CHAPTER 7
POWER PRODUCTION AND ENERGY CONSUMPTION

Hydroelectric facilities generate a significant portion of California's energy requirements. Private electric utilities and water agencies own and operate reservoirs that store and release water to generate hydroelectric power. Electric utilities produce power for their customers, while water agencies produce power for their own use and market the excess to electric utilities, government and public installations, and commercial customers.

Chapter 7 describes how and when electricity is generated at hydropower facilities within the project study area and assesses how the Proposed Project/Action and alternatives would benefit or adversely affect this resource.

7.1 ENVIRONMENTAL SETTING/AFFECTED ENVIRONMENT

Because of the coordinated operations of CVP and SWP water projects in California, where management decisions or alterations in one basin may directly impact the operations of projects in other basins, the Proposed Project/Action and alternatives evaluated in this EIR/EIS have the potential to affect hydropower resources and power consumption in several watersheds. The local environmental setting includes a description of hydropower resources within the Yuba Region, which is followed by a general discussion of CVP and SWP hydropower facilities, seasonal generating characteristics and CVP/SWP power customers and descriptions of hydropower facilities specific to the CVP/SWP Upstream of the Delta Region (e.g., the Sacramento, Feather, and American rivers), the Delta Region and the Export Service Area. The hydroelectric facilities included in the project study area are listed below by region and river in **Table 7-1**.

Table 7-1. Hydroelectric and Pumping Plant Facilities Located in the Project Study Area

Location	Facility		Operator
Yuba Region			
Yuba River	New Bullards Bar Dam	New Colgate Powerhouse	YCWA
Yuba River	New Bullards Bar Dam and Reservoir	Fish Release Powerhouse	YCWA
Yuba River	Englebright Dam	Narrows I Powerhouse	PG&E
Yuba River	Englebright Dam	Narrows II Powerhouse	YCWA
CVP/SWP Upstream of the Delta Region			
Sacramento River	Shasta Dam	Shasta Power Plant	Reclamation (CVP)
Sacramento River	Keswick Dam	Keswick Power Plant	Reclamation (CVP)
Feather River	Oroville Dam	Hyatt-Thermalito Power Plant Complex	DWR (SWP)
Delta Region			
South Delta	Banks Pumping Plant		DWR (SWP)
North Delta	Barker Slough Pumping Plant		DWR (SWP)
South Delta	Jones Pumping Plant		Reclamation (CVP)
Export Service Area			
California Aqueduct	O'Neill Forebay/San Luis Reservoir	O'Neil Pumping-Generating Plant	Reclamation (CVP)
Delta-Mendota Canal	O'Neill Forebay/San Luis Reservoir	William R. Gianelli Pumping-Generating Plant	Joint CVP/SWP Facility

7.1.1 YUBA REGION

Hydroelectric facilities on the Yuba River include New Colgate Powerhouse and the Fish Release Powerhouse, both of which are associated with New Bullards Bar Dam, and Narrows I and II powerhouses associated with Englebright Dam. The locations of these facilities are shown on Figure 5-1.

7.1.1.1 NEW COLGATE POWERHOUSE AND FISH RELEASE POWERHOUSE

New Bullards Bar Dam and New Colgate Powerhouse are parts of the Yuba Project, which was constructed by YCWA to provide flood control protection for Yuba and Sutter counties, irrigation water for Yuba County agriculture, recreation, and hydropower generation. The New Colgate Powerhouse is located below the confluence of the Middle and North Yuba rivers, about 5 miles downstream of New Bullards Bar Dam. The New Colgate Powerhouse receives water through the New Colgate tunnel and penstock from New Bullards Bar Reservoir. The maximum release capacity of the New Colgate Powerhouse is 3,700 cfs and the total generating capacity of the twin turbines is 315 MW. Average annual generation for the New Colgate Powerhouse is 1,314,000 MWh.

YCWA has a contract with PG&E through 2016 regarding power generation at the New Colgate and Narrows II powerhouses. The power purchase contract between YCWA and PG&E is described in Section 7.1.3.2. The power purchase contract provides funds for payments on project bonds and operation and maintenance, with the exception of recreation. The power purchase contract describes the formal operating agreement between YCWA and PG&E, and YCWA and PG&E collaborate closely to operate New Bullards Bar and Englebright reservoirs, and the three powerhouses associated with these reservoirs. YCWA and PG&E operate outside the specific operating provisions agreement of the power purchase contract when such operations benefit both parties; however, this past practice is not binding on any future operations.

While the amounts of seasonal and total daily releases from the New Colgate Powerhouse are typically driven by downstream demands, the short-term scheduling of releases is determined by power generation needs. Hourly releases are scheduled to meet demands of PG&E customers, and to regulate loads on the PG&E grid. Re-regulation of variable flows from the New Colgate Powerhouse at Englebright Reservoir allows more uniform releases from the Narrows I and Narrows II powerhouses to the lower Yuba River.

In addition to New Colgate Powerhouse, YCWA constructed the Fish Release Powerhouse in 1986 at the base of New Bullards Bar Dam. This facility generates power from water released through the lower dam outlet that is used for fishery maintenance in the North Yuba River. The Fish Release Powerhouse has a capacity of 150 kilowatts, which is sufficient to operate the spillway gates of New Bullards Bar Dam in the event of a power outage. The powerhouse generates about 1,300 MWh of electricity per year.[1]

[1] YCWA also owns the Deadwood Creek Powerhouse, which is a 2 MW facility located at the upper end of the New Bullards Bar Reservoir. The powerhouse went into service in 1993 and generates about 5,100 MWh of electricity per year. The tailrace of the Deadwood Creek Powerhouse is above New Bullards Bar Reservoir, so it lies outside of the designated local study area.

7.1.1.2 Narrows I and II Powerhouses

Englebright Dam, which is located about 10 miles downstream of New Colgate Powerhouse, was built in 1941 by the Corps. Its original purpose was to keep upstream hydraulic gold mining debris out of the lower reaches of the river. Two tunnels at the dam convey water to the turbines that generate electricity at the Narrows I and Narrows II powerhouses, which are located on opposite sides of the river.

Narrows I Powerhouse, constructed in 1942, is owned and operated by PG&E. The Narrows I Powerhouse has a discharge capacity of approximately 730 cfs and a bypass flow capacity (when the generator is not operating) of 540 cfs. The powerhouse has a generating capacity of 12 MW and produces an average of 45,600 MWh of electricity per year.

Narrows II Powerhouse, located about 400 feet downstream of Englebright Dam, was constructed in 1970 as part of the Yuba Project (FERC No. 2246). The powerhouse is owned and operated by YCWA. At full load and full head (235.0 feet gross head), the Narrows II Powerhouse has a discharge capacity of about 3,400 cfs; however, when the turbines go off-line, flow must be routed through a bypass system with a maximum release capacity of about 3,000 cfs. The powerhouse has a generating capacity of about 50 MW, and produces an average 248,000 MWh of electricity per year.

YCWA and PG&E coordinate the operations of the Narrows I and Narrows II powerhouses for hydropower efficiency and to maintain a relatively constant flow in the lower Yuba River. The Narrows I Powerhouse typically is used for low flow reservoir releases (less than 730 cfs), or to supplement the Narrows II Powerhouse capacity when high-flow reservoir releases are occurring.

Annual maintenance requires the Narrows II Powerhouse to be shut down for a two to three week period, or longer if major maintenance is performed. Maintenance is typically scheduled for the beginning of September, when Narrows I can discharge the total reservoir release, or during the winter months when cold water can be spilled over the dam. The Narrows II Bypass Project, which recently was completed, has a 3,000 cfs bypass capacity for the Narrows II Powerhouse that can be used during maintenance and emergency shutdowns.

7.1.1.3 Groundwater Pumping

Groundwater pumping for agricultural use within the Yuba Region is also described in Chapters 6, 15, and 17.

7.1.2 CVP/SWP System

The area of analysis used to evaluate the potential effects of the Proposed Project/Action and alternatives on hydropower generation and electrical energy consumption includes CVP/SWP hydroelectric facilities located in the following regions: (1) CVP/SWP Upstream of the Delta Region (i.e., the Sacramento and Feather rivers); (2) the Delta Region; and (3) the Export Service Area.

Both the CVP and SWP rely on their hydroelectric facilities to reduce the cost of operations and maintenance and to repay the capital costs of the projects. Hydropower from the CVP/SWP is an important renewable energy source and comprises approximately 36 percent of the total online capacity of California hydroelectric facilities. Overall, CVP/SWP hydroelectric facilities comprise nearly 7 percent of the total online capacity of all California power plants.

CVP power is a source of electricity for CVP pumping facilities throughout the Central Valley and the Delta, and for many of California's communities. The Western Area Power Administration (Western) sells excess CVP capacity and energy (supplementary to CVP internal needs) to municipal utilities, irrigation districts, and institutions and facilities such as schools, prisons, and military bases. Both CVP and SWP sell power at rates designed to recover costs. For the CVP, these rates historically have been slightly below market rates. Revenue from Western power sales is an important funding source for the CVP Restoration Fund and for repaying project debt incurred during construction of the CVP.

The SWP uses its power primarily to run the pumps that move SWP water to agricultural and municipal users and to provide peak power to California utilities. SWP long-term power contracts act as exchange agreements with utility companies. These exchange agreements allow the SWP and utilities to integrate the uses of their individual power resources in a mutually beneficial manner. In these agreements, the SWP provides on-peak energy to the utilities in exchange for the return of a greater amount of mid-peak and off-peak energy. The SWP also may receive other compensation in the form of annual monetary payments and/or reduced transmission service rates for SWP facilities served by the utility. Except during surplus conditions in extremely wet years, all SWP power is used for peak power exchange agreements and to operate pumping facilities. In all years, the SWP must purchase additional power to meet some of its pumping requirements.

Due to the integrated nature of the CVP and SWP power generation facilities throughout the various study areas, the CVP and SWP systems will be evaluated as a whole, rather than by region.

7.1.2.1 CVP Hydropower System

Hydropower generation at CVP facilities substantively contributes to the reliability of California's electrical power system. The CVP hydropower system contains eight power plants and two pump-generating plants (**Table 7-2**). This system is fully integrated with the Northern California power system and provides a significant portion of the hydropower available for use in central and northern California. The installed capacity of the system is 2,044 MW (Reclamation 2001). In comparison, the combined capacity of the 368 operational hydroelectric power plants in California is 12,866 MW. The area's major power supplier, PG&E, has a generating capacity from all sources of over 20,000 MW.

Hydropower produced at CVP facilities is first used to meet the power needs at CVP pumping plants (Project Use). In the past, Project Use load has consumed approximately 20 to 30 percent of the 4,600,000 MWh average annual gross energy generation of the CVP. The average annual energy consumption of the major CVP pumping facilities is presented in **Table 7-3**.

Hydropower not used at CVP facilities is allocated based on classification as First Preference customers or Preference customers. First Preference customers are customers wholly located in Trinity, Calaveras, or Tuolumne counties, as specified under the Trinity River Diversion Act (69 Stat. 719), and the New Melones provisions of the Flood Control Act of 1962 (76 Stat. 1173, 1191-1192). Under both statutes, the customers of these counties are entitled to 25 percent of the additional CVP energy resulting from the operational integration of their specific unit or division into the CVP.

Table 7-2. Hydropower Facilities of the Central Valley Project

Unit	Maximum Generating Capacity (MW)
Sacramento River Service Area	
Carr [a]	154
Keswick	105
Shasta	629
Spring Creek [a]	200
Trinity [a]	140
Subtotal	*1,228*
American River Service Area	
Folsom	215
Nimbus	14
Subtotal	*229*
Delta Export and San Joaquin Valley	
New Melones [a]	383
O'Neill [b]	29
San Luis [b,c]	202
Subtotal	*614*
Total	**2,071**

[a] CVP power plants unaffected by Yuba Accord.
[b] Pump-generating plant.
[c] Jointly owned, pumping and generating facility. Federal share only.
Source: (Western 2002; Western 2003; Western 2004)

Table 7-3. Major Pumping Plants of the Central Valley Project

Unit	Annual Energy Use (MWh)
Sacramento River Service Area	
Tehama-Colusa Canal	7,900
Corning Canal	5,200
Subtotal	*13,100*
American River Service Area	
Folsom Pumping Plant	1,041
Delta Export and San Joaquin Valley	
Contra Costa Canal	18,908
Dos Amigos [b]	180,146 [a]
O'Neill [b]	87,185 [a]
San Luis [b]	306,225 [a]
Jones	620,712
Subtotal	*1,213,176*
Total	**1,227,317**

[a] Federal energy use.
[b] Joint state-federal facility.
Source: (Reclamation 2001)

Preference Customers are those who have contracts subject to the requirements of Reclamation law, which provides that preference in the sale of federal power shall be given to municipalities and other public corporations or agencies and also to cooperatives and other nonprofit organizations financed in whole or in part by loans made pursuant to the Rural Electrification Act of 1936.

Western is the marketing agency for power generated at Reclamation's CVP facilities. Created in 1977 under the Department of Energy Organization Act, Western markets and transmits electric power throughout 15 western states. Western's Sierra Nevada Customer Service Region annually markets approximately 8,000 MWh, including 3,000 MWh produced by CVP generation and 5,000 MWh produced by other sources. Western's mission is to sell and deliver electricity that is excess to project use (power required for CVP operations). Western's power marketing responsibility includes managing the federal transmission system and, as a federal agency, ensuring that operations of the hydropower facilities are consistent with its regulatory responsibilities.

7.1.2.2 SWP HYDROPOWER SYSTEM

The primary purpose of the SWP power generation facilities is to help meet energy requirements of the SWP pumping plants. To the extent possible, SWP pumping is scheduled during off-peak periods, and energy generation is scheduled during peak periods. Although the SWP uses more energy than it generates from its hydroelectric facilities, DWR has exchange agreements with other utility companies and has developed other power resources. DWR sells surplus power, when it is available, to minimize the net cost of pumping energy. DWR first sold excess power commercially in 1968.

The SWP conveys an annual average of about 2.5 MAF of water through its 17 pumping plants, eight hydroelectric power plants, 32 storage facilities, and over 660 miles of aqueduct and pipelines. Hydroelectric generation provides the greatest share of SWP power resources. The Edward Hyatt Pumping-Generating Plant and Thermalito Pumping-Generating Plant (Hyatt-Thermalito Power Plant Complex) at Oroville Reservoir generate about 2,200,000 MWh of energy in a median water year, while the Thermalito Diversion Dam Power Plant adds another 24,000 MWh of electrical energy per year. Generation at SWP plants (Gianelli, Alamo, Devil Canyon, Warne, and Mojave Siphon) varies with the amount of water conveyed. SWP hydropower and pumping plants and their capacities are listed in **Table 7-4** and **Table 7-5**.

Table 7-4. Major Power Plants of the State Water Project

Hydroelectric Power Plant	Maximum Generating Capacity (MW)
Thermalito Diversion Dam	3,300
Hyatt-Thermalito	840,000
Gianelli	222,000
Alamo	18,000
Warne	78,200
Mojave Siphon	30,000
Devil Canyon	291,000
Source: (DWR 2004)	

Table 7-5. Major Pumping Plants of the State Water Project

Pumping Plant	Annual Energy Use (MWh)
North Bay Interim	13
Cordelia	9,257
Barker Slough	9,094
South Bay	100,405
Del Valle	655
Banks	727,300
Buena Vista	445,956
Teerink	479,653
Chrisman	1,061,571
Edmonston	3,875,692
Pearblossom	552,048
Oso	211,909
Las Perillas	7,756
Badger Hill	20,747
Devil's Den	23,106
Bluestone	22,154
Polonio Pass	22,961
Source: (DWR 2004)	

7.1.2.3 Seasonal Variation of Pumping and Power Generation

CVP and SWP power requirements vary seasonally depending on demands in export areas south of the Delta, project water allocations, and filling of San Luis Reservoir. During the winter (December through February), water demands are relatively low, but in the wetter years Delta exports may be high until San Luis Reservoir fills. Typically, CVP generation is sufficient in the winter months to satisfy power needs for project use, but insufficient to satisfy both project pumping requirements and Preference Customer load requirements; therefore, Western must purchase additional energy from other sources. Generation from SWP hydropower facilities and the Reid Gardner coal-fired plant is sufficient to satisfy SWP pumping loads in the winter. Winter power generation is higher in winter than in fall if flood control operations require additional releases from reservoirs.

During the spring (March through May), exports from the Delta may be limited either because San Luis Reservoir is full or because of Delta export restrictions; thus, project-pumping loads may be lower in spring than in winter. Late season rainfall and snowmelt flood releases govern the timing of power generation. Spring is a transitional period for power, as the purchase of additional energy is sometimes, but not always, required for CVP pumping and preference load requirements. Generation from SWP hydropower facilities and the Reid Gardner coal-fired plant is sufficient to satisfy SWP pumping loads in the spring.

CVP and SWP water demands are highest during the summer (June through August). Releases to meet these water demands produce energy at the upstream reservoirs and at San Luis Reservoir. Although generation at CVP power plants is high because of releases for CVP water demands, pumping loads combined with high preference customer loads frequently require the import of additional energy from the Pacific Northwest. SWP generation at its hydropower facilities also is higher in response to increased releases to meet water demands; however, this generation, combined with Reid Gardner generation, is typically insufficient to meet SWP loads. In summer, the SWP relies on its power exchange agreements and energy purchases (primarily from the Pacific Northwest) to meet its remaining energy requirements.

During the fall (September through November) agricultural demands are low, and the CVP and SWP start to fill San Luis Reservoir. CVP generation is sufficient in the fall months to satisfy power pumping requirements and Preference Customer load requirements. Generation from SWP hydropower facilities and the Reid Gardner coal-fired plant is sufficient to satisfy SWP pumping loads in the fall.

7.1.3 Regulatory Setting

The Proposed Project/Action and alternatives will either continue to be operated under existing regulations, or will require modifications of existing regulations. These regulations range from agreements with state or federal agencies state and federal laws.

7.1.3.1 Federal and State

The regional study area comprises CVP and SWP facilities located upstream of the Delta, in the Delta, and in the Export Service Area. The hydroelectric generation facilities of the CVP and SWP are operated by Reclamation and DWR respectively. Hydropower operations at these facilities must comply with regulations governing flows in the downstream river reaches and flow requirements in the Delta. These flow requirements are discussed in Chapter 5.

7.1.3.2 LOCAL

YCWA's activities on the lower Yuba River are regulated through a series of licenses, permits, contracts, and laws. The primary focus of these regulations is the flow in the lower Yuba River, but powerhouse operations are also subject to control by some of these various regulations.

FERC LICENSE FOR YUBA RIVER DEVELOPMENT PROJECT

FERC originally issued a license under the Federal Power Act for the Yuba Project on May 16, 1963. On May 6, 1966, FERC issued an order amending this license. On November 22, 2005, FERC approved an amendment to YCWA's license specifying revised flow fluctuation and ramping criteria. YCWA is obligated to operate its facilities to meet minimum flow schedules and flow fluctuation criteria below New Bullards Bar Dam, Englebright Dam, and Daguerre Point Dam. These requirements are described in Chapter 5.

1966 POWER PURCHASE CONTRACT

YCWA executed a power purchase contract with PG&E on May 13, 1966. The Yuba County Water Agency Power Purchase Contract, which allowed for financing the construction of the Yuba Project, specifies the conditions of PG&E's power purchase from YCWA and PG&E's rights to require releases of water from New Bullards Bar Reservoir for power production.

Power Purchase Contract Appendix C, Subsection C-2.A.(b), Water for Power and Irrigation, details the monthly storage criteria and monthly power quotas. The maximum end-of-month storage amount (the "critical line") is described in paragraph (1):

> *"When it appears that storage by the end of any month will exceed the critical amount for such month listed in Appendix D, project power plants shall be operated, unless otherwise agreed, to reduce the storage on hand by the end of such month to the amount specified in Appendix D but at rates not to exceed the amount required for full capability operation except when greater releases are needed by reason of flood control requirements …."*

Compliance with this criterion requires releases of up to 3,400 cfs at New Colgate Powerhouse to bring the end-of-month storage to, or below, the amounts listed in **Table 7-6**, which is the "critical storage at end of month in Yuba's New Bullards Bar Reservoir" in Appendix D.

Table 7-6. Storage Criteria for New Bullards Bar Reservoir Under 1966 PG&E Power Purchase Contract

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (TAF)	660	645	645	600	600	685	825	930	890	830	755	705

In addition to the storage requirements, a power production quota also is imposed when the operations described above would result in an end-of-month storage at or below the critical line. This quota schedule is described in the contract as follows:

> *"When drafts of storage will result in the storage on hand at the end of any month being equal to or less than the critical amount for such month listed in Appendix D, then, unless otherwise requested by Pacific, Yuba shall release during that month only a sufficient amount of water, in accordance with schedules furnished from time to time by Pacific, to generate the following specified amount of energy at the new Colgate Power Plant".*

Table 7-7 gives the required power generation criteria. The contract also provides that Narrows II Power Plant *"… shall be operated in a manner consistent with the foregoing water release requirements."*

Table 7-7. Minimum Required Power Production under 1966 PG&E Power Purchase Contract

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Power (MWh)	39,300	39,500	37,800	81,700	81,700	81,500	81,700	82,000	82,100	37,700	38,200	38,900

1993 NARROWS I FERC LICENSE

In 1993, FERC issued a new license to PG&E for continued operation of the Narrows I Powerhouse which is located downstream of the left abutment of Englebright Dam. This order contains a new set of instream flow requirements. The order requires flows measured at Smartville on the Lower Yuba River to meet the schedule listed in **Table 7-8**, subject to several important conditions.

Table 7-8. Narrows I FERC License Lower Yuba River Instream Flow Requirements at Smartville

Period	Flow (cfs)
October 1 to March 31	700
April 1 to April 30	1,000
May 1 to May 31	2,000
June 1 to June 30	1,500
July 1 to September 30	450

Table 2 of the order lists the "Conditions Defining When the Licensee Shall Maintain the Schedule of Daily Average Flows." The two basic conditions are: (1) when the total volume of water released to maintain the schedule of daily average flows during the water year, as quantified in the above table, is less than 45 TAF, and (2) when storage in Englebright Reservoir exceeds 60 TAF or when PG&E is entitled to dispatch releases of water from New Bullards Bar Reservoir under the terms of PG&E's Power Purchase Contract with YCWA (i.e., when storage in New Bullards Bar Reservoir exceeds the critical line).

7.2 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES

Reductions in YCWA's or the CVP/SWP's hydropower capacity and generation, and increases in energy requirements for pumping, would have economic consequences by decreasing their abilities to market excess power or by increasing their needs to purchase capacity or energy to support loads.

Proposed Yuba Accord actions may impact energy generation and use by: (1) decreasing reservoir water surface elevations, thereby decreasing hydropower capacity and generation; (2) changing the timing of hydropower generation to a season when market prices for electricity are lower; (3) increasing power consumption at CVP/SWP facilities in the Delta; and (4) increasing electrical demands of YCWA participating member units at groundwater wells as a part of groundwater substitution transfers, or in response to surface water delivery deficiencies.

7.2.1 IMPACT ASSESSMENT METHODOLOGY

The computer models developed to simulate the operations of the Proposed Project/Action and alternatives are driven by the water supply operations of the local and regional study areas.

The hydropower generation and power consumption calculations resulting from these water supply models can be used in a comparative sense to determine the effects on net electrical generation of one alternative versus another. Results from a single simulation may not necessarily correspond to actual system operations for a specific month or year, but are representative of general electrical generation and use. The applications of the water supply computer models are described in Section 5.2.1.

7.2.1.1 *METHODOLOGY FOR EVALUATING POTENTIAL IMPACTS TO YUBA RIVER BASIN HYDROPOWER*

Potential impacts to hydropower resources in the Yuba Region are evaluated using the YPM described in Section 5.2.1, and Attachment A of Appendix D. The YPM computes electrical generation for each month of the period of simulation for the New Colgate Powerhouse and Narrows I and Narrows II powerhouses. Power generation at New Colgate Powerhouse is calculated based on flow through the powerhouse, New Bullards Bar Reservoir surface water elevation, flow-dependent tailwater elevation, and an assumed efficiency of 90 percent. Power generation at Narrows I and Narrows II powerhouses is calculated in a similar manner, except that power generation is calculated based on an assumed Englebright Reservoir surface water elevation of 530 feet msl, which corresponds to 60 TAF of storage. The YPM assumes constant storage in Englebright Reservoir.

7.2.1.2 *METHODOLOGY FOR EVALUATING POTENTIAL IMPACTS TO SWP AND CVP HYDROPOWER AND POWER CONSUMPTION*

Changes to CVP and SWP hydropower production and power consumption resulting from implementation of the Proposed Project/Action and alternatives are assessed using CALSIM II. To quantify changes in CVP net electricity use, CALSIM II output is analyzed using the LongTermGen Model. This is a CVP power model developed to estimate the CVP power generation, capacity, and Project Use power based on the operations defined by a CALSIM II simulation. The LongTermGen Model computes monthly hydropower generation, capacity, and CVP Project Use power for each month of the CALSIM II simulation, over the 2-year simulation period.

Similarly, changes in SWP electricity generation and consumption are assessed using a CALSIM II power module developed by DWR.

7.2.2 IMPACT INDICATORS AND SIGNIFICANCE CRITERIA

The CEQA Guidelines do not provide any specific guidance regarding changes in hydropower generation or power consumption. Significance criteria have been tailored specifically to address these issues. The impact indicators and significance criteria for power production and energy consumption are presented in **Table 7-9**.

Table 7-9. Impact Indicators and Significance Criteria for Power Production and Energy Consumption

Impact Indicator	Significance Criteria
Power generation at New Colgate, Narrows I and Narrows II powerhouses	❑ Decrease in long-term average annual hydropower generation of more than 5 percent. ❑ Change in long-term average monthly hydropower generation of more than 5 percent.
Power generation at Oroville-Thermalito Complex	
Power generation at the San Luis Pumping-Generating Plant	
Power consumption at groundwater wells within YCWA Member Units	❑ Increase in long-term average annual power requirement of more than 5 percent.
Power consumption at the CVP Jones Pumping Plant	
Power consumption at SWP Banks Pumping Plant	
Power consumption at the O'Neil Forebay Pumping Plant	
Power consumption at the San Luis Pumping-Generating Plant	

7.2.2.1 *HYDROPOWER*

The Proposed Project/Action and alternatives would result in a potentially significant impact on hydropower production if generation at affected facilities were reduced, or if the timing of generation were changed to seasons with less favorable market price conditions. An effect on hydropower production is considered potentially significant if implementing a particular action would cause either of the following:

- ❑ An average annual decrease in hydropower capacity or generation for the 72-year simulation period; and
- ❑ A change in the season pattern of power generation.

A net decrease in hydropower generation is defined as significant if the average annual energy generated over the 72-year period of simulation changes by more than 5 percent. A threshold of 5 percent is selected as the threshold of significance for hydroelectric generation for several reasons. First, hydropower by its nature is highly susceptible to seasonal and annual variation resulting from hydrologic variability, including the timing of precipitation and runoff. Secondly, short-term operations decisions (related to flood control, coordinated releases, timing of demand for agricultural water deliveries related to weather and cropping patterns, etc.) also contribute to variations in seasonal and total annual generation levels. Finally, regional power market demands and prices provide a backdrop for hydropower generation decisions, as excess generation from hydro facilities is delivered to the transmission grid for use. Hydroelectric operators would typically change generation patterns to match to the extent possible periods of high energy demand. Taken together, these factors would cause generation patterns to vary (potentially quite substantially) seasonally or on a year-to-year basis, even if water deliveries and groundwater utilization was exactly the same. As a result, generation variations of less than 5 percent are not considered significant.

Changes to the seasonal pattern of generation may be considered significant if there is a change of generation out of high demand periods to low demand periods. Typically, generating resources are dispatched to meet demand utilizing the most efficient units first. During periods of high demand, the marginal units (the last units dispatched to meet the peak of demand) may be the least efficient, and as a result changing of generation out of high demand periods to low demand periods may result in negative environmental impacts.

Usually some degree of seasonal variation in generation would be anticipated in year-on-year operations for the same suite of reasons that overall generation variation can occur (as described in the previous paragraphs, changes in hydrology, operations decisions, and delivery patterns). Additionally, water, the "fuel" for hydroelectric generation, is easily stored by retention in the reservoir, with essentially no differential if used sooner or later in the season. As a result, seasonal variations measured by a change in monthly generation of less than 5 percent per month are not considered significant; only changes of 5 percent or more in a month's generation are considered potentially significant.

7.2.2.2 POWER CONSUMPTION

For electricity consumption, the environmental consequences of the Proposed Project/Action and alternatives are measured in terms of how they would affect the net energy requirements of groundwater wells within YCWA Member Units and the CVP and SWP. This is consistent with the significance criteria used in the CALFED Bay-Delta Program Final Programmatic EIS/EIR (CALFED 2000).

For this analysis, it is assumed that any additional water provided by the Proposed Project/Action or alternatives available for export would be conveyed through the Banks and Jones pumping plants. Additional water pumped through project facilities, and additional groundwater pumping by YCWA Member Units, would increase power consumption. To estimate the power requirement for groundwater pumping, the maximum power requirement, as described in Section 7.1.1.3 will be used to determine the total power consumption. This approach may overestimate the amount of power required to pump the groundwater for the various alternatives, because there are several variables making a precise determination impossible. These variables include:

- The amount of lift required to extract the groundwater. The vertical distribution of groundwater is not adequately determined at this time to accurately determine the amount of lift required. Similarly, there are no modeling data available to indicate localized effects of groundwater pumping to determine the groundwater surface elevation. The range of depths to the groundwater surface is assumed to be between 10 and 120 feet.
- The pump efficiency is unknown. Well surveys for Yuba County indicate the range of pump efficiencies to be between 0.585 and 0.715.

With these ranges of depth to the groundwater surface and pump efficiency, a maximum and minimum power requirement per acre-foot can be estimated. The minimum power requirement would represent a 10-foot depth to groundwater surface and a 0.715 pump efficiency, indicating a power requirement of 14 KWh/AF. The maximum power requirement would represent a 120-foot depth to groundwater surface and a 0.585 pump efficiency, requiring 210 KWh/AF.

Using these power requirements, a maximum and minimum annual power usage for each alternative can be determined and compared. For the purposes of determining the maximum change in long-term power requirement for each alternative, the maximum groundwater pumping power requirement is used in analysis.

The change in power requirements is defined as significant if the net energy consumption over the 72-year period of simulation increases by more than 5 percent.

As discussed in Chapter 4, CEQA and NEPA have different legal and regulatory standards that require slightly different assumptions in the modeling runs used to compare the Proposed Project/Action and alternatives to the appropriate CEQA and NEPA bases of comparison in the impact assessments. Although only one project (the Yuba Accord Alternative) and one action alternative (the Modified Flow Alternative) are evaluated in this EIR/EIS, it is necessary to use separate NEPA and CEQA modeling scenarios for the Proposed Project/Action, alternatives and bases of comparisons to make the appropriate comparisons. As a result, the scenarios compared in the impact assessments below have either a "CEQA" or a "NEPA" prefix before the name of the alternative being evaluated. A detailed discussion of the different assumptions used for the CEQA and NEPA scenarios is included in Appendix D.

As also discussed in Chapter 4, while the CEQA and NEPA analyses in this EIR/EIS refer to "potentially significant," "less than significant," "no" and "beneficial" impacts, the first two comparisons (CEQA Yuba Accord Alternative compared to the CEQA No Project Alternative and CEQA Modified Flow Alternative compared to the CEQA No Project Alternative) presented below instead refer to whether or not the proposed change would "unreasonably affect" the evaluated parameter. This is because these first two comparisons are made to determine whether the action alternative would satisfy the requirement of Water Code Section 1736 that the proposed change associated with the action alternative "would not unreasonably affect fish, wildlife, or other instream beneficial uses."

7.2.3 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE CEQA YUBA ACCORD ALTERNATIVE COMPARED TO THE CEQA NO PROJECT ALTERNATIVE

Impact 7.2.3-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-1, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA No Project Alternative. Therefore, the CEQA Yuba Accord Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect long-term average annual hydropower generation.

Impact 7.2.3-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and Narrows II powerhouses

As shown in Table F3-2, there would be decreases in average monthly generation of more than 5 percent in December, January, February and May at either Colgate or Narrows I and II powerhouses, with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA No Project Alternative. There would be increases of 5 percent or more in July, August, September and October for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts; conversely, changing generation from low demand months to high demand months would have relatively positive environmental impacts. Since this seasonal change in generation for this comparison would be from periods of generally lower power demand in California (the winter months) to periods of generally higher power demand (the summer months), it is likely that this change would result in minimal or generally positive environmental impacts. Thus, the CEQA Yuba Accord Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect long-term average monthly hydropower generation at the Colgate or Narrows facilities.

Impact 7.2.3-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-2, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA Yuba Accord Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.3-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-2, there would be one month (December) with a decrease of 5 percent or more in average monthly generation. However, December is the month that has the second lowest generation production for the San Luis Pumping-Generating Plant (1,864 MWh under the CEQA Yuba Accord Alternative, 1,973 MWh under the CEQA No Project Alternative). In contrast, average monthly generation during the months of April through July is over 31,850 MWh per month under either scenario, and a change in generation of 191 MWh in May between the CEQA Yuba Accord Alternative and the CEQA No Project Alternative represents only a 0.4 percent change in generation. While the change in generation during December for this comparison would be large relative to the total December generation for the San Luis Pumping Generating Plant, but very low relative to the average monthly generation for the San Luis facility, and since the total average annual generation for the San Luis facility would vary by less than 0.05 percent, it can be concluded that the generation change for this single month under the CEQA Yuba Accord Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect hydropower generation.

Impact 7.2.3-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-3, a 10 percent increase in average annual power consumption would be expected with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA No Project Alternative. Overall, the CEQA Yuba Accord Alternative, relative to the CEQA No Project Alternative, would have a potential unreasonable effect on annual power consumption for groundwater pumping within YCWA Member Unit service areas.

Impact 7.2.3-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-4, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay Pumping Plants and at the San Luis Pumping-Generating Plant with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA No Project Alternative. Therefore, the CEQA Yuba Accord Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect annual power consumption at these facilities.

7.2.4 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE CEQA MODIFIED FLOW ALTERNATIVE COMPARED TO THE CEQA NO PROJECT ALTERNATIVE

Impact 7.2.4-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-5, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA No Project Alternative. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect long-term average annual hydropower generation.

Impact 7.2.4-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and Narrows II powerhouses

As shown in Table F3-6, there would be decreases in average monthly generation of more than 5 percent in November, December, January and May at either Colgate or Narrows I and II powerhouses, with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA No Project Alternative. There would be increases of 5 percent or more in July and August for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts; conversely, changing generation from low demand months to high demand months would have relatively positive environmental impacts. Since the seasonal change in generation for this comparison would be from periods of generally lower power demand in California (the winter months) to periods of generally higher power demand (the summer months), it is likely that this change would result in minimal environmental impacts. Thus, the CEQA Modified Flow Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect long-term average monthly hydropower generation at the Colgate or Narrows facilities.

Impact 7.2.4-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-6, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.4-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-6, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect hydropower generation at the San Luis Pumping-Generating Plant.

Impact 7.2.4-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-7, a 10 percent decrease in average annual power consumption would be expected with the implementation of the CEQA Yuba Accord Alternative as compared to the

CEQA No Project Alternative. This decrease in power consumption would not be considered an unreasonable effect on annual power consumption for groundwater pumping within YCWA Member Unit service areas for the CEQA Modified Flow Alternative, relative to the CEQA No Project Alternative.

Impact 7.2.4-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-8, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay pumping plants and at the San Luis Pumping-Generating Plant with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA No Project Alternative. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA No Project Alternative, would not unreasonably affect annual power consumption at these facilities.

7.2.5 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE CEQA YUBA ACCORD ALTERNATIVE COMPARED TO THE CEQA EXISTING CONDITION

Impact 7.2.5-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II powerhouses; at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-9, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA Existing Condition. Therefore, the CEQA Yuba Accord Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to long-term average annual hydropower generation.

Impact 7.2.5-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and Narrows II powerhouses

As shown in Table F3-10, there would be decreases in average monthly generation of more than 5 percent in July at either Colgate or Narrows I and II powerhouses, with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA Existing Condition. There would be increases of 5 percent or more in June, September, October, November and December for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts; conversely, changing generation from low demand months to high demand months would have relatively positive environmental impacts. In this comparison, the net reduction in generation at the Colgate and Narrows facilities would be more than replaced by the increases in generation in June and September, resulting in a change between months within the high demand period, not a change out of the high demand period. The increases in generation in the fall and winter months would not in themselves be potentially significant. In summary, the CEQA Yuba Accord Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to long-term average monthly hydropower generation at the Colgate or Narrows facilities.

Impact 7.2.5-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-10, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA Yuba Accord Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.5-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-10, there would be one month (December) with a decrease of 5 percent or more in average monthly generation. However, December is the month that would have the second lowest generation production for the San Luis Pumping-Generating Plant (1,864 MWh under the CEQA Yuba Accord Alternative, 2,012 MWh under the CEQA Existing Condition). In contrast, average monthly generation during the months of April through July would be over 31,850 MWh per month under either scenario, and a change in generation of 191 MWh in May between the CEQA Yuba Accord Alternative and the CEQA Existing Condition would represent only a 0.4 percent change in generation. While the change in generation during December for this comparison would be large relative to the total December generation for the San Luis complex, but very low relative to the average monthly generation for the San Luis complex, and since the total average annual generation for the San Luis complex would vary by less than 0.05 percent, it can be concluded that the generation change for this single month under the CEQA Yuba Accord Alternative, relative to the CEQA Existing Condition, would not represent a significant impact.

Impact 7.2.5-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-11, a 51 percent increase in average annual power consumption would be expected with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA Existing Condition. Overall, the CEQA Yuba Accord Alternative would have a potentially significant impact on annual increases in long-term power consumption for groundwater pumping within YCWA Member Unit service areas, relative to the CEQA Existing Condition.

Impact 7.2.5-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-12, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay pumping plants and at the San Luis Pumping-Generating Plant with the implementation of the CEQA Yuba Accord Alternative as compared to the CEQA No Project Alternative. Therefore, the CEQA Yuba Accord Alternative, relative to the CEQA Existing Condition, would have a less than significant impact on annual power consumption at these facilities.

7.2.6 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE CEQA MODIFIED FLOW ALTERNATIVE COMPARED TO THE CEQA EXISTING CONDITION

Impact 7.2.6-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II Powerhouses; at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-13, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II Powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA Existing Condition. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to long-term average annual hydropower generation.

Impact 7.2.6-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and Narrows II powerhouses

As shown in Table F3-14, there would be a decrease in average monthly generation of more than 5 percent in August at either Colgate or Narrows I and II powerhouses, with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA Existing Condition. There would be an increase of 5 percent or more in December for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts. Thus, there would potentially be a significant impact to long-term average monthly hydropower generation at the Colgate or Narrows facilities under the CEQA Modified Flow Alternative, relative to the CEQA Existing Condition.

Impact 7.2.6-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-14, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.6-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-14, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to hydropower generation at the San Luis Pumping-Generating Plant.

Impact 7.2.6-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-15, a 23 percent increase in average annual power consumption would be expected with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA Existing Condition. This increase in power consumption would be considered a significant impact on annual power consumption for groundwater pumping within YCWA Member Unit service areas under the CEQA Modified Flow Alternative, relative to the CEQA Existing Condition.

Impact 7.2.6-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-16, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay pumping plants and at the San Luis Pumping-Generating Plant with the implementation of the CEQA Modified Flow Alternative as compared to the CEQA Existing Condition. Therefore, the CEQA Modified Flow Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to annual power consumption at these facilities.

7.2.7 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE CEQA NO PROJECT/NEPA NO ACTION ALTERNATIVE COMPARED TO THE CEQA EXISTING CONDITION/NEPA AFFECTED ENVIRONMENT

As discussed in Chapter 3, the key elements and activities (e.g., implementation of the RD-1644 Long-term instream flow requirements) for the CEQA No Project Alternative would be the same for the NEPA No Action Alternative. The primary differences between the CEQA No Project and NEPA No Action alternatives are various hydrologic and other modeling assumptions (see Section 4.5 and Appendix D). Because of these differences between the No Project and No Action alternatives, these alternatives are distinguished as separate alternatives for CEQA and NEPA evaluation purposes.

Based on current plans and consistent with available infrastructure and community services, the CEQA No Project Alternative in this EIR/EIS is based on current environmental conditions (e.g., project operations, water demands, and level of land development) plus potential future operational and environmental conditions (e.g., implementation of the RD-1644 Long-term instream flow requirements in the lower Yuba River) that probably would occur in the foreseeable future in the absence of the Proposed Project/Action or another action alternative. The NEPA No Action Alternative also is based on conditions without the proposed project, but uses a longer-term future timeframe that is not restricted by existing infrastructure or physical and regulatory environmental conditions. The differences between these modeling characterizations and assumptions for the CEQA No Project and the NEPA No Action alternatives, including the rationale for developing these two different scenarios for this EIR/EIS, are explained in Chapter 4[2].

Although implementation of the RD-1644 Long-term instream flow requirements would occur under both the CEQA No Project and the NEPA No Action alternatives, the resultant model outputs for both scenarios are different because of variations in the way near-term and long-term future operations are characterized for other parameters in the CEQA and NEPA assumptions. As discussed in Chapter 4, the principal difference between the CEQA No Project Alternative and the NEPA No Action Alternative is that the NEPA No Action Alternative includes several potential future water projects in the Sacramento and San Joaquin valleys (e.g., CVP/SWP Intertie, FRWP, SDIP and a long-term EWA Program or a program equivalent to the

[2] For modeling purposes related to CEQA analytical requirements, OCAP Study 3 (2001 level of development) is used as the foundational study upon which the modeling scenarios for the CEQA No Project Alternative and the CEQA Existing Condition were developed. For modeling purposes related to NEPA analytical requirements, OCAP Study 5 (2020 level of development) is used as the foundational study upon which the modeling scenarios for the NEPA No Action Alternative was developed.

EWA), while the CEQA No Project Alternative does not. Because many of the other assumed conditions for these two scenarios are similar, the longer-term analysis of the NEPA No Action Alternative compared to the NEPA Affected Environment builds upon the nearer-term analysis of the CEQA No Project Alternative compared to the CEQA Existing Condition.

Because the same foundational modeling base (OCAP Study 3) was used to characterize near-term conditions (2001 level of development) both the CEQA No Project Alternative and the CEQA Existing Condition, it was possible to conduct a detailed analysis to quantitatively evaluate the hydrologic changes in the Yuba Region and the CVP/SWP system that would be expected to occur under these conditions. Building on this CEQA analysis, the analysis of the NEPA No Action Alternative compared to the NEPA Affected Environment consists of two components: (1) an analysis of near-term future without project conditions quantified through the CEQA No Project Alternative, relative to the CEQA Existing Condition; and (2) a qualitative analysis of longer-term future without project conditions (the NEPA No Action Alternative)[3].

7.2.7.1 CEQA No Project Alternative Compared to the CEQA Existing Condition

Impact 7.2.7.1-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II Powerhouses; at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-17, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II Powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating complex with the implementation of the CEQA No Project Alternative as compared to the CEQA Existing Condition. Therefore, the CEQA No Project Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to long-term average annual hydropower generation.

Impact 7.2.7.1-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II Powerhouses

As shown in Table F3-18, there would be a decrease in average monthly generation of more than 5 percent in July, August and September at either Colgate or Narrows I and II powerhouses, with the implementation of the CEQA No Project Alternative as compared to the CEQA Existing Condition. There would be an increase of 5 percent or more in May, June, November, December and January for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts. Thus, there would potentially be a significant impact to long-term average monthly hydropower generation at the Colgate or Narrows facilities under the CEQA No Project Alternative, relative to the CEQA Existing Condition.

Impact 7.2.7.1-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-18, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA No Project Alternative, relative to the CEQA

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[3] The second analytical component cannot be evaluated quantitatively due to the differences in the underlying baseline assumptions for OCAP Study 3 and OCAP Study 5.

Existing Condition, would result in a less than significant impact to hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.7.1-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-18, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the CEQA No Project Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to hydropower generation at the San Luis Pumping-Generating Plant.

Impact 7.2.7.1-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-19, a 37 percent increase in average annual power consumption would be expected with the implementation of the CEQA No Project Alternative as compared to the CEQA Existing Condition. This increase in power consumption would be considered a significant impact on annual power consumption for groundwater pumping within YCWA Member Unit service areas under the CEQA No Project Alternative, relative to the CEQA Existing Condition.

Impact 7.2.7.1-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-20, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay pumping plants and at the San Luis Pumping-Generating Plant with the implementation of the CEQA No Project Alternative as compared to the CEQA Existing Condition. Therefore, the CEQA No Project Alternative, relative to the CEQA Existing Condition, would result in a less than significant impact to annual power consumption at these facilities.

7.2.7.2 NEPA No Action Alternative Compared to the NEPA Affected Environment

In the Yuba Region, the primary difference between the NEPA No Action Alternative and the NEPA Affected Environment would be the changes in lower Yuba River flows associated with the implementation of the RD-1644 Long-term instream flow requirements, to replace the RD-1644 Interim instream flow requirements, and the increased local surface water demands for WWD. These also are the primary difference that would occur in the Yuba Region between the CEQA No Project Alternative and the CEQA Existing Condition. These potential effects to power production and energy consumption that were evaluated in the quantitative analyses that is presented in Section 7.2.7.1 above for the CEQA No Project Alternative, relative to the CEQA Existing Condition (see also Appendix F3, Table F3-17 through Table F3-20), therefore also are used for comparison of the NEPA No Action Alternative relative to the NEPA Affected Environment, and are not repeated here.

As discussed above, the analysis of the NEPA No Action Alternative includes several additional proposed water supply and operations projects in the project study area that are not included in the CEQA analysis. However, these other proposed projects would not significantly affect hydrologic conditions or hydroelectric generation in the Yuba Region and, thus, are only discussed in the context of CVP/SWP operations upstream of and within the Delta.

Under the NEPA No Action Alternative, several water storage, supply or re-operations projects may be implemented to supply future levels of demand for water in California, including water storage and conveyance projects (e.g., SDIP[4]), water transfers and acquisition programs (e.g., a long-term EWA Program or a program equivalent to the EWA) and other projects related to CVP/SWP system operations (e.g., CVP/SWP Intertie and FRWP).

Construction and operation of conveyance projects, implementation of water transfer and acquisition projects, or future changes in CVP/SWP system operations under the NEPA No Action Alternative could alter hydroelectric generation output or total electrical loads related to pumping compared to the NEPA Affected Environment. Other than new storage projects, most projects that would be implemented or ongoing under the NEPA No Action Alternative would likely not result in an overall increase or decrease in total hydroelectric generation or pumping, but could result in shifting of generation and/or pumping to different months in a given year. To the extent that water acquisition projects (e.g., SVWMP, a long-term EWA Program or a program equivalent to the EWA) would purchase water through groundwater substitution programs, additional pumping and/or shifting of release of reservoir water to accommodate the groundwater usage could also cause a shift in generation patterns as well as additional electrical usage for pumping, either from additional pumping at the Jones or Banks facilities for export, or from groundwater pumping for substitution.

Generally, impacts to hydroelectric generation related to new water conveyance projects, new water transfer and acquisition programs, and other projects related to CVP/SWP operations under the NEPA No Action Alternative would be shifts in generation patterns; although there could be some minor increase or decrease in generation, it is not likely that changes in generation quantity would be significant. Various projects could impact generation timing at the Oroville-Thermalito complex or at the San Luis Pumping-Generating Plant. Water transfer and acquisition projects have the potential to increase the long-term average annual power consumption for pumping at the CVP/SWP pumping facilities (Banks and Jones), or increase pumping of groundwater for water supply, with corresponding secondary impacts in pollution resulting from replacing lost generation or providing additional energy from polluting sources as described in Sections 7.2.2.1 and 7.2.2.2.

7.2.8 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE NEPA YUBA ACCORD ALTERNATIVE COMPARED TO THE NEPA NO ACTION ALTERNATIVE

Impact 7.2.8-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II powerhouses; at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-21, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant with the implementation of the NEPA Yuba Accord Alternative as compared to the NEPA No Action Alternative. Therefore, the NEPA Yuba Accord Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to long-term average annual hydropower generation.

[4] The SDIP includes a maximum pumping rate of 8,500 cfs at the Banks Pumping Plant.

Impact 7.2.8-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II powerhouses

As shown in Table F3-22, there would be a decrease in average monthly generation of more than 5 percent in January, February, May and December at either Colgate or Narrows II and II powerhouses, with the implementation of the NEPA Yuba Accord Alternative as compared to the NEPA No Action Alternative. There would be an increase of 5 percent or more in July, August, September and October for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts; conversely, changing generation from low demand months to high demand months would have relatively positive environmental impacts. Since the seasonal change in generation for this comparison would be from periods of generally lower power demand in California (the winter months) to periods of generally higher power demand (the summer months), it is likely that this change would result in minimal environmental impacts. Thus, the NEPA Yuba Accord Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to long-term average monthly hydropower generation at the Colgate or Narrows facilities.

Impact 7.2.8-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-22, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the NEPA Yuba Accord Alternative relative to the NEPA No Action Alternative would result in a less than significant impact to hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.8-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-22, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the NEPA Yuba Accord Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to hydropower generation at the San Luis Pumping-Generating Plant.

Impact 7.2.8-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-23, an 11 percent increase in average annual power consumption would be expected with the implementation of the NEPA Yuba Accord Alternative as compared to the NEPA No Action Alternative. This increase in power consumption would be considered a significant impact on annual power consumption for groundwater pumping within YCWA Member Unit service areas under the NEPA Yuba Accord Alternative, relative to the NEPA No Action Alternative.

Impact 7.2.8-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-24, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay pumping plants and at the San Luis Pumping-Generating Plant with the implementation of the NEPA Yuba Accord Alternative as compared to the NEPA No Action Alternative. Therefore, the NEPA Yuba Accord Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to annual power consumption at these facilities.

7.2.9 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES OF THE NEPA MODIFIED FLOW ALTERNATIVE COMPARED TO THE NEPA NO ACTION ALTERNATIVE

Impact 7.2.9-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II powerhouses; at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant

As shown in Table F3-25, there would be less than 1 percent change in average annual power generation at the New Colgate Powerhouse, Narrows I or II powerhouses, at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant with the implementation of the NEPA Modified Flow Alternative as compared to the NEPA No Action Alternative. Therefore, the NEPA Modified Flow Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to long-term average annual hydropower generation.

Impact 7.2.9-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II powerhouses

As shown in Table F3-26, there would be a decrease in average monthly generation of more than 5 percent in January, May, November and December at either Colgate or Narrows I and II powerhouses, with the implementation of the NEPA Modified Flow Alternative as compared to the NEPA No Action Alternative. There would be an increase of 5 percent or more in July, August, September and October for this comparison.

As described in Section 7.2.2.1, a change in generation from high demand periods to low demand periods would likely have negative environmental impacts; conversely, changing generation from low demand months to high demand months would have relatively positive environmental impacts. Since the seasonal change in generation for this comparison would be from periods of generally lower power demand in California (the winter months) to periods of generally higher power demand (the summer months), it is likely that this change would result in minimal environmental impacts. Thus, the NEPA Modified Flow Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to long-term average monthly hydropower generation at the Colgate or Narrows facilities.

Impact 7.2.9-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex

As shown in Table F3-26, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the NEPA Modified Flow Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to hydropower generation at the Oroville-Thermalito Complex.

Impact 7.2.9-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant

As shown in Table F3-26, there would be no months with decreases of 5 percent or more in average monthly generation. Therefore, the NEPA Modified Flow Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to hydropower generation at the San Luis Pumping-Generating Plant.

Impact 7.2.9-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas

As shown in Table F3-27, an 8 percent decrease in average annual power consumption would be expected with the implementation of the NEPA Modified Flow Alternative as compared to the NEPA No Action Alternative. This decrease in power consumption would not be considered a significant impact on annual power consumption for groundwater pumping within YCWA Member Unit service areas for the NEPA Yuba Accord Alternative, relative to the NEPA No Action Alternative.

Impact 7.2.9-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant

As shown in Table F3-28, there would be less than 1 percent change in average annual power consumption at the Banks, Jones, and O'Neill Forebay pumping plants and at the San Luis Pumping-Generating Plant with the implementation of the NEPA Modified Flow Alternative as compared to the NEPA No Action Alternative. Therefore, the NEPA Modified Flow Alternative, relative to the NEPA No Action Alternative, would result in a less than significant impact to annual power consumption at these facilities.

7.3 CUMULATIVE IMPACTS

Hydrologic modeling was used to evaluate the cumulative effects of the Yuba Accord Alternative and other likely changes in CVP/SWP operations on hydrology and water supply. The proposed projects that have been adequately defined (e.g., in recent project-level environmental documents or CALSIM II modeling) and that have the potential to contribute to cumulative impacts are included in the quantitative assessment of the Yuba Accord's impacts. For analytical purposes of this EIR/EIS, the projects that are considered well defined and "reasonably foreseeable" are described in Chapter 21. Additionally, the assumptions used to categorize future hydrologic cumulative conditions that are quantitatively simulated using CALSIM II and the post-processing tools are presented in Appendix D. To the extent feasible, potential cumulative impacts on resources dependent on hydrology or water supply (e.g., reservoir surface elevations) are analyzed quantitatively. Because several projects cannot be accurately characterized for hydrologic modeling purposes at this time, either due to the nature of the particular project or because specific operations details are only in the preliminary phases of development, these projects are evaluated qualitatively.

Only those projects that could affect surface water quality are included in the qualitative evaluation that is presented in subsequent sections of this chapter. Although most of the proposed projects described in Chapter 21 could have project-specific impacts that will be addressed in future project-specific environmental documentation, future implementation of these projects is not expected to result in cumulative impacts to regional water supply operations, or water-related and water dependent resources that also could be affected by the Proposed Project/Action or alternatives (see Chapter 21). For this reason, only the limited number of projects with the potential to cumulatively impact power production and energy consumption in the project study area are specifically considered qualitatively in the cumulative impacts analysis for power production and energy consumption. These projects are:

- Water Storage and Conveyance Projects
  - Shasta Lake Water Resources Investigation (Shasta Lake Enlargement)
  - Upper San Joaquin River Basin Storage Investigation
- Projects Related to CVP/SWP System Operations
  - Delta Cross Channel Re-operation and Through-Delta Facility
  - Long-Term CVP and SWP Operations Criteria and Plan
  - CVP/SWP Integration Proposition
  - Isolated Delta Facility
  - Delta-Mendota Canal Recirculation Feasibility Study
  - Oroville Facilities FERC Relicensing
- Water Transfer and Acquisition Programs
  - Delta Improvements Package
  - Sacramento Valley Water Management Program
  - Dry Year Water Purchase Program
- Ecosystem Restoration and Flood Control Projects
  - San Joaquin River Restoration Settlement Act (Friant Settlement Legislation)
- Local Projects in the Yuba Region
  - Yuba River Development Project FERC Relicensing

These projects are described in Chapter 21 and qualitatively addressed below.

7.3.1 Environmental Impacts/Environmental Consequences of the Yuba Accord Alternative Cumulative Condition Compared to the Existing Condition

For CEQA, the purpose of the cumulative analysis is to determine whether the incremental effects of the Proposed Project (Yuba Accord Alternative) would be expected to be "cumulatively considerable" when viewed in connection with the effects of past projects, other current projects, and probable future projects (PRC Section 21083, subdivision (b)(2)).[5]

For NEPA, the scope of an EIS must include "cumulative actions", which when viewed with other proposed actions, have cumulatively significant impacts and should therefore be discussed in the same impact statement (40 CFR, §1508.25(a)(2)).

Because the CEQ regulations implementing NEPA and the CEQA guidelines contain very similar requirements for analyzing, and definitions of, cumulative impacts, the discussions of cumulative impacts of the Yuba Accord Alternative Cumulative Condition relative to the Existing Condition will be the basis for evaluation of cumulative impacts for both CEQA and

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[5] The "*Guide to the California Environmental Quality Act*" (Remy *et al.* 1999) states that "*…although a project may cause an "individually limited" or "individually minor" incremental impact that, by itself, is not significant, the increment may be "cumulatively considerable", and thus significant, when viewed against the backdrop of past, present, and probable future projects.*" (CEQA Guidelines, § 15064, subd. (i)(l), 15065, subd. (c), 15355, subd. (b)).

NEPA. In addition, an analysis of the Modified Flow Alternative Cumulative Condition relative to the Existing Condition is provided to fulfill NEPA requirements.

The following sections describe this analysis for the projects discussed in Section 7.3 above.

7.3.1.1 *Water Storage Projects*

Enlargement of existing dam and reservoir facilities would involve the additional storage of water, and presumably additional water releases for hydroelectric generation, although actual additional generation potential will be determined in part by flood control and other operational changes. To the extent that additional hydroelectric generation is provided to the grid, corresponding reductions in generation by thermal or other polluting sources would be a net benefit to the environment from the perspective of energy generation.

7.3.1.2 *Projects Related to CVP/SWP System Operations*

Changes in CVP/SWP system operations may modify hydroelectric generation output or total electrical loads related to pumping. Most of these projects would likely not result in an overall increase or decrease in total hydroelectric generation or pumping, but would more likely result in changing of generation and/or pumping to different months in a given year.

7.3.1.3 *Water Transfer and Acquisition Programs*

Several water projects (e.g., SVWMP, Dry Year Water Purchase Program, a long-term EWA Program or a program equivalent to the EWA) could purchase water through groundwater substitution programs. Water held in reservoirs during April through June generally would be released during July through September under such programs. Agencies participating in groundwater substitution programs or other water transfer programs could cause reservoirs to release more water during July through September than under existing conditions. If these programs were to be implemented, it is possible that hydroelectric generation could increase during summer (high demand) seasons, and be reduced during winter/spring (generally lower demand) seasons during reservoir refill. It is also possible that pumping loads could increase, either from additional pumping at the Jones or Banks facilities for export, or from groundwater pumping for substitution.

7.3.1.4 *Ecosystem Restoration and Flood Control Projects*

The San Joaquin River Restoration Settlement Act includes changes in the operations of the San Joaquin River facilities, including releases for instream uses. This project could result in either a reduction in hydroelectric generation or in an inter-seasonal changing of generation.

7.3.1.5 *Local Projects in the Yuba Region*

Of the projects identified above, only the Yuba River Development Project FERC Relicensing has the potential to affect hydropower generation operations in the Yuba Region. Through the relicensing process, FERC may impose new regulatory constraints (such as additional instream flow releases) on the Yuba Project which would likely reduce the total annual generation of the Yuba Project. Corresponding increases in local groundwater pumping in dry year conditions may be expected to offset reduced water deliveries from the Yuba Project.

7.3.1.6 *Other Cumulative Power Production and Energy Consumption Impact Considerations*

The quantitative operations-related impact considerations for the CEQA Yuba Accord Alternative, relative to the CEQA Existing Condition, are discussed in Section 7.2.5. Potential impacts identified in Section 7.2.5 are summarized below and provide an indication of the potential incremental contributions of the Yuba Accord Alternative to cumulative impacts. These potential impacts are summarized here:

- Impact 7.2.5-1: Decreases in long-term average annual hydropower generation at New Colgate, Narrows I and Narrows II powerhouses; at the Oroville-Thermalito Complex, or at the San Luis Pumping-Generating Plant – Less than significant
- Impact 7.2.5-2: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II powerhouses – Less than significant
- Impact 7.2.5-3: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the Oroville-Thermalito Complex – Less than significant
- Impact 7.2.5-4: Decreases in long-term average annual or change in long-term average monthly hydropower generation at the San Luis Pumping-Generating Plant – Less than significant
- Impact 7.2.5-5: Increases in long-term average annual power consumption for groundwater pumping within YCWA Member Unit service areas – Potentially significant
- Impact 7.2.5-6: Increases in long-term average annual power consumption at the Banks Pumping Plant, the Jones Pumping Plant, the O'Neill Forebay Pumping Plant and the San Luis Pumping-Generating Plant – Less than significant

Although most of these impacts would be less than significant, the potential nevertheless exists for cumulative impacts. Cumulative impact determinations are presented below, and are based upon consideration of the quantified Yuba Accord Alternative impacts relative to the CEQA Existing Condition, in combination with the potential impacts of other reasonably foreseeable projects.

7.3.1.7 *Potential for Cumulative Power Production and Energy Consumption Impacts within the Project Study Area*

Of the projects discussed above, the Yuba River Development Project FERC Relicensing has the potential to significantly affect generation at the Colgate and Narrows powerhouses. In addition, the relicensing has the potential to impact the long-term average annual power consumption for groundwater pumping within the YCWA Member Units, by reducing the amount of water available for diversion for surface water supply. Several of the other Water Storage, CVP/SWP System Operations, or Water Transfer and Acquisition Projects may impact generation at the Oroville-Thermalito complex or at the San Luis Pumping-Generating Plant. In addition, the Water Transfer and Acquisition projects have the potential to increase the long-term average annual power consumption for pumping at the CVP/SWP pumping facilities (Banks and Jones), as a result of increased export levels.

It is possible that some combination of these projects may reach a level of significance either in reduction or changing of generation, or increases in electrical pumping load, with corresponding secondary impacts in pollution resulting from replacing lost generation or providing additional energy from polluting sources as described in Sections 7.2.2.1 and 7.2.2.2.

Therefore, there is a potential for future cumulative significant and unavoidable impacts to the hydroelectric generation and power consumption for pumping in the Project Study Area as a result of the Yuba Accord Cumulative Condition compared to the existing condition.

7.3.2 Environmental Impacts/Environmental Consequences of the Modified Flow Alternative Cumulative Condition Compared to the Existing Condition

It is anticipated that the Modified Flow Alternative Cumulative Condition will have the same potential cumulative and unavoidable impacts as the Yuba Accord Alternative Cumulative Condition. Therefore, the description of the potential impacts in Section 7.3.1 also serves as the description of cumulative impacts associated with the Modified Flow Alternative.

7.4 Potential Conditions to Support Approval of YCWA's Water Rights Petition

No unreasonable adverse effects to power production and energy consumption would occur under the Proposed Project/Action or alternatives and, thus, no impact avoidance measures or other protective conditions are identified for the SWRCB's consideration in determining whether or not to approve YCWA's petitions to implement the Yuba Accord.

7.5 Mitigation Measures/Environmental Commitments

No specific mitigation measure are suggested for the increase in consumption of electrical energy, the decrease in production of hydroelectric generation, or the change in production of energy.

7.6 Potentially Significant Unavoidable Impacts

There are several potentially significant unavoidable impacts to power production and energy consumption associated with the implementation of the Proposed Project/Action or alternatives, as shown in **Table 7-10**.

Each of these potential significant unavoidable impacts is the result of a decrease in energy production (decrease in hydropower generation) or an increase in energy usage (increased annual power consumption for pumping). These unavoidable impacts are potentially significant because they will require the generation of electrical energy from another source (to replace lost hydroelectric generation or to provide additional power for pumping). Replacement or additional generation would likely come from a thermal generation source, such as a combined cycle natural gas fired turbine, or a coal fired power plant. Generation from a source that meets the California Public Utilities Commission's Emissions Performance Standards would contribute up to 1,200 pounds/MWh of greenhouse gasses, plus other pollutants such as particulates and oxides of nitrogen. Thus, additional pumping electrical load of 5,000 MWh per year would likely contribute 3,000 tons or more of greenhouse gasses to the atmosphere.

Table 7-10 Potentially Significant Unavoidable Impacts to Power Production and Energy Consumption

Comparison	Potentially Significant Impact	Potential Impact Level
CEQA Yuba Accord Alternative Compared to the CEQA No Project Alternative	*Impact 7.2.3-5*: Increase in long-term average annual power consumption for groundwater pumping within YCWA Member Units	605 MWh increase in consumption
CEQA Yuba Accord Alternative Compared to the CEQA Existing Condition	*Impact 7.2.5-5:* Increase in long-term average annual power consumption for groundwater pumping within YCWA Member Units	2,153 MWh increased in consumption
CEQA Modified Flow Alternative Compared to the CEQA Existing Condition	*Impact 7.2.6-2*: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II Powerhouses *Impact 7.2.6-5*: Increase in long-term average annual power consumption for groundwater pumping within YCWA Member Units	2,892 MWh net change + 954 MWh increase in consumption
CEQA No Project Alternative Compared to the CEQA Existing Condition	*Impact 7.2.7-2*: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II Powerhouses *Impact 7.2.7-5*: Increase in long-term average annual power consumption for groundwater pumping within YCWA Member Units	28,970 MWh net change + 1,549 MWh increase in consumption
NEPA No Action Alternative Compared to the NEPA Affected Environment	*Impact 7.2.7-2*: Change in long-term average monthly hydropower generation at New Colgate, Narrows I and II Powerhouses *Impact 7.2.7-5*: Increase in long-term average annual power consumption for groundwater pumping within YCWA Member Units	28,970 MWh net change + 1,549 MWh increase in consumption
NEPA Yuba Accord Alternative Compared to the NEPA No Action Alternative	*Impact 7.2.8-5*: Increase in long-term average annual power consumption for groundwater pumping within YCWA Member Units	592 MWh increase in consumption

The CEQA No Project Alternative compared to the CEQA Existing Condition and the NEPA No Action Alternative compared to the NEPA Affected Environment would have the greatest relative environmental impacts of all of the potentially significant environmental impacts identified in the comparisons.