changed since issuance of the draft EIR/EIS on August 8, 2003. Many of these changes are a result of comments received on the draft EIR/EIS during the comment period, which ended December 15, 2003. Changes to the project are presented in the list below, followed by a more detailed description of each.

1. Modifications to the layout and configuration of the intake facilities
2. Site identification for Zone 40 water treatment plant
3. Revised modeling and coordinated operation agreement assumptions
4. Water contract settlement agreements

None of these changes results in new impacts. In some cases they result in a reduction of severity of impacts identified in the draft EIR/EIS. A revised summary of impacts and mitigation measures is provided at the end of this chapter in Tables S-1, S-2, and S-3. Table S-1 summarizes the significant environmental impacts and Table S-2 summarizes the less-than-significant environmental impacts of the FRWP alternatives. Table S-3 summarizes significant cumulative impacts. The tables are organized to present impacts by environmental topic area and to indicate the significance of each impact, available mitigation measures, and the significance of each impact if mitigation is implemented.

Responsibility for Project Implementation

As noted in Chapter 1 of the draft EIR/EIS, FRWA is a joint powers agency formed by the Sacramento County Water Agency and East Bay Municipal Utility District. The City of Sacramento is an associate member of FRWA as well. During project implementation, each agency will have responsibility for certain aspects of project construction, mitigation implementation, and operation. In general, these responsibilities can be described as follows:

FRWA: construct and operate the intake and appurtenant facilities, the pipeline from the intake facility to the Folsom South Canal, and the pipeline to the SCWA treatment facility.

SCWA: construct and operate the Zone 40 surface water treatment plant and appurtenant facilities.

EBMUD: construct and operate the pipeline from the Folsom South Canal to the Mokelumne Aqueducts, the Canal pumping plant, and the Aqueduct pumping plant and pretreatment facilities.

In general, implementing and monitoring mitigation measures for each of these facilities will be the responsibility of the agency responsible for construction of the facility.

Modifications to the Layout and Configuration of the Intake Facilities

Although the site selected for locating the intake structure is the same as shown in the draft EIR/EIS, the layout of the site has been modified in response to public comment. In addition, more detail has been added to the project description in order to elaborate on the basis for selecting the proposed intake facility site. Additional detail on this matter is included in this final EIR/EIS in Chapter 3, "Master Responses," under Intake Facility Issues and in Appendix A.

Several refinements have been made to the site layout and project description to increase the project's compatibility with the existing site and further minimize potential impacts. Many of these refinements are based on input received during the public comment period. Most of this input came from representatives of the City of Sacramento and residents of the South Pocket and Meadowview communities. The refinements include additional commitments made by FRWA and physical refinements to the site layout and facility configurations.

Additional commitments made by FRWA include:

- Visual elements
  - Provide approximately 5 acres of landscaped buffer area to be maintained by FRWA
  - Improve visual aesthetics of the site over its current state
  - Implement a public process for the architectural design of the intake facility
- Noise control
  - Design facilities so that the levels of noise generated by project operation will remain at or below current background noise levels at the nearest sensitive receptor. The commitment and methods to minimize operational noise are described below under the Updated Project Description heading.

- Minimizing use and storage of chemicals
  - Use only sodium hypochlorite on site (sodium hypochlorite is two to three times stronger than household bleach)
  - Store on site only as needed
  - Use triple containment for storage of sodium hypochlorite
- Minimizing adverse construction effects and resolving construction-related issues
  - Implement measures to minimize construction noise and the amount of dust and dirt leaving the site, and take measures as necessary to avoid potential adverse effects of pile-driving on property and structures
  - Work closely with local residents and City of Sacramento representative to reduce impacts as much as possible and to jointly develop mitigation plans
  - Provide a 24-hour FRWA contact person
  - Work together to monitor mitigation throughout construction

The basic elements of the intake facility are the intake structure located on the riverbank (which houses the pump station) and several associated features located on the landside of the levee. The associated facilities include an electrical switchyard, chemical injection facility, surge tanks, air compressor station, and settling basins.

The locations of the electrical switchyard, chemical injection facility, surge tanks, air compressor station, and settling basins have changed since publication of the draft EIR/EIS. In general, all of these facilities have been moved east to provide greater distance between the facilities and the adjacent residences. The revised intake site layout, including the locations of these facilities, is shown in Figure 2-1.

The location of the intake structure has not changed. However, some aspects of the structure have been modified in order to minimize operation-related noise. A brief description of each associated feature follows:

- The electrical switchyard will contain necessary electrical equipment such as electrical transformers and controls.
- The chemical injection facility is needed to control potential biofouling within the pipeline and will be located adjacent to the pipeline to allow direct injection into the pipe. It will consist of a permanent double-containment on-site tank and an associated containment basin for chemical delivery to effectively result in triple containment to meet applicable codes, ordinances, and industry safety standards. The pump and tank may be constructed in a belowground vault.

- Approximately five surge tanks measuring 12 feet in diameter and 60 feet long will be contained in a structure adjacent to the electrical switchyard.
- The air compressor station is needed to provide air charge for the surge tanks. The compressors will be contained in a structure adjacent to the surge tanks.
- Several options for managing sediment in the intake were described in the draft EIR/EIS. These included settling basins at the intake facility site, settling basins adjacent to the FSC, and managing sediment within the FSC itself. The only sediment management option currently being considered to remove sediments that settle in the intake forebay is the use of settling basins at the intake site.

Updated Project Description

The portion of the project description that has changed since publication of the draft EIR/EIS is set forth below. All other portions of the project description remain the same as in the draft EIR/EIS.

Freeport Intake Facility

Location

An intake facility and pumping plant would be constructed on the Sacramento River to divert water from the river. In identifying potential locations for the intake facility, several factors were considered to minimize the potential for water quality problems:

- To minimize potential for intake of treated effluent from the SRCSD discharges during a reverse flow event, the intake point would need to be located at least 3,500 feet (ft) upstream from the SRCSD discharge point.
- To minimize water quality issues from the combined sewage outfall (CSO) near the Pioneer Bridge, the intake would need to be located at least 9,000 ft downstream to achieve full mixing and dilution of the discharges.
- To avoid water quality impacts associated with discharges from the Sacramento Yacht Club (e.g., fuel spills, solid wastes, sanitary wastes), the intake would need to be located at least 9,000 ft downstream of the marina.

The intake site is located on the left, or northeast, bank in the City of Sacramento, approximately 6,500 ft upstream of the Freeport Bridge and adjacent to the southeast edge of the South Pocket community. (The left bank is the left side of the river when facing downstream.)

Numerous technical evaluations were conducted to identify the best location along the Sacramento River to locate the necessary intake structure. While water quality and river geometry are primary factors when considering location, several other factors, including impacts on adjacent residents, were also considered. The results indicate that there are very few suitable locations.

An initial screening of potential sites was performed based primarily on water quality and potential sources of contamination. There were three primary items considered: to keep the site sufficiently upstream of the SRCSD outfall to limit diversion of poor quality water during reverse flow events; to locate the site sufficiently downstream of the CSO discharge to ensure full mixing of sewer discharges and river water; and to avoid the potential fuel spills and solid and sanitary waste disposal associated with marinas. This initial screening greatly reduced the number of possible locations.

On occasion, when river flow is low and tides in the Pacific Ocean are high, water in the Sacramento River in the project vicinity can flow northward (i.e., backward, upstream). According to SRCSD measurements during the period 1984–2000, reverse flow occurred in approximately 5% of all days. During those periods, the reverse flow in the river could cause treated wastewater to reach the intake. Therefore, the farther upstream from the outfall the intake is located, the better. The reverse flow events are typically of such duration that treated wastewater reaches a limited distance upstream of the outfall. FRWA's technical team set a target criterion of finding a site where treated wastewater would reach the site on no more than 20% of the occasions when reverse flow occurs. Computer modeling revealed that this distance is at least 3,500 feet. Therefore, the 3,500 feet of river closest to the SRCSD outfall was excluded from further analysis.

Locating the intake downstream and in general proximity to the WWTP outfall would be a breach of the member agencies' duty to protect the public's health and would be very unlikely to be approved by regulatory agencies such as the Department of Health Services. The waste discharges carried by reverse flows that FRWA is attempting to avoid are infrequent events, yet are still of great concern because waste discharges will be continuous and impossible to avoid.

In addition to the water quality issues posed by the SRCSD WWTP, the City of Sacramento operates a combined storm and sanitary sewer system serving a portion of the City and County of Sacramento. Under most conditions, the combined flow of the sewers is directed to the SRCSD WWTP and is treated (secondary treatment) before discharge to the river. On occasion, however, storm flows are so great that the capacity of the WWTP is exceeded, and the excess flow is diverted to a series of smaller treatment plants that treat the water before discharge to the river to a lesser degree (primary treatment) than the SRCSD WWTP. On even less frequent occasions, the capacity of both the WWTP and the primary treatment facilities is exceeded, and raw sewage combined with storm drainage is discharged to the river with no treatment at all. These intermittent events are of concern to FRWA.

The only way to avoid completely the effect of untreated CSO discharges on the intake would be to locate it upstream of any untreated CSO discharge sites. This would require relocating the intake upstream of Sump No. 2, which is west of William Land Park. Locating the intake upstream of Sump No. 2 would add at least 5 miles to the length of the pipeline, running through some of the most densely developed parts of Sacramento. Conservatively, project construction costs would increase by at least $20 million, if a vacant site with sufficient room could be found. The permanent environmental impacts associated with a site this far upstream would be at least as much as the preferred site, but the construction impacts would be much greater. An additional environmental impact would result from the increased electrical power required to pump the water through the longer pipeline.

As an alternative to placing the intake upstream of any untreated CSO discharge, FRWA tried to find a location where untreated discharges would mix fully with river water before reaching the intake. If untreated discharges could not be completely avoided, the next best thing is to make sure they are as diluted with as much river water as possible. Computer modeling indicated that approximately 9,000 feet of river length is necessary for full mixing.

It was also a criterion to locate the intake a similar distance below any marinas, which might be the source of fuel spills or other waste discharges (Stan's Yolo Marina is at RM 50.6; Site A is about 9,000 feet downstream). These criteria limited the study reach to approximately 3,500 feet above the SRCSD discharge to approximately 9,000 feet below Sump No. 2. This stretch of river extends from Chicory Bend (RM 54.6) to the northern limits of the developed portion of Freeport (RM 46.7).

The only undeveloped areas on the left bank (looking downstream) within this water quality–constrained reach are the preferred site and a site approximately 3,000 feet downstream of the preferred site, near the northern limits of development in Freeport. Potentially suitable sites with less residential development exist on the right bank.

After public health and safety were addressed, several engineering criteria were applied to the site selection. The first of these criteria is river geometry. In general, deep water and fast-flowing water are desirable. The pumps and intake screens must be placed under water, and naturally deep water allows this pump submergence and minimizes environmentally harmful and costly dredging. High flow velocities across the intake minimize sediment accumulation and improve the functioning of the required fish screens. The high velocities help to sweep sediment and fish past the intake. Sediment buildup can interfere with the flow of water to the pumps, causing noisy operation and possibly damage to the pumps. Buildup as a result of erosion can also damage the pumps and create locally higher velocities of flow through the fish screens. Fish screens protect fish best with even, slow flow through the screens.

Deeper, faster-flowing water is found at the outside of bends. Within the reach defined by water quality constraints, five bends exist: Oak Hall Bend (RM 53.7),

Clay Bank Bend (RM 52), Garcia Bend (RM 51), RM 49.2, and Freeport Bend (RM 47.2).

The outside of Oak Hall Bend is on the left bank. Dense development (the Greenhaven area) exists adjacent to the river, and no vacant sites are available. Construction of an intake at that site would require obtaining private property and constructing approximately 4 miles of additional pipeline (approximately $15 million) through a very densely populated area. This is the only bend on the left bank in the study reach other than the preferred site, and is either inferior or equivalent to the preferred site in every evaluation criterion.

The three bend sites on the right bank all have some similarity with respect to the evaluation criteria: they all have comparable levels of adjacent development; and they all require additional pipeline length and an expensive river crossing. The biggest difference between them is the length of pipeline added to the project. Therefore, only the site requiring the least additional pipe (RM 49.2) was given further consideration because all the other right-bank bends were considered to have flaws of relatively greater magnitude.

As a result of this analysis, it was determined that the preferred site best meets the range of criteria, including those relating to institutional, technical, and environmental issues. Additional detail is included in Appendix A of the final EIR/EIS. This site is located along the left (north) bank of the Sacramento River just southeast of the South Pocket neighborhood and approximately 1 mile north of the town of Freeport. The site, a former sewage treatment plant, is currently owned by the City of Sacramento Department of Utilities, and existing public facilities include an elevated water storage tank and stormwater outfall pumps. The site has long been considered suitable for public water facilities.

Design

The intake facility would be located on the riverbank. Site features would include an intake and pump station, electrical switchyard, chemical storage and injection facility, surge tanks, air compressor station, settling basins, security fencing, parking, and access pathways (Figure 2-1). The pump station would be located within the intake facility, and the remaining features would be located behind (north and east of) the intake facility. The entire facility, including the intake facility and associated features (e.g., electrical switchyard, chemical injection facility, surge tanks, air compressor station), would require approximately 7 acres. FRWA is providing landscaping on site to mitigate any potential visual or noise impact on the adjacent neighborhood. The extent of any additional off-site landscaping on City-owned property above and beyond what is necessary to mitigate visual and noise impacts to a less-than-significant level, how much FRWA will contribute to those costs, and how any such landscaping will be maintained is a matter of negotiation between the City and FRWA as part of the Purchases and Sales Agreements for the intake site.

The recommended foundation for the intake is a pile foundation with steel H-piles, precast concrete piles, or concrete-filled pipe piles. Each pile type has advantages and disadvantages and selection is best determined by load, soil conditions, and driving conditions. Given the need for more precise soil conditions and structural loadings, the type, size, spacing, and depth of piles must be determined in final design. Some of the sheet piles that would be built to facilitate construction of the intake would be left in place, and stone riprap would be installed around the intake. The riprap would be 3 ft thick and would extend approximately 200 ft from the top of the levee to the toe of the embankment. Riprap would also extend approximately 50 ft upstream and downstream beyond the sheet piling.

The intake facility would include a fish exclusion system designed to meet DFG, NOAA Fisheries, and USFWS criteria for adequate screen area, maintenance features, and facility hydraulics. The fish screen could be as long as 175 ft. A floating log boom would be installed on the river side of the intake facility to protect the fish screen from damage by floating debris and boaters.

The pump station would have seven to nine vertical turbine pumps with a total capacity of 185 MGD enclosed in a structure approximately 225 feet long and would accommodate a pump spacing of about 15 feet, assuming nine pumps.

Low-wattage fascia wash lighting fixtures would be installed on the river-facing walls of the intake facility and fish screen. The debris boom would be fitted with a strobe light in accordance with U.S. Coast Guard requirements. Exterior doors would be equipped with photocell/motion detector–controlled downlighting.

The primary operation noise sources at the intake facility would include the pump station, electrical switchyard, and air compressor station. All the pumps and motors would be enclosed in a structure approximately 225 ft long. The intake structure and support facilities design will incorporate noise control measures so that noise generated by the facility will not be at levels above existing background noise at the nearest sensitive receptor. Possible measures might include interior and exterior noise control measures for the pump station such as the use of low noise motors, acoustic louvers, acoustic access doors and wall panels; use of low noise transformers; and acoustical treatment of the compressor station, electrical switchyard, and surge tank facilities. Noise measurements will be conducted after the project startup to determine the effectiveness of the acoustical treatment measures and whether additional measures are needed. As a result, the significant and unavoidable operational noise impact identified in the draft EIR/EIS is now a less-than-significant impact.

Operation and Maintenance

The new intake facility and pumping plant would allow the delivery of up to 185 MGD of water and would be capable of diverting water under all river hydraulic conditions. A source of electrical power would be required to operate the new intake facility.

The intake facility, including screens and pumping equipment, would be accessible year-round from the levee bank for operations and maintenance. The screen face would be oriented parallel to the river flow and would extend into the river section to allow adequate water depth at the screen (10 ft minimum). The orientation would also allow for suitable sweeping flows across the screens, reduce the overall screen length needs, and reduce maintenance requirements. The pumping wet well would be located on the water side of the levee section. Discharge lines would cross over the levee bank.

Construction Considerations

The first phase of the intake construction would involve construction of a temporary ring levee, followed by construction of a sheet-pile cofferdam. Excavation within the area enclosed by the cofferdam and levee would proceed next followed by installation of structural piles. Following pile placement, a concrete tremie seal would be placed to allow dewatering inside the cofferdam. Following dewatering, actual construction of the intake would begin. Construction materials may be brought to the site by water or land. Some dredging of the site may be required.

Settling Basins

Location

Because the intake facility would be used under a wide range of river-flow conditions, there is potential for grit and sediment to enter the intake facility and pipelines. Larger sediments will be deposited in the forebay of the intake. Such deposits would need to be removed to keep the forebay clear and to keep approach velocities at the fish screen relatively uniform along all parts of the screen. A set of settling basins, located near the intake facility site, would collect the relatively large-diameter sediments (Figure 2-1). Smaller particles would likely continue into the pipelines. These sediments would be carried to the Zone 40 Surface WTP and the FSC, where, in both locations, suspended sediment would settle out and periodically be removed by dredging. No modifications have been made to the optional settling basins considered for construction near the terminal facility.

Design

If it is determined during design that settling basins are required at the intake facility, they would consist of two or more concrete-lined basins with discharge piping from the intake forebays to the basins and return lines from the basins back to the intake forebays or sanitary sewer. Access ramps would be installed in each basin for cleaning purposes. Preliminary analysis indicates that the total area required for these settling basins would be approximately 2 acres. For

purposes of this analysis, it is assumed that settling basins would be required at the intake facility. Because the relatively large-diameter size of the predominantly inorganic sediments to be removed and the absence of small particle–size organic-laden sediment, odor from the accumulated sediment is not expected.

Operation and Maintenance

The amount of sediment will vary with the amount of water diverted, the time of year it is diverted, and the sediment load in the river. The basins would be configured with two or more cells so that individual cells could be drained and dried out. Depending on the final design of the basins, actual operational practices, and other factors, the frequency of basin cleaning may vary from year to year. However, for the purpose of this analysis, annual cleaning has been assumed. At the intake facility, potential estimated annual sediment accumulation could range from 310 tons under minimum conditions (a uniform 10 MGD per year to SCWA only) to 4,540 tons under severe conditions (125% of median flows to both SCWA and EBMUD and double the median suspended solids concentrations in the river). Under average conditions (full time SCWA diversion and EBMUD diversions every 3.3 years), annual sediment accumulation would be approximately 1,910 tons.

The collected sediment would be excavated and hauled to the nearest landfill (assumed to be located off Kiefer Road near Grant Line Road). The principal equipment required for cleaning the sediment basins includes wheeled front-end loaders, dozers, and tractor-trailer dump trucks. The duration of equipment usage would depend on the rate that material can be loaded into the trucks and the haul distance/round trip time for the trucks.

Construction Considerations

The material excavated for construction of the settling basins would be stockpiled and used as embankment fill, and any excess material would be hauled off site to an approved landfill.

Chemical Storage

Sodium hypochlorite is proposed for use at FRWA's intake to control potential biofouling in the pipeline. There is a possibility that the pipeline capacity will be reduced because of the growth of slime or other organisms in the pipe. That growth can be removed through chemical treatment and flushing.

Sodium hypochlorite, in liquid form, would be injected into and slowly distributed through the pipeline with low velocity flow of water. The chlorinated water would be emptied from the pipeline at Sacramento County's Zone 40 water

treatment plant and at the FSC settling basin (if constructed). It is expected that this operation would be infrequent, likely less than annually.

Sodium hypochlorite solution is a yellowish liquid with a characteristic odor. The substance to be used at the intake is very similar to household bleach, albeit with a higher concentration (about 10–12% hypochlorite at the intake vs. 3–6% in household bleach). It is widely used in homes, schools, hospitals, swimming pools, drinking water supplies, and for disinfecting hard surfaces and surgical instruments.

According to a May 1996 article in *Environmental Science and Engineering*, years of investigation have produced the conclusion that hypochlorite is safe for humans and the environment. In the environment, sodium hypochlorite decomposes into water, oxygen, and table salt.

Sodium hypochlorite is typically delivered by truck. For example, the City of Sacramento receives sodium hypochlorite in 4,500-gallon truckloads at their treatment plants. During unloading, the truck would park within a containment basin, which in its simplest form would consist of a depressed concrete pad with entry and exit ramps at each end. The truck would transfer its contents into a permanent on-site tank made of fiberglass, fiber-reinforced plastic, or other material not susceptible to corrosion. The pump and tank may be constructed in a belowground vault, which would both mask the equipment from view and act as a containment structure should the tank leak. The only aboveground facilities would be a connection for the truck to the pump or to the underground storage tank, and vault ventilation intake and exhaust. As an alternative, the truck, tank, and pump could all be housed inside a small building. The truck would not need to be on site for more than 1 day at a time.

The project description in the draft EIR/EIS identified the possible use of chemicals at the intake facility. The related impact in Chapter 15, "Public Health and Safety," discussed the use of sodium hypochlorite at the Zone 40 Surface Water Treatment Plant. This impact (Impact 15-6 on page 15-9 of the draft EIR/EIS) was found to be less than significant and adequately describes the potential impact of its use at the intake facility. Therefore, the proposed use of sodium hypochlorite at the intake facility does not introduce a new impact or substantial new information.

Site Identification of the Zone 40 Surface Water Treatment Plant

The draft EIR/EIS included a description of the proposed location, design, and construction of the Zone 40 Water Treatment Plant. Since publication of the draft EIR/EIS, more information has become available regarding the specific location where the Zone 40 Water Treatment Plant may be constructed.

The draft EIR/EIS included a description of the general area in which the Zone 40 Surface Water Treatment Plant would be constructed. The general area was described as the area bounded by Elder Creek Road on the north, Gerber Road on the south, Bradshaw Road on the west, and Excelsior Road on the east. The Zone 40 Surface Water Treatment Plant would require an 80- to 100-acre parcel within that area.

SCWA has recently secured an option on an 80-acre parcel that could be used for the Zone 40 Surface Water Treatment Plant. The parcel is located within the general area described in the draft EIR/EIS and is at the north side of Florin Road halfway between Bradshaw and Excelsior Roads (Figure 2-2). The analysis in the draft EIR/EIS adequately addresses the resources and issues associated with this parcel. As described in the draft EIR/EIS, SCWA will ultimately purchase a parcel, potentially this one, and construct the Zone 40 Surface Water Treatment Plant at that location. However, additional detailed surveys and associated supplemental environmental documentation may be required before SCWA purchases the parcel and constructs the facility.

Modification to the Operation of the Canal Pumping Plant

Design

The plant will be designed with a 100-MGD capacity. The main facilities include a turnout in the canal, a traveling screen structure used to remove debris in the FSC water, a chain link–fenced electrical substation, surge control features, access roads and site infrastructure, and the main pumping plant building.

All the pumps and motors would be enclosed in a structure. The intake structure and support facilities design will incorporate noise control measures so that noise generated by the facility at the nearest existing sensitive receptor (e.g., residence) will not exceed 5dBa above existing background noise. Noise measurements will be conducted after the project startup to determine the effectiveness of the acoustical treatment measures and whether additional measures are needed. As a result, the significant and unavoidable operational noise impact identified in the draft EIR/EIS is now a less-than-significant impact.

Hydrologic Modeling Assumptions

Project-Level Analysis

Since publication of the draft EIR/EIS, Reclamation has made minor changes to the 2001 level-of-development version of the CALSIM II model and assumptions regarding the FRWP. The primary changes in the model are that Reclamation

has slightly revised the way that CALSIM II interprets implementation of CVPIA 3406(b)(2) water and the Environmental Water Account to better reflect anticipated operations. These changes have very minor implications for project modeling of environmental effects and result in essentially indiscernible changes.

Also since publication of the draft EIR/EIS, Reclamation has determined that deliveries to EBMUD should be treated as a Delta export for purposes of the Coordinated Operations Agreement (COA), rather than as a Sacramento in-basin use. This assumption results in minor changes to model results but does not result in any meaningful changes to the impact analysis. Appendix 3 of the draft EIR/EIS (Section 3.4.10) included a preliminary CALSIM II model run under the assumption that deliveries to EBMUD would be treated as an export under the COA, rather than an in-basin use. A review of this study concluded that there would be no difference in the impact assessment compared to the modeling used for the draft EIR/EIS.

FRWA and Reclamation have determined that it is appropriate to conduct additional modeling for this final EIR/EIS and to review the results of that modeling to determine whether these changes in modeling assumptions would have any potential to change the results of the impact analysis contained in the draft EIR/EIS. A comparison of the key hydrologic modeling results from the draft EIR/EIS and the revised CALSIM II modeling for 2001 level-of-development is summarized in Table 2-1. As shown in that table, the difference in results between the two sets of modeling studies is extremely small and would not affect the analysis of potential environmental effects and conclusions drawn regarding significance of impacts that relies in part on the results of the CALSIM II modeling.

Based on review of the modeling, Reclamation and FRWA have determined that the minor changes in assumptions with respect to CALSIM II modeling would not alter the conclusions of the draft EIR/EIS and, therefore, do not constitute significant new information. If the revised assumptions were to be used, Reclamation and FRWA would reach the same conclusions reached in the draft EIR/EIS with respect to potential environmental effects related to hydrologic impacts, the significance of those effects, and the need for mitigation measures.

Cumulative Impact Analysis

Similar to and in addition to the changes made in the project-level modeling (2001 level-of-development), Reclamation has also revised the 2020 level-of-development hydrologic modeling that is intended to form the basis of ESA Section 7 consultation with USFWS and NOAA Fisheries for purposes of its revised CVP Operations Criteria and Plan (OCAP). The version of the 2020 level-of-development CALSIM II model that was available in summer 2003 formed the basis for the cumulative impact analysis in the draft EIR/EIS. Reclamation and FRWA also conducted a review of the revised version of this model scenario released in February 2004 to determine whether the changes in modeling assumptions would have any potential to change the results of the

cumulative impact analysis contained in the draft EIR/EIS. A comparison of the key hydrologic modeling results from the draft EIR/EIS and the revised CALSIM II modeling for 2020 level-of-development is summarized in Table 2-2. As shown in that table, the difference in results between the two sets of modeling studies is extremely small and would not affect the analysis of potential cumulative environmental effects.

Based on review of the modeling, Reclamation and FRWA have determined that the minor changes in assumptions with respect to CALSIM II modeling would not alter the conclusions of the cumulative impact analysis contained in the draft EIR/EIS and, therefore, do not constitute significant new information. If the revised modeling were to be used for the cumulative impact analysis, Reclamation and FRWA would reach the same conclusions reached in the draft EIR/EIS with respect to potential environmental effects related to hydrologic impacts, the significance of those effects, and the need for mitigation measures.

Settlement Agreements

Since publication of the draft EIR/EIS, FRWA and its member agencies have negotiated settlements with other water agencies that had challenged the adequacy of the environmental documentation that supported EBMUD's amendatory contract with Reclamation. That amendatory contract provides for EBMUD's participation in the FRWP. As part of these settlements, FRWA and EBMUD have agreed to provide one of those agencies, Contra Costa Water District, limited access to FRWP facilities for the purposes of conveying a limited amount of water. In addition, FRWA and EBMUD agreed to one other minor change in operations as part of a settlement. The relevant aspects of those settlement agreements are summarized below and the environmental effects are addressed herein to the extent possible. Some of the settlements also include financial compensation and other types of agreements. Because these aspects of the settlement agreements do not have any potential to result in environmental effects, they are not discussed further in this final EIR/EIS.

As described in the draft EIR/EIS, under the terms of EBMUD's amendatory contract with Reclamation, EBMUD is able to take delivery of Sacramento River water in any year in which EBMUD's March 1 forecast of its October 1 total system storage is less than 500,000 acre-feet (af) (this is considered a drought condition). When this condition is met, the amendatory contract entitles EBMUD to take up to 133,000 af annually. However, deliveries to EBMUD are limited to its portion of the diversion capacity of the FRWP (100 MGD), which is equivalent to approximately 112,000 af/year. Deliveries to EBMUD are also subject to curtailment pursuant to CVP shortage conditions and are further limited to no more than 165,000 af in any three-consecutive-year period that EBMUD's forecasted October 1 storage remains below 500,000 af.

EBMUD would take delivery of its entitlement at a maximum rate of 100 MGD. Deliveries would start at the beginning of the CVP contract year (March 1) or

Table 2-1. Summary Statistics of CALSIM and EBMUDSIM Hydrologic Modeling Parameters for FRWP Alternatives 2–5 at a 2001 Level of Development Comparison of DEIR/EIS Modeling and Revised Modeling

Location/Resource	FRWP DEIR/EIS Modeling [b]			Revised Modeling [c]			Difference: Change in Revised Modeling Results minus Change in DEIR/EIS Modeling Results
	No Action	FRWP Alternatives 2–5 Change from No Action	FRWP Alternatives 2–5 Change from No Action (%)	No Action [d]	FRWP Alternatives 2–5 Change from No Action [e]	FRWP Alternatives 2–5 Change from No Action (%)	
Trinity Reservoir Storage (TAF) [f]	1318	-4	-0.3	1335	-7	-0.5	-3
Shasta Reservoir Storage (TAF) [f]	2672	-15	-0.6	2659	-15	-0.5	1
Oroville Reservoir Storage (TAF) [f]	2113	-8	-0.4	2079	-2	-0.1	5
Folsom Reservoir Storage (TAF) [f]	503	-4	-0.9	535	-8	-1.4	-3
San Luis Reservoir Storage (TAF) [f]	573	-5	-0.9	586	-13	-2.2	-8
Pardee Reservoir Storage (TAF) [f]	176	6	3.4	176	6	3.4	0
Camanche Reservoir Storage (TAF) [f]	221	17	7.4	221	17	7.4	0
Mokelumne Inflow to Delta (TAF)	284	8	2.8	284	8	2.8	0
Delta Outflow (TAF)	14473	-33	-0.2	14408	-43	-0.3	-9
Exports, Banks Pumping Plant (TAF)	3170	-6	-0.2	3159	4	0.1	10
Exports, Tracy Pumping Plant (TAF)	2300	-4	-0.2	2321	-4	-0.2	-1
X2 Position (km)	75.7	0.0	0.0	75.7	0.0	0.0	0.0
CVP Deliveries North of Delta (TAF) [g]	2210	0	0.0	2211	0	0.0	0
CVP Deliveries South of Delta (TAF)	2595	-4	-0.2	2631	-8	-0.3	-4
SWP Deliveries South of Delta (TAF) [h]	3213	-6	-0.2	3212	9 [i]	0.7	15

[a] Values are averages for the 72-year simulation period (1922–1993), based on water years (October–September)

[b] Draft EIR/EIS values from Table 3-1.

[c] Revised modeling results based on CALSIM II version utilized for Draft OCAP Biological Assessment Studies, released February 2, 2004 .

[d] OCAP Study 3, "Today CVPIA 3406 b(2) with EWA."

[e] OCAP Study 3, "Today CVPIA 3406 b(2) with EWA," with FRWP added. EBMUD is considered a Delta export. EWA, (b)(2), and salinity control actions are fixed to No Action study.

[f] End of September carryover storage.

[g] Does not include American River Division and FRWP deliveries.

[h] Includes 65 TAF of annual losses.

[i] The apparent benefit to the SWP in the revised modeling is not an effect of the FRWP, but rather results from a very minor change during a single year in the calculation of the trigger for changing the Feather River minimum flow requirement. Change in this minimum flow requirement directly affects the simulated SWP delivery that year. Under actual project operations, there would be effectively no difference in this minimum flow requirement, and thus the average change in SWP deliveries caused by the FRWP would be similar to the difference simulated in the FRWP DEIR modeling. For discussion on the appropriate interpretation of CALSIM II results, see Sections 2.7, 3.4.9, and 3.5.9 in Volume 3 of the draft EIR/EIS.

Table 2-2. Summary Statistics of CALSIM and EBMUDSIM Hydrologic Modeling Parameters for FRWP Alternatives 2–5 at a 2020 Level of Development Comparison of DEIR/EIS Modeling and Revised Modeling

Location/Resource	FRWP DEIR/EIS Modeling [b]			Revised Modeling [c]			Difference: Change in Revised Modeling Results minus Change in DEIR/EIS Modeling Results
	No Action	FRWP Alternatives 2–5 Change from No Action	FRWP Alternatives 2–5 Change from No Action (%)	No Action [d]	FRWP Alternatives 2–5 Change from No Action [e]	FRWP Alternatives 2–5 Change from No Action (%)	
Trinity Reservoir Storage (TAF) [f]	1318	-4	-0.3	1293	-4	-0.3	0
Shasta Reservoir Storage (TAF) [f]	2582	-15	-0.6	2538	-9	-0.4	5
Oroville Reservoir Storage (TAF) [f]	2066	-11	-0.5	2046	-2	-0.1	9
Folsom Reservoir Storage (TAF) [f]	479	-3	-0.6	504	-4	-0.8	-1
San Luis Reservoir Storage (TAF) [f]	558	-4	-0.7	551	-4	-0.7	0
Pardee Reservoir Storage (TAF) [f]	173	7	4.0	173	7	4.0	0
Camanche Reservoir Storage (TAF) [f]	211	21	10.0	211	21	10.0	0
Mokelumne Inflow to Delta (TAF)	270	15	5.5	270	15	5.5	0
Delta Outflow (TAF)	14291	-26	-0.3	14094	-33	-0.2	-8
Exports, Banks Pumping Plant (TAF)	3229	-2	-0.1	3337	1	0.0	4
Exports, Tracy Pumping Plant (TAF)	2267	-7	-0.3	2320	-7	-0.3	0
X2 Position (km)	75.8	0.0	0.0	75.9	0.0	0.0	0.0
CVP Deliveries North of Delta (TAF) [g]	2274	0	0.0	2262	0	0.0	0
CVP Deliveries South of Delta (TAF)	2526	-6	-0.2	2638	-14	-0.5	-8
SWP Deliveries South of Delta (TAF) [h]	3319	-6	-0.2	3393	10 [i]	0.3	15

[a] Values are averages for the 72-year simulation period (1922–1993), based on water years (October–September)

[b] Draft EIR/EIS values from Table 3-3.

[c] Revised modeling results based on CALSIM II version utilized for Draft OCAP Biological Assessment Studies, released February 2, 2004 .

[d] OCAP Study 5, "Future CVPIA 3406 b(2) and SDIP with EWA," with FRWP removed.

[e] OCAP Study 5, "Future CVPIA 3406 b(2) and SDIP with EWA."

[f] End of September carryover storage.

[g] Does not include American River Division and FRWP deliveries.

[h] Includes 65 TAF of annual losses.

[i] The apparent benefit to the SWP in the revised modeling is not an effect of the FRWP, but rather results from a very minor change during a single year in the calculation of the trigger for changing the Feather River minimum flow requirement. Change in this minimum flow requirement directly affects the simulated SWP delivery that year. Under actual project operations, there would be effectively no difference in this minimum flow requirement, and thus the average change in SWP deliveries caused by the FRWP would be similar to the difference simulated in the FRWP DEIR modeling. For discussion on the appropriate interpretation of CALSIM II results, see Sections 2.7, 3.4.9, and 3.5.9 in Volume 3 of the draft EIR/EIS.

any time afterward. Deliveries would cease when EBMUD's CVP allocation for that year is reached, when the 165,000 af limitation is reached, or when EBMUD no longer needs the water, whichever comes first. Alternatives 2–5 assume that delivery limitations mandated in the Hodge Decision would not apply to the Sacramento River diversion point because it is not located on the lower American River.

Contra Costa Water District

FRWA and EBMUD have agreed to "wheel" 3,200 af/year of water for the Contra Costa Water District (CCWD). Wheeling is the transmission of water owned by one entity through the facilities owned by another. In this case, CCWD water, which would normally be diverted in the Delta, would instead be diverted from the Sacramento River at the FRWP intake and conveyed to CCWD through FRWP facilities, Reclamation's Folsom South Canal, and EBMUD's Mokelumne Aqueduct. The path of the Mokelumne Aqueduct intersects the path of CCWD's Los Vaqueros Pipeline in Brentwood, California. CCWD would design and construct interconnection facilities, which are expected to be located within the existing EBMUD and CCWD rights-of-way at the intersection of the Mokelumne Aqueduct and Los Vaqueros Pipeline. CCWD water could be wheeled every year, upon request by CCWD, unless there are unavoidable conditions that reduce the capacity of the system to the extent that FRWA and EBMUD are unable to wheel the water. The rate of delivery of the wheeled water will be determined each year in conjunction with development of the wheeling schedule. The maximum wheeling rate would be 155 cubic feet per second (cfs) (100 MGD), the full capacity of the Folsom South Canal Connection.

Santa Clara Valley Water District

EBMUD would make available to the Santa Clara Valley Water District (SCVWD) 6,500 af of EBMUD's CVP water allocation in the first year of a drought cycle in which EBMUD would take delivery of Sacramento River water. If the next year is also a drought year in which EBMUD continues to take delivery of water, then SCVWD would be obligated to return up to 100% of the 6,500 af of water to EBMUD, or at EBMUD's discretion, the water may be returned in the following year. If drought conditions do not continue in the second and/or third years, SCVWD would keep EBMUD's water and would compensate EBMUD for its Reclamation costs. SCVWD would take delivery of EBMUD's CVP water at Tracy Pumping Plant, and EBMUD would take delivery of SCVWD's CVP water at Freeport, so no additional facilities would need to be constructed. The exchange described above provides a means to offset shortages that would otherwise occur in SCVWD's CVP supply as a result of EBMUD diversions at Freeport, and does not result in any increased water demand within SCVWD's service area.

Environmental Considerations

The proposed operations under the settlement agreements would result in no measurable changes in the environmental impact analysis contained in the draft EIR/EIS. Each of the settlement agreements described above would result in the same amount of water being diverted each year, although the location of the diversion would vary slightly compared to the draft EIR/EIS analysis.

Under the settlement with CCWD, each year CCWD could take delivery of a small portion of its CVP supply (less than 3%) at the FRWP intake instead of its Rock Slough or Old River intakes in the Delta. CVP operations would be essentially identical, as the volume of CVP water delivered to CCWD would be unchanged, and no measurable changes in Delta outflow, Delta exports by others, or Delta hydrodynamics would occur. Increasing diversions at Freeport by 3,200 af/year would result in no net environmental impact on Delta habitat and fisheries because (1) the change in diversion volume at that location is not substantial (average diversions are approximately 90,000af/year), (2) it would be offset by an identical reduction in diversions from the Delta as shown in Table 2-3, and (3) fish screening capabilities at the FRWP intake are equivalent to fish screening capabilities at CCWD's Delta intakes where the wheeled water would otherwise be diverted.

The agreement with CCWD also would require the construction of new facilities by CCWD connecting the Mokelumne Aqueduct and CCWD's Los Vaqueros Pipeline in Brentwood, California, to provide for delivery of water from the Mokelumne Aqueduct. The interconnection would be constructed, to the extent feasible, within existing rights-of-way of the two facilities and would have a capacity of 100 MGD. The environmental effects associated with construction, operation, and maintenance of the interconnection piping and associated valves would be subject to further environmental review and are anticipated to be very minor. The rights-of-way for EBMUD's and CCWD's existing conveyance facilities have been previously highly disturbed and are currently heavily maintained to facilitate access for inspection and maintenance to help ensure water supply reliability. Potential environmental effects would most likely be construction-related (noise, dust, traffic circulation) but are expected to be well within the range of normal urban construction disturbance. No significant environmental effects associated with the interconnection facility are anticipated.

Under the settlement agreement with SCVWD, EBMUD would divert 6,500 af less at the FRWP intake than currently assumed in the project modeling during the first year of a drought when EBMUD would take delivery of water under its contract. This same amount of water would then be delivered to SCVWD via Reclamation's Tracy pumping plant in the Delta, resulting in no net change in CVP deliveries. Based on historical hydrology, it is expected that this shift in delivery location for 6,500 af would take place in 19% of all years. In the second consecutive year (or at EBMUD's discretion, the third year) of a drought, SCVWD would be obligated to return the water to EBMUD for diversion at the FRWP intake. As not all droughts continue for more than a year, the return of water to EBMUD would occur less often, in 8% of all years (based on historical

hydrology). The net effect of this difference in the occurrence of first year and second year of droughts is a slight reduction in the average FRWP total diversion (by 0.7%) and the average EBMUD diversion at Freeport (by 2.7%).

Table 2-3 summarizes the net changes in diversion that result from these settlement agreements compared to operations assumed in the draft EIR/EIS.

Table 2-3. Change in Assumed Deliveries under the Settlement Agreements

	Nondrought Years		First Drought Year		Second or Third Consecutive Drought Year	
	FRWP Intake (af)	Delta (af)	FRWP Intake (af)	Delta (af)	FRWP Intake (af)	Delta (af)
EBMUD	0	0	-6,500	0	+6,500	0
CCWD	+3,200	-3,200	+3,200	-3,200	+3,200	-3,200
SCVWD	0	0	0	+6,500	0	-6,500
Change	+3,200	-3,200	-3,300	+3,300	+9,700	-9,700
Net Change	0		0		0	

These changes are extremely small in the total CVP system that delivers an average of approximately 5.5 million af/year to customers even in dry years. The settlement agreements simply modify slightly the location of CVP deliveries; total quantities delivered are unchanged or reduced slightly. No new or increased environmental impacts would result from these slight modifications in deliveries.

The primary change that would occur as a result of the settlement agreements is that inflow to the Delta and flow in the Sacramento River downstream of the FRWP intake would be slightly altered compared to the modeling conducted for the draft EIR/EIS. In nondrought years, Delta inflow and river flow below the FRWP intake could be reduced by up to 3,200 af. This volume is equal to an average reduction of 4 cfs. It is important to note that during normal and wet years, Sacramento River flow nearly always exceeds 14,000 cfs. Thus, the anticipated average change in Sacramento River inflow to the Delta during nondrought years would be less than 0.03%. Delta diversions would be reduced by an identical amount, so there would be no net effect on Delta outflow.

In the first year of a drought, inflow to the Delta would be increased by a nearly identical amount, 3,300 af. This slight increase would be offset by an identical increase in Delta pumping, resulting in no change in Delta outflow. Evaluation of hydrologic modeling results indicates that in the first year of droughts, allowable Tracy Pumping Plant capacity will be sufficient to convey the additional deliveries to SCVWD. In most of these years, this capacity would be available during conditions when Delta water quality would be unaffected by a slightly increased Delta export. During those years, no additional carriage water would be needed. Consequently, this shift in delivery locations would not result in a substantial change to the impact analysis.

In the second or third consecutive year of a drought, Delta inflow may be decreased by as much as 13 cfs on the average. This decrease, which remains minor (0.1%) compared to the typical low flows of 10,000 cfs in the Sacramento River, is also offset by decreased pumping in the Delta, resulting in no net change in Delta outflow and the resulting impact analysis.

Table S-1. Summary of Significant Impacts and Mitigation Measures for the Freeport Regional Water Project

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Hydrology, Water Supply, and Power—No significant impacts			
Water Quality—No significant impacts			
Fish—No significant impacts			
Recreation			
Loss of recreational area from inundation of a segment of the Mokelumne Coast to Crest Trail	Alternative 6	Implement Mitigation Measure 6-1: Relocate a portion of the Mokelumne Coast to Crest Trail	LS
Loss of the New Middle Bar take-out facility because of inundation	Alternative 6	Implement Mitigation Measure 6-2: Replace necessary Middle Bar Take-Out Facility amenities	LS
Loss of whitewater boating on the Upper Mokelumne River Electra Run	Alternative 6	Implement Mitigation Measure 6-3: Ensure availability of a take-out on the Electra Run	SU
Loss of whitewater boating on the Upper Mokelumne River between Middle Bar Bridge and SR 49 Bridge	Alternative 6	No mitigation available	SU
Vegetation and Wetland Resources			
Temporary disturbance to or potential loss of sensitive vegetation and wetland resources near active construction areas	Alternatives 2–6	Implement Mitigation Measure 7-1: Confine construction activities and equipment to the designated construction work area Implement Mitigation Measure 7-2: Avoid and protect sensitive vegetation and wetland resources near designated construction work areas Implement Mitigation Measure 7-3: Reestablish preconstruction site conditions to allow natural colonization of plant species and reseed, if necessary	LS
Potential introduction and spread of noxious weeds	Alternatives 2–6	Implement Mitigation Measure 7-4: Implement best management practices during construction activities	LS

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Degradation of blue oak woodlands and loss of individual locally protected trees	Alternatives 2–6	Implement Mitigation Measure 7-5: Identify and avoid oak woodland and individual locally protected trees	LS
		Implement Mitigation Measure 7-6: Obtain and comply with county tree removal permits and implement conditions of permits	
Loss of or disturbance to riparian communities	Alternatives 2–6	Implement Mitigation Measure 7-7: Establish a protection buffer around woody riparian communities	LS
		Implement Mitigation Measure 7-8: Compensate for unavoidable riparian woodland losses	
Loss of or disturbance to jurisdictional waters of the United States, including wetlands	Alternatives 2–6	Implement Mitigation Measure 7-9: Avoid and minimize impacts on jurisdictional waters of the United States, including wetlands, by installing protective barriers and implementing best management practices	LS
		Implement Mitigation Measure 7-10: Obtain and comply with state and federal wetland permits	
		Implement Mitigation Measure 7-11: Compensate for unavoidable impacts on jurisdictional waters of the United States	
Potential loss of special-status plant populations	Alternatives 2–6	Implement Mitigation Measure 7-12: Conduct preconstruction surveys in areas not previously inventoried	LS
		Implement Mitigation Measure 7-13: Avoid known special-status plant populations during project design	
		Implement Mitigation Measure 7-14: Compensate for impacts on special-status plant populations	
Permanent loss of riparian woodland and riparian scrub communities within the inundation zone	Alternative 6	Implement Mitigation Measure 7-15: Compensate for unavoidable riparian habitat losses	LS

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Potential impacts on jurisdictional waters of the United States, including wetlands and riparian woodland, within the water fluctuation zone	Alternative 6	Implement Mitigation Measure 7-16: Monitor and adaptively manage vegetation affected by inundation	LS
Loss of or disturbance to jurisdictional waters of the United States, including wetlands, as a result of inundation	Alternative 6	Implement Mitigation Measures 7-9 through 7-11	LS
Permanent loss of oak woodland communities within the inundation and flood zone	Alternative 6	Implement Mitigation Measure 7-17: Replace individual trees Implement Mitigation Measure 7-18: Permanently preserve intact blue oak woodland	LS
Loss of or disturbance to oak woodland communities with the water fluctuation zone	Alternative 6	Implement Mitigation Measures 7-16 through 7-18	LS
Permanent loss of special-status plants and habitats within the inundation and flood zone	Alternative 6	Implement Mitigation Measure 7-19: Compensate for impacts on sensitive vegetative communities and associated special-status plants	LS
Wildlife			
Loss or alteration of vernal pools, vernal swales, and other temporary ponds that could provide habitat for vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, and California linderiella	Alternatives 2–6	Implement Mitigation Measure 8-1: Conduct surveys and develop a mitigation plan for vernal pool fairy shrimp and vernal pool tadpole shrimp	LS
Potential mortality of, disturbance to, or removal of habitat of the valley elderberry longhorn beetle during construction	Alternatives 2–6	Implement Mitigation Measure 8-2: Conduct preconstruction surveys for valley elderberry longhorn beetle and avoid or compensate for loss of habitat	LS
Potential mortality of, disturbance to, or loss of habitat for giant garter snake and western pond turtle	Alternatives 2–6	Implement Mitigation Measure 8-3: Avoid, minimize, and compensate for unavoidable impacts on jurisdictional waters of the United States, including wetlands, and implement associated wildlife protection and compensation measures	LS

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Potential mortality of, disturbance to, or loss of habitat for the California tiger salamander and western spadefoot	Alternatives 2–6	Implement Mitigation Measure 8-4: Conduct preconstruction surveys and compensate for loss of California tiger salamander and western spadefoot habitat if these species are present	LS
Loss of or disturbance to active raptor nests or tricolored blackbird nests	Alternatives 2–6	Implement Mitigation Measure 8-5: Conduct surveys for nesting raptors and tricolored blackbirds	LS
Disturbance of nesting Swainson's hawks	Alternatives 2–6	Implement Mitigation Measure 8-5	LS
		Implement Mitigation Measure 8-6: Consult with the California Department of Fish and Game if hawks are present and follow mitigation guidelines to avoid disturbance of nesting hawks and/or the removal of hawks' nesting trees	
Loss of Swainson's hawk and white-tailed kite foraging habitat	Alternatives 2–6	Implement Mitigation Measure 8-7: Consult with California Department of Fish and Game and Sacramento County and compensate for loss of foraging habitat	LS
Loss of or disturbance to nesting western burrowing owls	Alternatives 2–6	Implement Mitigation Measure 8-5	LS
		Implement Mitigation Measure 8-8: Consult with California Department of Fish and Game and follow the burrowing owl mitigation guidelines	
Potential loss of habitat for Sacramento anthicid beetle and Sacramento valley tiger beetle	Alternatives 2–6	Implement Mitigation Measures 7-7 and 7-8	LS
Loss of or alteration to riparian wildlife habitat	Alternative 6	Implement Mitigation Measures 7-15 and 7-8	LS
Potential mortality to or disturbance of nesting cliff swallows	Alternative 6	Implement Mitigation Measure 8-9: Conduct preconstruction surveys for nesting birds	LS
		Implement Mitigation Measure 8-10: Avoid active nests during the breeding season	
Mortality or disturbance of nesting birds in the vegetation clearance and inundation zone	Alternative 6	Implement Mitigation Measure 8-11: Avoid removal of trees and other vegetation during the bird breeding season	LS

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Potential mortality to roosting bat species of concern	Alternative 6	Implement Mitigation Measure 8-12: Conduct preconstruction bat clearance surveys	LS
Geology, Soils, Seismicity, and Groundwater			
Inadvertent soil loss from clearing operations	Alternative 6	Implement Mitigation Measure 9-1: Prevent inadvertent soil loss from clearing operations	LS
Land Use—No significant impacts			
Agricultural Resources			
Loss or conversion of prime farmland and farmland of statewide importance	Alternatives 2–6	Implement Mitigation Measure 11-1: Comply with Sacramento County General Plan requirements	LS
Traffic and Transportation			
Reduced access options for area residents	Alternative 6	Implement Mitigation Measure 12-1: Replace the Middle Bar Bridge with a new bridge	LS
Air Quality			
Short-term increase in NOx and CO emissions in Sacramento County	Alternatives 2–5	Implement Mitigation Measure 13-1: Include air quality mitigation measures as part of the proposed project's construction management plan	LS
Short-term increase in NOx emissions in San Joaquin County	Alternatives 2–5	Implement Mitigation Measure 13-1	LS
Short-term increase in PM10 emissions in San Joaquin County	Alternatives 2–5	Implement Mitigation Measure 13-2: Comply with Regulation VIII for control measures of fugitive PM10	LS
Short-term increase in NOx emissions in Sacramento County	Alternative 6	Implement Mitigation Measure 13-1	LS
Short-term increase in PM10 emissions in Amador and Calaveras Counties	Alternative 6	Implement Mitigation Measure 13-3: Implement dust control measures	LS

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Noise			
Short-term increases in construction noise levels during daytime hours	Alternatives 2–6	Implement Mitigation Measure 14-1: Provide public notice of proposed activities and provide noise shielding to the extent feasible	SU
Exposure of noise-sensitive land uses to general construction noise at night	Alternatives 2–6	Implement Mitigation Measure 14-1 Implement Mitigation Measure 14-2: Minimize nighttime construction activity	SU
Public Health and Safety—No significant impacts			
Visual Resources			
Adverse impacts on views of the Zone 40 Surface WTP	Alternatives 2–6	Implement Mitigation Measure 16-1: Reduce visual intrusion by preparing design plans consistent with rural visual character, providing vegetative buffer	LS
Adverse change to views of the canal pumping plant site	Alternatives 2–5	Implement Mitigation Measure 16-1	LS
Adverse change to views of the aqueduct pumping plant and pretreatment facility site (Camanche site and optional Brandt site)	Alternatives 2–5	Implement Mitigation Meaure16-2: Implement appropriate aesthetic treatment at the aqueduct pumping plant and pretreatment facility site	LS
Changes in visual resources from inundation of the area upstream of the existing Pardee Reservoir (Upper Mokelumne River)	Alternative 6	No mitigation available	SU
Cultural Resources			
Disturbance of known cultural resources	Alternatives 2–5	Implement Mitigation Measure 17-1: Prepare and implement a cultural resources significance evaluation, effects analysis, and mitigation plan for known cultural resources	LS

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Level of Significance after Mitigation
Disturbance of unidentified cultural resources	Alternatives 2–5	Implement Mitigation Measure 17-2: Prepare and implement a cultural resources inventory, significance evaluation, effects analysis, and mitigation plan for unidentified cultural resources Implement Mitigation Measure 17-3: Prepare and implement a plan for unanticipated discovery of cultural resources	LS
Disturbance of known cultural resources at Pardee Reservoir that are listed on the National Register of Historic Places	Alternative 6	Implement Mitigation Measure 17-4: Conduct Historic American Engineering Record documentation where avoidance to structures is impossible	LS
Disturbance to other known cultural resources from the intake facility to the Zone 40 Surface WTP and at Pardee Reservoir	Alternative 6	Implement Mitigation Measure 17-1	LS
Disturbance of unidentified cultural resources from the intake facility to the Zone 40 Surface WTP and at Pardee Reservoir	Alternative 6	Implement Mitigation Measures 17-2 and 17-3	LS

LS = Less than significant
SU = Significant and unavoidable

Table S-2. Summary of Less-than-Significant Impacts and Mitigation Measures for the Freeport Regional Water Project

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Hydrology, Water Supply, and Power		
Changes in Upper Sacramento River Basin hydrologic conditions	Alternatives 2–6	No mitigation required
Changes in Lower Sacramento River, Delta Inflow, and Delta Outflow hydrologic conditions	Alternatives 2–6	No mitigation required
Changes in Mokelumne River Basin hydrologic conditions	Alternatives 2–6	No mitigation required
Changes in south-of-Delta water supply delivery operations	Alternatives 2–6	No mitigation required
Hydropower and energy production changes at CVP facilities	Alternatives 2–6	No mitigation required
Water Quality		
Potential contaminant discharges during construction could occur for approximately 2 years, and disturbed construction areas would be exposed to storms that could transport materials	Alternatives 2–5	No mitigation required
Operational effects during reverse flow in the Sacramento River associated with diversion of water from the Freeport intake facility could result in diluted discharges	Alternatives 2–5	No mitigation required
Operational effects on water quality in the Sacramento River downstream of the diversion (the Freeport intake facility) could result due to reduced background streamflow and increased SRWWTP effluent discharges	Alternatives 2–5	No mitigation required
Changes to reservoir temperature patterns for Camanche and Pardee Reservoirs attributable to project-related diversions of Sacramento River water	Alternatives 2–5	No mitigation required
Increased inorganic mineral content and nutrients could incrementally increase the frequency or duration of adverse taste and odor events in EBMUD terminal reservoirs	Alternatives 2–5	No mitigation required
Changes to Folsom South Canal water quality, attributable to project-related diversions of Sacramento River water that will be discharged to the FSC	Alternatives 2–5	No mitigation required
Operation effects on Delta water quality	Alternatives 2–5	No mitigation required
Pipeline operation effects on surface drainages attributable to change in discharge levels	Alternatives 2–5	No mitigation required

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Freeport Intake Facility to Zone 40 Surface WTP/Enlarge Pardee Reservoir has potential for contaminant discharges hazardous to aquatic habitats and existing vegetation during construction	Alternative 6	No mitigation required
Operating effects during reverse flow in the Sacramento River could reduce or increase the distance of travel and/or limit dilution water in the river that is available for SRWWTP effluent discharge compliance	Alternative 6	No mitigation required
Operational effects on water quality in the Sacramento River downstream of the diversion (the Freeport intake facility) could result due to reduced background streamflow and increased SRWWTP effluent discharges	Alternative 6	No mitigation required
Changes to reservoir temperature patterns	Alternative 6	No mitigation required
Discharges of contaminants during construction of Pardee Dam	Alternative 6	No mitigation required
Operational effects of chloride and EC differences on Delta water quality	Alternative 6	No mitigation required
Fish		
Negative impact on spawning habitat of fish species from construction-related activities	Alternatives 2–6	No mitigation required
Negative impact on rearing habitat of fish species from construction-related activities	Alternatives 2–6	No mitigation required
Negative impact on migration habitat of fish species from construction-related activities	Alternatives 2–6	No mitigation required
Introduction of contaminants harmful to fish populations during construction	Alternatives 2–6	No mitigation required
Creation of additional habitat for predators of native fish populations from temporary structures	Alternatives 2–6	No mitigation required
Direct injury to fish from construction activities	Alternatives 2–6	No mitigation required
Adverse impacts on spawning habitat of fish resulting from decreased flows during ongoing operations	Alternatives 2–6	No mitigation required
Adverse impacts on rearing habitat of fish resulting from decreased flows during ongoing operations	Alternatives 2–6	No mitigation required
Adverse impacts on migration habitat of fish resulting from decreased flows during ongoing operations	Alternatives 2–6	No mitigation required
Adverse impacts on water temperature resulting from changes in reservoir storage and river flow during operations	Alternatives 2–6	No mitigation required

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Potential risk of fish entrainment at the intake facility	Alternatives 2–6	No mitigation required
Adverse impacts on fish habitat resulting from changes in reservoir storage during project operations	Alternatives 2–6	No mitigation required
Recreation		
Temporary disruption to recreational opportunities during construction of the intake facility	Alternatives 2–6	No mitigation required
Temporary disruption to recreational opportunities during construction of the pipeline from the intake facility to Zone 40 Surface WTP/FSC	Alternatives 2–6	No mitigation required
Temporary disruption to recreational opportunities along the Folsom South Canal	Alternatives 2–5	No mitigation required
Temporary disruption to recreational opportunities during construction of the pipeline from the Folsom South Canal to the Mokelumne Aqueducts	Alternatives 2–5	No mitigation required
Change in water-dependent and water-enhanced recreation opportunities at Shasta, Oroville, and Trinity Reservoirs and the Sacramento River	Alternatives 2–6	No mitigation required
Change in water-dependent and water-enhanced recreation opportunities at Folsom Reservoir	Alternatives 2–6	No mitigation required
Change in water-dependent recreation opportunities on the lower American River	Alternatives 2–6	No mitigation required
Disruption to recreation opportunities on the Sacramento River associated with location of the intake facility	Alternatives 2–6	No mitigation required
Potential inconsistency with local plans and policies addressing recreation	Alternatives 2–6	No mitigation required
Temporary disruption of whitewater use along the Electra Run near State Route 49	Alternative 6	No mitigation required
Temporary disruption of water-dependent recreation activities near Pardee Dam	Alternative 6	No mitigation required
Temporary disruption to water-dependent and water-enhanced recreation activities on Pardee Reservoir	Alternative 6	No mitigation required
Change in water-dependent recreation opportunities on Pardee Reservoir	Alternative 6	No mitigation required
Change in recreation opportunities at Camanche Reservoir from increased storage	Alternative 6	No mitigation required
Change in recreation opportunities on the Lower Mokelumne River from increased water release	Alternative 6	No mitigation required
Loss of recreation area from inundation of the Pardee Recreation Area	Alternative 6	No mitigation required
Loss of fishing access attributable to inundation of Middle Bar Bridge	Alternative 6	No mitigation required

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Vegetation and Wetland Resources		
Temporary disturbance to and permanent loss of developed areas, agricultural land, eucalyptus stands, artificially created roadside drainage ditches, and annual grassland habitat within construction corridor	Alternatives 2–6	No mitigation required
Permanent loss of developed areas, non-serpentine chaparral, and annual grassland habitat within the inundation zone	Alternative 6	No mitigation is required
Wildlife		
Loss of or disturbance to developed and agricultural lands and associated wildlife habitats	Alternatives 2–6	No mitigation required
Temporary loss or alteration of Swainson's hawk foraging habitat	Alternative 2–6	No mitigation required
Temporary loss of San Joaquin pocket mouse habitat	Alternative 2–6	No mitigation required
Loss of grassland habitats for wildlife	Alternative 6	No mitigation required
Loss of chaparral-type habitats for wildlife	Alternative 6	No mitigation required
Loss of upland woodland wildlife habitats	Alternative 6	No mitigation required
Loss of perching habitat for bald eagles	Alternative 6	No mitigation required
Increase in open water and shoreline habitat for waterfowl, waterbirds, and associated species	Alternative 6	No mitigation required
Geology, Soils, Seismicity, and Groundwater		
Localized erosion and sedimentation from construction-related activities	Alternatives 2–6	No mitigation required
Threat of hydrological hazards from potential trench dewatering	Alternatives 2–6	No mitigation required
Destruction of unique geological features from construction-related activities	Alternatives 2–6	No mitigation required
Threat of ground shaking and fault rupture	Alternatives 2–6	No mitigation required
Subsidence south of the Delta from increased groundwater pumping	Alternatives 2–6	No mitigation required
Threat of a reservoir-induced seismic event	Alternative 6	No mitigation required
Erosion and sedimentation within the expanded reservoir inundation zone from reservoir operations	Alternative 6	No mitigation required
Land Use		
Construction-period conflicts with residential and urbanized land uses	Alternatives 2–6	No mitigation required
Postconstruction conflicts with residential and urbanized land uses	Alternatives 2–6	No mitigation required
Inconsistency with local plans and policies and land use designations	Alternatives 2–6	No mitigation required

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Conflicts with planned new land uses	Alternatives 2–6	No mitigation required
Disproportionate impacts on low income residents and other environmental justice considerations	Alternatives 2–6	No mitigation required
Conflict with proposed scenic highway designation for SR 49	Alternative 6	No mitigation required
Loss of land because of inundation associated with enlarging Pardee Reservoir	Alternative 6	No mitigation required
Conflict with mineral resources zone general plan classification	Alternative 6	No mitigation required
Agricultural Resources		
Loss of agricultural production	Alternatives 2–6	No mitigation required
Nonrenewal or termination of Williamson Act Contracts	Alternatives 2–6	No mitigation required
Reduction in agricultural productivity in the San Joaquin Valley	Alternatives 2–6	No mitigation required
Traffic and Transportation		
Alteration of present patterns of vehicular circulation, increased traffic delay, and increased traffic hazards during construction of facilities	Alternatives 2–6	No mitigation required
Damage to the roadway surface during construction of facilities	Alternatives 2–6	No mitigation required
Disruption of rail traffic during construction	Alternatives 2–6	No mitigation required
Interference with emergency response routes during construction	Alternatives 2–6	No mitigation required
Interference with bicycle routes during construction	Alternatives 2–6	No mitigation required
Congestion of roadways and the permanent alteration of present patterns of vehicular circulation from the facility operations	Alternatives 2–6	No mitigation required
Air Quality		
Short-term increase in ROG and PM10 emissions in Sacramento County from construction	Alternatives 2–5	No mitigation required
Short-term increase in ROG and CO emissions in San Joaquin County from construction	Alternatives 2–5	No mitigation required
Long-term increase in emissions in Sacramento and San Joaquin Counties from operations	Alternatives 2–6	No mitigation required
Short-term increase in ROG, CO, and PM10 emissions in Sacramento County from construction	Alternative 6	No mitigation required
Short-term increase in ROG, NOx, and CO emissions in Amador and Calaveras Counties from construction	Alternative 6	No mitigation required

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Short-term release of NOx, CO, and PM10 from blasting at the existing Pardee Reservoir during construction	Alternative 6	No mitigation required
Long-term increase in emissions in Amador and Calaveras Counties from continued operation	Alternative 6	No mitigation required
Noise		
Exposure of existing structures to vibration from pile driving activities	Alternatives 2–6	No mitigation required
Exposure of existing structures and noise-sensitive uses to noise and vibration from blasting activities at enlarged Pardee Reservoir	Alternative 6	No mitigation required
Exposure of noise-sensitive land uses to continued operation of power-generating facilities	Alternative 6	No mitigation required
Increase in noise levels from facility operation	Alternatives 2-6	No mitigation required
Public Health and Safety		
Exposure of people to existing contamination	Alternatives 2–6	No mitigation required
Contamination of soil and water during construction	Alternatives 2–6	No mitigation required
Increased risk of fires during construction	Alternatives 2–6	No mitigation required
Increased flooding along Sacramento River	Alternatives 2–6	No mitigation required
Increased flooding during pipeline construction	Alternatives 2–6	No mitigation required
Increased risk from use and storage of hazardous materials during operations at water treatment plants and intake facility	Alternatives 2–6	No mitigation required
Increased risk from transportation of hazardous materials during operations	Alternatives 2–6	No mitigation required
Construction activity hazards to workers	Alternative 6	No mitigation required
Downstream flood hazards from rupture of the proposed dam	Alternative 6	No mitigation required
Increased flooding during dam construction	Alternative 6	No mitigation required
Visual Resources		
Short-term changes to views associated with construction of project components	Alternatives 2–5	No mitigation required
Adverse changes to views of the intake facility site	Alternatives 2–5	No mitigation required
Adverse changes to views along the pipeline from the intake facility to Zone 40 Surface WTP/FSC	Alternatives 2–5	No mitigation required
Adverse changes to views along the pipeline from the FSC to the Mokelumne Aqueducts	Alternatives 2–5	No mitigation required
Short-term changes to views associated with construction of project components from the intake facility to the Zone 40 Surface WTP	Alternative 6	No mitigation required

Resource Topic/Impact	Applicable Alternative	Mitigation Measure
Short-term changes to views associated with construction of the enlarged Pardee Reservoir	Alternative 6	No mitigation required
Adverse changes to views of the intake facility site	Alternative 6	No mitigation required
Adverse changes to views along the pipeline from the intake facility to Zone 40 Surface WTP	Alternative 6	No mitigation required
Adverse impacts on visual resources from raising Pardee Reservoir water elevations	Alternative 6	No mitigation required
Adverse impacts on visual resources from inundation of the area downstream of the existing Pardee Dam (Middle Mokelumne River)	Alternative 6	No mitigation required
Adverse impacts on visual resources from changes in Camanche Reservoir water elevations	Alternative 6	No mitigation required
Change in views of the Pardee replacement dam	Alternative 6	No mitigation required
Change in views of the new Pardee saddle dams	Alternative 6	No mitigation required
Change in view of the new Jackson Creek saddle dams	Alternative 6	No mitigation required
Change in view of the raised intake tower	Alternative 6	No mitigation required
Change in views of raised or relocated utility lines	Alternative 6	No mitigation required
Change in views of new roads and bridges	Alternative 6	No mitigation required
Change in views from the new Pardee Recreation Area	Alternative 6	No mitigation required
Cultural Resources—No less-than-significant impacts		

Table S-3. Summary of Significant Cumulative Impacts and Mitigation Measures for the Freeport Regional Water Project

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Result
Hydrology, Water Supply, and Power—No project-related contribution			
Water Quality—No project-related contribution			
Fish—No project-related contribution			
Recreation—No project-related contribution			
Vegetation and Wetland Resources			
Effects of local and regional projects and general growth in the region, in combination with the FRWP, on the cumulative loss of identified sensitive resources, including wetlands and riparian woodlands.	Alternatives 2–6	Implementing all mitigation measures described in Chapter 7, "Vegetation and Wetland Resources," will eliminate any contribution to cumulative effects.	Not cumulatively considerable
Wildlife			
Effects of local and regional projects and general growth in the region on the cumulative loss of identified sensitive resources, including habitats for sensitive wildlife species.	Alternatives 2–6	Implementing all mitigation measures described in Chapter 8, "Wildlife," will eliminate any contribution to cumulative effects.	Not cumulatively considerable
Geology, Soils, Seismicity, and Groundwater—No significant impacts			
Land Use—No project-related contribution			
Agricultural Resources			
Effects of local and regional projects and general growth in the region, in combination with the FRWP, on the cumulative loss of prime agricultural lands.	Alternatives 2–6	No mitigation available to reduce effect to less than cumulatively considerable	SU
Traffic and Transportation—No project-related contribution			
Air Quality—No project-related contribution			
Noise—No project-related contribution			

Resource Topic/Impact	Applicable Alternative	Mitigation Measure	Result
Public Health and Safety—No project-related contribution			
Visual Resources—No project-related contribution			
Cultural Resources			
Effects of local and regional projects and general growth in the region on the cumulative loss of cultural (archeological and historic) resources.	Alternatives 2–6	Implementing all mitigation measures described in Chapter 17, "Cultural Resources," will eliminate any contribution to cumulative effects.	Not cumulatively considerable

SU = Significant and unavoidable