SECTION 3.8: SURFACE WATER RESOURCES

This section discusses the effects that the alternatives considered in Chapter 2 may have on surface water resources for the CVP contractors in the DMC Unit.

AFFECTED ENVIRONMENT

WATER RIGHTS

The DMC Unit is composed of two different types of water rights holders: (1) Exchange Contractors, who have a previous San Joaquin River water right that is now supplied by Reclamation and who are not subject to the Proposed Action, and (2) water service contractors, who have acquired water through the CVP and whose long-term contract renewals constitute the Proposed Action. The CVP has developed different reliability criteria for each type of contractor. Typically, Exchange Contractors have a more reliable water supply because of their pre-CVP water right.

WATER SUPPLY

Prior to the CVP, irrigators in the Central Valley depended primarily on groundwater for agricultural irrigation. As the groundwater quantity and quality declined and land subsidence increased, it became apparent that an additional source of water was needed for agriculture to continue. The CVP was implemented in part to supply irrigators, primarily in the Central Valley, with a more consistent water supply than the existing groundwater resources. Groundwater resources were previously discussed in Section 3.7.

CVP water is used for irrigation of agricultural areas, M&I uses, and more recently, to restore fisheries and aquatic habitat in the waterways that have been affected by water development. The largest use of CVP water is for agricultural irrigation. The greatest demand for irrigation water occurs in mid- to late summer, as crops mature and crop water use increases. During the winter, farmers also use water for frost control and pre-irrigation of fields to saturate the upper soil. This saturation process loosens the soil for plowing and provides adequate moisture for seed germination. Natural winter precipitation is usually insufficient for these pre-irrigation needs at the lower elevations typical of the DMC Unit.

Reclamation makes water from the CVP available to contractors for reasonable and beneficial uses, but this water is generally insufficient to meet all of the contractors' needs. In the DMC Unit service area, contractors without a sufficient CVP water supply may extract groundwater if pumping is feasible or negotiate water transfers with other contractors. Available alternate supplies from groundwater pumping, alternate surface water supplies, and/or transfers may also be accessed when CVP surface water deliveries

become more expensive than pumping or transfer costs. However, increased groundwater pumping can cause overdraft conditions and land subsidence. Shallow aquifers have been contaminated by years of irrigation in the valley. The application of pesticides and herbicides and the increased solubility of naturally occurring trace elements in the soil, including selenium, boron, and arsenic, contribute to groundwater contamination.

The CVPIA PEIS developed estimates of maximum water contract deliveries for the year 2026 (Reclamation and Service 1999). These estimates were based on previous use, existing contract amount, and appropriate general plan environmental documentation relevant to CVP water use. The estimates for the two types of contracts, depending on the type of service, include the following:

- **Agricultural Water Service Contracts:** The maximum annual use between 1980 and 1993 or the projected use as addressed in the appropriate environmental documentation, limited by the maximum contract amount.

- **Water Rights and Exchange Contractors:** The maximum annual use between 1980 and 1993 or projected use as addressed in relevant environmental documentation, limited by the maximum contract amount.

- **M&I Water Service Contracts:** Total demand based on 2020 demands in DWR Bulletin 160-93 (DWR 1994) or the current M&I shortage criteria. Since 1991, Reclamation has been attempting to develop an M&I shortage policy applicable to as many CVP contractors as possible. Current M&I shortage criteria are detailed in the CVP Draft M&I Water Shortage Policy (Reclamation 2001f).

WATER QUALITY

Surface water quality in the San Joaquin River Basin is affected by many factors, most notably, the upstream development of Friant Dam and dams on other tributaries, which withhold most of the natural flow of the river, except during flood conditions. Other factors affecting San Joaquin River surface water quality include natural runoff, agricultural return flows, biostimulation, construction, logging, grazing, operations of flow-regulating facilities, urbanization, and recreation. In addition, irrigated crops grown in the western portion of the San Joaquin Valley have accelerated the leaching of minerals from soils, altering water quality conditions in the San Joaquin River system.

In the western part of the San Joaquin Valley, soils are derived mainly from the marine sediments that make up the Coast Range and are high in salts and trace elements such as selenium, molybdenum, arsenic, and boron. As a result of extensive land development in the San Joaquin Valley, erosion and drainage patterns have been altered, thereby

accelerating the rate at which these trace elements have been dissolved from the soil to accumulate in groundwater, streams, and the San Joaquin River.

Water quality in the San Joaquin River varies considerably along the river's length. Above Millerton Lake and downstream toward the Mendota Pool, water quality is generally excellent. The reach from Gravelly Ford to the Mendota Pool (about 17 miles) is frequently dry except during flood control releases, because all water released from Millerton Lake is diverted upstream to satisfy water rights agreements or percolated to groundwater. During the irrigation season, most of the water released from the Mendota Pool to the San Joaquin River is imported from the Delta via the Delta-Mendota Canal and generally has a higher concentration of total dissolved solids than that of the water in the upper reaches of the San Joaquin River. Most of the water released from the Mendota Pool to the San Joaquin River is diverted at or above Sack Dam for agricultural uses. Between Sack Dam and the confluence with Salt Slough, the San Joaquin River is often dry. From Salt Slough to Fremont Ford, most of the flow in the river is derived from irrigation returns carried by Salt and Mud Sloughs. This reach typically has the poorest water quality of any reach of the river.

As the San Joaquin River progresses downstream from Fremont Ford, water quality generally improves at successive confluences, specifically at those with the Merced, Tuolumne, and Stanislaus Rivers. In the relatively long reach between the Merced and Tuolumne Rivers, however, mineral concentrations tend to increase as a result of agricultural drainage water, other wastewaters, and effluent groundwater (DWR 1965). Total dissolved solids in the San Joaquin River near Vernalis have historically ranged from 52 mg/L (at high stages) to 1,220 mg/L from 1951 to 1962 (DWR 1965). During the mid- to late 1960s, San Joaquin River water quality continued to decline. In 1972, the State Board included a provision in Decision 1422 that Reclamation maintain average monthly total dissolved solid concentrations in the San Joaquin River at Vernalis of 500 mg/L as a condition of the operating permit for New Melones Reservoir on the Stanislaus River. The State Board's Decision 1641 implementing the 1995 Bay-Delta Plan requires both the CVP and SWP to meet Delta water quality standards. The Regional Board has developed a proposed Basin Plan Amendment dealing with salinity and boron on the San Joaquin River that is pending before the State Board. In addition, extensive water quality monitoring and implementation of best management practices to address water quality is being implemented through the Regional Board's Irrigated Lands Conditional Waiver Program. The Westside San Joaquin River Watershed Coalition has obtained an approved waiver, with most contractors in the DMC Unit participating.

In drier years, CVP water quality and reliability decreases. First, the salinity and the concentration of organic materials from upstream soils and return flows increase in the

Delta in drier years because the flow volumes from the Sacramento and San Joaquin Rivers decrease and salt water intrudes further upstream in the Delta.

WATER DELIVERY CRITERIA

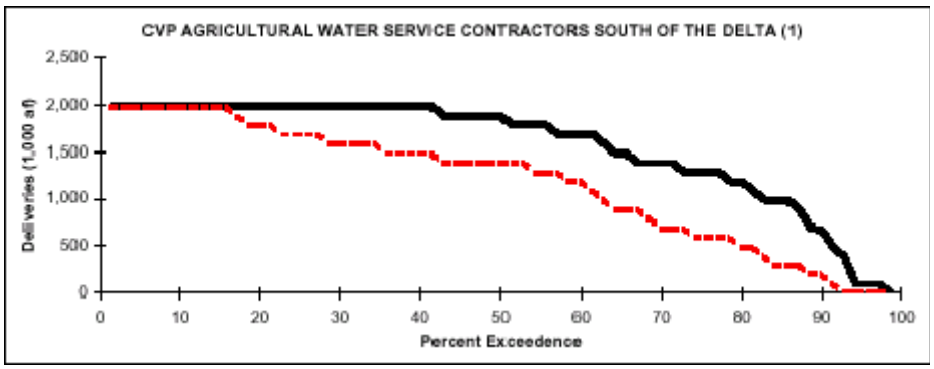
The amount of CVP water available each year for contractors is based on the storage of winter precipitation and control of spring runoff in the Sacramento and San Joaquin River basins. The schedule of CVP water conveyed to and diverted from the river is determined by state water right permits, judicial decisions, and state and federal obligations to maintain water quality, enhance environmental conditions, and prevent flooding. Water delivery criteria are shaped by these obligations to a larger degree than was realized in the CVPIA PEIS (Reclamation and Service 1999) and the impact that meeting these obligations has had on water deliveries is greater than was foreseen in the CVPIA PEIS (Reclamation and Service 1999). The allocation of CVP water to the contractors is determined by water service contracts and the capacity of project facilities to store and convey water.

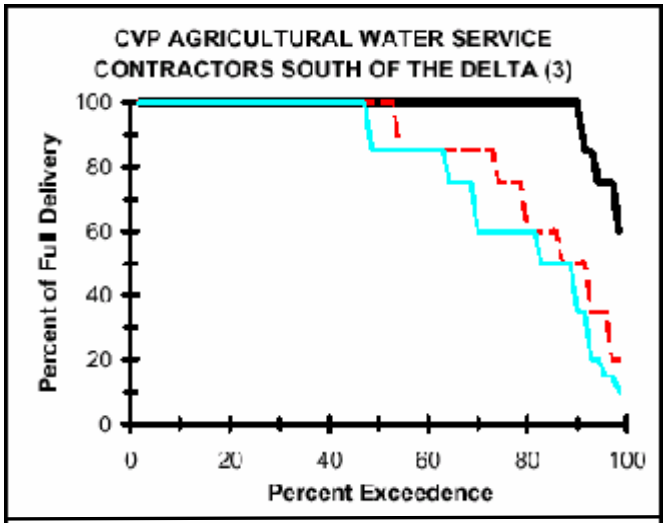
Conditions with CVPIA Implementation

With CVPIA implementation in accordance with the PEIS Preferred Alternative, in addition to conditions in the late 1990s, CVPIA PEIS modeling indicated that CVP agricultural water service contractors located south of the Delta would receive an average of 59 percent of current total contract amounts, based upon a hydrologic pattern that is similar to the previous 70 years of hydrology, as shown below in Figure 3.8-1 and described in Technical Appendix, Volume 2, of the Draft CVPIA PEIS (Reclamation 1997b). These conditions result in the delivery of total contract amounts to agricultural water service contractors located south of the Delta approximately 15 percent of the time. Minimum deliveries of zero would occur only in critically dry years. The 2004 Biological Assessment for the CVP OCAP (Reclamation 2004b) projects that under current operation of the EWA, agricultural contractors located south of the Delta would receive their total contracted amount approximately 50 percent of the time.

Under these conditions, PEIS modeling indicated that CVP M&I water service contractors will receive an average of 85.5 percent of existing total contract amounts, as shown in Figure 3.8-1. PEIS modeling estimated that total contract amounts would be delivered to M&I water service contractors located south of the Delta approximately 65 percent of the time. Minimum deliveries of 50 percent would occur only in critically dry years.

Figure 3.8-1
Percentages of Full Delivery;
CVP Agricultural and M&I Water Service Contractors South of the Delta





ENVIRONMENTAL CONSEQUENCES

NO-ACTION ALTERNATIVE

Water Supply

Under the CVPIA PEIS No-Action Alternative, average annual deliveries under the CVP were estimated at 5.7 million acre-feet per year, including deliveries to refuges, water rights holders, Sacramento River Settlement Contractors, Delta-Mendota Exchange Contractors, and CVP water service contractors. Total CVP water deliveries were estimated to decrease under most alternatives, including the Preferred Alternative, by approximately 10 percent as a result of the allocation of CVP water to Level 2 refuge water supplies, allocation of water to Section 306(b)(2) of the CVPIA, and reduced Trinity River exports to the Central Valley. These reduced delivery impacts were addressed fully in the CVPIA PEIS (Reclamation and Service 1999).

Recent modeling using the assumptions developed for the OCAP generated average annual total CVP deliveries that range from 4,748,000 acre-feet to 5,045,000 acre-feet, depending upon the environmental programs in place. The OCAP modeling assumes that CVP allocations to agriculture range from zero to 100 percent of the contracted deliveries, based on supplies reduced by Section 3406(b)(2) allocations. The modeling assumes that allocations to M&I contractors range from 50 to 100 percent of contracted deliveries, based on the same considerations applied to agriculture.

OCAP modeling estimates that average annual CVP water deliveries to south-of-Delta agricultural and M&I water service contractors would range from 1,225,000 acre-feet to 1,587,000 acre-feet, depending on the environmental programs in place. Table 3.8-1 indicates predicted average south-of-Delta water supply allocations under the six alternatives modeled in the OCAP.

Table 3.8-1
Long-Term Averages for the Six OCAP CALSIM II Studies
(1,000 acre-feet)

	D-1485 (1991)	D-1485 (1992)[1]	D-1485 (1993)[2]	D-1641 (1994)	D-1641 (1997)[3]	EWA (2004)[4]
CVP Total Deliveries	4,868	5,044	5,045	4,918	4,748	4,752
South of Delta – agriculture	1,454	1,374	1,375	1,260	1,102	1,110
South of Delta – exchange	851	851	851	847	847	847
South of Delta – M&I	133	131	131	128	123	124
South of Delta – refuge	132	280	280	280	280	280
South of Delta – total[5]	2,753	2,819	2,821	2,699	2,536	2,545

[1] D-1485 with Firm Refuge Level 2 (1992)
[2] D-1485 with Firm Level 2 and Winter-Run Biological Opinion (1993)
[3] D-1641 with CVPIA Section 3406(b)(2) (1997)
[4] CVPIA Section 3406(b)(2) with EWA (2004)
[5] Total includes canal losses due to evaporation

These modeling estimates illustrate the varying effects of D-1485, D-1641, and the EWA, when added to obligations for Refuge Level 2 deliveries, winter-run chinook salmon Biological Opinion flows, and CVPIA Section 3406(b)(2) allocations.

Water Quality

The No-Action Alternative would not result in any alteration to surface water quality. Continued operation of the system of pumps, canals, laterals, and related water conveyance and distribution facilities would not lead to further degradation in water quality.

ALTERNATIVE 1

Water Supply

Explanatory recitals and provisions in Alternative 1 differ from the No-Action Alternative by emphasizing increased water supply reliability through the completion of yield increase studies and the development of CVP operational criteria that would minimize delivery shortages. Although these recitals and provisions call for increased supply reliability, future reliability will actually depend on several interacting factors, including among other considerations, water year type, water transfer acquisitions, and the implementation of other water development projects. The action of renewing long-term water service contracts under Alternative 1 does not substantially differ from the No-Action Alternative with respect to the following:

- "Contract Total" definition
- Water to be made available and delivered to the contractor
- The time for delivery of water
- The point of diversion and responsibility for water distribution
- Water measurement
- Rates and methods of payment for water

Because there are no substantial differences between Alternative 1 and the No-Action Alternative, there would be no surface water supply impacts from the implementation of Alternative 1.

Water Quality

Alternative 1 would not result in any alteration to surface water quality because there would be essentially no increase in drainage discharges when compared to the No-Action Alternative. Continued operation of the system of pumps, canals, laterals, and related water conveyance and distribution facilities would not lead to degradation in water quality. Current trends affecting the surface water quality would continue.

ALTERNATIVE 2

Water Supply

The action of renewing long-term water service contracts under Alternative 2 does not substantially differ from the No-Action Alternative with respect to the following:

- "Contract Total" definition
- Water to be made available and delivered to the contractor
- The time for delivery of water
- The point of diversion and responsibility for water distribution
- Water measurement
- Rates and methods of payment for water

Because there are no substantial differences between Alternative 2 and the No-Action Alternative, there would be no surface water supply impacts from implementation of Alternative 2.

Water Quality

Alternative 2 would not result in any alteration to surface water quality as long as water deliveries remain the same and, thus, drainage also remains the same. Continued operation of the system of pumps, canals, laterals, and related water conveyance and distribution facilities would not lead to degradation in surface water quality and current trends affecting the surface water quality would continue.

CUMULATIVE EFFECTS

Long-term contract renewals, when added to other past, present, and reasonably foreseeable future actions, will not create any additional cumulative impacts on surface water resources or quality. Water deliveries to DMC Unit contractors will be but one of many competing demands on surface water resources available for diversion and delivery. Because south-of-Delta deliveries rely on several actions "upstream" of the DMC Unit study area, long-term contract renewals in the DMC Unit have limited opportunities to increase reliance on other south-of-Delta surface water resources.