3.6 Land Use

3.6.1 Affected Environment

The proposed project is located within the limits of Tehama County. The project area is bounded by USBR land on the left and right banks, and privately owned industrial land on the right bank. TCCA delivers CVP water to 17 districts that serve approximately 300,000 acres of farmland in Tehama, Glenn, Colusa, and Yolo counties. The predominant land use along the canal is agriculture. TCCA water primarily serves olives, almond, alfalfa, rice, and tomato crops.

The project area is bounded by USBR land on the left and right banks, and privately owned industrial land on the right bank.

Current Land Uses

Right Bank Facilities. Most of the existing RBDD facilities are located on the right bank of the dam, which marks the beginning of the TC Canal. Existing facilities at RBDD are shown on Figure 2.1-1. These facilities include:

- Intake headworks
- Drum screens with fish bypass pipes
- Settling basin
- Fish ladder
- Research Pumping Plant
- USBR headquarters

USBR's land on the right bank of the river extends upstream, to the mouth of Red Bank Creek. The property north of Red Bank Creek is owned by Pactiv uses a portion of the parcel to house a manufacturing facility, and the remainder of the parcel adjacent to the river corridor is a landfill for its wastewater treatment sludge. Pactiv indicated that the landfill is near capacity, and that they intend to cap it with a geosynthetic membrane. A large segment of the landfill area is along the proposed conveyance pipeline corridor.

The vacant parcel upstream of Pactiv is owned by Meyer-Crest, Ltd. The Meyer Motels property is the site of the former Diamond Lumber Mill. The proposed intake facilities are located on this parcel within the adjacent river channel.

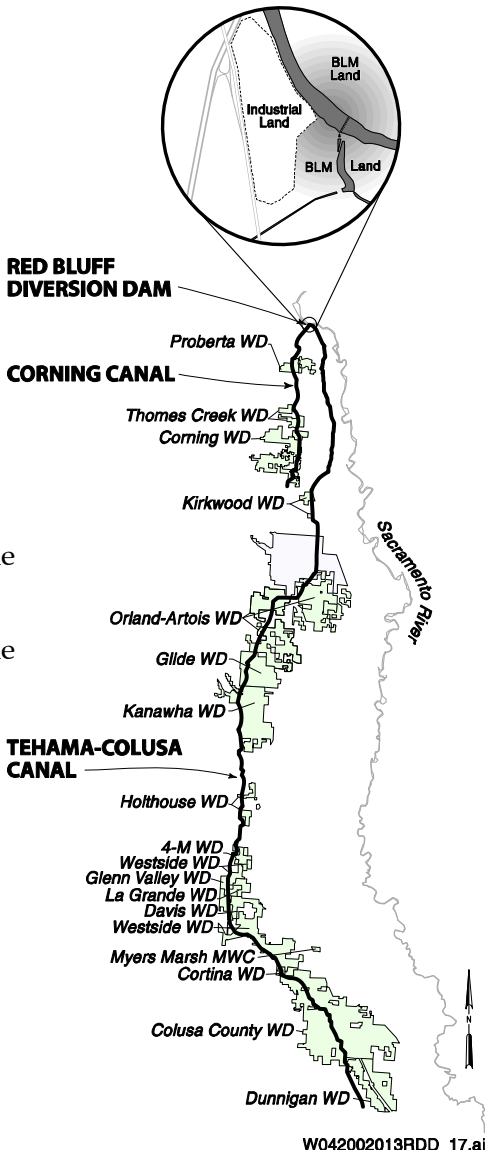
Left Bank Facilities. Existing facilities at RBDD are shown on Figure 2.1-1.

RBDD facilities on the left bank include:

- Fish ladder
- Fish-counting facility/salmon-viewing plaza

Land on the left bank of the Sacramento River across from the facilities for the canal headworks is owned by USFS and contains the Recreation

TCCA-served Districts



Area and Discovery Center. This land is managed by USFS Mendocino National Forest. The facilities are used for many recreational and educational purposes. When the gates are in the "down" position and the left bank fish ladder is in operation, the fish passing through the ladder may be viewed at the salmon-viewing plaza adjacent to the facility. The plaza contains Sacramento River fishery information, as well as a video monitor that provides viewing of salmon as they work their way up the ladder. Two boat launches are located within the park vicinity – one upstream of the dam and one downstream of the dam. In addition, the area offers designated camping spots, bike trails, hiking trails, wildlife viewing areas, and educational facilities. The proposed bypass channel would be located in this area.

Land on the left bank of the Sacramento River (Recreation Area and Discovery Center) is managed by USFS Mendocino National Forest.

Lake Red Bluff. When the diversion dam gates are in the down position, the Sacramento River rises 10 to 12 feet and forms what is known as Lake Red Bluff. The lake extends north of the diversion dam approximately 6~~4~~ miles and covers approximately 15 miles of shoreline. A portion of East Sand Slough, which parallels the river to the east, makes up a large portion of the lake. Adjacent land is governed by both Tehama County and the City of Red Bluff.

The property adjacent to the river corridor immediately upstream from the dam is within unincorporated Tehama County. Land uses for this area include public parks, industrial facilities, and agricultural lands. Several orchards are located within the vicinity of this land, as well as oak trees and sycamore groves. A portion of the river corridor near central Red Bluff is also unincorporated. These lands include a number of housing tracts and residential parcels.

Lake Red Bluff extends north of the diversion dam approximately 6~~4~~ miles and covers approximately 15 miles of shoreline.

The remaining land adjacent to Lake Red Bluff is in the City of Red Bluff. Land uses include public parks, neighborhoods, and businesses. River Park (also known as City Park) provides river access via a boat launch near Reeds Creek. Dining and camping facilities are available in central Red Bluff. Many residential yards abut the river and have floating docks providing river access. Currently, approximately 21 private boat docks located in the City of Red Bluff are used to access the river.

Downstream Land Use. In 1989, the Upper Sacramento River Fisheries and Riparian Habitat Management Plan was prepared in accordance with SB 1086. One goal of the management plan was to "*preserve remaining riparian habitat and re-establish a continuous riparian ecosystem along the Sacramento River between the mouth of the Feather River and Keswick Dam.*" Most of the land adjacent to the river south of the diversion dam is rural and is used for farming. Riparian habitat lines the corridor of the river separating the agriculture lands from the river.

Land Use Plans

Tehama County. General plans contain information about current land use conditions and future trends associated with anticipated physical development. Tehama County's General Plan, adopted March 1, 1983, was last amended March 21, 2000. The Tehama County General Plan is based on four fundamental concepts:

- Accommodating growth, but not limiting growth or accepting uncontrolled growth.
- Locating major growth along the Interstate 5 (I-5) transportation corridor.
- Organizing growth according to a range of community types.
- Preserving agricultural land resources.

Agricultural preservation was addressed in the Tehama County General Plan as a priority issue. Agriculture is a key economic and social contributor to Tehama County. Agricultural land occupies approximately 58 percent of the total land area for the County and was reported in 1980 to have contributed approximately $89,400,00 (cost value) to the County's economy. In addition to contributing to the County's economy, agriculture offers direct employment (approximately 12 percent according to the County General Plan) and other employment, which includes providing goods and services to the agriculture industry.

Agriculture is a key economic and social contributor to Tehama County.

Tehama County does not have jurisdiction over lands owned by the federal government.

City of Red Bluff. The City of Red Bluff General Plan applies to those areas along Lake Red Bluff that are within the City limits. Red Bluff's General Plan was first adopted in 1974, and the most recent General Plan amendment occurred November 19, 1993. The following concerns relative to land use were extracted from the applicable General Plan elements.

Land Use Element: "The Land use element identifies the spatial arrangement of existing and proposed uses of the land including public lands and facilities. It lays out the distribution of classes of land use, the intensity of those uses and proposes a strategy of goals, objectives, policies and implementation measures to promote a wise use of land to promote the welfare of the community" (City of Red Bluff, 1993).

Zoning

Tehama County. Tehama County's Zoning Code was "adopted for the purpose of providing for the promotion and protection of the public

health, safety, peace, morals, comfort, convenience and general welfare; and

1. to implement the county general plan and to guide the future growth of the county in accordance with said plan;

2. to protect the character and the social and economic stability of agricultural, residential, commercial, industrial, recreational and other areas within the county, and to assure the orderly and beneficial development of such areas" (Tehama County Zoning Code, 1983).

Tehama County zoning designations are shown on Figure 3.6-1. The following County zoning designations apply to the affected project area:

GOVT – Government jurisdiction.

EA-AP – Exclusive Agriculture – Agriculture Preserve. Purpose is to implement the "croplands" designation of the Agricultural Element of the General Plan by recognizing lands capable of supporting crop production by operators and protecting them from incompatible uses and other detrimental effects. The AP combining district is intended to implement the policies of the "croplands" and "grazing lands" categories of the Agricultural Element of the General Plan.

P-F – Primary Floodplain. Intended to be applied by the County to properties that lie within a primary floodway and the portions of the adjacent floodplain as are required to efficiently carry the flood flow of the stream. On P-F lands, special regulations are necessary for the minimum protection of public health and safety, and of property and improvements, from hazards and damage resulting from floodwaters.

M-2 – General Industrial. Provides opportunities for heavy industrial land uses and support facilities.

R-1 – One-family Residence. Intended to be applied in areas where topography, access, utilities, and public services make the land suitable and desirable for single-family home development, and where the regulations of this classification will supply the necessary protection for such development.

R-3 – Neighborhood Apartment. Intended to be applied where it is reasonable to permit and protect garden-type low-density apartment developments.

C-3-S – General Commercial – Special Highway Frontage. Intended to provide for a wide range of goods and services required by residents and businesses that are inappropriate in community or neighborhood centers due to size or operating characteristics, or are not economically feasible in such centers.

Legend

- Community Commercial District
- Excluse Agricultural District
- General Apartment District
- General Commercial Districts
- General Industrial Districts
- Government
- Light Industrial District
- Natural Resource Lands and Recreation District
- Neighborhood Apartment District
- One-family Residence District
- Planned Development
- Primary Floodplain
- Public Agency District
- Residential Estates District

2,000 1,000 0 2,000 Feet

N

FIGURE 3.6-1
TEHAMA COUNTY LAND USE

FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

CH2MHILL

THOR\CART1\RDDGIS\RB_DAM\MXD\TCAA_LU_3_6_1.MXD

City of Red Bluff. City of Red Bluff zoning designations are shown on Figure 3.6-2. The following City zoning designations apply to the affected project area:

R-1 – Single-family Residential. Applied in areas subdivided and used or designed or planned for use as one single-family dwelling per parcel.

R-3 – Neighborhood Apartment. Applied in areas where single- or multiple-dwelling units within one or more buildings are appropriate.

R-4 – General Apartment. Applied in areas where single- or multiple-dwelling units within one or more buildings are appropriate, and where small-scale professional offices may be appropriate.

C-2 – Central Business. Applied in areas suitable for complete retail business and service to serve a residential community.

C-3 – General Commercial. Applied where general commercial facilities are necessary for public service and convenience.

P-A – Public Agency. Applied to properties that are properly used for, or are proposed for use for, public or public service purposes, or for specified public utility purposes.

Lake Red Bluff Recreation Area Development Plan

USFS manages the 488-acre Recreation Area located on the left bank of the Sacramento River. Jurisdiction of the site was transferred from USBR to USFS in 1988 under the assurance that USFS would develop a management plan for the area. The management plan that was developed is the Lake Red Bluff Recreation Area Development Plan (Recreation Area Plan). Development of the Recreation Area Plan began in 1988 under NEPA as an EIS. The FEIS was signed in 1991, which implemented Alternative 4, Modified Recreation. The objective of the FEIS was to analyze the effects of managing and developing the site at Lake Red Bluff for recreational purposes and enhancement of riparian wildlife habitat. The Preferred Alternative emphasized a balance between protecting riparian habitat and providing water-oriented recreation.

Jurisdiction of the site was transferred from USBR to USFS in 1988 under the assurance that USFS would develop a management plan for the area.

The Recreation Area Plan emphasizes interpretation of natural systems through displays, facilities, and programs. Under the Recreation Area Plan, habitat that existed in the 1800s is re-created on the site. Additionally, facilities are provided for interpreting the relationship between the river's aquatic system and its riparian and upland surroundings.

The Recreation Area Plan emphasizes interpretation of natural systems through displays, facilities, and programs.

3.6.2 Environmental Consequences

Methodology

To characterize existing land uses surrounding the project area, City of Red Bluff and Tehama County planning documents were consulted for objectives regarding the level, type, location, density, and intensity of development within City and County jurisdictions. The Recreation Area Plan was also consulted for objectives regarding current and future uses of the Recreation Area, both for recreational purposes and enhancement of riparian wildlife habitat.

Land use maps and zoning maps were consulted with regard to the presence of any prime or unique farmland, as well as current General Plan and zoning land use designations.

Significance Criteria

Significance criteria represent the thresholds that were used to identify whether an impact would be potentially significant. These criteria are based on Appendix G of the *CEQA Guidelines* and professional judgment.

Impacts on land use would be significant if they would result in any of the following:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the General Plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use.

No Action Alternative

No changes to hydrology or surface-water management would occur. Gates would be operated during the current 4-month gates-in period. Construction activity would be limited to the installation of the fourth pump at RPP. No other construction activity would occur as a result of the No Action Alternative.

Legend

- Airport District
- Central Business Districts
- General Apartment District
- General Commercial District
- General Industrial District
- Light Industrial District
- Neighborhood Apartment District
- Neighborhood Commercial District
- Planned Industrial Districts
- Public Agency District
- Single-family Residential District
- Two-family Residence District

2,000 1,000 0 2,000 Feet

N

FIGURE 3.6-2
CITY OF RED BLUFF LAND USE

FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

THOR\CART1\RDDGIS\RB_DAM\MXD\TCCA_RBLU3_6_2.MXD

1A: 4-month Improved Ladder Alternative

Construction-related Impacts.

Impact 1A–LU1: Surrounding Land Uses. The majority of existing land uses surrounding the project site would not be precluded during construction. The Mill Site is currently unoccupied. Construction activities would be limited to the easterly portion of the property, near the Sacramento River. Because that area is unoccupied, construction activity would have no impacts to land use in that area. Pactiv intends to close the landfill located behind their packaging plant from use, so there would be no construction impact to land use in the landfill area. There are no established uses associated with Red Bank Creek; therefore, construction activity would not preclude any land use in the creek. Temporary impacts would occur to the left bank fish ladder and salmon-viewing plaza as a result of construction activity; however, the salmon-viewing is only operated during the 4-month gates-in period. Construction for the left bank fish ladder would be phased to have minimal impact on the left bank fish ladder.

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 1A–LU2: Existing Agricultural Uses. Existing agricultural land uses within the district would not be precluded during the construction period. The majority of construction on the right bank would occur outside of the irrigation canal facilities on the Mill Site, Pactiv landfill area, and Red Bank Creek. Access to all of the irrigation canal facilities would be maintained for the duration of construction. In-canal construction activities would be phased so that irrigation deliveries to agricultural users would continue uninterrupted.

The impacts from construction on agricultural lands would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 1A–LU3: Surrounding Land Uses. Operation of the left bank and right bank fish ladders would not change, preclude, or adversely affect existing land uses in the surrounding area. Operation of the proposed pump station would change the existing land use on the Mill Site. Currently, the Mill Site is unoccupied, and the buildings that are on the property are in a state of disrepair. These buildings would be removed prior to construction of the pump station. In addition, the landfill located on the easterly side of Pactiv property is intended for closure prior to project implementation. There are no established uses on Red

Bank Creek. Therefore, no land uses would be adversely impacted or precluded by operation of the pump station.

The impacts from operation on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 1A–LU4: Existing Agricultural Uses. The operation of the fish ladders and pump station would have no significant impact on existing agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

There would be no operations-related impacts on agricultural lands; therefore, no mitigation is required.

1B: 4-month Bypass Alternative

Construction-related Impacts.

Impact 1B–LU1: Surrounding Right Bank Land Uses. The majority of existing land uses surrounding the project site on the right bank would not be precluded during construction of the Mill Site pump station. The Mill Site is currently unoccupied. Construction activity would be limited to the easterly portion of the property, near the Sacramento River. Because that area is unoccupied, construction activity would have no impact to land use in that area. Pactiv intends to close the landfill located behind their packaging plant from use, so there would be no construction impact to land use in the landfill area. There are no established uses associated with Red Bank Creek; therefore, construction activity would not preclude any land use in the creek.

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 1B–LU2: Recreation Area Facilities. Temporary land use impacts would occur as a result of the construction of the bypass channel. Construction would temporarily obstruct access to the bike trails associated with the Shasta View Trail in the project area, the access road to the Recreation Area, access to the Sycamore Campground, and the access road to the downstream boat ramp. Alternate routes and temporary access would be constructed to allow access to the Recreation Area, associated facilities, and downstream boat ramp throughout construction of the bypass channel. Additionally, a public restroom, pump house, and a USFS maintenance garage would be removed as part of construction of the channel. Portable restrooms would be made available during construction, and the pump house and maintenance garage would be rebuilt in an area that would be accessible during and after the construction period.

The impacts from construction on the Recreation Area facilities would be less than significant; therefore, no mitigation is required.

Impact 1B–LU3: Sycamore Grove Campground. Temporary and permanent construction-related impacts would also occur to the use of the Sycamore Grove Campground facilities located in the Recreation Area. Construction vehicles would need access to the campground area to construct the lower end of the channel. Approximately 10 camping facilities would be ~~permanently~~ removed as a result of construction of the bypass channel. A new road would need to be constructed to maintain access to the remaining camping facilities. Although the loss of 10 campsites from Sycamore Campground is unavoidable, construction of replacement campsites (Mitigation 1B-R1), including supporting infrastructure, would mitigate the impact.

The impacts from construction on the Sycamore Grove Campground would be significant ~~***and unavoidable***~~***.***

Impact 1B–LU4: Sacramento River Discovery Center. Temporary impacts would occur as a result of construction to the use of the Discovery Center. Schools from the area make daily trips to the center during the spring months. If construction of the bypass channel were to occur during the springtime, access to the valley oak, western red bud, California native sycamore, and Fremont cottonwood plantings would be blocked. This would conflict with the riparian and oak lessons and hikes that occur with the daily trips.

The impacts from construction or on the Discovery Center would be significant and unavoidable.

Impact 1B–LU5: Existing Agricultural Uses. Impacts on existing agricultural uses under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–LU2).

The impacts from construction on agricultural lands would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 1B–LU6: Surrounding Land Uses. Operation of the proposed pump station would change the existing land use on the Mill Site. Currently, the Mill Site is unoccupied, and the buildings on the property are in a state of disrepair. These buildings would be removed prior to construction of the pump station. In addition, the landfill located on the easterly side of Pactiv property is intended for closure prior to project implementation. There are no established land uses on Red Bank Creek. Therefore, no land use would be adversely impacted or precluded by operation of the pump station.

The impacts from operations on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 1B–LU7: Red Bluff Recreation Area. The bypass channel lies entirely within the Recreation Area. It begins just above the upstream

boat ramp and ends just downstream of the diversion dam. The channel crosses the main road into the Recreation Area, passes through sections of the Recreation Area that have been planted with valley oaks (by Pacific Gas & Electric Company [PG&E] as mitigation for the pipe crossing near the TC Canal) and mixed riparian habitat, crosses the access road to the downstream boat ramp, and goes through the lower portion of the Sycamore Grove Campground. Access to these areas would be maintained through construction by temporary access roads. Upon completion of the bypass channel, new permanent roads would be constructed that would pass over the channel and maintain access to all of these areas, thereby reducing any impacts to accessing these areas to a less than significant level.

The goal of the Recreation Area Plan is to develop overnight and day-use recreation facilities integrated with the existing riparian woodland and annual grassland-oak area. A large part of this Recreation Area Plan is to develop interpretive displays and programs that illustrate the management of fish, wildlife, and their habitat, and to provide visitors with recreation information for activities and facilities available in Northern California. Several million dollars and thousands of hours of volunteer's time have been invested in restoring riparian habitat and constructing recreation and interpretive facilities under the Recreation Area Plan. Replacement planting (Mitigation 1B-BR4) would mitigate the riparian plantings lost to the bypass construction.

Because of the unique quality of the Recreation Area, the thousands of hours of volunteer time spent on the development of the recreation area, and the education potential for future students and visitors of the interconnected ecosystems of Sacramento River Valley, construction of the bypass channel does not comply with the current management direction in the Mendocino National Forest Land and Resource Management Plan. Amendment of the Mendocino National Forest Land and Resource Management Plan under this alternative would ~~reconcile management direction~~eliminate conflict with the new situation, but would not avoid the impacts.

The impacts from operations on the Recreation Area would be significant and unavoidable.

2A: 2-month Improved Ladder Alternative

Construction-related Impacts.

Impact 2A–LU1: Surrounding Land Uses. Impacts on surrounding land uses under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–LU1).

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 2A–LU2: Existing Agricultural Uses. Impacts on existing agricultural uses under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–LU2).

The impacts from construction on agricultural lands would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 2A–LU3: Surrounding Land Uses. Impacts on surrounding land uses under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–LU3).

The impacts from operations on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 2A–LU4: Public and Private Boat Docks and Ramps Along the Sacramento River. Permanent impacts would occur to the use of public and private boat docks and ramps located on the Sacramento River. Public and private boat docks and ramps currently existing along the shoreline of the river do not properly function when the gates are in the up position; therefore, they would be unusable for 2 additional months.

The impacts from operations on public and private boat docks and ramps along the Sacramento River would be significant and cannot be mitigated.

Impact 2A–LU5: Existing Agricultural Uses. Impacts on existing agricultural uses under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–LU4).

There would be no operations-related impacts on agricultural lands; therefore, no mitigation is required.

2B: 2-month with Existing Ladders Alternative

Construction-related Impacts.

Impact 2B–LU1: Surrounding Land Uses. The majority of existing land uses surrounding the project site would not be precluded during construction. The Mill Site is currently unoccupied. Construction activities would be limited to the easterly portion of the property, near the Sacramento River. Because that area is unoccupied, construction activity would have no impacts to land use in that area. Pactiv intends to close the landfill located behind their packaging plant from use, so there would be no construction impacts to land use in the landfill area. There are no established uses associated with Red Bank Creek; therefore, construction activity would not preclude any land use in the creek.

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 2B–LU2: Existing Agricultural Uses. Impacts on existing agricultural uses under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–LU2).

The impacts from construction on agricultural lands would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 2B–LU3: Surrounding Land Uses. Impacts on surrounding land uses under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–LU3).

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 2B–LU4: Public and Private Boat Docks and Ramps Along the Sacramento River. Impacts on public and private boat docks and ramps along the Sacramento River under Alternative 2B would be the same as those identified for Alternative 2A (see Impact 2A–LU4).

The impacts from operations on public and private boat docks and ramps along the Sacramento River would be significant and cannot be mitigated.

Impact 2B–LU5: Existing Agricultural Uses. Impacts on existing agricultural uses under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–LU4).

There would be no operations-related impacts on agricultural lands; therefore, no mitigation is required.

3: Gates-out Alternative

Construction-related Impacts.

Impact 3–LU1: Surrounding Land Uses. Impacts on surrounding land uses under Alternative 3 would be the same as those identified for Alternative 2B (see Impact 2B–LU1).

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 3–LU2: Existing Agricultural Uses. Impacts on existing agricultural uses under Alternative 3 would be the same as those identified for Alternative 1A (see Impact 1A–LU2).

The impacts from construction on agricultural lands would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 3–LU3: Surrounding Land Uses. Impacts on surrounding land uses under Alternative 3 would be the same as those identified for Alternative 1A (see Impact 1A–LU3).

The impacts from construction on surrounding land uses would be less than significant; therefore, no mitigation is required.

Impact 3–LU4: Public and Private Boat Docks and Ramps Along the Sacramento River. Permanent impacts would occur to the use of public and private boat docks and ramps located on Sacramento River. Public and private boat docks and ramps currently existing along the shoreline of the river will not properly function when the gates are in the up position. These boat docks and ramps would no longer access the lower elevations of the river in its natural, free-flowing state.

The impacts from operations on public and private boat docks and ramps along the Sacramento River would be significant and cannot be mitigated.

Impact 3–LU5: Existing Agricultural Uses. The operations of the pump station would have no significant impact on existing agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

There would be no operations-related impacts on agricultural lands; therefore, no mitigation is required.

3.6.3 Mitigation

This section discusses mitigations for each significant impact described in Environmental Consequences.

1A: 4-month Improved Ladder Alternative

No impacts are anticipated under implementation of this alternative; therefore, no mitigation is provided.

1B: 4-month Bypass Alternative

Mitigation 1B–LU3. To the extent possible, disturbance to the camping facilities would remain in the footprint and construction easement for the bypass channel. To maintain access to the Sycamore Grove camping facilities, a temporary road would be constructed to allow traffic to and from the facilities to bypass construction. ~~The permanent removal of the camping facilities however, cannot be mitigated, and thus would remain a significant, unavoidable impact.~~Construction of replacement campsites (Mitigation 1B-R1), including supporting infrastructure, would mitigate the impact.

Mitigation 1B–LU4. Access to the Discovery Center would be maintained during construction via temporary construction roads. However, because of potential access problems and safety reasons, pedestrian access throughout the Discovery Center facilities (i.e., valley oak, western red bud, California native sycamore, and Fremont cottonwood plantings) that are used for lessons may be blocked during construction.

This is a significant and unavoidable impact that cannot be mitigated; therefore, no mitigation is provided.

Mitigation 1B–LU7. Construction of the bypass channel does not comply with the Mendocino National Forest Land and Resource Management Plan. ~~This is a significant, unavoidable impact.~~Amendment of the Mendocino National Forest Land and Resource Management Plan under the alternative would eliminate conflict with current management direction in the Mendocino National Forest Land and Resource Management Plan. A footbridge (illustrated on Figure 2.3-4) would be constructed that would partially mitigate the separation of Sycamore Campground from other camping facilities and the southeast portion of the Recreation Area.

2A: 2-month Improved Ladder Alternative

Significant, unavoidable impacts under Alternative 2A cannot be mitigated; therefore, no mitigation is provided.

2B: 2-month with Existing Ladders Alternative

Significant, unavoidable impacts under Alternative 2B cannot be mitigated, therefore, no mitigation is provided.

3: Gates-out Alternative

Significant, unavoidable impacts under Alternative 3 cannot be mitigated; therefore, no mitigation is provided.

3.7 Geology

3.7.1 Affected Environment

The Red Bluff area is situated in the northern portion of the Sacramento Valley, which functions as a structural trough extending on a northwest trend approximately 149 miles (240 kilometers) north from the Delta. The Sacramento Valley is bounded to the east by the Sierra Nevada and Cascade mountain ranges, to the north by the Klamath Mountains, and to the west by the Coast Range. Rocks underlying the valley and the bordering mountains are Paleozoic and Mesozoic granitic, metamorphic, and marine sediments (DWR, 1978). These rocks are found at considerable depths in the center of the valley and more shallow depths near the margins. Eocene marine and continental sedimentary rocks containing saline or brackish water overlay these deposits. All of these rocks are relatively impermeable and form the bottom of the basin.

Except in the deeper portions of the valley, a series of non-marine deposits that yield fresh water overlie the Eocene and pre-Eocene rocks. Streams flowing from the surrounding mountains into the subsiding trough laid these post-Eocene continental deposits. This assemblage of predominately sedimentary rocks also includes volcanic mudflows, lava flows, and volcanic ash deposits, all associated with the volcanic activity that occurred in the middle- to late-Tertiary period (DWR, 1978). The Sutter Buttes near Yuba City are prominent volcanic features that originated during the late-Tertiary period.

Several formations of post-Eocene age are present in the valley and are important sources of groundwater. They include the Tuscan, Mehrten, Tehama, Laguna, and Victor formations and several unnamed alluvial units, principally alluvial fans and floodplain deposits.

Several formations of post-Eocene age are present in the valley and are important sources of groundwater. They include the Tuscan, Mehrten, Tehama, Laguna, and Victor formations and several unnamed alluvial units, principally alluvial fans and floodplain deposits.

The Tuscan Formation is situated in the northeastern portion of the valley, the Mehrten Formation along the east side, the Tehama Formation on the west side, the Laguna Formation on the southeast side, and the Victor Formation occupies the low alluvial plain on the east side of the valley. On the east side of the valley, north of Chico, a fanglomerate unit, which is an assemblage of partially cemented layers of sand and gravel with thick layers of clay and silt, overlays the Tuscan Formation.

Gravelly deposits belonging to the Red Bluff Formation exist along the east margin near Oroville and in small isolated areas south to Sacramento County and west of Red Bluff, Corning, and Orland. In Sacramento County, these deposits are known as the Arroyo Seco and South Fork gravels. These gravels are surficial deposits that occur mostly above the zone of saturation and have little importance as

sources of groundwater. Collectively, they are known as the Pleistocene gravels. The Red Bluff Formation overlays the Tehama Formation and attains an exposed thickness of 15 meters in the vicinity of Red Bluff (DWR, 1978). Gravel sizes range from small cobbles to pebbles contained in a reddish silty to sandy matrix. The upper surface consists of hardpan soil, and rock fragments are metamorphic and igneous. The formation was deposited during a period when glaciers were active in the North Coast Ranges and Klamath Mountains. Streams draining these glacial areas contained coarse debris and suspended fine-grained material. These fine-grained materials filled the voids after deposition of the gravel so that most Red Bluff gravels are not very permeable.

Alluvial fans, stream channel deposits, and floodplain and flood-basin deposits are the most recently deposited materials. Alluvial fans occur mostly on the west side and are relatively thin, highly permeable materials. Stream channel and floodplain deposits consist of well-sorted sand, gravel, and silt adjacent to major streams. Flood-basin deposits are the finest-grained materials consisting of clay and silt occupying large areas adjacent to the Sacramento River.

Geological Structures

Seven major structural features influence the occurrence and movement of groundwater in the Sacramento Valley:

1. The Chico Monocline extends from the vicinity of Red Bluff southeast to Chico. This structure tends to facilitate groundwater inflow to the valley from areas outside the basin.

2. The Red Bluff Arch forms the northern boundary of the basin and consists of a series of parallel faults and gentle folds. This structure tends to restrict movement of water between the Redding groundwater basin to the north and the Sacramento Valley groundwater basin to the south.

3. The Corning Anticline impedes movement of groundwater eastward between Red Bluff and Corning.

4. The Sutter Buttes, located northwest of Yuba City, are the surface expression of coalescing domes that were thrust from below, tilting, faulting, folding, and exposing at the surface the intruded Cretaceous to Pliocene sediments. The Buttes divert groundwater around their flanks.

5. The Dunnigan Anticline, located west of Dunnigan, has folded the Tehama and Red Bluff formations and diverts groundwater southeast.

6. The Plainfield Ridge, south of the Dunnigan Anticline, may possibly be a southern continuation of the Dunnigan Anticline. This structure impedes the flow of groundwater to the east.

7. The Willows Arch is located east of Artois and extends north in the direction of Orland. This structure appears to be a partial barrier to the southwesterly movement of groundwater from Stony Creek.

Local Geology

The project area is on the upper member of the Riverbank Formation.

The project area is on the upper member of the Riverbank Formation, a Late Pleistocene-age stream/terrace deposit of fluvial/deltaic origin. This unit consists of moderately well-consolidated, interconnected, and discontinuous layers and lenses of channel and overbank deposits containing varying mixtures of gray, brown, reddish-brown, and red-orange-brown gravel, sand, silt, and clay. These deposits occur along channels, floodplains, and natural levees of major streams; are highly permeable; and vary in thickness from 5 to 15 feet (RWQCB, 1990).

The upper member of the Riverbank Formation is underlain by the Middle Pleistocene-age Red Bluff Formation. This clastic, continental, alluvial fan deposit comprises well-consolidated layers and lenses of interconnected and disconnected mixtures of bright red and orange-red gravel with minor amounts of sand and silt, generally 5 to 15 feet thick. The Red Bluff Formation is underlain by the Pliocene-age Tehama Formation, a well-consolidated deposit consisting of dense to very dense sandy clay and clayey gravel (RWQCB, 1990).

Seismology

No active faults are within the site vicinity, and no other geologic hazards are known.

No active faults are within the site vicinity, and no other geologic hazards are known. The nearest mapped active fault is the Cleveland Fault, located approximately 65 miles southeast of the site near the Town of Oroville. Occasional seismic activity (less than 5.5 on the Richter magnitude scale) has been measured north of Redding (30 miles north of Red Bluff) in the last 5 years; however, no surface rupture is associated with the activity.

Hydrogeology

Significant water-producing geologic units are the unconsolidated to semi-consolidated non-marine sediments that range from the Oligocene to Miocene ages (13 to 25 million years ago) to recent ages and are located in the valley trough. Generally, unconfined groundwater exists in the relatively shallow alluvial fan, floodplain, and stream channel deposits. It is partially confined in and under the flood-basin deposits and is confined beneath impervious clay and mudflow strata in the older Pleistocene and Pliocene formations. The depth to groundwater increases from the central portions of the basin towards the margins. Levels are usually highest in the spring and lowest in the fall. Permeability values for the claybound soils range from 10^{-5} to 10^{-7} centimeters per second, indicating relatively impermeable strata (RWQCB, 1990).

Groundwater in the immediate vicinity of Lake Red Bluff is greatly affected by the annual filling of the lake. This change in the surface elevation of the Sacramento River corresponds to a change in the groundwater hydraulic gradient.

Groundwater in the North Valley moves in the general direction of the Sacramento River. In the valley south of Sutter Buttes, the groundwater gradient is nearly flat, sloping toward the Sacramento River or the Delta; however, intensive development of groundwater has created pumping depressions along the east side from Marysville to Sacramento County and on the west side of Solano County. Groundwater replenishment occurs through deep percolation of streamflow, precipitation, and applied irrigation water. Most of the recharge occurs in the north and east sides of the valley where precipitation is the greatest.

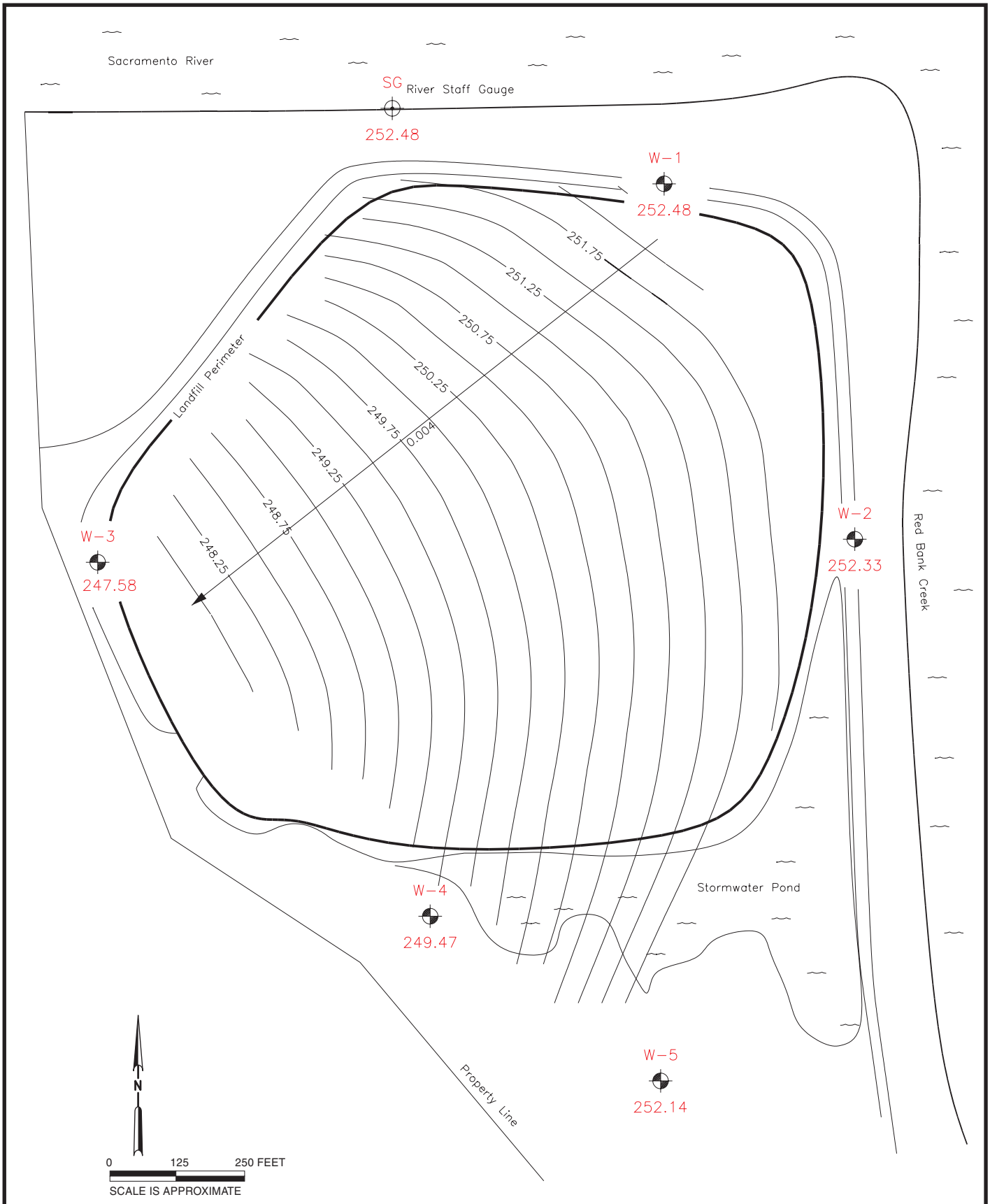
Groundwater in the immediate vicinity of Lake Red Bluff is greatly affected by the annual filling of the lake. As discussed in Section 3.3.1, the filling of Lake Red Bluff coincides with the gates-in period from May 15 through September 15 of each year. This change in the surface elevation of the Sacramento River, which subsequently becomes Lake Red Bluff, corresponds to a change in the groundwater hydraulic gradient as evidenced by groundwater elevation measurements conducted during the gates-in and gates-out periods. Data collected from monitoring wells in the vicinity of RBDD during the gates-out periods from 1996 to 2000 indicated that lateral hydraulic gradients ranged from 0.002 to 0.005 foot per foot to the north to northeast, thus indicating a groundwater flow direction toward the Sacramento River in the vicinity of RBDD. The lateral hydraulic gradient during gates-in periods from 1996 to 2000 ranged from 0.002 to 0.005 foot per foot to the west to northwest, thus indicating a change in the direction of groundwater flow away from the vicinity of RBDD. Figures 3.7-1 and 3.7-2 display groundwater contours and the hydraulic gradient at the Pactiv landfill during gates-in and gates-out periods (URS Corporation, 2000).

Groundwater quality is generally excellent in the region. In the most recent summary of groundwater conditions (1991), total dissolved solids (TDS) in the Red Bluff area were classified as less than 200 mg/L, which is below drinking water standards. No evidence of elevated levels of boron, nitrates, arsenic, or selenium has been found in the groundwater in the Red Bluff area. Groundwater quality in the immediate vicinity of RBDD is monitored quarterly and is discussed in Section 3.3.3. For a more complete discussion on groundwater quality, refer to Section 3.3.3.

Mineral resources in the vicinity of the site include two gravel and sand quarries. This project is not anticipated to impact current quarry operations.

Mineral Resources

Mineral resources in the vicinity of the site include two gravel and sand quarries. The Red Bluff Quarry is located approximately 7 miles south of the site, and Valley Rock Products is located in Corning, approximately 27 miles south of the site. This project is not anticipated to impact current quarry operations.



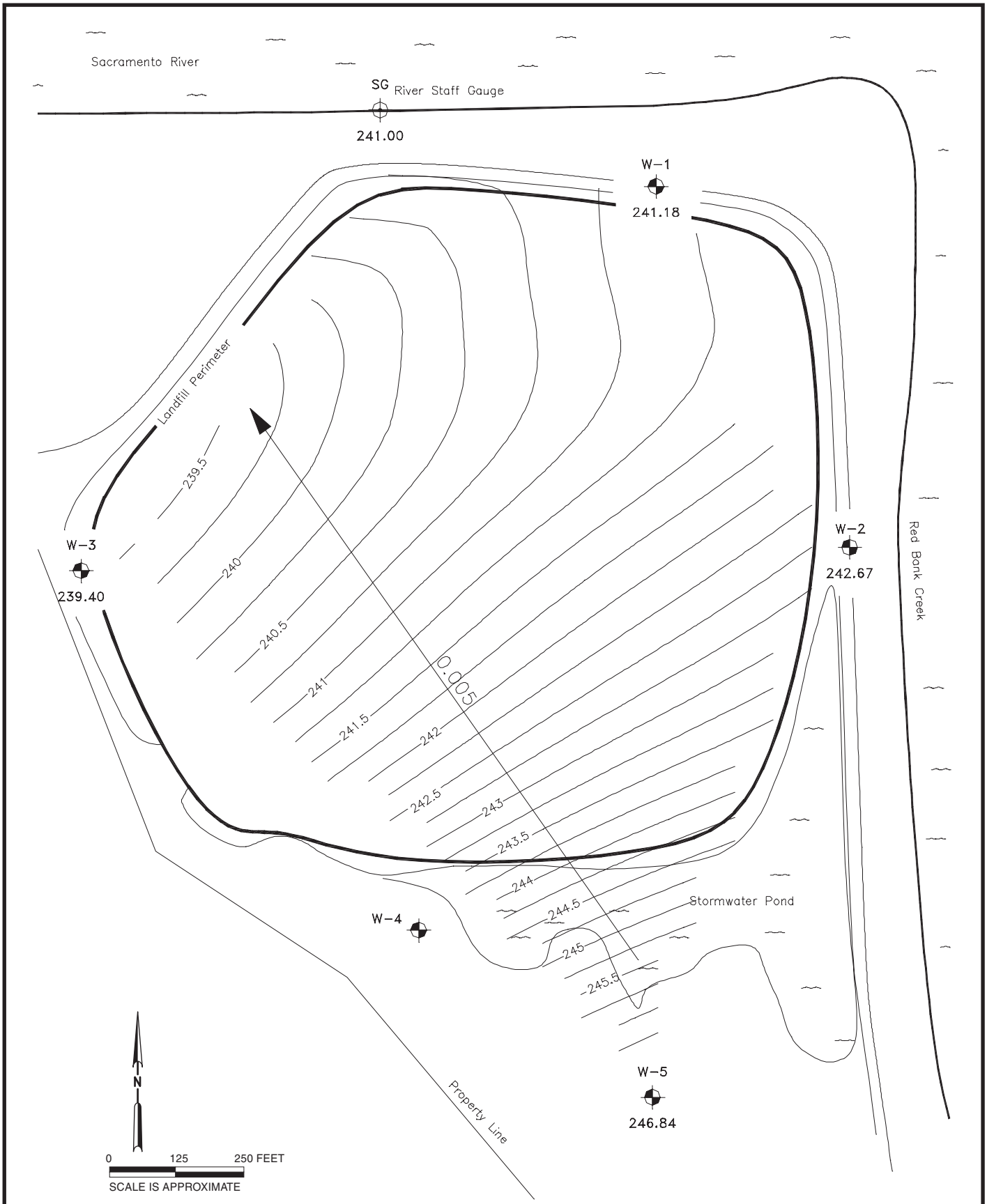
LEGEND

0.001 GROUNDWATER DIRECTION FLOW AND GRADIENT

FIGURE 3.7-1
GATES-IN PERIOD
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

W122001005RDD_07 (12/14/01)

CH2MHILL



LEGEND

0.001 GROUNDWATER DIRECTION FLOW AND GRADIENT

FIGURE 3.7-2
GATES-OUT PERIOD
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

W122001005RDD_08 (12/14/01)

CH2MHILL

Hazardous Materials

Pactiv occupies an 8.3-acre site approximately 1,400 feet upstream of RBDD. The site (comprising a portion of Assessor's Parcel No. 35-08-2) is a Class III landfill owned and operated by the Pactiv Corporation. This facility was first operated by Diamond International Corporation in 1957 as an open burn dump. In 1964, dikes surrounding the site were constructed in conjunction with the construction of RBDD. The facility was purchased by Pactiv in 1983 (RWQCB, 1990).

The Pactiv landfill is used for the disposal of dried paper sludge generated at the onsite industrial wastewater treatment facility. The last time sludge was dumped at this location was during the third quarter of 1999, when 6,980 CY were dumped. Typically, 2,500 CY of waste is dumped annually (URS, 2000). During some years no waste is dumped at all (RWQCB, 1990).

In addition, this site includes an active wastewater treatment plant that currently discharges approximately 1.9 million gallons per day to the Sacramento River. The Pactiv wastewater plant discharges into the Sacramento River via an outfall diffuser. This diffuser is presently located within the proposed pumping facility footprint. It is possible that the diffuser will need to be relocated and/or incorporated into the design of the pumping facility. The design team will coordinate with Pactiv and RWQCB to incorporate the diffuser into the final project design. Wastewater is monitored for 5-day biochemical oxygen demand, chemical oxygen demand (COD), total suspended solids (TSS), total organic carbon, and pH.

This landfill site is viewed as somewhat problematic because of its location, in summer months when RBDD gates are closed, river water backs up and creates Lake Red Bluff. When this occurs, groundwater rises and comes in contact with waste in the unlined landfill. At times when the groundwater level is high, elevated levels of inorganic constituents are detected in groundwater collected from site wells. Constituents currently being monitored include TDS, turbidity, iron, soluble iron, manganese, alkalinity, bicarbonate, chloride, sulfate, dissolved organic carbon (DOC), COD, pH, Total Kjeldahl Nitrogen, nitrate, sulfides, specific conductivity, calcium, magnesium, potassium, sodium, and tannins and lingins.

Of these constituents, TDS, turbidity, iron, and manganese concentrations have exceeded the secondary maximum contamination levels in the well downgradient of the landfill. A slight seasonal variation in manganese concentrations appears to occur in the downgradient well, with peaks in concentrations occurring in September and December of each year. No seasonal variation was detected in concentrations of TDS, turbidity, and iron in the downgradient well. In addition, alkalinity, TDS, DOC, specific conductivity, calcium, magnesium, manganese,

potassium, and sodium concentrations were found to be significantly greater (according to an ANOVA statistical analysis) in the down-gradient well than the upgradient well (URS Corporation, 2000). Pactiv has completed a corrective action plan in response to the elevated levels of the constituents detected in site wells in October 2000. The corrective action plan indicated that Pactiv intends to close the landfill, possibly by capping the landfill with a geosynthetic clay liner or designating a containment zone. As outlined in the February 2001 Work Plan, further site characterization is being performed in preparation for site closure (Pactiv, 2001).

3.7.2 Environmental Consequences

Methodology

The geological environmental consequences of the proposed alternatives are derived from a comparison against the No Action Alternative. The comparison examined changes to the site's fundamental geology, topsoil, and geography during construction and post-construction operations of the facilities. Mitigation is identified for all potential geological impacts. The proposed mitigation meets CEQA requirements by neutralizing the geologic impact to a less than significant level.

Significance Criteria

Significance criteria represent the thresholds used to identify whether an impact would be potentially significant. These criteria are based on Appendix G of the *CEQA Guidelines* and professional judgment.

Impacts on geology and soils would be significant if they would result in any of the following:

- Exposure of people or structures to potential substantial geologic hazards. This may include earthquakes, ground failure, or similar hazards.
- Substantial soil erosion or loss of topsoil.
- Creation of unstable soil or geological conditions, potentially resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Location of the project on expansive soils.

No Action Alternative

No changes to hydrology or surface-water management would occur. Gates would be operated during the current 4-month gates-in period. Construction activity would be limited to the installation of the fourth pump at RPP. No other construction activity would occur as a result of the No Action Alternative.

1A: 4-month Improved Ladder Alternative

Construction-related.

Impact 1A–G1: Excavation. Approximately 800,000 CY of material would need to be excavated to complete construction of this alternative. This includes excavation for the pumping station and forebay, as well as the right bank and left bank fish ladders. Approximately 600,000 CY of this material would be stored onsite.

The impacts from excavation during construction would be significant and unavoidable.

Operations-related.

Impact 1A–G2: Geology. No impacts involving geologic hazards are expected from the operation of this proposed alternative. The fundamental geology of the area would remain unchanged. No active faults are within the site vicinity, and no other geologic hazards are known. Therefore, the potential for seismic activity, liquefaction, landslide, expansive soils, or other event would be minimal.

The impacts from operations on geology would be less than significant; therefore, no mitigation is required.

1B: 4-month Bypass Alternative

Construction-related.

Impact 1B–G1: Excavation. Approximately 800,000 CY of material would need to be excavated to complete construction of this alternative. This includes excavation for the pumping station, forebay, and bypass channel. Approximately 600,000 CY of this material would be stored onsite.

The impacts from excavation during construction would be significant and unavoidable.

Operations-related.

Impact 1B–G2: Geology. Impacts on geology under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–G2).

The impacts from operations on geology would be less than significant; therefore, no mitigation is required.

2A: 2-month Improved Ladder Alternative

Construction-related.

Impact 2A–G1: Excavation. Impacts from excavation under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–G1).

The impacts from excavation during construction would be significant and unavoidable.

Operations-related.
Impact 2A–G2: Geology. Impacts on geology under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–G2).

The impacts from operations on geology would be less than significant; therefore, no mitigation is required.

2B: 2-month with Existing Ladders Alternative

Construction-related.
Impact 2B–G1: Excavation. Approximately 750,000 CY of material would need to be excavated to complete construction of this alternative. The primary excavation for this alternative is required to construct the Mill Site pump station and conveyance facilities. Approximately 580,000 CY of this material would remain onsite.

The impacts from excavation during construction would be significant and unavoidable.

Operations-related.
Impact 2B–G2: Geology. Impacts on geology under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–G2).

The impacts from operations on geology would be less than significant; therefore, no mitigation is required.

3: Gates-out Alternative

Construction-related.
Impact 3–G1: Impacts from excavation under Alternative 3 would be the same as those identified for Alternative 2B (see Impact 2B–G1).

The impacts from excavation during construction would be significant and unavoidable.

Operations-related.
Impact 3–G2: Geology. Impacts on geology under Alternative 3 would be the same as those identified for Alternative 1A (see Impact 1A–G2).

The impacts from operations on geology would be less than significant; therefore, no mitigation is required.

3.7.3 Mitigation

This section discusses mitigations for each significant impact described in Environmental Consequences.

1A: 4-month Improved Ladder Alternative

Mitigation 1A–G1. To minimize soil erosion, movement of sediments, loss of topsoil, and associated water quality impacts, an approved

drainage, grading, and erosion control plan would be completed prior to construction. This plan would meet all local requirements and incorporate construction site Best Management Practices (BMP) to stabilize areas cleared of vegetation and soil stockpiles. BMPs may include preservation of existing vegetation, silt fences, and/or straw bales. Covering soil stockpiles with mulch or matting as well as continuous maintenance of erosion control measures would be necessary. Timely re-vegetation of disturbed sites would minimize post-construction erosion impacts.

1B: 4-month Bypass Alternative

Mitigation 1B–G1. See Mitigation 1A–G1.

2A: 2-month Improved Ladder Alternative

Mitigation 2A–G1. See Mitigation 1A–G1.

2B: 2-month with Existing Ladders Alternative

Mitigation 2B–G1. See Mitigation 1A–G1.

3: Gates-out Alternative

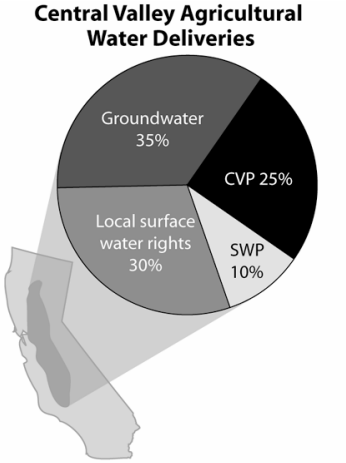
Mitigation 3–G1. See Mitigation 1A–G1.

3.8 Agricultural Resources

3.8.1 Affected Environment

Central Valley Project

The Central Valley is an important agricultural region for both the state and the United States. In 1993, the 19 Central Valley counties contributed more than 60 percent, by value, of California's agricultural production and included 6 of the top 10 agricultural counties in the state. The Central Valley produces almost 10 percent of the total United States market value of crop production, including 40 percent of the nation's fruits and nuts, 20 percent of the cotton, and 15 percent of the vegetables. California producers account for about 10 percent of total United States agricultural exports. These exports represent almost 25 percent of the gross farm income of the state. Many of California's leading export commodities are largely or exclusively grown in the Central Valley, including cotton, rice, almonds, grapes, oranges, walnuts, prunes, tomatoes, and wheat.



Almost 80 percent of the irrigated land in California is located in the Central Valley. Water deliveries for agriculture average about 22.5 maf per year, with CVP providing about 25 percent, the State Water Project about 10 percent, local surface-water rights about 30 percent, and groundwater about 35 percent.

Most districts that receive CVP supplies also use other supplies such as groundwater. Use of such sources varies on an annual basis because of changes in weather and crop market conditions.

The CVP normally supplies irrigation water to approximately 200 water districts, individuals, and companies through water service, water rights, and exchange contracts. The type of contract a particular district holds determines the potential CVP water supply curtailments in dry years. Those districts with water service contracts are subject to the greatest curtailments (as much as 100 percent), while districts with water rights settlement contracts, such as those along the Sacramento River, are cut no more than 25 percent. Districts/entities with pre-1914 water rights that do not have settlement contracts with USBR are entitled to their full right regardless of CVP operations.

The CVP normally supplies irrigation water to approximately 200 water districts, individuals, and companies through water service, water rights, and exchange contracts.

In recent years, CVP water has been delivered to about 13,000 full-time and 6,300 part-time farms, or just less than 50 percent of all Central Valley farms. The Federal Farm Program has been especially important to individual farmers in the Central Valley, particularly for rice and cotton production, as a substantial share of the revenue from these crops was derived directly or indirectly from the program. From 1985 to 1995, as many as 400,000 acres of California rice and cotton land was idled by acreage reduction requirements. Additional fallowing was allowed

during the worst drought years, without loss of most government payments. The 1996 Farm Bill resulted in a major revision to the programs for most crops, including rice and cotton. Acreage reduction programs have been eliminated, and government payments per unit of crop produced have been replaced with declining lump-sum payments.

Sacramento Valley

Agriculture is the largest industry in the Sacramento Valley. The region produces a wide variety of crops including rice, grain, tomatoes, field crops, fruits, and nuts.

Agriculture is the largest industry in the Sacramento Valley. The region produces a wide variety of crops including rice, grain, tomatoes, field crops, fruits, and nuts. The value of Sacramento Valley crop production reached $1.7 billion in 1992, with rice, tomatoes, and orchard crops providing the highest revenues. The CVP's Tehama-Colusa service area is representative of areas within the region that are heavily dependent on CVP supplies. Districts within the Tehama-Colusa service area hold water service contracts with USBR, making them subject to water delivery curtailments up to 100 percent in dry years. All TCCA member districts rely on CVP service contracts for a portion of their supplies. A total of 25 such districts are located within the Sacramento Valley region. Approximately 10 percent of the applied water within the Sacramento Valley is provided through CVP service contracts.

The service area of the TC and Corning canals lies entirely in the area of origin of the Sacramento River watershed along the westerly side of the Sacramento River valley. A total of 18 water districts contract with the federal government for water deliveries from the TC and Corning canals. These districts have contracts totaling 325,000 acre-feet of water each year and provide service to over 150,000 acres of land located in Tehama, Glenn, Colusa, and Yolo counties.

Corning Canal

Corning Canal serves Proberta, Thomes Creek, and Corning water districts

The Corning Canal was authorized in 1950 as part of the CVP and completed in 1959. It is a 21-mile long earth-lined canal starting at RBDD and ending about 4 miles south of the City of Corning.

The water districts served by the canal include Proberta, Thomes Creek, and Corning water districts. The Corning Water District was formed in 1954, specifically to supplement the local groundwater supply with water from the CVP.

Tehama-Colusa Canal

Construction of the TC Canal was started in 1964 as a result of signed contracts between USBR and water districts dating back as early as 1954, and was completed in 1980. The canal is a 111-mile-long concrete-lined structure also starting at RBDD and ending approximately 2 miles south of Dunnigan. The canal travels through Tehama, Glenn, and Colusa counties, and ends in Yolo County.

The water districts served by the canal include Orland-Artois, Glide, Kanawha, Holthouse, 4-M, La Grande, Davis, Westside, Myers-Marsh, Cortina, Colusa, and Dunnigan water districts.

The diverted water is used mainly for irrigating agriculture, with a very small percentage used for non-agriculture purposes. The principal crop types associated with the TC and Corning canals include almonds, olives, rice, corn, wheat, alfalfa, vine seeds, irrigated pasture, beans, sugar beets, tomatoes, and orchard fruits (see Table 3.8-1).

TABLE 3.8-1
TC and Corning Canals' Formation Date, Acreage, and Crop Types[a]

District	Formation Date	District Acreage	Irrigated Acreage	Dominant Crop Types
4-M Water District	1978	15,000	956	Almonds, alfalfa, row crops, wheat
Colusa County Water District	1954		40,348	Almonds, vine seeds, tomatoes
Corning Water District			5,060	Subtropical orchard, improved pasture, rice
Cortina Water District			575	Alfalfa, almonds
Davis Water District			863	
Dunnigan Water District			7,235	Alfalfa, wheat, almonds
Glenn Valley Water District	1978	1,954	700	Rice, tomatoes, grain/hay
Glide Water District			4,984	Rice, wheat, alfalfa
Holthouse Water District			509	Almonds, vineyard, tomatoes
Kanawha Water District			13,920	Wheat, rice, corn, sugar beets
Kirkwood Water District			335	
La Grande Water District			1,376	Rice, tomatoes
Myers-Marsh Water District			251	Alfalfa, tomatoes
Orland-Artois Water District	1954		25,572	Almonds, alfalfa, rice, wheat, subtropical orchards
Proberta Water District			2,438	Improved pasture, corn, rice, grains
Thomes Creek Water District			1,372	Rice, alfalfa, almonds
Westside Water District			13,561	Tomatoes, wheat, almonds

[a]Data is based on 1999 TCCA water deliveries.

3.8.2 Environmental Consequences

This section provides a discussion of the consequences of the project alternatives on agricultural resources as compared to the No Action Alternative. Each project alternative impacts each agricultural area differently.

Methodology

An analysis was conducted to compare the ability of the alternatives to provide water reliability in meeting agricultural water demand. For the years 1989 through 1999, water delivery records were reviewed, as well as the maximum amount of water delivered on each day between May and September. These calculations helped establish the historical range of deliveries accommodated by TCCA over that time period.

The second step of the analysis included calculating reference evapotranspiration for the combined TCCA member districts. Reference evapotranspiration is used to calculate crop water consumption for both agricultural and natural vegetation. The analysis used the modified Pennman-Monteith method, which is endorsed by the Food and Agriculture Organization of the United Nations.

For the TCCA districts, average crop mix, as determined by the USBR needs assessment, was used as a representative crop variety over the period of record. The percentage of specific crops was prorated against the recorded acres irrigated in each year between 1989 and 1999. The acreage of each crop in each year, in conjunction with average monthly climate data, was used to derive a monthly water demand for the 1989 to 1999 period. Daily water demand was assumed to follow a pattern similar to the daily water deliveries. Using daily water deliveries, the monthly crop demands were disaggregated into daily demands to give a sense of variability within months. Average and maximum daily crop demand was then determined similar to those reported for water delivery. In most cases, crop demand far outpaces actual water deliveries.

Average modeled crop demand reflects the water needs of crops grown by TCCA member districts indicated by acres in production, water requirements of different crops, and weather conditions, averaged over the 11-year study period. The difference between crop demand and water delivery is likely accounted for by water reuse, groundwater pumping, and precipitation. Maximum modeled crop demand is simply the maximum calculated crop demand for each day of the period of record. These average and maximum water deliveries and average and maximum crop demands were then compared to the delivery capability from RBDD under each of the project alternatives.

Each of the alternatives includes various assumptions about the amount of capacity available to divert water into the TCCA system, and the time periods during which that capacity is available. Thus, the maximum potential diversion under each alternative is a measure of the water supply reliability of the alternative. The difference between the No Action Alternative and the various alternatives is a measure of the addition or reduction in total water supply reliability of the action alternatives. Further, by comparing the alternatives to the actual water

deliveries and the modeled crop demand, it is possible to assess how the alternatives might constrain crop selection.

See Appendix A for a detailed agricultural water supply benefit analysis.

Significance Criteria

The following criteria were used to evaluate the significance of effects on agriculture. These criteria are based on the *CEQA Guidelines* and NEPA regulations. Construction and operations impacts on agricultural resources were considered significant if they would:

- Convert prime farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California resources agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act Contract.
- Involve other changes in the exiting environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use.

For the purposes of distinguishing project alternatives from the No Action Alternative, the average and maximum water delivery and average and maximum modeled crop demand for each alternative were compared to the No Action Alternative. As a result of this comparison, water supply delivery either increased or decreased for each of the alternatives, during the irrigation period of May 1 through September 30. Changes in water reliability are used in the analysis of impacts or benefits.

No Action Alternative

No changes to hydrology or surface-water management would occur. Gates would be operated during the current 4-month gates-in period. Construction activity would be limited to the installation of the fourth pump at RPP. No other construction activity would occur as a result of the No Action Alternative.

1A: 4-month Improved Ladder Alternative

Construction-related Impacts.

Impact 1A–AG1: Agricultural Uses. The existing CVP agricultural uses would not be precluded during the construction period. The construction process would be sequenced so that irrigation deliveries to agricultural users would continue uninterrupted.

The impacts from construction on agricultural uses would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 1A–AG2: Agricultural Use and Prime Agricultural Land. The operation of Alternative 1A would have no significant impact on existing CVP agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

Increased pumping capacity at TCCA would have beneficial impacts to water deliveries within the CVP. Increased supply and availability of TCCA water to the associated districts during the off-peak irrigation season would result in an increase in the ability to reliably schedule project water during the gates-out period. Although this would not affect contract amounts, it may allow individual farmers to plant additional crops that require irrigation outside of the gates-in period. Such a change could increase the production efficiency of member districts.

Table 3.8-2 summarizes Alternative 1A diversion capacity and maximum diversion, as well as the total quantity difference between the Alternative 1A and the No Action Alternative.

TABLE 3.8-2
Comparison of Diversion Capacity and Maximum Diversion; Difference Between Alternative 1A and No Action Alternative

	No Action Alternative		1A: 4-month Improved Ladder Alternative		Difference	
Time Period	Capacity (cfs)	Maximum Diversion (acre-feet)	Capacity (cfs)	Maximum Diversion (acre-feet)	Capacity (cfs)	Maximum Diversion (acre-feet)
May 1 through May 14	485	14,405	1,700	50,490	1,215	36,086
May 15 through May 31	2,500	79,200	2,500	79,200	0	0
June 1 through June 30	2,500	148,500	2,500	148,500	0	0
July 1 through August 31	2,500	306,900	2,500	306,900	0	0
September 1 through September 15	2,500	74,250	2,500	74,250	0	0
September 16 through September 30	485	14,405	1,700	50,490	1,215	36,086
Total		**637,659**		**709,830**		**72,171**

Note: Total maximum diversion would not change the cumulative CVP water service contract held by TCCA member districts.

Impacts to water reliability from Alternative 1A would be beneficial because of increased pumping capacity during the irrigation season. The largest amount of benefit from this alternative would occur during May 1 through May 14, and September 16 through September 30, when RBDD is typically in the gates-out position. Increased pumping capacity would greatly benefit this period when agricultural demands are still considerable. For the period of May 1 through May 14, average and

maximum water deliveries and average and maximum crop demand exceed the ability of the No Action Alternative to deliver water. For the same time period, the maximum water delivery would exceed the ability of Alternative 1A to deliver water. For the period of September 16 through September 30, average and maximum crop demand would exceed the ability of the No Action Alternative to deliver water, but the ability of Alternative 1A to deliver water would not be exceeded. For the majority of the irrigation season, May 15 through September 15, Alternative 1A could meet the water needs defined by average and maximum water delivery and average and maximum crop demand. See Figure 3.8-1 for a graphic comparison of the alternatives.

The impacts from operations on agricultural water demands would be beneficial; therefore, no mitigation is required.

1B: 4-month Bypass Alternative

Construction-related Impacts.

Impact 1B–AG1: Agricultural Uses. Construction-related impacts under Alternative 1B would be the same as those listed under Alternative 1A (see Impact 1A–AG1).

The impacts from construction on agricultural uses would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 1B–AG2: Agricultural Use and Prime Agricultural Land. The operations of Alternative 1B would have no significant impact on existing CVP agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

Increased pumping capacity at TCCA would have beneficial impacts to water deliveries within CVP. Increased supply and availability of TCCA water to the associated districts during the off-peak irrigation season would result in an increase in the ability to reliably schedule project water during the gates-out period. Although this would not affect contract amounts, it may allow individual farmers to plant additional crops that require irrigation outside of the gates-in period. Such a change could increase the production efficiency of member districts.

Table 3.8-3 summarizes Alternative 1B diversion capacity and maximum diversion, as well as the total quantity difference between the proposed project and the No Action Alternative.

Impacts to water reliability from Alternative 1B would be beneficial because of increased pumping capacity during the irrigation season. The largest amount of benefit from this alternative would occur during May 1 through May 14, and September 16 through September 30, when

TABLE 3.8-3
Comparison of Diversion Capacity and Maximum Diversion; Difference Between Alternative 1B and No Action Alternative

	No Action Alternative		1B: 4-month Bypass Alternative		Difference	
Time Period	Capacity (cfs)	Maximum Diversion (acre-feet)	Capacity (cfs)	Maximum Diversion (acre-feet)	Capacity (cfs)	Maximum Diversion (acre-feet)
May 1 through May 14	485	14,405	1,700	50,490	1,215	36,086
May 15 through May 31	2,500	79,200	2,500	79,200	0	0
June 1 through June 30	2,500	148,500	2,500	148,500	0	0
July 1 through August 31	2,500	306,900	2,500	306,900	0	0
September 1 through September 15	2,500	74,250	2,500	74,250	0	0
September 16 through September 30	485	14,405	1,700	50,490	1,215	36,086
Total		**637,659**		**709,830**		**72,171**

Note: Total maximum diversion would not change the cumulative CVP water service contract held by TCCA member districts.

RBDD is typically in the gates-out position. Increased pumping capacity would greatly benefit this period, when agricultural demands are still quite considerable. For the period of May 1 through May 14, average and maximum water deliveries and average and maximum crop demand would exceed the ability of the No Action Alternative to deliver water. For the same time period, the maximum water delivery would exceed the ability of Alternative 1B to deliver water. For the period of September 16 through September 30, average and maximum crop demand would exceed the ability of the No Action Alternative to deliver water, but the ability of Alternative 1B to deliver water would not be exceeded. For the majority of the irrigation season, May 15 through September 15, Alternative 1B could meet the water needs defined by average and maximum water delivery and average and maximum crop demand. See Figure 3.8-1 for a graphic comparison of the alternatives.

The impacts from operations on agricultural water demands would be beneficial; therefore, no mitigation is required.

2A: 2-month Improved Ladder Alternative

Construction-related Impacts.

Impact 2A–AG1: Agricultural Uses. Impacts on agricultural uses under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–AG1).

The impacts from construction on agricultural uses would be less than significant; therefore, no mitigation is required.

LEGEND

- NO ACTION ALTERNATIVE
- 4-MONTH GATES-IN ALTERNATIVE
- AVERAGE WATER DELIVERY
- MAXIMUM WATER DELIVERY
- AVERAGE MODELED CROP DEMAND
- MAXIMUM MODELED CROP DEMAND

FIGURE 3.8-1
AVERAGE AND MAXIMUM WATER DELIVERY AND AVERAGE AND MAXIMUM MODELED CROP DEMAND COMPARED TO NO ACTION AND 4-MONTH GATES-IN ALTERNATIVES
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

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Operations-related Impacts.

Impact 2A–AG2: Agricultural Use and Prime Agricultural Land. The operations of Alternative 2A would have no significant impact on existing CVP agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

Increased pumping capacity at TCCA would have beneficial impacts to water deliveries within CVP. Increased supply and availability of TCCA water to the associated districts during the off-peak irrigation season would result in an increase in the ability to reliably schedule project water during the gates-out period. Although this would not affect contract amounts, it may allow individual farmers to plant additional crops that require irrigation outside of the gates-in period. Such a change could increase the production efficiency of member districts.

Table 3.8-4 summarizes Alternative 2A diversion capacity and maximum diversion, as well as the total quantity difference between the proposed project and the No Action Alternative.

TABLE 3.8-4
Comparison of Diversion Capacity and Maximum Diversion; Difference Between Alternative 2A and No Action Alternative

	No Action Alternative		2A: 2-month Improved Ladder Alternative		Difference	
Time Period	Capacity (cfs)	Maximum Diversion (acre-feet)	Capacity (cfs)	Maximum Diversion (acre-feet)	Capacity (cfs)	Maximum Diversion (acre-feet)
May 1 through May 14	485	14,405	2,000	59,400	1,515	44,996
May 15 through May 31	2,500	79,200	2,000	63,360	(500)	(15,840)
June 1 through June 30	2,500	148,500	2,000	118,800	(500)	(29,700)
July 1 through August 31	2,500	306,900	2,500	306,900	0	0
September 1 through September 15	2,500	74,250	2,000	59,400	(500)	(14,850)
September 16 through September 30	485	14,405	2,000	59,400	1,515	44,996
Total		**637,659**		**667,260**		**29,601**

Note: Total maximum diversion would not change the cumulative CVP water service contract held by TCCA member districts.

Impacts to water reliability from Alternative 2A would be beneficial because of increased pumping capacity during the irrigation season. The largest amount of benefit from this alternative occurs during May 1 through May 14, and September 16 through September 30, when RBDD is typically in the gates-out position. Increased pumping capacity would greatly benefit this period, when agricultural demands are still quite considerable. For the period of May 15 through July 14 however, a

maximum modeled crop demand exceeds the ability of Alternative 2A, as does a portion of the maximum water delivery. Although year-round pumping capacity would increase under this alternative, during the peak-irrigation season, irrigation deliveries would actually decrease because of reduced diversion ability. For the remainder of the irrigation season, July 15 through September 30, Alternative 2A could meet average and maximum water delivery and average and maximum crop demand. Alternative 2A would reduce the reliability of water diversion during the May 15 through June 30 and September 1 through 15 periods; however, because of increased capacity in the May 1 through 14 and September 16 through 30 periods, Alternative 2A would increase the reliability of water diversion over the No Action Alternative. See Figure 3.8-2 for a graphic comparison of the alternatives.

The impacts from operations on agricultural water demands would be beneficial; therefore, no mitigation is required.

2B: 2-month with Existing Ladders Alternative

Construction-related Impacts.

Impact 2B–AG1: Agricultural Uses. Impacts from construction on agricultural uses under Alternative 2B would the same as those identified for Alternative 1A (see Impact 1A–AG1).

Impacts from construction on agricultural uses would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 2B–AG2: Agricultural Use and Prime Agricultural Land. The operation of Alternative 2B would have no significant impact on existing CVP agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

Increased pumping capacity at TCCA would have beneficial impacts to water deliveries within CVP. Increased supply and availability of TCCA water to the associated districts during the off-peak irrigation season would result in an increase in the ability to reliably schedule project water during the gates-out period. Although this would not affect contract amounts, it may allow individual farmers to plant additional crops that require irrigation outside of the gates-in period. Such a change could increase the production efficiency of member districts.

Table 3.8-5 summarizes Alternative 2B diversion capacity and maximum diversion, as well as the total quantity difference between the proposed project and the No Action Alternative.

LEGEND

- NO ACTION ALTERNATIVE
- GATES-OUT ALTERNATIVE
- 4-MONTH GATES-IN ALTERNATIVE
- AVERAGE WATER DELIVERY
- MAXIMUM WATER DELIVERY
- AVERAGE MODELED CROP DEMAND
- MAXIMUM MODELED CROP DEMAND

FIGURE 3.8-2
AVERAGE AND MAXIMUM WATER DELIVERY AND MODELED CROP DEMAND COMPARED TO NO ACTION AND 2-MONTH GATES-IN ALTERNATIVES AND NO ACTION AND GATES-OUT ALTERNATIVE
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

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TABLE 3.8-5
Comparison of Diversion Capacity and Maximum Diversion; Difference Between Alternative 2B and No Action Alternative

	No Action Alternative		2B: 2-month with Existing Ladders Alternative		Difference	
Time Period	**Capacity (cfs)**	**Maximum Diversion (acre-feet)**	**Capacity (cfs)**	**Maximum Diversion (acre-feet)**	**Capacity (cfs)**	**Maximum Diversion (acre-feet)**
May 1 through May 14	485	14,405	2,000	59,400	1,515	44,996
May 15 through May 31	2,500	79,200	2,000	63,360	(500)	(15,840)
June 1 through June 30	2,500	148,500	2,000	118,800	(500)	(29,700)
July 1 through August 31	2,500	306,900	2,500	306,900	0	0
September 1 through September 15	2,500	74,250	2,000	59,400	(500)	(14,850)
September 16 through September 30	485	14,405	2,000	59,400	1,515	44,996
Total		**637,659**		**667,260**		**29,601**

Note: Total maximum diversion would not change the cumulative CVP water service contract held by TCCA member districts.

Impacts to water reliability from Alternative 2B would be beneficial because of increased pumping capacity during the irrigation season. The largest amount of benefit from this alternative would occur during May 1 through May 14, and September 16 through September 30, when RBDD is typically in the gates-out position. Increased pumping capacity would greatly benefit this period, when agricultural demands are still quite considerable. For the period of May 15 through July 14 however, a maximum modeled crop demand exceeds the ability of Alternative 2B, as does a portion of the maximum water delivery. Although year-round pumping capacity increases under this alternative, during the peak irrigation season, irrigation deliveries actually would decrease because of reduced diversion ability. For the remainder of the irrigation season, July 15 through September 30, Alternative 2B could meet average and maximum water delivery and average and maximum crop demand. Alternative 2B would reduce the reliability of water diversion during the May 15 through June 30 and September 1 through 15 periods; however, because of increased capacity in the May 1 through 15 and September 16 through 30 periods, Alternative 2B would increase the reliability of water diversion over the No Action Alternative. See Figure 3.8-2 for a graphic comparison of the alternatives.

The impacts from operations on agricultural water demands would be beneficial; therefore, no mitigation is required.

3: Gates-out Alternative

Construction-related Impacts.

Impact 3–AG1: Agricultural Uses. Impacts from construction on agricultural uses under Alternative 3 would be the same as those identified for Alternative 1A (see Impact 1A–AG1).

The impacts from construction on agricultural uses would be less than significant; therefore, no mitigation is required.

Operations-related Impacts.

Impact 3–AG2: Agricultural Use and Prime Agricultural Land. The operation of Alternative 3 would have no significant impact on existing CVP agricultural uses, nor would the project affect prime agricultural land and/or convert prime agricultural land to a non-agricultural use.

Increased pumping capacity at TCCA would have beneficial impacts to water deliveries within CVP. Increased supply and availability of TCCA water to the associated districts during the off-peak irrigation season would result in an increase in the ability to reliably schedule project water during the gates-out period. Although this would not affect contract amounts, it may allow individual farmers to plant additional crops that require irrigation outside of the gates-in period. Such a change could increase the production efficiency of member districts.

Table 3.8-6 summarizes Alternative 3 diversion capacity and maximum diversion, as well as the total quantity difference between the proposed project and the No Action Alternative.

TABLE 3.8-6
Comparison of Diversion Capacity and Maximum Diversion; Difference Between Alternative 3 and No Action Alternative

	No Action Alternative		3: Gates-out Alternative		Difference	
Time Period	**Capacity (cfs)**	**Maximum Diversion (acre-feet)**	**Capacity (cfs)**	**Maximum Diversion (acre-feet)**	**Capacity (cfs)**	**Maximum Diversion (acre-feet)**
May 1 through May 14	485	14,405	2,500	74,250	2,015	59,846
May 15 through May 31	2,500	79,200	2,500	79,200	0	0
June 1 through June 30	2,500	148,500	2,500	148,500	0	0
July 1 through August 31	2,500	306,900	2,500	306,900	0	0
September 1 through September 15	2,500	74,250	2,500	74,250	0	0
September 16 through September 30	485	14,405	2,500	74,250	2,015	59,846
Total		**637,659**		**757,350**		**119,691**

Note: Total maximum diversion would not change the cumulative CVP water service contract held by TCCA member districts.

Impacts to water reliability from Alternative 3 would be beneficial because of increased pumping capacity during the irrigation season. The largest amount of benefit from this alternative would occur during May 1 through May 14, and September 16 through September 30, when RBDD is typically in the gates-out position. Increased pumping capacity would greatly benefit this period, when agricultural demands are still quite considerable. For the period of May 1 through May 14, average and maximum water deliveries and average and maximum crop demand would exceed the ability of the No Action Alternative to deliver water. The water delivery ability of Alternative 3 would satisfy the average and maximum water deliveries and average and maximum crop demand for the entire irrigation season, with the exception of a single day where maximum modeled crop demand would not be met. Alternative 3 would increase the reliability of water diversion by increasing capacity in the May 1 through 14 and September 16 through 30 over the No Action Alternative. See Figure 3.8-2 for a graphic comparison of the alternatives.

The impacts from operations on agricultural water demands would be beneficial; therefore, no mitigation is required.

3.8.3 Mitigation

No negative impacts from construction or operations of the proposed alternatives have been identified; therefore, no mitigation is provided.

3.9 Power Resources

This section addresses the power consumption of the various alternatives as well as the potential sources of power that might supply the electrical needs of the potential project. Hydropower generation facilities in CVP play an important role in meeting statewide demand for electricity. In 2000, hydropower accounted for approximately 15 percent (42,000 Gigawatt-hours) of the total electricity used in California (284,000 Gigawatt-hours) (California Energy Commission, 2002). CVP generation accounted for approximately 6,000 Gigawatt-hours of energy in 2000, approximately 15 percent of the total hydropower production and 2 percent of the total energy consumed. However, the annual and seasonal variability of hydropower is an important factor in considering the potential impacts of the alternatives.

Hydropower generation facilities in CVP play an important role in meeting statewide demand for electricity.

3.9.1 Affected Environment

California Electricity Market Structure

California's electric deregulation created a statewide electricity market with its own characteristics and governance. When California deregulated, it established the California Power Exchange to operate a power exchange system from which the state's investor-owned utilities (IOU) (PG&E, Southern California Edison, and San Diego Gas & Electric) had to buy their power on a day-ahead and day-of basis. The highest price power supply bid that was needed for the next day set the price for the entire market. The IOUs were also prevented from hedging into future markets. This eliminated bilateral, negotiated agreements from the market place.

As power suppliers gained an understanding of the market, the Pacific Northwest began to experience the second driest water year of record, and there was a decrease in the natural gas supplies available to California.

This led to a situation where wholesale market prices became extremely volatile and provided opportunities for market manipulation. The California Independent System Operator had responsibility to provide the system with "spinning reserves" which it had to purchase on the spot market, driving wholesale power prices even higher.

The IOUs were unable to pass the increased costs on to their retail customers. As a result, their financial capabilities were quickly lost, and they approached bankruptcy. This eventually led to credit concerns on the part of power suppliers who then withheld supplies because of payment concerns.

The state became involved in purchasing power supply in January 2001. At the end of January 2001, the California Power Exchange suspended its day-ahead and day-of market operations.

In early March 2001, DWR negotiated and executed 40 contracts for nearly 8,900 megawatts for 10 years to meet South California Edison and PG&E needs. These contracts, negotiated during the power crisis, are at above-market prices, and the state is making an ongoing effort to renegotiate the contracts. The state has had some success in this regard.

In April 2001, PG&E filed a voluntary petition for bankruptcy protection under Chapter 11 of the U.S. Bankruptcy Code. Also in April, the Federal Energy Regulatory Commission issued its initial order to provide market mitigation for summer 2001, followed by a second order in June that revised, clarified, and expanded upon the April order. In May, the state authorized the sale of $13.4 billion in bonds to finance power purchases and other measures to ease the crisis.

In June, a Federal Energy Regulatory Commission administrative law judge mediated negotiations on the appropriate level of refunds due California from power suppliers. The negotiations broke down over a lack of documentation.

With the October 2001 California Public Utilities Commission order ending direct access in the state, California's deregulation of its wholesale electricity markets came to an end. The state is now in a position of being a major power purchaser and seller, and longer-term bilateral contracts dominate the market.

The state is now in a position of being a major power purchaser and seller, and longer-term bilateral contracts dominate the market.

In December, the Federal Energy Regulatory Commission issued additional extensive orders clarifying the market mitigation framework that exists in California today; that is due to expire on September 30, 2002. Efforts are underway to redesign the California wholesale power market and to extend the present market mitigation framework until such time as a new framework can be put in place.

In May 2002, documents surfaced indicating deliberate market manipulation by various power marketers that in turn have led to calls for refunds, increased regulatory scrutiny, and perhaps litigation.

Central Valley Project

USBR owns and operates RBDD and serves the dam's electrical loads with Project Use Power (PUP; see discussion under Eligibility). The following discussion sets the framework for existing electrical service to the dam.

USBR's CVP and Washoe Project include 11 power plants with a maximum operating capability of about 2,044 megawatts and an estimated average annual generation of 4.6 million megawatt-hours (MWh). USBR operates all of the power plants with the exception of

one, which is operated by the state for USBR. The Western Area Power Administration (Western), a federal power marketing agency, markets and transmits the power available from the CVP and Washoe Project. Table 3.9-1 provides a summary of CVP hydroelectric generation facilities.

TABLE 3.9-1
Hydroelectric Generation Facilities

CVP Division	Power Plant	Location	Generating Units	Capability (kW[a])
Trinity River	Trinity	Trinity Dam/Trinity River	2	139,650
	Lewiston	Lewiston Dam/Trinity River	1	350
	J.F. Carr	Whiskeytown Dam	2	157,000
	Spring Creek	Spring CreekPower Conduit	2	200,000
Shasta	Shasta	Shasta Dam/Sacramento River	7[b]	625,000
	Keswick	Keswick Dam/Sacramento River	3	105,000
American River	Folsom	Folsom Dam/American River	3	215,000
	Nimbus	Nimbus Dam/American River	2	14,900
Delta	San Luis	San Luis Reservoir	8 (total)	202,000 (CVP share) (424,000 total)
	O'Neill	San Luis Canal	6	29,000
East Side	New Melones	New Melones Dam/ Stanislaus River	2	383,000
Total Capability				**2,070,900**

[a]kW = kilowatt.
[b]Includes two station service units.

Western has historically combined CVP hydroelectric output with supplemental power from other sources to enhance CVP power and to market an amount of firm power to its customers that would not be available in all years solely from CVP facilities.

The Western Area Power Administration markets and transmits the power available from the CVP and Washoe Project.

The first priority for CVP generation is PUP, defined by USBR law and used to operate the CVP and Washoe Project facilities. Western markets the remaining power, currently about 1,580 megawatts, under long-term contracts with 80 preference customers in northern and central California. These contracts expire December 31, 2004, as does a related contract with PG&E, Western Contract 14-06-200-2948A (2948A).

Contract 2948A governs the interconnection of the PG&E and Western systems, Western's use of the PG&E transmission and distribution system, and integration of their respective loads and resources. It

provides for coordinated use and dispatch of CVP and PG&E power resources to meet the federal load supported by the contract. There is insufficient CVP generation in every hour to support the Project Use and Western marketing obligations.

Under the contract, PG&E is responsible for firm electric service to Project Use loads that exceed 100 kW of demand for 3 consecutive months. The charges for that service are limited to wheeling charges and transmission losses. The contract expires December 31, 2004, and replacement arrangements are needed. These arrangements need to reflect the PG&E bankruptcy reorganization and acknowledge who is the appropriate provider of transmission services. Whatever the future arrangements, USBR will retain the statutory service requirement for Project Use loads.

Future Western contractual arrangements for services similar to those provided by PG&E under Contract 2948A might or might not be provided by PG&E. Alternatively, after the contract expires, Western may take an increased role in providing firming services to preference power customers.

Because of the contract expirations, Western developed a new Marketing Plan for the CVP and Washoe Project power in 1997. The Marketing Plan, recently finalized, sets forth the Western policies and procedures under which it will market CVP power. Western will sign 20-year contracts, effective January 1, 2005, with preference customers. Table 3.9-2 lists Western's current customers and long-term requirements (kW).

TABLE 3.9-2
Western Customers by Agency and Sub-agency Type and Associated Firm Power

Customers by Agency and Sub-agency Types	Long-term Firm (kW)
Federal Agencies	
Air Force, U.S. Department of	
Beale Air Force Base	20,507
David Grant Medical Facility, Travis	3,552
McClellan Air Force Base	10,655
Onizuka Air Force Base	3,500
Travis Air Force Base	11,299
Travis Wherry Housing (Air Force Base)	100
Category Total:	**49,613**
Defense Logistics Agency	
Parks Reserve Forces Training Area	500
Sharpe Facility	4,000
Tracy Defense Distribution Depot	3,800
Category Total:	**8,300**

TABLE 3.9-2
Western Customers by Agency and Sub-agency Type and Associated Firm Power

Customers by Agency and Sub-agency Types	Long-term Firm (kW)
Energy, U.S. Department of	
DOE/Lawrence Livermore/Site 300	2,000
DOE/Lawrence Berkeley National Laboratory	9,000
DOE/Lawrence Livermore National Laboratory	23,897
DOE/Stanford Linear Accelerator Center	12,903
Category Total:	**47,800**
National Aeronautics and Space Administration	
Ames Research Center	80,000
Moffett Federal Airfield	3,984
Category Total:	**83,984**
Navy, U.S. Department of	
Naval Air Station, Lemoore	21,869
Naval Communications Station, Stockton	2,943
Naval Radio Station, Dixon	915
Naval Weapons Station, Concord	2,687
Oakland Army Base	2,275
Category Total:	**30,689**
State Agencies	
Department of Corrections	
California Medical Facility, Vacaville	1,800
California State Prison, Sacramento	2,300
Deuel Vocational Institution	1,700
Northern California Youth Center	2,200
Sierra Conservation Center	3,000
Category Total:	**11,000**
Department of Parks and Recreation	
California State Parks and Recreation, Folsom	100
Category Total:	**100**
State Universities	
CSUS Nimbus	40
University of California, Davis	21,500
Category Total:	**21,540**
Municipalities	
Alameda, City of	21,145
Avenal, City of	622
Biggs, City of	1,300

TABLE 3.9-2
Western Customers by Agency and Sub-agency Type and Associated Firm Power

Customers by Agency and Sub-agency Types	Long-term Firm (kW)
Gridley, City of	4,200
Healdsburg, City of	1,490
Lodi, City of	5,173
Lompoc, City of	2,042
Oakland, Port of	745
Palo Alto, City of	171,200
Redding, City of	91,000
Roseville, City of	69,000
San Francisco, City and County of	2,012
Shasta Lake, City of	11,450
Silicon Valley Power	73,000
Ukiah, City of	4,917
Category Total	**459,296**
Public Utility Districts	
Calaveras Public Power Agency	8,000
East Bay Municipal Utility District	3,914
Lassen Municipal Utility District	23,500
Modesto Irrigation District	4,845
Sacramento Municipal Utility District	361,000
Trinity County Public Utility District	17,000
Tuolumne Public Power Agency	8,000
Turlock Irrigation District	2,190
Category Total:	**428,449**
Rural Electric Cooperatives	
Plumas-Sierra Rural Electric Cooperative	17,900
Category Total:	**17,900**
Irrigation and Water Districts	
Arvin-Edison Water Storage District	30,000
Banta-Carbona Irrigation District	3,700
Broadview Water District	500
Byron-Bethany Irrigation District	2,200
Cawelo Water District	3,500
East Contra Costa Irrigation District	2,000
East Contra Costa Irrigation District	500
Eastside Power Authority	1,914
Glenn-Colusa Irrigation District	3,343
James Irrigation District	638
Kern-Tulare Water District	638
Lower Tule River Irrigation District	914

TABLE 3.9-2
Western Customers by Agency and Sub-agency Type and Associated Firm Power

Customers by Agency and Sub-agency Types	Long-term Firm (kW)
Patterson Water District	2,000
Provident/Princeton Irrigation District	750
Rag Gulch Water District	500
Reclamation District 2035	1,600
San Juan Water District	1,000
San Luis Water District (Fittje)	3,250
San Luis Water District (Kalijian)	3,400
Santa Clara Valley Water District	638
Sonoma County Water Agency	6,000
West Side Irrigation District	2,000
West Stanislaus Irrigation District	5,200
Westlands Water District	16,391
Westlands Water District 6-1	1,850
Westlands Water District 7-1	3,200
Category Total:	**97,626**
Railroads and Railways	
Bay Area Rapid Transit District	4,000
Category Total:	**4,000**
Economic Development	
Merced Irrigation District	3,724
Pittsburg Power Company	3,869
Category Total:	**7,593**
Grand Total:	**1,267,890**

Western will market its Base Resource, which is defined as CVP and Washoe Project power output and existing power purchase contracts extending beyond 2004 that Western determines is available for marketing. The priorities for CVP power are Project Use; first preference customers (preference customers within the counties of Trinity, Calaveras, and Tuolumne); and adjustments for maintenance, reserves, transformation losses, and certain ancillary services. The remaining power is available for marketing.

Data from Western, summarized in Table 3.9-3, show the estimated monthly amount of power available from CVP under average water conditions, under a rolling dry year and under a rolling wet year; the estimated PUP for the same 3 years; and the remaining power available for sale.

TABLE 3.9-3
Estimated Amount of CVP Power Available for Sale

	CVP (MWh)			Project Use (MWh)			Net CVP Project Use (MWh)		
Month	**Average Year**	**Rolling Dry Year**	**Rolling Wet Year**	**Average Year**	**Rolling Dry Year**	**Rolling Wet Year**	**Average Year**	**Rolling Dry Year**	**Rolling Wet Year**
January	331,567	143,733	458,664	147,204	140,768	156,107	184,363	2,965	302,557
February	313,753	134,420	703,017	123,143	129,753	157,344	190,610	4,666	545,673
March	344,767	174,874	714,516	113,965	142,204	104,934	230,802	32,670	609,582
April	375,708	218,054	789,889	60,540	33,193	87,425	315,168	184,861	702,464
May	560,475	356,260	575,712	63,461	45,964	100,940	497,014	310,296	474,772
June	592,539	504,263	553,827	91,418	22,130	154,242	501,121	482,133	399,585
July	664,040	436,587	788,749	105,802	19,997	156,410	558,238	416,590	632,340
August	542,982	357,394	533,772	105,390	34,491	71,301	437,592	322,903	462,471
September	300,960	204,312	246,853	97,304	47,293	85,586	203,656	157,019	161,267
October	227,994	143,449	195,731	91,846	27,286	104,884	136,148	116,163	90,847
November	210,758	119,261	331,327	106,780	19,421	117,813	103,978	99,840	213,514
December	274,877	119,158	651,137	127,449	132,031	140,961	142,821	12,471	494,233
Annual	4,740,420	2,911,765	6,543,194	1,234,302	794,531	1,437,947	3,501,511	2,117,635	5,089,305

The determination of whether or not a load is considered a Project Use load is made by USBR. The available resources are indicated in Table 3.9-4.

TABLE 3.9-4
Western 2004 Marketing Plan Estimated CVP Power Resources and Adjustments

Power Resources/Adjustment	Range/Value
Annual Energy Generation	2,400,000 to 8,600,000 MWh
Monthly Energy Generation	100,000 to 1,100,000 MWh
Monthly Capacity	1,100 to 1,900 megawatts
Annual Project Use	670,000 to 1,670,000 MWh
Monthly Project Use	10,000 to 180,000 MWh
Monthly Project Use (on peak)	30 to 230 megawatts
Monthly Maintenance	0 to 300 megawatts
Reserves – Hydro	Minimum 5% of monthly capacity
CVP Transmission and Transformation Losses from the Generator Bus to a 230-kilovolt Load Bus	1.8% currently

Source: Western, Notice of Final 2004 Power Marketing Plan.

During some critically dry months, purchases may be required to meet Project Use and first preference customers' obligations. A customer's ability to use the Base Resource for meeting its load will be directly related to the amount of firming provided by Western and the customer's ability to integrate its Base Resource with its other power resources. At the customer's option, Western will provide varying degrees of Base Resource firming and power management services.

Under the Marketing Plan, Western's CVP customers are responsible for providing for the delivery of Western power to their loads and will incur transmission system losses. Figure 3.9-1 illustrates the CVP's power generating and transmission facilities. The Marketing Plan also anticipates that customers will be responsible for scheduling power deliveries with the California Independent System Operator control area. Customers can purchase this service from Western or from a third party.

TCCA is not a preference customer of Western. Because the deadline for application to become a preference customer under the Western 2004 Marketing Plan has passed, there may not be an opportunity for TCCA to become a preference customer until the new contracts expire, perhaps 20 years away. This precludes TCCA from being able to purchase preference power from Western.

However, the use of PUP to serve RBDD electrical loads directly affects Western's power marketing efforts.

TCCA is not a preference customer of Western, which precludes TCCA from being able to purchase preference power from Western. However, the use of PUP to serve RBDD electrical loads directly affects Western's power marketing efforts.

Eligibility

The following discussion is based on USBR's Mid-Pacific Region Draft Policy Statement on Project Use Power, dated September 8, 2000. At the publication of this DEIS/EIR, there were no known changes to the Draft Policy.

PUP is electrical power as defined by USBR law and/or that is used to operate CVP or the Washoe Project facilities. PUP can also be provided to USBR-designated facilities that meet authorized purposes under USBR law, to meet statutory and contractual obligations, and in water rights settlements. Other PUP uses include station-service requirements at USBR dams, power plants, pumping plants, and designated loads directly associated with the federal project. PUP is only available to those USBR project features in which the United States retains ownership. The Secretary of the Interior has discretion in the application of PUP pursuant to the law. That discretion has been delegated to the Commissioner of USBR. PUP is not made available to pump non-project water or to pump project water outside the authorized service area.

Revenues associated with PUP are not considered power sales revenue; they are considered water revenue. Use of PUP reduces the power that can be sold to assist in the repayment of the project. PUP is used when the cost of power from other sources does not result in an economic advantage over the use of PUP.

USBR policy is to reserve as Project Use only that project generation needed to meet the minimum electric service requirements, considering the most economical methods of providing electric service. From the Mid-Pacific Region Draft Policy Statement, "The amount of power required to provide irrigation service shall not be more than the amount required to provide water delivery by gravity from that point on unless specifically authorized by Congress."

To the degree practical, project loads are scheduled to minimize the amount of PUP required during peak load hours. Also, PUP loads are considered critical and are excluded from voluntary or elective load dropping. The cost of PUP power is approximately 1.3 cents per kilowatt-hour (kWh).

RBDD Energy Consumption

The power supply for operation of RBDD and related diversion facilities and the Corning Canal Pumping Plant is provided as CVP PUP, the cost of which is included in USBR's O&M charges to the water users on the TC and Corning canals.

Current energy use at RBDD includes the Corning Canal Pumping Plant, the administration and other buildings, the RPP, and all of the other loads at the diversion dam.

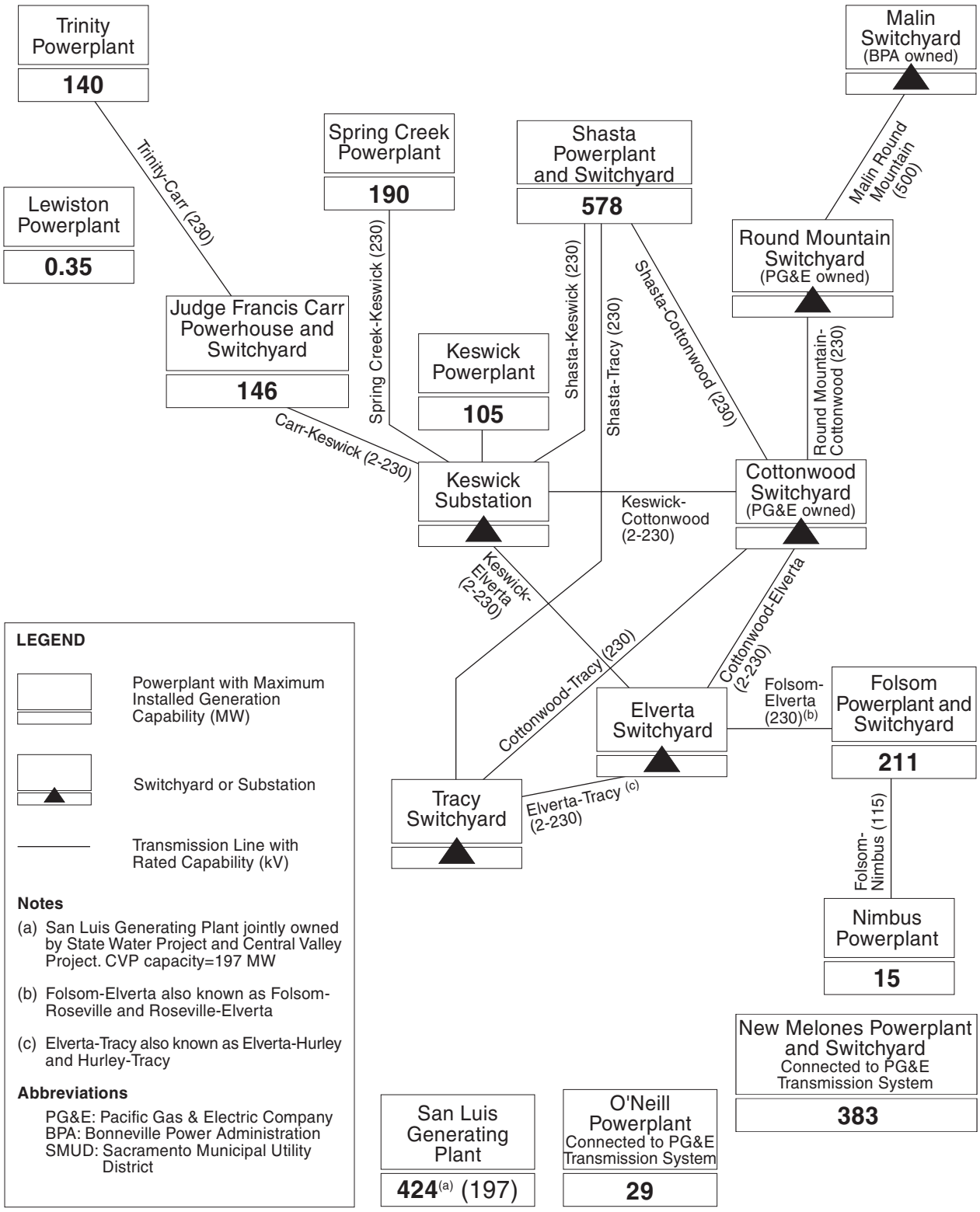

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FIGURE 3.9-1
CVP POWER GENERATION FACILITIES AND ASSOCIATED TRANSMISSION FACILITIES
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

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In any given year, the use can vary significantly depending on water conditions, weather, and water allocations. The total estimated monthly kWh energy requirements for both the main pump station and the fish bypass pump station are shown in Table 3.9-5. It also shows the estimated monthly energy use to an estimated peak demand in each month based on the number of hours in the month and the estimated relationship of peak demand to average usage. There is considerable year-to-year and month-to-month variability in these numbers, depending on water conditions and weather.

The most significant amount of PUP goes to the operation of the seasonal pumps and RPP and the Corning Canal Pumping Plant. Figure 3.9-2 shows existing annual energy use.

TABLE 3.9-5
Estimated Monthly Energy Use and Peak Demands

Month	Monthly Energy Use (kWh)	Peak Demand (kWh)
January	213,595	1,500
February	119,970	900
March	452,735	2,100
April	963,589	3,000
May	658,164	1,400
June	207,284	500
July	170,566	400
August	157,467	400
September	564,708	3,200
October	862,678	3,200
November	156,136	600
December	87,602	400
Total	**4,614,492**	**3,200[a]**

[a]Annual maximum.

3.9.2 Environmental Consequences

Methodology

For the purposes of this EIS/EIR, it was assumed that CVP would continue to be operated to meet authorized project purposes, which include providing water deliveries to water users, meeting fish and wildlife needs, and generating power. Records of power usage were reviewed for both RBDD and CVP. For each alternative, estimates of projected power usage were made, given the typical amounts of water delivered to TCCA districts and typical pumping efficiencies of similar-scale pump stations. Projected usage for each of the alternatives was then compared to overall usage of CVP to determine the scale of the effect on the overall system.

Significance Criteria

Alternatives were analyzed for their impacts on power consumption. Long-term reductions in power availability to preference power customers could require individual customers to either purchase additional power through the open power markets or construct new power facilities. Given the evolving nature of the power market under recent deregulation statutes and regulations, and in light of the complexity of the grid on which power is wheeled among various locations in the western United States, it is impossible to predict from where replacement power would come. Because natural gas plants are increasingly an economic and relatively clean source of fossil fuel power, it seems likely that elimination of some power from the net CVP power available to preference customers would result in greater natural gas power generation somewhere in the western United States, for ultimate consumption in California. To assess the severity of the impacts, the following significance criteria were developed:

- A 50-megawatt reduction in capacity available for sale to preference power customers in January, February, March, June, July, August, September, or December (the months typically most sensitive to reduced capacity).
- A reduction of 5 percent or more in the annual energy available for sale to preference power customers.
- A reduction of 5 percent or more in the average energy available for sale to preference power customers during any month.

No Action Alternative

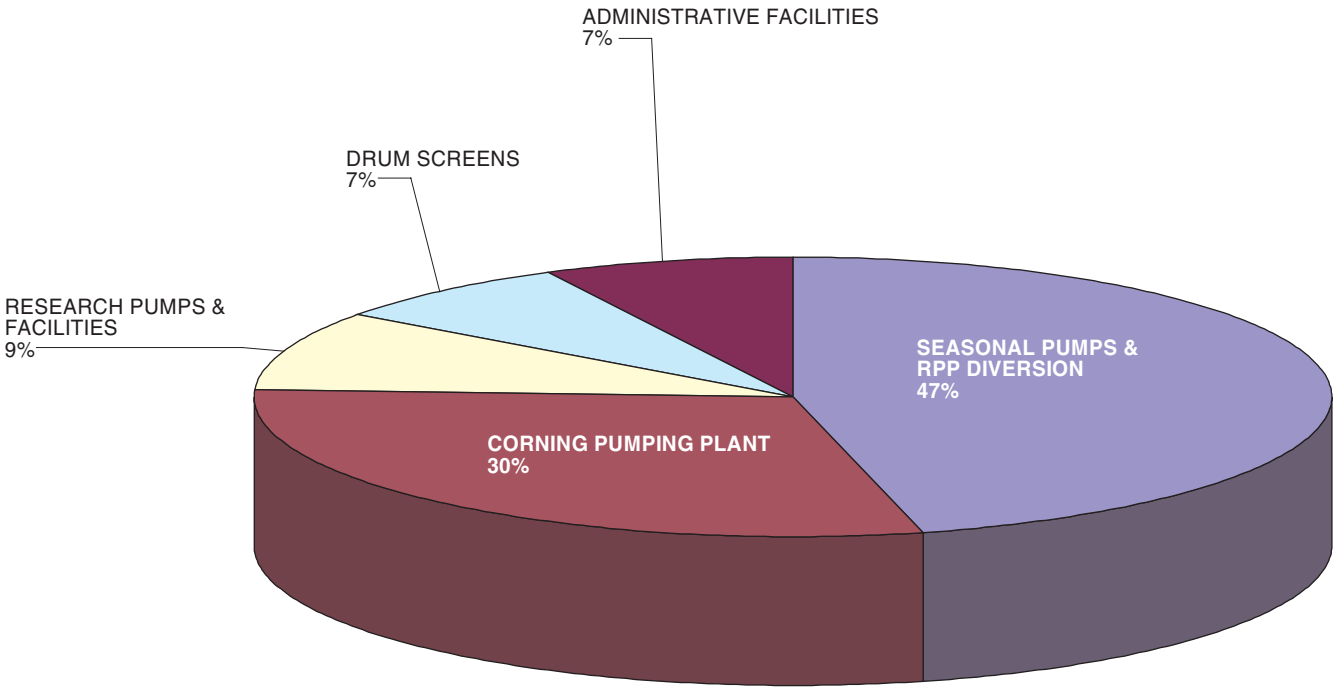
No changes to hydrology or surface-water management would occur. Gates would be operated during the current 4-month gates-in period. Construction activity would be limited to the installation of the fourth pump at RPP. No other construction activity would occur as a result of the No Action Alternative.

1A: 4-month Improved Ladder Alternative

Construction-related Impacts.

Impact 1A–PR1: Power Resources. Construction of the proposed facilities would not affect power resources in the project area.

There would be no construction-related impacts on power resources; therefore, no mitigation is required.



NOTE: CURRENT ANNUAL ENERGY USE TOTALS 4,800 MWH

FIGURE 3.9-2
EXISITNG ANNUAL ENERGY USE
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

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Operations-related Impacts.

Impact 1A–PR2: Power Resources. The electricity use for the Corning Canal Pumping Plant, administration facilities, drum screens, and research are estimated to be unchanged under this alternative. The loads that would change are the seasonal pumps and RPP diversion loads.

Table 3.9-6 compares the estimated monthly kWh energy requirements for both the main pump station and the fish bypass pump station for Alternative 1A to the No Action Alternative. In addition, it converts the estimated monthly energy use to an estimated peak demand in each month based on the number of hours in the month and the estimated relationship of peak demand to average usage.

The incremental use of each alternative is the difference between the alternative and the No Action Alternative. Based on the level of accuracy, the No Action Alternative and Alternative 1 have the same annual electricity use, although there are differences as to during which month the use occurs. It can be seen that the estimated peak demand does not increase to the same extent as the energy use. This is because the annual energy use increases are spread out over the various months, and the load factor is relatively unchanged.

Using the monthly energy use from Table 3.9-6, Figure 3.9-3 shows, for a dry water year, how much of the power Western has available to market. It can be seen that in January and February, the loads for Alternative 1A represents about 6 percent of the available Western power, which is less than the No Action Alternative.

TABLE 3.9-6
Estimated Monthly Energy Use and Peak Demands for the 4-month Gates-in Alternative[a]

	No Action Alternative		1A: 4-month Gates-in Alternative	
Month	Monthly Energy Use (kWh)	Peak Demand (kWh)	Monthly Energy Use (kWh)	Peak Demand (kWh)
January	213,595	1,500	187,988	1,300
February	119,970	900	202,495	1,600
March	452,735	2,100	314,245	1,500
April	963,589	3,000	809,148	2,500
May	658,164	1,400	1,020,397	2,200
June	207,284	500	184,948	500
July	170,566	400	214,327	500
August	157,467	400	224,842	600
September	564,708	3,200	323,361	1,800
October	862,678	3,200	614,539	1,900
November	156,136	600	318,905	1,200
December	87,602	400	235,583	1,100
Total	**4,614,492**	**3,200[b]**	**4,650,778**	**2,500[b]**

[a]There is considerable year-to-year and month-to-month variability in these numbers, depending on water conditions and weather.
[b]Annual maximum.

In all other months but December, the percentages are generally less than 0.5 percent (or 0.005 per unit) of the power Western has to market in a dry year. In a dry-year December, power would have to be purchased to meet PUP needs; the new loads, if served with PUP, would increase the amount of power to be purchased.

In an average or wet water year, the percentages are well within the normal variability of the system (less than 0.5 percent on a total load basis).

Because California is a summer peaking system, and the new loads are small percentages of the net CVP power in the summer months, there should be less controversy over serving the new pumping loads with PUP.

From this, it can be concluded that the use of PUP to serve any increased loads resulting from Alternative 1A would have an insignificant effect on Western's power marketing.~~, except in the winter. In the winter, California usually has sufficient in-state electrical generation to export power to the Northwest.~~

The impacts from operations on power resources would be less than significant; therefore, no mitigation is required.

1B: 4-month Bypass Alternative

Construction-related Impacts.

Impact 1B–PR1: Power Resources. Impacts from construction on power resources under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–PR1).

There would be no construction-related impacts on power resources; therefore, no mitigation is required.

Operations-related Impacts.

Impact 1B–PR2: Power Resources. Impacts on power resources under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A-PR2).

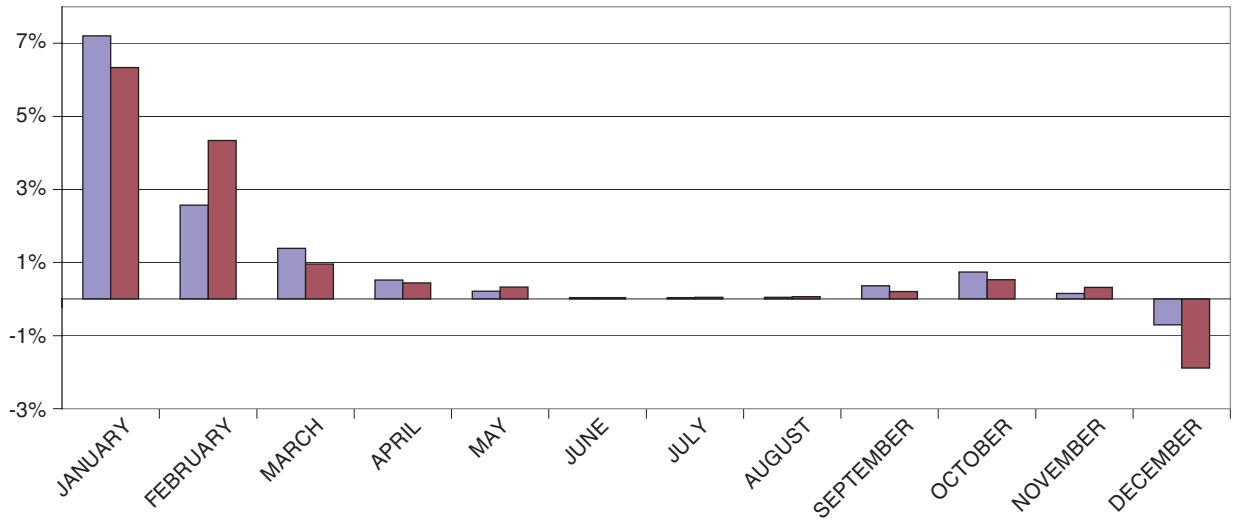
The impacts from operations on power resources would be less than significant; therefore, no mitigation is required.

2A: 2-month Improved Ladder Alternative

Construction-related Impacts.

Impact 2A–PR1: Power Resources. Impacts from construction on power resources under Alternative 2A would be same as those identified for Alternative 1A (see Impact 1A–PR1).

There would be no construction-related impacts on power resources; therefore, no mitigation is required.



LEGEND

- NO ACTION
- ALTERNATIVE 1

FIGURE 3.9-3
RBDD DRY WATER YEAR ADJUSTED LOADS AS A PERCENT OF NET CVP POWER — NO ACTION ALTERNATIVE VERSUS ALTERNATIVE 1
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

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Operations-related Impacts.

Impact 2A–PR2: Power Resources. The electricity use for the Corning Canal Pumping Plant, administration facilities, drum screens, and research are estimated to be unchanged under this alternative. The loads that would change are the seasonal pumps and RPP diversion loads.

Table 3.9-7 compares the estimated monthly kWh energy requirements for both the main pump station and the fish bypass pump station for Alternative 2A to the No Action Alternative. In addition, it converts the estimated monthly energy use to an estimated peak demand in each month based on the number of hours in the month and the estimated relationship of peak demand to average usage.

The incremental use of each alternative is the difference between the alternative and the No Action Alternative. Based on the level of accuracy, the No Action Alternative and Alternative 2 represents about a 33 percent increase in annual electricity use. It can be seen that the estimated peak demand does not increase to the same extent as the energy use. This is because the annual energy use increases are spread out over the various months, and the load factor is relatively unchanged.

TABLE 3.9-7
Estimated Monthly Energy Use and Peak Demands for the 2-month Gates-in Alternative[a]

	No Action Alternative		2A: 2-month Gates-In Alternative	
Month	Monthly Energy Use (kWh)	Peak Demand (kWh)	Monthly Energy Use (kWh)	Peak Demand (kWh)
January	213,595	1,500	176,873	1,200
February	119,970	900	192,238	1,500
March	452,735	2,100	302,956	1,400
April	963,589	3,000	798,247	2,500
May	658,164	1,400	1,390,120	3,000
June	207,284	500	1,187,417	2,600
July	170,566	400	214,327	500
August	157,467	400	224,842	600
September	564,708	3,200	500,366	2,800
October	862,678	3,200	603,718	2,800
November	156,136	600	308,360	1,100
December	87,602	400	224,583	1,100
Total	**4,614,492**	**3,200[b]**	**6,124,047**	**3,000**

[a]There is considerable year-to-year and month-to-month variability in these numbers, depending on water conditions and weather.
[b]Annual maximum.

Using the monthly energy use from Table 3.9-7, Figure 3.9-4 shows, for a dry water year, how much of the power Western has available to market. It can be seen that in January and February, the loads for Alternative 2A represent about 6 percent of the available Western power, which is less than the No Action Alternative.

In all other months but December, the percentages are generally less than 0.5 percent (or 0.005 per unit) of the power Western has to market in a dry year. In a dry-year December, power would have to be purchased to meet PUP needs; the new loads, if served with PUP, would increase the amount of power to be purchased.

In an average or wet water year, the percentages are well within the normal variability of the system (less than 0.5 percent on a total load basis).

Because California is a summer peaking system, and the new loads are small percentages of the net CVP power in the summer months, there should be less controversy over serving the new pumping loads with PUP.

From this, it can be concluded that the use of PUP to serve any increased loads resulting from Alternative 2A would have an insignificant effect on Western's power marketing, except in the winter. In the winter, California usually has sufficient in-state electrical generation to export power to the Northwest.

The impacts from operations on power resources would be less than significant; therefore, no mitigation is required.

2B: 2-month with Existing Ladder Alternative

Construction-related Impacts.

Impact 2B–PR1: Power Resources. Impacts from construction on power resources under Alternative 23B would be the same as those identified for Alternative 1A (see Impact 1A–PR1).

There would be no construction-related impacts on power resources; therefore, no mitigation is required.

Operations-related Impacts.

Impact 2B–PR2: Power Resources. Impacts on power resources under Alternative 2B would be the same as those identified for Alternative 2A (see Impact 2A-PR2).

The impacts from operations on power resources would be less than significant; therefore, no mitigation is required.