SECTION 4

Effects of the Proposed Project and Alternatives

4.1 Introduction

This section addresses the potential environmental impacts of implementing the Proposed Project and alternatives, and addresses the environmental impacts that resulted from the historical delivery of CVP water to lands located outside the authorized POU. A large portion of the historical environmental impacts occurred from the late 1950s to late 1960s, prior to the establishment of statutes and regulations requiring compliance with CEQA and protection of endangered species, cultural resources, and other environmental resources. In addition, requirements for implementing mitigation measures to compensate for significant effects on these resources were not in place at the time many of the lands outside the authorized POU were encroached by CVP water supplies.

To the degree possible, historical changes to the environment that have occurred from introducing CVP water to lands located outside the authorized POU have been estimated. Pre-CVP water delivery land uses have been determined and compared with current land uses. This comparison allows a determination of the net change to the physical and biological environment that occurred with the introduction of CVP water to the encroached lands outside the authorized POU.

In locations where CVP water is currently delivered to M&I water users outside the authorized POU, it is not reasonable to assume that these land uses would be abandoned if the CVP water supply were to be terminated, as would be the case with Alternative. Because M&I uses required the permanent development of urban infrastructure and were accompanied by the settlement of human populations, it is assumed that alternative water could be obtained if CVP water could no longer be delivered to M&I lands outside the authorized POU. Therefore, it is assumed that no change to the physical environment would occur where M&I land uses are currently located if Alternative 1 were selected.

Because the Proposed Project and alternatives would delineate only the general area where CVP water could be delivered and the purposes for which it may be used, site-specific impacts resulting from future CVP water deliveries to expansion area lands cannot be estimated. To the degree possible, potential impacts to the lands and environmental resources within the CVP water contractor service areas are discussed; however, it is acknowledged that this discussion may be speculative.

Additional decisions by local land use authorities and the individual CVP water contractors would be needed prior to the delivery and future use of CVP water to expansion lands outside the authorized POU. Therefore, the actual places and purposes for which CVP water would be used is not known at this time, except as restricted by the individual water delivery contracts between Reclamation and the CVP water contractors.

4.2 Summary of Proposed Project Land Use and Habitat Impacts

The Proposed Project would expand the authorized POU boundary by about 834,667 acres. If CVP water is available to support irrigated agricultural or M&I land uses, then CVP water could be provided to (1) lands outside the authorized POU that currently receive CVP water (encroachment lands); (2) lands outside the authorized POU that receive water from other sources (expansion lands); and (3) dryland agriculture or undeveloped lands (expansion lands).

The availability of CVP water to these lands would not induce a land use change, but its availability could accommodate future planned land use changes.

The total acreage outside the authorized POU is 834,667 acres. Of this total, 116,664 acres are encroachment lands, classified as follows:

- 37,075 acres are CVP-induced agricultural lands
- 19,468 acres are non-CVP-induced agricultural lands
- 2,918 acres are CVP-induced M&I lands
- 57,203 acres are non-CVP-induced M&I lands

Of the remaining 718,003 acres of expansion lands, the Proposed Project would allow the delivery of CVP water to 21,678 acres of land located within 13 CVP water contractor service areas.

4.2.1 Comparison With Permitted Conditions

4.2.1.1 Land Use Changes

The Proposed Project, when compared to permitted conditions, would allow the delivery of CVP water to a total of 142,762 acres of the 834,667 acres outside the authorized POU. This acreage consists of: (1) the 116,664 acres of land that have already been encroached, (2) about 21,678 acres of undeveloped lands that would be developed into irrigated agricultural uses and M&I uses (expansion lands), (3) about 399 acres of dryland agricultural lands, (4) about 2,107 acres of non-CVP supplied irrigated agricultural lands, and (5) about 1,914 acres of non-CVP supplied M&I lands.

4.2.1.2 Habitat Changes

Of the total 834,667 acres located outside the authorized POU, 151,274 acres have been developed and would not be further affected by the proposed project. Of the 151,274 acres, 116,664 acres currently receive CVP water (60,121 acres receive CVP water for M&I uses and 56,543 acres for irrigated agriculture). The remaining 34,610 acres outside the authorized POU currently receive non-CVP water sources.

Of the 116,664 acres that currently receive CVP water, 67,072 acres were originally developed with non-CVP water. The development of the remaining 49,602 acres was facilitated by delivery of CVP water. The habitats of those 49,602 acres consisted of:

- 8 acres of valley-foothill hardwood-conifer
- 47 acres of mixed chaparral
- 198 acres of valley-foothill riparian/fresh emergent wetland
- 19,262 acres of annual grassland
- 29,918 acres of alkali scrub
- 169 acres of open water

Table 4-1 shows the water contractor service areas where these 49,602 acres are located, and the threatened and endangered species that are associated with those habitats.

Table 4-1
Habitats Affected, and Associated Threatened and Endangered Species on Encroachment Lands

Water Contractor Name	Habitats Affected		
	Habitat Type	No. of Acres	Species[a]
Kanawha Water District	Annual Grassland	665	Western spadefoot Golden Eagle Peregrine Falcon American badger Northern Harrier Merlin Prairie Falcon Loggerhead Shrike Townsend's big-eared bat Caper-fruited tropidocarpum
	Valley Foothill Riparian/ Fresh Emergent Wetland	24	Western pond turtle Merlin Peregrine Falcon Foothill yellow-legged frog Burrowing Owl Loggerhead Shrike Tricolored Blackbird Townsend's big-eared bat American badger
Sacramento Municipal Utility District	Annual Grassland	2,772	Vernal pool fairy shrimp Vernal pool tadpole shrimp California linderiella Western spadefoot California tiger salamander Golden Eagle Prairie Falcon Burrowing Owl Short eared Owl California Horned Lark Long-billed Curlew Merlin Townsend's big-eared bat Sacramento orcutt grass Bogg's Lake hedge-hyssop American badger
	Valley Foothill Riparian/ Fresh Emergent Wetland	58	California tiger salamander Western Pond Turtle Western Spadefoot Giant garter snake Northern Harrier Swainson's Hawk Ferruginous Hawk Merlin Tricolored Blackbird American badger Townsend's big-eared bat
San Luis Water District	Annual Grassland	7,928	California tiger salamander Recurved larkspur Hoover's eriastrum San Joaquin kit fox San Joaquin woolly-threads American badger Townsend's big-eared bat Short-nosed kangaroo rat Giant kangaroo rat San Joaquin antelope squirrel
	Valley Foothill Riparian/ Fresh Emergent Wetland	80	Foothill yellow-legged frog American badger Townsend's big-eared bat California tiger salamander

Table 4-1
Habitats Affected, and Associated Threatened and Endangered Species on Encroachment Lands

Water Contractor Name	Habitats Affected		
	Habitat Type	No. of Acres	Species[a]
	Alkali Scrub	1,601	Giant garter snake, Golden Eagle, Prairie Falcon, Burrowing Owl, Tricolored Blackbird, Tulare grasshopper mouse, San Joaquin antelope squirrel, Giant kangaroo rat, Fresno kangaroo rat, Short-nosed kangaroo rat, Townsend's big-eared bat, Heartscale, Recurved larkspur, Blunt-nosed leopard lizard, Hispid bird's beak, Moestan blister beetle
Silverthorn Summer Homes, Inc.	Valley-foothill hardwood-conifer	8	Shasta salamander, Bald Eagle, Golden Eagle
	Mixed chaparral	47	Blue-gray Gnatcatcher
Westlands Water District	Annual Grassland	8,066	Morrison's blister beetle, Hoppings blister beetle, San Joaquin dune beetle, Western spadefoot, Burrowing Owl, Northern Harrier, San Joaquin antelope squirrel, Short-nosed kangaroo rat, Fresno kangaroo rat, Giant kangaroo rat, San Joaquin pocket mouse, San Joaquin kit fox, American badger, Townsend's big-eared bat, California jewelflower, San Joaquin woolly-threads, Recurved larkspur
	Valley Foothill Riparian/ Fresh Emergent Wetland	36	Western spadefoot, Western pond turtle, Giant garter snake, American badger, Townsend's big-eared bat, Panoche peppergrass
	Alkali Scrub	28,317	Moestan blister beetle, San Joaquin dune beetle, Blunt-nosed leopard lizard, Short-nosed kangaroo rat, Tulare grasshopper mouse, Recurved larkspur, Panoche peppergrass

[a] Listed species include species designated by both State and Federal Endangered Species Acts.

In addition to those lands outside the POU that currently receive CVP water (116,664 acres), about 21,678 acres of undeveloped land could be developed with implementation of the proposed project. Of this total, about 17,961 acres could be developed into M&I uses, and 3,717 acres could be developed into irrigated agricultural uses with the delivery of CVP water. These lands are located in 13 of the affected CVP water contractor services areas consisting of:

- Bella Vista Water District
- City of Coalinga
- Colusa County Water District
- El Dorado Irrigation District
- Glenn Valley Water District
- Kanawha Water District
- Mountain Gate Community Services District
- San Benito County Water District
- Santa Clara Valley Water District
- Shasta Community Services District
- Shasta County Service Area No. 25–Keswick
- City of Shasta Lake
- Westside Water District

Because the specific location of the 21,678 acres is not known, all of the habitat available in the expansion (undeveloped) area in these 13 CVP water contractor service areas could potentially be affected by the proposed project. The total amount of undeveloped acreage and habitat types found in these 13 CVP contractor service areas consist of 641,775 acres which are composed of:

- 757 acres of fresh emergent wetland
- 208,691 acres of annual grassland
- 0 acres of alkali scrub
- 140,337 acres of mixed chaparral
- 291,990 acres of valley-foothill hardwood

4.2.2 Comparison With Existing Conditions

4.2.2.1 Land Use Changes

Because CVP water deliveries have already encroached on 116,664 acres of lands outside the authorized POU, land uses have changed from those associated with permitted conditions. The Proposed Project, when compared to existing conditions, would allow the delivery of water to 211,678 acres of expansion lands. Of this 21,678 acres, 3,717 acres could be developed into CVP irrigated agricultural uses and 17,961 acres could be developed into CVP M&I uses located in the 13 CVP water contractor service areas previously mentioned. No other water contractors would be affected because of a lack of surplus water or absence of developable lands.

4.2.2.2 Habitat Changes

Of the total 834,667 acres located outside the authorized POU, 151,274 acres have been developed and would not be further affected by selecting the proposed project. The remaining 683,393 acres of undeveloped land where development could be facilitated with the delivery of CVP water (expansion area) are located within 19 of the 26 CVP water contractor service areas. Of these 19 CVP water contractors, only 13 have sufficient CVP water to allow future development on 641,775 acres of currently undeveloped lands. Based on estimates of current use of CVP water, the acreage that could be developed within those 13 CVP water contractor service areas is 21,678 acres.

The specific locations of the 21,678 acres within the 641,775 acres are not known. Because the locations are not known, all of the habitat shown in each of the 13 water contractor service areas could be affected by the proposed project. The amount of acreage and types of habitat are presented below:

- 757 acres of fresh emergent wetland
- 208,691 acres of annual grassland
- 0 acres of alkali scrub
- 140,337 acres of mixed chaparral
- 291,990 acres of valley-foothill hardwood

4.3 Effects on Water Use

Reclamation's petition and the three alternatives would not affect the volume of water specified to be appropriated in the existing water rights permits, nor would they affect the amount of CVP water currently contracted on a long-term basis by Reclamation to individual CVP water contractors.

Change 1 of Reclamation's petition would modify the various purposes of use currently authorized in each of the 16 water rights permits to conform with the 9 purposes listed in Table 3-4 of this EIR. Conforming the purposes of use would allow Reclamation to use water obtained in accordance with any of the 16 permits for any of the 9 purposes. This modification would not alter the volume of water appropriated, the volume of CVP water supplies currently contracted, or the location where CVP water supplies are used. Therefore, this change in and of itself would not result in a physical change to the environment that would constitute an adverse environmental impact.

Change 2 of Reclamation's petition would consolidate the authorized POU specified in each water right permit to allow each CVP source or facility to deliver water to locations consistent with the current integrated operations of the CVP. Reclamation's current operations allow water to be delivered from any source or facility to locations within the authorized POU where it is hydraulically possible to convey water. This modification would not alter the volume of water appropriated, the volume of CVP water supplies currently contracted, or the location where CVP water supplies are used. Therefore, this change in and of itself would not result in a physical change to the environment that would constitute an adverse environmental impact.

Change 3 of Reclamation's petition would expand the authorized POU to encompass all lands within the 26 CVP water contractor service areas. The following discussion addresses how each of the project alternatives would affect water use in relation to this change.

4.3.1 Water Use Changes Associated with the Proposed Project

Reclamation's petition would enable all 26 CVP water contractors with lands located outside the authorized POU to continue using their currently contracted CVP water. The total amount of CVP water contracted for delivery to the 26 CVP water contractors with implementation of the Proposed Project is about 2,328,675 acre-feet per year (Table 4-2).

Table 4-2
Potential CVP Water Deliveries

CVP Water Contractor	Purchased under Long-Term Contract (acre-feet)	Type of CVP Water Delivery Contract		Contracted CVP Water Able to be Delivered (acre-feet)			
		Municipal & Industrial	Agricultural	Proposed Project	No Project (Alt. 1)	Existing Conditions (Alt. 2)	Conformance and Consolidation (Alt. 3)
Anderson-Cottonwood Irrigation District	10,000		✓	10,000	10,000	10,000	10,000
Arvin-Edison Water Storage District	40,000	✓	✓	40,000	40,000	40,000	40,000
Avenal, City of	3,500	✓		3,500	3,500	3,500	3,500
Bella Vista Water District	24,000	✓	✓	24,000	24,000	24,000	24,000
Coalinga, City of	10,000	✓		10,000	10,000	10,000	10,000
Colusa County Water District	62,200		✓	62,200	62,200	62,200	62,200
Contra Costa Water District	195,000	✓		195,000	195,000	195,000	195,000
Corning Water District	25,300		✓	25,300	25,300	25,300	25,300
Del Puerto Water District	140,210	✓	✓	140,210	140,210	140,210	140,210
East Bay Municipal Utility District	150,000	✓		150,000	150,000	150,000	150,000
El Dorado Irrigation District	7,550	✓		7,550	0	7,550	0
Glenn Valley Water District	1,730		✓	1,730	1,730	1,730	1,730
Kanawha Water District	45,000	✓	✓	45,000	45,000	45,000	45,000
Mountain Gate Community Services District	350	✓		350	350	350	350
Orland-Artois Water District	53,000		✓	53,000	53,000	53,000	53,000
Sacramento Municipal Utility District	60,000	✓		60,000	0	60,000	0
San Benito County Water District	43,800	✓	✓	43,800	43,800	43,800	43,800
San Luis Water District	125,080	✓	✓	125,080	125,080	125,080	125,080
Santa Clara Valley Water District	152,500	✓	✓	152,500	152,500	152,500	152,500
Shasta Community Services District	1,000	✓		1,000	1,000	1,000	1,000
Shasta County Service Area No. 6— Jones Valley	190	✓		190	0	190	0
Shasta County Service Area No. 25— Keswick	500	✓		500	500	500	500
Shasta Lake, City of	2,750	✓		2,750	2,750	2,750	2,750
Silverthorn Summer Homes, Inc.	15	✓		15	0	15	0
Westlands Water District	1,150,000	✓	✓	1,150,000	1,150,000	1,150,000	1,150,000
Westside Water District	25,000		✓	25,000	25,000	25,000	25,000
TOTAL	2,328,675			2,328,675	2,260,920	2,328,675	2,260,920

Most of the CVP water contractors have put their maximum contracted CVP water supply to a beneficial use; only 13 CVP water contractors have not (Table 4-3). Therefore, for most of the CVP water contractors, no additional CVP water is available to accommodate additional irrigated agriculture or M&I land uses within their service areas. For the CVP water contractors listed in Table 4-3, CVP water is available to accommodate future agricultural or M&I land use. Anticipated changes to land use associated with the availability of CVP water is discussed in Section 4.3 of this EIR.

Table 4-3
CVP Water Contractors with Surplus CVP Water

Bella Vista Water District	San Benito County Water District
Coalinga, City of	Santa Clara Valley Water District
Colusa County Water District	Shasta Community Services District
El Dorado Irrigation District	Shasta County Service Area no. 25 – Keswick
Glenn Valley Water District	Shasta Lake, City of
Kanawha Water District	Westside Water District
Mountain Gate Comminuty Services District	

4.3.2 Water Use Changes Associated with Alternative 1 (No Project)

With implementation of Alternative 1, water contractors located outside the authorized POU would no longer be able to receive CVP water. Water contractors with lands inside and outside the authorized POU could continue to deliver CVP water only to lands within the authorized POU.

As a result of implementing Alternative 1, CVP water deliveries to EID, SMUD, Jones Valley, and SSH would be discontinued because these CVP water contractors are located entirely outside the authorized POU. Of these four CVP water contractors, SSH currently has no alternative source of water capable of meeting its current demand. Therefore, SSH would need to acquire water or its ongoing land uses would be jeopardized.

The volume of water contracted to these four CVP water contractors that would not be delivered equals about 67,755 acre-feet. These CVP water contractors would no longer be able to receive CVP water, and the 67,755 acre-feet of CVP water could be used for other beneficial uses, as determined by Reclamation. The amount of CVP water that could be delivered to the remaining 22 CVP water contractors that have lands within the authorized POU and could be applied to a beneficial use is about 2,260,920 acre-feet per year.

As noted previously in this EIR, it is assumed that the CVP water contractors that deliver water for M&I land uses would acquire water from other sources to serve the populations residing in those service areas. The alternative sources of water are not known; however, such water would be needed, regardless of cost, to support existing residential, commercial, and industrial land uses. Based on discussions with the CVP water contractors listed in Table 4-4, no identified alternative onsite sources of water are capable of supporting existing land uses and activities for lands outside the authorized POU.

Table 4-4
CVP Water Contractors with No Alternative Water

Coalinga, City of	Mountain Gate Comminuty Services District
Colusa County Water District	San Luis Water District
Corning Water District	Shasta Community Services District

Del Puerto Water District	Silverthorn Summer Homes, Inc.
Glenn Valley Water District	Wetlands Water District
Kanawha Water District	Westside Water District

Although these CVP contractors could potentially acquire non-CVP water through purchase or transfer from willing sellers to support existing and future land uses outside the authorized POU, this would constitute a separate action subject to a separate CEQA environmental review. Therefore, such action is not discussed in this document.

4.3.3 Water Use Changes Associated with Alternative 2 (Existing Conditions)

Alternative 2 would continue water delivery to CVP water contractor lands outside the authorized POU that currently receive CVP water. The volume of water that could be delivered under this alternative to the CVP water contractors is the current contracted amount of 2,328,675 acre-feet per year.

This alternative would allow continued CVP water delivery to agricultural and M&I land uses that currently receive CVP water. Only the lands within the CVP water contractor service area boundaries that do not currently receive CVP water would be prevented from future CVP deliveries.

4.3.4 Water Use Changes Associated with Alternative 3 (Permit Consolidation and Conformance)

Water use changes that would occur with implementation of Alternative 3 are the same as those for Alternative 1 (No Project). With implementation of Alternative 3, CVP water contractors would no longer be able to deliver CVP water to lands located outside the authorized POU. CVP water contractors with lands inside the authorized POU could continue to deliver CVP water to those lands.

As a result of implementing Alternative 3, CVP water deliveries to the four CVP water contractors located entirely outside the authorized POU (EID, SMUD, Jones Valley, and SSH) would be discontinued, and the associated volume of water contracted could be made available for other beneficial uses, as determined by Reclamation. The volume of water associated with these CVP water contractors totals about 65,755 acre-feet. The amount of CVP water that could be delivered to the remaining 22 CVP water contractors that have lands within the authorized POU and could be applied to a beneficial use is about 2,260,920 acre-feet per year.

4.3.5 Effects on River Flow and Reservoir Conditions Associated with the Proposed Project and Alternatives

The Proposed Project and three alternatives would not significantly vary the volume of water delivered in accordance with existing CVP contracts. As a result, there would be no substantial change in river flow or reservoir conditions.

The Proposed Project and Alternative 2 (Existing Conditions) would allow the contracted volume of water (totaling 2,328,675 acre-feet per year) to be delivered to the CVP water contractors and, therefore, would not affect river flow or CVP reservoir levels.

Alternatives 1 and 3 would not allow delivery of CVP water to the four CVP water contractors located entirely outside the authorized POU. Therefore, about 67,755 acre-feet of CVP water would become available for other beneficial uses, including meeting other CVP water delivery obligations.

Alternatives 1 and 3 would have a minor effect on flows of the American River, Folsom Lake, Sacramento River, and Shasta Lake. Because the 67,755 acre-feet of CVP water could be used for other purposes, it would have no discernible effect on Folsom Lake or Shasta Lake water elevations or operating conditions. Of the total 1,024,400 acre-feet typical maximum storage and 2,708,000 acre-feet average release from Folsom Lake, the volume of water affected by Alternatives 1 and 3 equal about 6.7 percent of Folsom Lake storage and 2.5 percent of releases. Both reservoir elevations may undergo minor seasonal changes in elevations; however, such changes cannot be accurately estimated at this time.

4.4 Effects on Land Use

4.4.1 Introduction

Changes 1 and 2 would not affect the volume of water delivered or the place where water may be used in any of the 236 CVP water contractor service areas. Therefore, the following discussion addresses only acreage and land use activities outside the authorized POU that would be affected by implementing Change 3 (expanding the authorized POU to encompass CVP water contractor service areas).

The land uses within the CVP water contractor boundaries that could occur if the Proposed Project or three alternatives are implemented have been divided into four categories: irrigated agriculture, dryland agriculture, M&I uses, and undeveloped land (native vegetation). In this analysis, unirrigated pasture lands that have not been tilled recently have been classified as undeveloped.
The land use estimates in this section of the EIR consider whether there would be sufficient CVP water to support the land uses outside the authorized POU or whether local land management agencies would permit municipal, industrial, or agricultural activities on those lands. To calculate the land uses that could be served CVP water, the following assumptions were used:

- For either agricultural or M&I contracts, potential land uses would be consistent with contract terms. Therefore, only agricultural development would occur in areas with agricultural contracts, and only M&I development would occur in areas with M&I contracts.

- For combination agricultural and M&I water contracts, the future land uses that could occur with the Proposed Project were based on land use designations presented in applicable general plans having jurisdiction over the affected CVP water contractor lands.

- Future land use changes would occur only to the degree allowed with available CVP water not currently being used in other portions of the water contractor service area. Agricultural lands would be served between 0.8 and 6.5 acre-feet per acre of CVP water, depending on the historical water use rate and crops grown in each individual district. M&I lands would be served CVP water at an assumed rate of 2 acre-feet per acre unless district-specific information indicated otherwise. In several cases, information indicates M&I use rates ranging from 0.2 to 1.4 acre-feet per acre. These lower rates are typical of

those water districts serving rural residential land uses, where single-family homes are located on large rural tracts of land 2 or more acres in size.

The acreages presented in the following text and in Appendix E were determined through several sources: (1) interviews with CVP water contractor personnel, which provided information on existing water sources, land use, and the availability of alternative water; (2) land use information developed by the Department of Water Resources (DWR), which provided parcel-specific land use descriptions for several districts; and (3) an aerial flyover and onsite reconnaissance surveys to verify ongoing land use practices on selected lands. If there were discrepancies between information sources, the information provided by the water contractors was used because their information was more recent and was compiled by onsite management personnel.

In developing the estimates of future land uses associated with the Proposed Project, several assumptions were made. These include:

- If the CVP water contractor historically had used its entire contract amount to support existing land uses, no additional agriculture or M&I development outside the authorized POU would occur.

- If the historical maximum CVP water use was less than the contracted amount, the difference could be used to support future agricultural or M&I development within or outside the authorized POU.

- If the CVP contractor currently irrigates less than a majority of its service area with CVP water, the available water (contracted volume minus historical maximum volume) would be used on lands located within the authorized POU.

- If the CVP contractor currently irrigates more than a majority of its service area with CVP water, the available water (contracted volume minus historical maximum volume) would be used on lands located outside the authorized POU.

4.4.2 Land Use Changes Associated with the Proposed Project

The Proposed Project would expand the authorized POU boundary by about 834,667 acres to encompass all lands within the contracted service area boundaries of the 26 affected CVP water contractors. These water contractors would allow CVP water to be used for agricultural, municipal, and industrial purposes on (1) lands outside the authorized POU that currently receive CVP water (encroached lands); (2) lands outside the authorized POU that receive water from other sources; and (3) dryland agriculture or undeveloped lands (expansion lands), provided sufficient CVP water is available to support irrigated agricultural or M&I land uses.

The availability of CVP water to these lands would not induce a change to existing land use; however, its availability could accommodate future land uses that are planned by local land management agencies. Therefore, the acreage presented for the Proposed Project in the following discussion reflects the ultimate land uses that could occur if future land management decisions allow the change.

Comparison to Permitted Conditions

The Proposed Project would allow all 834,667 acres outside the authorized POU to receive CVP water. Because CVP water is limited, of this total, only 142,762 acres would be able to receive either agricultural or M&I CVP water. About 62,766 acres of agricultural land outside the authorized POU would be irrigated by CVP water. When compared to permitted conditions, the Proposed Project would allow CVP water to be delivered to 7,581 acres that were irrigated by non-CVP water, 51,468 acres that were dryland farmed, and 3,717 acres that previously were undeveloped.

In addition, the Proposed Project would provide CVP water to about 79,996 acres of M&I lands. When compared to permitted conditions, the Proposed Project would allow delivery of CVP water to 62,035 acres of M&I lands that previously were supported by non-CVP water and 17,961 acres that previously were undeveloped.

Comparison to Existing Conditions

The Proposed Project would allow CVP water to be delivered to 62,766 acres of irrigated agricultural land. Of these lands, 56,543 acres currently are irrigated with CVP water, 2,107 acres currently are irrigated with non-CVP water, 399 acres are dryland farmed, and 3,717 acres are undeveloped.

Land uses within the service areas of several CVP water contractors would not be changed with implementation of the Proposed Project because the uses have already been developed with non-CVP water; the maximum volume of contracted CVP water currently is used to support existing land uses; existing land use restrictions prevent future development; or the available CVP water makes up only a minor proportion of the total water available to the district and, therefore, would not be sufficient to facilitate future development within the service areas.

In several cases, the Proposed Project would not facilitate altering land uses within the boundaries of the CVP water contractors. Within EBMUD, lands outside the authorized POU have been developed for M&I purposes with non-CVP water. The introduction of CVP water to this service area would not induce land use changes to these lands, but would substitute or augment the existing water supply. A similar condition is also found in Contra Costa. The lands located outside the authorized POU, although currently undeveloped, have been protected by the district as mitigation lands for the Los Vaqueros Water Quality and Resource Management Project. Therefore, the Proposed Project would not facilitate altering land uses on these district lands.

Within SMUD, no change in land use would occur. No additional water would be available to support further agricultural or M&I land uses on district-owned lands.

Therefore, for the three water contractors discussed above and the other 12 CVP water contractors with no alternative water source (Table 4-4), no additional land use changes would occur as a result of implementing the Proposed Project.

The Proposed Project would substitute and augment non-CVP water that facilitated historically irrigated agricultural and M&I development. In SCVWD and SBCWD, both irrigated agriculture and M&I development took place using non-CVP water. The Proposed Project would change the source of water to existing irrigated agricultural and M&I lands, as well as facilitate the use of CVP water on existing dryland farms and lands classified as native vegetation. In these two districts, the conversion of dryland

agriculture and native vegetation would be expected to take place even if CVP water was not available. The CVP water that would be provided would make up only a small proportion of the total water available and would not facilitate land use changes that would most likely occur with the availability of non-CVP water.

4.4.3 Land Use Changes Associated with Alternative 1 (No Project)

With implementation of Alternative 1, the authorized POU would not be expanded, and Reclamation would be prohibited from delivering CVP water to the 834,667 acres of land located outside the authorized POU. Accordingly, many land management activities and land uses that have relied on the delivery of CVP water may be jeopardized; however, the historic delivery of CVP water to areas outside the authorized POU cannot be construed as a vested right for the continued delivery of water.

Comparison to Existing Conditions

Alternative 1 would eliminate existing CVP water delivery to 56,543 acres of irrigated agriculture. Because several CVP water contractors have available alternative water, a total of about 32,366 acres of agricultural land could be irrigated by non-CVP water (an increase of 5,474 acres). An additional 51,069 acres of dryland agricultural could result.

Alternative 1 also would eliminate existing CVP water delivery to about 60,121 acres of M&I land uses. However, it is unreasonable to assume that the permanent infrastructure and human populations that reside in these areas would be abandoned because of eliminating CVP water. Alternative sources of water are assumed to be available, at an unknown cost, to continue to support these land uses. Therefore, the 60,121 acres of M&I use would require non-CVP water sources.

Although 22 of these CVP water contractors would continue to receive CVP water for lands within the authorized POU, CVP water would be eliminated completely from four CVP water contractors with service areas located entirely outside the authorized POU. These four water contractors would no longer be able to support current land use activities unless an alternative water supply is acquired.

Six water contractors have relied on CVP water to support irrigated agriculture on lands outside the authorized POU (Table 4-5). These lands (totaling about 50,069 acres) would revert to dryland agriculture or commercial agricultural production would be discontinued unless an alternative water supply is acquired. If CVP irrigated agriculture is discontinued and alternative water sources are not developed, these lands probably would assume the characteristics of undeveloped lands in the immediate vicinity—unless they were developed into residential or commercial land uses or dryland agriculture.

Four CVP water contractors have relied on CVP water to develop municipal, industrial, and rural residential uses outside the authorized POU (Table 4-5). These lands total about 1,674 acres. Other unproven water sources may be available, but it is assumed that these land uses developed because of CVP water availability. These water contractors would have to secure other water sources to meet local municipal water demand if Alternative 1 is implemented.

Table 4-5
CVP Water Contractors Relying Solely on CVP Water to Support Current Agricultural and M&I Land Uses Outside the Authorized POU

CVP Water Contractor	Irrigated Ag. (Acres)[a]	M&I (Acres)[a]
Colusa County Water District	1,499	0
Corning Water District	1,647	0
Kanawha Water District	689	0
San Luis Water District	9,609	0
Shasta County Service Area No. 6—Jones Valley	0	668
Shasta County Service Area No. 25—Keswick	0	918
Silverthorn Summer Homes, Inc.	0	55
Westlands Water District	36,386	33
Westside Water District	239	0
Total Acreage	50,069	1,674

[a] Corresponds to acreage presented in the irrigated agriculture and M&I columns, respectively, of Alternative 2 in Table 4-4.

4.4.4 Land Use Changes Associated with Alternative 2 (Existing Conditions)

About 83,435 acres (10 percent) of the lands outside the authorized POU have been developed into irrigated agriculture. Of that total, about 56,543 acres currently use CVP water to provide irrigation. The remaining 26,892 acres use other sources of water. About 5,804 acres (0.7 percent) of the lands outside the authorized POU currently support dryland agriculture.

M&I land uses occur on about 62,035 acres (7.4 percent) of the lands outside the authorized POU. Of that total, about 59,338 acres use CVP water to support this land use, and the remaining 1,914 acres rely on other water sources. About 683,393 acres (82 percent) of the total lands remain in an undeveloped condition.

Implementation of Alternative 2 would result in the continued delivery of CVP water to these land uses, including delivering water to the four CVP water contractors that are located entirely outside the authorized POU (EID, SMUD, Jones Valley, and SSH).

Comparison to Permitted Conditions

When compared to permitted conditions, this alternative facilitated the increase of irrigated agriculture by about 51,069 acres. This alternative has not changed the amount dedicated to M&I land use, nor has it reduced the acreage of lands classified as native vegetation.

4.4.5 Land Use Changes Associated with Alternative 3 (Permit Consolidation and Conformance)

Comparison to Permitted Conditions

This alternative would have the same effects on land use as Alternative 1. Because no changes to the authorized POU would occur under this alternative, delivery of CVP water to lands outside the authorized POU would be terminated.

Comparison to Existing Conditions

As discussed in Section 4.4.3, terminating CVP water deliveries on the lands outside the authorized POU would eliminate CVP water delivery to lands located outside the authorized POU, including 56,543 acres currently receiving CVP water for irrigated agricultural lands and 60,121 acres of M&I land uses supported by CVP. Accordingly, many existing land management activities and land uses may require an alternative water source.

4.5 Effects on Terrestrial Biological Resources

The potential effects of the Proposed Project and three alternatives on terrestrial biological resources were determined by assuming that changes to the existing water rights permits would result from the following actions:

- Continued delivery of CVP water to irrigated agricultural and M&I lands and the new delivery of CVP water to lands outside the authorized POU, to the degree CVP water is available, that are currently in dryland agriculture or native vegetation. This action would occur with implementation of the Proposed Project.

- Termination of delivery of CVP water to lands located outside the authorized POU that are currently being irrigated. This could result in the conversion of land use if no alternative water supply is available. This action would occur with implementation of Alternative 1 and Alternative 3.

- Continued delivery of CVP water to irrigated agricultural and M&I lands outside the authorized POU. This action would occur with implementation of Alternative 2.

4.5.1 Effects of the Proposed Project

Comparison to Existing Conditions

Of the total 834,667 acres located outside the authorized POU, 151,274 acres have been developed and would not be further affected by adopting the Proposed Project. Lands that have been developed for agricultural or M&I purposes are discussed in Section 3.4. The impact associated with the historical and ongoing delivery of CVP water to these lands is discussed in Section 4.5.3.

Although each CVP water contractor could conceivably redistribute CVP water to support new development within its service area, it would not likely be redistributed if existing water users would not receive sufficient water to support existing land uses. Therefore, future new development would not likely occur within individual CVP water contractor service areas that do not have firm CVP water delivery contracts of sufficient quantity to support the demand of future land uses.

Although there are 683,393 acres of undeveloped lands located throughout 19 CVP water contractor service areas, 5 CVP water contractors do not have surplus water and 1 CVP water contractor has lands that cannot be developed. Therefore, 13 CVP water contractors (totaling 641,775 acres) have both land that could be developed and surplus CVP water.

Table 4-6 lists the 13 CVP water contractors and the acreage and types of existing vegetative communities that could be affected by irrigated agricultural or M&I development facilitated by CVP water if the Proposed Project is implemented. Based on estimates of current use of CVP water, about 21,678 acres of vegetation could be affected with implementation of the Proposed Project. However, the specific locations of the 21,678 acres within the 641,775 acres of vegetation are not known.

The alteration of these habitats could change their ability to support associated wildlife species and other terrestrial biological resources. This is particularly valid for lands located in large, closely associated tracts that are considered to be regionally important. In other areas where the lands consist of relatively small and isolated tracts, contain varied habitat quality, and are geographically dispersed, the impact on common wildlife species is considered nonsignificant.

Table D-1 in Appendix D lists the vegetation and wildlife species commonly found in, or associated with, each of the habitat types listed in Table 4-6. Although the Proposed Project would have an impact on individual vegetation and wildlife species found in these habitats, the Proposed Project would not jeopardize the long-term existence of regional populations or communities of these species.

Table 4-6
Vegetation Communities in the Expansion Area that Could be Affected by the Proposed Project

CVP Water Contractor	Acres That Could be Developed by Proposed Project	Acreage of Habitat Potentially Affected by the Proposed Project				
		Fresh Emergent Wetland	Annual Grassland	Alkali Scrub	Mixed Chaparral	Valley-Foothill Hardwood
Bella Vista Water District	3	6	126		106	22
Coalinga, City of	1,631	639	63,293			
Colusa County Water District	210	7	571		3	67
El Dorado Irrigation District	1,275		3,234			1,849
Glenn Valley Water District	41		130			
Kanawha Water District	213	6	207			
Mountain Gate Community Services District	111	36	794		832	924
San Benito County Water District	150				150	
Santa Clara Valley Water District	15,717		139,986		137,473	287,860
Shasta Community Services District	51				35	16
Shasta County Service Area No. 25—Keswick	1,590	53			1,738	926
Shasta Lake, City of	113	1	41			71
Westside Water District	573	9	309			255
TOTAL	**21,678**	**757**	**208,691**	**0**	**140,337**	**291,990**

Comparison to Permitted Conditions

Of the total 834,667 acres located outside the authorized POU, a total of 116,664 acres have already developed and currently receive CVP water supplies. Of these 116,664 acres, 60,121 acres receive CVP water for M&I purposes while 56,543 acres receive CVP water for irrigated agricultural purposes. The remaining 34,610 acres outside the POU that have been developed do not receive CVP water supplies.

Of the 116,664 acres that currently receive CVP water supplies, 67,062 acres were originally developed with non-CVP water sources. The development of the remaining 49,602 acres was facilitated with the availability of CVP water. Table 4-7 summarizes the acreage of habitats that have been encroached by the delivery of CVP water supplies.

Table 4-7
Habitats Encroached by CVP Water Supplies

Habitat Type	Acreage Affected by CVP Agricultural Water Delivery	Acreage Affected by CVP M&I Water Delivery
Valley-foothill hardwood-conifer	0	8
Mixed chaparral	0	47
Valley-foothill riparian/fresh emergent wetland	140	58
Annual grassland	16,659	2,603
Alkali scrub	29,885	33
Open water	0	169

The availability of CVP water supplies has altered habitats and their ability to support associated wildlife and vegetation species. Where this has occurred over larger tracts of land, this alteration could have adversely affected the regional importance of the habitat to support viable populations of such species. As shown in Table 4-7, larger tracts of grassland and alkali scrub habitat have been affected by the delivery of CVP water supplies.

In the case of SLWD, Westlands, and KWD, CVP water facilitated the development of 7,928 acres, 8,066 acres, and 665 acres of annual grassland habitats, respectively, into irrigated agricultural uses. CVP water supplies also facilitated the development 1,601 acres and 28,317 acres of alkali scrub habitat in SLWD and Westlands, respectively, into irrigated agricultural land uses. The development of these lands is considered a significant impact because of the regional importance these large tracts had on maintaining local populations of species specifically associated with them.

The availability of CVP water supplies also facilitated the development of 24 acres of riparian habitat in KWD, 80 acres in SLWD, and 36 acres in Westlands. Although these habitats are not considered to be large tracts of land, their loss is considered to be a significant impact because of their value to associated vegetation and wildlife species that are dependent on this habitat.

The availability of CVP water also facilitated the development of 8 acres of valley-foothill hardwood-conifer and 47 acres of mixed chaparral habitats in Silverthorn Summer Homes, Inc. This loss is considered significant because of the habitats' value to value to associated threatened and endangered species.

In addition, about 21,678 acres of undeveloped land could be developed with implemen-tation of the proposed project when compared to permitted conditions. Of the 21,678 acres, 17,961 acres could be developed into CVP M&I uses and 3,717 acres could be developed into CVP irrigated agricultural uses. Table 4-6 identifies the habitats and corresponding acreage in the expansion area that could be affected with the Proposed Project.
The alteration of these habitats could change their ability to support associated wildlife species and other terrestrial biological resources. Large tracts of land that are able to support wildlife species are considered to be regionally important and could result in significant impacts on species. In areas that have relatively small and isolated tracts, contain varied habitat quality, and are geographically dispersed, the impact on common wildlife species is considered nonsignificant.

The encroachment of habitats for M&I purposes are not considered a significant impact because this type of development has previously undergone environmental review by local land management agencies that either determined that the alteration of such habitats was not significant or that there was suitable mitigation available to avoid, reduce, or otherwise minimize impacts to these habitats.

4.5.2 Effects of Alternative 1 (No Project)

Comparison to Existing Conditions

Alternative 1 would terminate the delivery of CVP water to lands outside the authorized POU. As a result, irrigated agricultural lands relying on CVP water would no longer receive it. It is expected that, where non-CVP water sources are available, these lands would continue to be irrigated. If no alternative water is available, however, the lands would convert to dryland agriculture or commercial agricultural practices would cease. The 56,543 acres of irrigated land outside the authorized POU currently receiving CVP water would no longer receive CVP water. About 32,336 acres would continue to be irrigated by non-CVP water (an increase of 5,474 acres). In addition, 51,069 acres of CVP-irrigated agriculture would revert to dryland agriculture.

Lands that would no longer receive irrigation water are assumed to be used for dryland agricultural purposes. However, some lands may not be suitable for such practices, depending on site-specific economic conditions, and commercial agricultural use may be abandoned. Such lands eventually would revert to a state exhibiting native vegetation characteristics. The time required to revert to a native state is unknown and depends on the type of vegetation in the area, seed sources, successional stages of the native vegetation, precipitation, and other factors such as future land disturbances and fire. The removal of the lands from continued CVP water delivery would not result in a significant impact to biological resources.

Under Alternative 1, about 60,121 acres of M&I land outside the authorized POU would no longer be able to receive CVP water. These land uses would not likely be abandoned. None of these lands would revert to their native condition, therefore, this alternative would not have a beneficial impact on the availability of wildlife habitat. Alternative water would need to be acquired to continue supporting existing M&I land uses; however, the availability or cost of such water supplies is not known.

4.5.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

Alternative 2 would not induce any new impacts on vegetation and wildlife resources. No land use changes would occur with the implementation of this alternative. The delivery of CVP water has already facilitated changes to the land use on lands outside the authorized POU. As a result, the delivery of CVP water has facilitated changes to vegetation and wildlife habitats that historically were found on these lands.

Of the 56,543 acres currently receiving CVP water for irrigation, 37,075 acres of wildlife habitat were changed by CVP-induced agricultural development (Table 3-6). The habitats affected by the CVP-induced agricultural development include fresh emergent wetlands, annual grassland, and alkali scrub. The remaining 19,468 acres previously had been disturbed by non-CVP-induced agriculture.

In addition to the CVP water that was delivered for agricultural uses, CVP water induced the development of land for M&I land uses. Of the 60,121 acres currently receiving CVP water for M&I purposes, 2,918 acres previously were undisturbed prior to the availability of CVP M&I water (encroached lands) (Table 3-6), and 57,203 acres were disturbed by non-CVP induced M&I water sources.

The availability of CVP water supplies has altered habitats and their ability to support associated wildlife and vegetation species. Where this has occurred over larger tracts of land, this alteration could have adversely affected the regional importance of the habitat to support viable populations of such species. As shown in Table 4-7, larger tracts of grassland and alkali scrub habitat have been affected by the delivery of CVP water supplies.

In SLWD, Westlands, and KWD, CVP water facilitated the development of 7,928 acres, 8,066 acres, and 665 acres of annual grassland habitats, respectively, into irrigated agricultural uses. CVP water supplies also facilitated the development 1,601 acres and 28,284 acres of alkali scrub habitat in SLWD and Westlands into irrigated agricultural land uses. The development of these lands is considered a significant impact because of the regional importance these large tracts had on maintaining local populations of species specifically associated with them.

The availability of CVP water supplies also facilitated the development of 24 acres of riparian habitat in KWD, 80 acres in SLWD, and 36 acres in Westland. Although these habitats are not considered to be large tracts of land, their loss is considered to be a significant impact because of their value to associated vegetation and wildlife species that are dependent on this habitat.

4.5.4 Effects of Alternative 3 (Permit Conformance and Consolidation)

Comparison to Existing Conditions

Alternative 3 would have similar impacts on biological resources as Alternative 1. Of the 56,543 acres of irrigated land outside the authorized POU currently receiving CVP water, about 32,366 acres would be irrigated by non-CVP water. These lands are located in Arvin-Edison, CCWD, OAWD, SBCWD, and SCVWD.

In a manner similar to Alternative 1, about 60,121 acres of M&I lands outside the authorized POU would no longer be able to receive CVP water. These land uses would not likely be abandoned. None of these lands would revert to their native condition, therefore, this alternative would not have a beneficial impact on the availability of wildlife habitat. Alternative water would need to be acquired to continue supporting existing M&I land uses; however, the availability or cost of such water supplies is not known.

Comparison to Permitted Conditions

Because Alternative 3 is identical to Alternative 1, no change in impacts to biological resources would occur with implementation of Alternative 3, when compared to Alternative 1.

The encroachment of habitats for M&I purposes are not considered a significant impact because this type of development has previously undergone environmental review by local land management agencies that either determined that the alteration of such habitats was not significant or that there was suitable mitigation available to avoid, reduce, or otherwise minimize impacts to these habitats.

4.6 Effects on Special-Status Vegetation and Wildlife Species

All special-status species (Table D-2 in Appendix D) known or expected to occur within the boundaries of the 26 CVP water contractors, yet outside the authorized POU, were assessed to determine potential impacts of the Proposed Project and three alternatives. Land modifications associated with agricultural use disrupts the soil such that no special-status species are expected to survive. Likewise, the invertebrates that depend on native vegetation would probably be adversely affected.

The potential significance of adverse effects on special-status species is typically determined on the basis of (1) the availability of habitat similar to that being altered by conversion to another land use; (2) the size, quality, and isolation of habitat patches with respect to nearby areas being affected; and (3) the life history characteristics (e.g., home ranges; mobility; and specialized habitat needs, range, and population status) of the species being affected.

For the purposes of this EIR, if suitable habitat conditions were present in an area, the species of concern are assumed to inhabit the area. Site-specific surveys are needed to verify the presence of these species or the characteristics of local populations that would be affected by the Proposed Project and three alternatives. Impacts on special-status species are described for each alternative below.

4.6.1 Effects of the Proposed Project

Comparison to Existing Conditions

Of the total 834,667 acres located outside the authorized POU, 21,678 acres of undeveloped land would be developed with implementation of the proposed project when compared to existing conditions. Of the 21,678 acres, 17,961 acres would be developed into CVP M&I uses and 3,717 acres would be developed into CVP irrigated agricultural uses.

The alteration of these habitats could change their ability to support associated wildlife species and terrestrial vegetation. Large tracts of land that are able to support wildlife species are considered to be regionally important and could result in significant impacts on species. In areas that have relatively small and isolated tracts, contain varied habitat quality, and are geographically dispersed, the impact on wildlife species is considered nonsignificant.

Comparison to Permitted Conditions

When compared to permitted conditions, the undeveloped land that could be affected by the Proposed Project totals about 683,393 acres. Of this area, 661,715 acres would not be affected by the Proposed Project because of existing land use restrictions and the lack of available CVP water to individual CVP water contractors. Therefore, 21,678 acres of undeveloped land are subject to development that would be facilitated by the Proposed Project. Undeveloped lands potentially subject to future CVP-water-facilitated changes are located within 13 of the 26 CVP water contractors affected by Reclamation's petition (Table 4-6).

The alteration of 21,678 acres of wildlife habitat would constitute a substantial change in these lands' ability to support wildlife species and terrestrial vegetation. In particular, the special-status species listed in Table D-2 would be subject to potential habitat losses that may affect the continued existence of local populations.

The impact of these land use alterations on special management zones, such as riparian zones, wetlands, or special-status species, is considered potentially significant. The conversion of land to an agricultural or M&I land use could have a significant adverse impact on species inhabiting those habitat types. The magnitude of such impacts cannot be estimated at this time because site-specific studies would be required to determine precise habitat changes that may occur and their effects on associated wildlife populations.

4.6.2 Effects of Alternative 1 (No Project)

As previously noted, existing M&I land uses would not likely be abandoned if CVP water delivery was discontinued to lands outside the authorized POU. Therefore, Alternative 1 would have no impact on special-status species occupying undeveloped lands outside the authorized POU.

Comparison to Existing Conditions

With implementation of this alternative, 51,069 acres currently irrigated by CVP water would revert to dryland agriculture. The majority of acreage change would occur in Westlands (36,386 acres) and SLWD (9,609 acres). The acreage in Westlands and SLWD that has been developed for agriculture consisted of annual grassland, alkali scrub, and fresh emergent wetland.

If these lands revert from their current land use to native habitats, adverse effects would occur to some common species, but effects would vary by agricultural use and native habitat type. Conversion of affected lands in these two districts is not considered a significant effect on common species. One special-status species (Swainson's hawk) may be adversely affected by converting agricultural lands in these areas to native habitats. Impacts of habitat conversion on the Swainson's hawk are considered significant because of the relatively large area of land that would be altered by this alternative. This species would be affected despite its large home range and mobility.

4.6.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

About 60,121 acres of native vegetation and habitats have been converted to M&I development from CVP water. This development has resulted in altering or eliminating the habitat value on these lands for various special-status species listed in Table D-2. This development may have contributed to the loss of these species' ability to sustain local populations. This change is considered a significant adverse impact.

Although some areas with native habitat have been developed, the intensity of development is not uniform and, therefore, the effects of conversion vary substantially. In more intensely developed portions of the M&I water contractors, most special-status species probably were affected in the immediate vicinity of the development.

About 36,386 acres of native habitat in Westlands and 689 acres in KWD have been converted to irrigated agriculture as a result of delivery of CVP water. This acreage most likely consisted of annual grassland, alkali scrub, and fresh emergent wetland. Significant adverse effects are expected to have occurred to several special-status species in these districts as a result of agricultural development (Table D-2).

4.6.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Existing Conditions

Alternative 3 would have similar impacts on special-status species as Alternative 1, when compared to Alternative 2. With implementation of this alternative, 51,069 acres currently irrigated by CVP water would revert to dryland agriculture. The majority of acreage change would occur in Westlands (36,386 acres) and SLWD (9,609 acres). The acreage in Westlands and SLWD that has been developed for agriculture consisted of annual grassland, alkali scrub, and fresh emergent wetland.

If these lands revert from their current land use to native habitats, adverse effects would occur to some common species, but effects would vary by agricultural use and native habitat type. Conversion of

affected lands in these two districts is not considered a significant effect on common species. One special-status species (Swainson's hawk) may be adversely affected by converting agricultural lands in these areas to native habitats. Impacts of habitat conversion on the Swainson's hawk are considered significant because of the relatively large area of land that would be altered by this alternative. This species would be affected despite its large home range and mobility.

Comparison to Permitted Conditions

Alternative 3 would have similar impacts on special-status species as Alternative 1. With implementation of this alternative, 51,069 acres currently irrigated by CVP water would revert to dryland agriculture. The majority of acreage change would occur in Westlands (36,386 acres) and SLWD (9,609 acres). The acreage in Westlands and SLWD that has been developed for agriculture consisted of annual grassland, alkali scrub, and fresh emergency wetland.

If these lands revert from their current land use to native habitats, adverse effects would occur to some common species, but effects would vary by agricultural use and native habitat type. Conversion of affected lands in these two districts is not considered a significant effect on common species. One special-status species (Swainson's hawk) may be affected adversely by converting agricultural lands in these areas to native habitats.

Impacts of habitat conversion on the Swainson's hawk are considered significant because of the relatively large area of land that would be altered by this alternative. This species would be affected despite its large home range and mobility.

4.7 Effects on Air Quality

No direct impact on air quality would occur from implementation of the Proposed Project or three alternatives. However, future land use changes that are expected to occur from adding lands that are currently outside the authorized POU into the authorized POU may induce air emissions that are potentially adverse.
To determine potential air quality impacts, changes in land use acreages associated with the proposed project and three alternatives were calculated based on acreages presented in Appendix E. When determining impacts on local air quality, we considered the following: (1) cultivating more irrigated agriculture and less dryland agriculture acreage could result in more dust emissions from farming operations, more airborne pesticide and fertilizer residues, and more smoke from field burning of selected crops because irrigated agriculture is more intensely and continuously cropped than dryland agriculture, and (2) additional lands dedicated to municipal and industrial uses within the 26 CVP water contractor service areas would likely result in an increase in population and an associated increase in air pollutant emissions. These two scenarios would result in a negative impact on local air quality.

Conversely, cultivating less irrigated agriculture and more dryland agricultural acreage results in less dust emissions from farming operations, less airborne pesticide and fertilizer residues, and less smoke from field burning of selected crops, and as such, this scenario is considered to result in a positive impact on local air quality.

The potential effects on air quality associated with changes in land use are discussed below by alternative.

4.7.1 Effects of the Proposed Project

Comparison to Permitted Conditions

When compared to Alternative 1, the Proposed Project would allow CVP water to be delivered for agricultural purposes to 62,766 acres, consisting of 7,581 acres that were irrigated by non-CVP water sources, 51,468 acres that were dryland farmed, and 3,717 acres that were previously undeveloped. The Proposed Project would also allow the delivery of CVP water to 62,035 acres of M&I land that were supported by a non-CVP water source, and 17,961 acres of land that were previously undeveloped. These potential land use changes would result in about 21,678 fewer acres of undeveloped land.

The land use changes associated with the Proposed Project could result in a minor negative effect on local air quality within the Sacramento Valley, San Joaquin Valley, San Francisco Bay Area, Mountain Counties, and North Central Coast air basins. The impact on air quality is considered nonsignificant because of the relatively small number of acres of land that would change land use when compared to the number of acres within the five air basins. Land use changes within the following 16 CVP water contractor service areas contribute to the nonsignificant impact on air quality:

- Bella Vista Water District
- City of Coalinga
- Colusa County Water District
- Del Puerto Water District
- El Dorado Irrigation District
- Glenn Valley Water District
- Kanawha Water District
- Mountain Gate Community Services District
- San Benito County Water District
- San Luis Water District
- Santa Clara Valley Water District
- Shasta Community Services District
- Shasta County Service Area No. 25–Keswick
- City of Shasta Lake
- Westlands Water District
- Westside Water District

Comparison to Existing Conditions

When compared to Alternative 2, the Proposed Project would allow CVP water to be delivered for agricultural purposes to 62,766 acres, consisting of 56,543 acres that are currently receiving CVP water, 2,107 acres that were irrigated by non-CVP water sources, 399 acres that were dryland farmed, and 3,717 acres that were previously undeveloped. The proposed project would also allow the delivery of CVP water to 1,914 acres of M&I land that were supported by a non-CVP water source, and 17,961 acres of land that were previously undeveloped. These potential land use changes would result in about 21,678 fewer acres of undeveloped land.

The land use changes associated with the proposed project could result in a minor negative effect on local air quality within the Sacramento Valley, San Joaquin Valley, San Francisco Bay Area, Mountain Counties, and North Central Coast air basins. The impact on air quality is considered nonsignificant because of the relatively small number of acres of land that would change land use when compared to the number of acres within the five air basins. Land use changes within the following 15 CVP water contractor service areas contribute to the nonsignificant impact on air quality:

- City of Avenal
- Bella Vista Water District
- City of Coalinga
- Colusa County Water District
- El Dorado Irrigation District
- Glenn Valley Water District
- Kanawha Water District
- Mountain Gate Community Services District
- San Benito County Water District
- Santa Clara Valley Water District
- Shasta Community Services District
- Shasta County Service Area No. 25–Keswick
- City of Shasta Lake
- Westside Water District

4.7.2 Effects of Alternative 1 (No Project)

Comparison to Existing Conditions

When compared to Alternative 2, Alternative 1 would not allow CVP water delivery to acreage outside the authorized POU for either agricultural or municipal and industrial uses. This would result in a change in practices on 56,543 irrigated acres that are currently receiving CVP water (encroached lands), including an increase of 5,474 acres to be irrigated by non-CVP water sources, and an increase of 51,069 acres to be dryland farmed. In addition, 60,121 M&I acres that currently receive CVP water (encroached lands) would need to be served by non-CVP water supplies. No development on currently undeveloped land would occur with Alternative 1.

The land use changes associated with Alternative 1 could result in a minor positive effect on local air quality within the Sacramento Valley and San Joaquin Valley air basins. The impact on air quality is considered nonsignificant because of the relatively small number of acres of land that would change land use when compared to the number of acres within the two air basins. No impact on air quality is expected in the San Francisco Bay Area, North Central Coast, or Mountain Counties air basins because no change in land use within those basins is expected with implementation of Alternative 1. Land use changes within the following six CVP water contractor service areas contribute to the nonsignificant improvement in air quality:

- Corning Water District
- Del Puerto Water District
- Kanawha Water District
- San Luis Water District
- Westlands Water District
- Westside Water District

4.7.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

When compared to Alternative 1, Alternative 2 would allow CVP water to be delivered for agricultural purposes to 56,543 acres, consisting of 5,474 acres irrigated by non-CVP water sources and 51,069 acres of dryland farmed land. In addition, 60,121 M&I acres served by non-CVP water supplies would be served by CVP water if Alternative 2 were implemented. No development on currently undeveloped land would occur with Alternative 2.

The land use changes associated with Alternative 2 could result in a minor negative effect on local air quality within the Sacramento Valley and San Joaquin Valley air basins. The impact on air quality is considered nonsignificant because of the relatively small number of acres of land that would change land use when compared to the number of acres within the two air basins. No impact on air quality is expected in the San Francisco Bay Area, North Central Coast, or Mountain Counties air basins because no change in land use within those basins is expected with implementation of Alternative 2. Land use changes within the following six CVP water contractor service areas contribute to the nonsignificant impact on air quality:

- Corning Water District
- Del Puerto Water District
- Kanawha Water District
- San Luis Water District
- Westlands Water District
- Westside Water District

4.7.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Permitted Conditions

Because land uses associated with Alternative 3 are identical to Alternative 1, there would be no difference in air quality between Alternative 1 and 3.

Comparison to Existing Conditions

When compared to Alternative 2, Alternative 3 would not allow CVP water delivery to acreage outside the authorized POU for either agricultural or municipal and industrial uses. This would result in a change in practices on 56,543 irrigated acres that are currently receiving CVP water (encroached lands), including an increase of 5,474 acres to be irrigated by non-CVP water sources, and an increase of 51,069 acres to be dryland farmed. In addition, 60,121 municipal and industrial acres that currently receive CVP water (encroached lands) would need to be served by non-CVP water supplies. No development on currently undeveloped land would occur with Alternative 3. This is the same effect as was described for Alternative 1.

Similar to that described for Alternative 1, the land use changes associated with Alternative 3 could result in a minor positive effect on local air quality within the Sacramento Valley and San Joaquin Valley air basins. The impact on air quality is considered nonsignificant because of the relatively small number of acres of land that would change land use when compared to the number of acres within the two air basins. No impact on air quality is expected in the San Francisco Bay Area, North Central Coast, or Mountain Counties air basins because no change in land use within those basins is expected with implementation of Alternative 3. Land use changes within the following six CVP water contractor service areas contribute to the nonsignificant improvement in air quality:

- Corning Water District
- Del Puerto Water District
- Kanawha Water District
- San Luis Water District
- Westlands Water District
- Westside Water District

4.8 Effects on Water Quality

The Proposed Project and three alternatives would not affect the volume of water available for delivery to each CVP water contractor, therefore, no changes to CVP operations or the amount of water that

could be delivered are expected. As a result, no change to river flows or water quality would occur with the implementation of the Proposed Project or three alternatives.

4.8.1 Effects of the Proposed Project

Comparison to Permitted Conditions

When compared to Alternative 1, the Proposed Project would not change the total flow, season of flow, or temperature of flow in the Sacramento River, American River, Trinity River, or other human-made conveyance systems. Existing contracted water would be available to CVP water contractors to be used throughout their water contractor service areas, rather than being restricted to areas that are in the currently authorized POU (as would be required by Alternative 1). Therefore, no impact to the water quality of these water systems would occur with implementation of the Proposed Project when compared to Alternative 1.

The Proposed Project would allow four CVP water contractors located entirely outside the authorized POU to legally receive CVP water: EID, SMUD, Jones Valley, and SSH. This differs from Alternative 1, which would not allow any CVP water delivery to occur outside the currently authorized POU. CVP water delivered as a result of implementing the Proposed Project would support the land uses within these CVP water contractors' boundaries, and these land uses would produce agricultural and municipal wastewater that would be discharged to surface and groundwater bodies. The wastewater discharges that would be generated as a result of uses supported by CVP water are not expected to adversely affect the water quality of the Sacramento River, American River, Trinity River, or other human-made conveyance systems when compared to Alternative 1.

Except for these four CVP water contractors located entirely outside the authorized POU, the Proposed Project would not result in any additional changes to the volume of wastewater generated.

Comparison to Existing Conditions

Because CVP water is currently being delivered to CVP water contractors located outside the authorized POU, implementation of the Proposed Project would not change the total flow, season of flow, or temperature of flow in the Sacramento River, American River, Trinity River, or other human-made conveyance systems when compared to Alternative 2. Existing contracted water would continue to be available to CVP water contractors, similar to existing conditions. Therefore, no impact to the water quality of these water systems would occur with implementation of the Proposed Project when compared to Alternative 2.

The Proposed Project would allow four CVP water contractors located entirely outside the authorized POU to legally receive CVP water: EID, SMUD, Jones Valley, and SSH. Because these four water contractors currently receive CVP water outside the authorized POU, the delivery of CVP water to these four water contractors does not constitute a change from existing conditions. CVP water delivered as a result of implementing the Proposed Project would continue to support the land uses within these CVP water contractors' boundaries, and these land uses would continue to produce agricultural and municipal wastewater that would be discharged to surface and groundwater bodies. The wastewater discharges that would be generated as a result of uses supported by CVP water are not expected to adversely affect the water quality of the Sacramento River, American River, Trinity River, or other human-made

conveyance systems beyond the effects (if any) that currently result from existing CVP water deliveries and associated land uses.

Except for these four CVP water contractors located entirely outside the authorized POU, the Proposed Project would not result in any additional changes to the volume of wastewater generated.

4.8.2 Alternative 1 (No Project)

Comparison to Existing Conditions

Although Alternative 1 would not allow the use of CVP water outside the authorized POU, it would not change the total flow, season of flow, or temperature of flows in the Sacramento River, American River, Trinity River, or other human-made conveyance systems. Alternative 1 would continue to allow existing contracted water to be available to CVP water contractors, for use within the currently authorized POU. Therefore, no impact to the water quality of these water systems would occur with implementation of Alternative 1 when compared to Alternative 2.

With implementation of Alternative 1, EID, SMUD, Jones Valley, and SSH would no longer be able to receive CVP water because their service areas are located entirely outside the authorized POU. Land uses within these four service areas that rely solely on CVP water would not continue unless other water sources are acquired. Land uses that have other water sources available would continue, unless restricted by the quantity and/or quality of these other water sources. If the land use continues, agricultural and municipal wastewater would be produced that would be discharged to surface and groundwater bodies. It is expected that M&I land uses would continue, but agricultural land uses may diminish in extent and/or water-intensive crops may be replaced with crops that require less irrigation. The wastewater discharges that would be generated are not expected to adversely affect the water quality of the Sacramento River, American River, Trinity River, or other human-made conveyance systems beyond the effects (if any) that result from Alternative 2. Except for these four CVP water contractors located entirely outside the authorized POU, Alternative 1 would not result in any additional changes to the volume of wastewater generated.

The CVP water that would have been available for use in these four CVP water contractor service areas would be allocated to other CVP water contractors or other beneficial uses outside of the four service areas, as assigned by Reclamation's water rights permit. The delivery rates and uses that could occur are not known at this time and would depend on future needs and available supplies; therefore, the impact on water quality from allocating this water elsewhere is unknown.

4.8.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

Implementation of Alternative 2 would not change the total flow, season of flow, or temperature of flow in the Sacramento River, American River, Trinity River, or other human-made conveyance systems when compared to Alternative 1. Existing contracted CVP water would continue to be available to CVP water contractors where it is currently delivered, instead of being restricted to use within the currently

authorized POU. No adverse impact to the water quality of these water systems would occur with implementation of Alternative 2 beyond current conditions.

Alternative 2 would allow the discharge of agricultural and municipal wastewater to surface and groundwater bodies within EID, SMUD, Jones Valley, and SSH from land uses that are supported by CVP water. As discussed for Alternative 1, if the existing land uses continue in these four service areas (supplied by alternative water sources), it is likely that agricultural and M&I wastewater would be discharged to surface and groundwater bodies. Therefore, there is no difference in the wastewater discharges between existing conditions and permitted conditions. Similar to Alternative 1, Alternative 2 would not adversely affect the water quality of the Sacramento River, American River, Trinity River, or other human-made conveyance systems, and Alternative 2 would not result in any additional changes to the volume of wastewater generated.

4.8.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Permitted Conditions

Because Alternative 3 is identical to Alternative 1, there would be no difference in water quality between Alternative 1 and 3.

Comparison to Existing Conditions

Alternative 3 would not change the total flow, season of flow, or temperature of flows in the Sacramento River, American River, Trinity River, or other human-made conveyance systems. Therefore, it would not affect the water quality of these water systems.

Similar to Alternative 1, implementation of Alternative 3 would eliminate CVP water delivery to EID, SMUD, Jones Valley, and SSH. Land uses within these four service areas that rely solely on CVP water would not continue unless other water sources are acquired. The CVP water that would have been available for use in these four CVP water contractor service areas would be allocated to other CVP water contractors or other beneficial uses outside of the four service areas.

4.9 Effects on Groundwater Resources

The Proposed Project and three alternatives would not have a significant impact on groundwater resources in the groundwater basins of the Central Valley; however, there may be localized effects on groundwater in specific areas in the San Joaquin Valley, such as the cities of Avenal and Coalinga, which are considered potentially significant.

4.9.1 Effects of the Proposed Project

Comparison to Permitted Conditions

This alternative would annually increase the groundwater volume in the Redding Basin by about 0.005 percent. It would also annually increase the groundwater volume in the Sacramento Valley Basin by about 0.001 percent, and would annually increase the groundwater volume in the San Joaquin Valley

Basin by about 0.002 percent. In addition, it would annually increase the groundwater volume in the eastern and southern San Francisco Bay Basin by about 0.016 percent. This is not a measurable impact on the basins' groundwater systems.

Comparison to Existing Conditions

This alternative would annually increase the groundwater volume in the Redding Basin by about 0.005 percent. It would also annually increase the groundwater volume in the Sacramento Valley Basin by about 0.0004 percent, and would annually increase the groundwater volume in the San Joaquin Valley Basin by about 0.00002 percent. In addition, it would annually increase the groundwater volume in the eastern and southern San Francisco Bay Basin by about 0.015 percent. This is not a measurable impact on the basins' groundwater systems.

4.9.2 Effects of Alternative 1 (No Project)

Comparison to Existing Conditions

This alternative would result in no annual change in the groundwater volume in the Redding and eastern and southern San Francisco Bay basins. It would annually decrease the groundwater volume in the Sacramento Valley Basin by about 0.0009 percent, and would annually decrease the groundwater volume in the San Joaquin Valley Basin by about 0.002 percent. This is not a measurable impact on the basins' groundwater systems.

Effects on the San Joaquin Valley Basin groundwater system in specific areas are considered potentially significant, e.g., in the San Luis Water District and Westlands Water District, where approximately 93 percent of this annual depletion would occur and where lowering of the groundwater table is already occurring (Reynolds, 1990). In addition to depleting the local groundwater resources and possibly causing surface subsidence, growers may also be economically affected by increased pumping costs resulting from lower groundwater tables.

4.9.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

This alternative would result in no annual change in the groundwater volume in the Redding and eastern and southern San Francisco Bay basins. It would annually increase the groundwater volume in the Sacramento Valley Basin by about 0.0009 percent, and would annually increase the groundwater volume in the San Joaquin Valley Basin by about 0.002 percent. This is not a measurable impact on the basins' groundwater systems.

4.9.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Permitted Conditions

Alternative 3 would have similar impacts on groundwater as Alternative 1. This is considered a nonsignificant impact on the basins' groundwater systems.

Comparison to Existing Conditions

Similar to Alternative 1, this alternative would result in no annual change in the groundwater volume in the Redding and eastern and southern San Francisco Bay basins. It would annually decrease the groundwater volume in the Sacramento Valley Basin by about 0.0009 percent, and would annually decrease the groundwater volume in the San Joaquin Valley Basin by about 0.002 percent. This is not a measurable impact on the basins' groundwater systems.

Effects on the San Joaquin Valley Basin groundwater system in specific areas are considered potentially significant, e.g., in the San Luis Water District and Westlands Water District.

4.10 Effects on Fish Resources

The Proposed Project and three alternatives would not affect the volume of water contracted for use by individual CVP water contractors, nor would they affect the total volume of water that Reclamation may use for beneficial purposes as assigned by its existing water rights permits. Therefore, no change to the operations of existing CVP facilities or associated surface water bodies would occur.

Because no change to CVP facility discharges, downstream flow rates, or associated water quality would occur, no new or project-induced adverse impact on fish resources in the Sacramento River, American River, or San Joaquin River basins would occur. The following discussion addresses each of the river basins affected by Reclamation's petition.

4.10.1 Effects of the Proposed Project

Comparison to Permitted Conditions and Existing Conditions

Sacramento River. The upper Sacramento River above Red Bluff is an area of particular concern for the threatened winter-run chinook salmon. Average temperatures during August, the key month for winter-run chinook success, would not change from permitted or existing conditions with the proposed project. Implementation of the Proposed Project would not cause further degradation of this species because no new significant flow or temperature changes are expected as a result of this alternative when compared to either permitted conditions or existing conditions.

Other Sacramento River species of concern, such as striped bass, sturgeon, shad, and steelhead trout, would likewise not be affected by implementation of the Proposed Project when compared to permitted conditions or existing conditions because there would be no new significant effects on flow or temperature.

There would be no maximum or minimum reservoir elevation changes for Shasta or Clair Engle reservoirs with implementation of the Proposed Project. As a result, there would be no new significant impacts on fisheries in the major CVP reservoirs when compared to either permitted conditions or existing conditions.

American River. Fall-run chinook salmon is a species of greatest concern in the American River Basin. As noted above, the Proposed Project would not change existing operations of CVP facilities, including Folsom Dam and Lake Natoma, therefore, no change to existing habitat for this species would occur. Specifically, spawning areas and critical habitat for fry lifestages would not be adversely affected with implementation of the Proposed Project. No change to water quality or water temperature would occur with the Proposed Project that would adversely affect fish resources. Therefore, no new impact on this fish species is expected with implementation of the Proposed Project when compared to either permitted conditions or existing conditions.

Sacramento-San Joaquin Delta. Flow, seasonality of flow, or input temperature in the Delta would not change significantly as a result of implementing the Proposed Project when compared to either permitted conditions or existing conditions. For example, maximum estimated flow reductions comparing the Proposed Project to permitted conditions would be approximately 1 to 2 percent in winter and spring months. As a result, the Proposed Project would have no significant effect on Delta fish species.

The lack of changes in flow and seasonal flow patterns in total Delta inflows when compared to permitted conditions or existing conditions indicate that the location of the estuarine null zone, which has been identified as important to Delta smelt and striped bass production, would not be affected by the Proposed Project. Steady-state salinity at all Delta locations is projected to remain nearly constant among the Proposed Project and the three project alternatives.

4.10.2 Effects of Alternative 1 (No Project)

Comparison to Existing Conditions

Sacramento River. The water surface elevations of Shasta and Clair Engle reservoirs would not be significantly altered from existing conditions with implementation of Alternative 1 because no appreciable change in the discharge or inflow to the reservoirs would occur. Also, elevation and temperature exceedance data show no appreciable changes that are likely to affect fish resources. Appreciable additional drawdown of the reservoirs affecting in-lake habitat associated with Alternative 1 is not expected; as a consequence, lake water temperatures would not be affected. Therefore, Alternative 1, when compared to existing conditions, would not affect fish resources in these reservoirs.

Sacramento River flow and temperature would not change significantly as a result of implementing Alternative 1 when compared to existing conditions. As a result, there would be no new impact from this alternative on the various runs of chinook salmon in the upper Sacramento River. Steelhead, striped bass, sturgeon, and shad would be similarly unaffected by Alternative 1.

American River. No significant change in flow or temperature would occur in the American River as a result of implementing Alternative 1. Therefore, there would be no effect on the fish species of the American River from implementing this alternative.

Sacramento-San Joaquin Delta. Total Delta inflow and outflow are not expected to change from existing conditions with implementation of Alternative 1. Sacramento River inflow temperatures at Freeport were used to examine potential Delta temperature changes. Freeport temperatures are not

projected to change from existing conditions (as estimated using 1922-1977 monthly average temperatures) as a result of implementing Alternative 1. Salinity changes are not expected to occur with Alternative 1. Therefore, Delta fish species would not be affected by implementing this alternative.

4.10.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

Alternative 2 is not projected to change water quality, river flow, reservoir elevation, or temperature when compared to permitted conditions for any of the CVP facilities. As a result, implementing Alternative 2 would result in no impacts on fish species.

4.10.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Existing Conditions

Alternative 3 would have similar impacts on fish resources as Alternative 1.

Sacramento River. The water surface elevations of Shasta and Clair Engle reservoirs would not be significantly altered from existing conditions with implementation of Alternative 3 because no appreciable change in the discharge or inflow to the reservoirs would occur. Also, elevation and temperature exceedance data show no appreciable changes that are likely to affect fish resources. Appreciable additional drawdown of the reservoirs affecting in-lake habitat associated with Alternative 3 is not expected; as a consequence, lake water temperatures would not be affected. Therefore, Alternative 3, when compared to existing conditions, would not affect fish resources in these reservoirs.

Sacramento River flow and temperature would not change significantly as a result of implementing Alternative 3 when compared to existing conditions. As a result, there would be no impact from this alternative on the various runs of chinook salmon in the upper Sacramento River. Steelhead, striped bass, sturgeon, and shad would be similarly unaffected by Alternative 3.

American River. No significant change in flow or temperature would occur in the American River as a result of implementing Alternative 3. Therefore, there would be no effect on the fish species of the American River from implementing this alternative.

Sacramento-San Joaquin Delta. Total Delta inflow and outflow are not expected to change from existing conditions with implementation of Alternative 3. Sacramento River inflow temperatures at Freeport were used to examine potential Delta temperature changes. Freeport temperatures are not projected to change from existing conditions (as estimated using 1922-1977 monthly average temperatures) as a result of implementing Alternative 3. Salinity changes are not expected to occur with Alternative 3. Therefore, Delta fish species would not be affected by implementing this alternative.

4.11 Effects on Cultural Resources

Effects on cultural resources include direct and indirect effects. Direct impacts on cultural resources from agricultural development or urban and industrial features, now a part of the landscape, are largely irreversible. Modifying the existing water rights permits to incorpo-rate these lands into the authorized POU would not, therefore, result in new or additional effects to these resources. Indirect effects on cultural resources, such as increased exposure to vandalism from development, have also occurred because the identified sites within the boundaries of various CVP water contractors have been compromised.

With delivery of CVP water to lands outside the authorized POU, two types of land use changes have occurred that may have affected cultural resources: (1) previously unirrigated farm lands have been converted to irrigated agriculture, and (2) various other lands have been changed to support urban and industrial development.

Conversion of unirrigated lands to irrigated agriculture varies with each CVP water contractor. A large portion of these lands had been disturbed by past agricultural practices prior to CVP water delivery, and some have been disturbed with application of CVP water. The establishment of urban and/or industrial land uses essentially precludes returning the land to an agricultural land use or native vegetation. Therefore, past land use impacts to cultural resources are unmitigable.

The potential effects on cultural resources that could occur or that have already occurred with each of the project alternatives are described below.

4.11.1 Effects of the Proposed Project

Comparison to Existing Conditions

No impact on cultural resources is expected from the continued delivery of CVP water to lands used for agricultural activities. In addition, new or additional adverse impacts on cultural resources are not expected from the M&I development that has already occurred within the boundaries of the CVP water contractors.

Potential impacts on cultural resources associated with the Proposed Project would occur as a result of the delivery of CVP water and subsequent development of currently undeveloped lands into an irrigated agricultural or M&I land use. Thirteen of the 26 CVP water contractors have lands within this category. These 13 CVP water contractors and the size of the currently undeveloped land area that could be developed into irrigated agricultural or M&I land uses are presented in Table 4-8.

Table 4-8
Current Undeveloped Lands that Could Change to an Irrigated Agricultural or M&I Land Use

CVP Water Contractor	Undeveloped Lands (acres)
Bella Vista Water District	3
Coalinga, City of	1,631
Colusa County Water District	210
El Dorado Irrigation District	1,275
Glenn Valley Water District	41
Kanawha Water District	213
Mountain Gate Community Services District	111
San Benito County Water District	150
Santa Clara Valley Water District	15,717
Shasta Community Services District	51
Shasta County Service Area No. 25–Keswick	1,590
Shasta Lake, City of	113
Westside Water District	573
Total Acreage	**21,678**

Delivery of CVP water to these undeveloped lands has the potential to generate significant adverse effects on cultural resources. Lands within these CVP water contractor boundaries have the potential to contain significant cultural resources of limited distribution. Until site-specific identification of cultural resources within the boundaries of each CVP water contractor is conducted, it is assumed that significant impacts on cultural resources could occur associated with local proposals that could be served by the Proposed Project.

4.11.2 Effects of Alternative 1 (No Project)

Comparison to Existing Conditions

Any potential impacts to cultural resources from M&I expansion have already occurred. Alternative 1 would eliminate irrigation from about 56,543 acres of currently irrigated farmlands and return these lands to dryland agriculture or irrigated agriculture served water by non-CVP sources. No adverse effects to cultural resources are expected from this action because no new land disturbance would be introduced which could adversely affect cultural resources that may be present.

No undeveloped lands would convert to a M&I land use when comparing Alternative 1 to existing conditions.

4.11.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

Six CVP water contractors have used CVP water in irrigated agricultural development of lands outside the authorized POU (Table 4-9). These lands would not have been developed into an irrigated agricultural land use without CVP water.

Table 4-9
Dryland Agricultural Lands with no Alternative Water Source that have Converted to Irrigated Agriculture from Alternative 2

CVP Water Contractor	Acres
Corning Water District	1,647
Del Puerto Water District	1,000
Kanawha Water District	689
San Luis Water District	9,609
Westlands Water District	36,386
Westside Water District	239
Total Acreage	**49,570**

The conversion of a total of about 51,069 acres of dryland agricultural fields to irrigated agricultural fields (which includes the 49,570 acres in Table 4-9) has had no significant effect on cultural resources. The potential effects to cultural resources from either irrigated or dryland agriculture in these areas are considered equal of the irrigated agricultural land use action does not disturb previously undisturbed subsurface cultural materials. However, if irrigated agricultural practices do disturb previously undisturbed subsurface cultural materials, then the potential for impacts to occur exists.

No undeveloped lands would convert to a M&I land use from Alternative 2 when compared to Alternative 1. A total of 62,035 acres of M&I lands have resulted from Alternative 2 and would result from Alternative 1; the only difference between the two alternatives is the source of water. Such development on the 62,035 acres may have adversely affected cultural resources. No new or additional adverse effects on cultural resources would result with implementation of this alternative because such adverse effects have already taken place on these lands.

4.11.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Existing Conditions

Alternative 3 would have similar impacts on cultural resources as Alternative 1. Any potential impacts to cultural resources from M&I expansion have already occurred. Alternative 3 would eliminate irrigation from about 56,543 acres of currently irrigated farmlands and return these lands to dryland agriculture or irrigated agriculture served water by non-CVP sources. No adverse effects to cultural resources are expected from this action because no new land disturbance would be introduced which could adversely affect cultural resources that may be present.

No undeveloped lands would convert to a M&I land use when comparing Alternative 3 to existing conditions.

4.12 Effects on Local Land Use Policies

4.12.1 Effects of the Proposed Project

Comparison to Permitted Conditions and Existing Conditions

With implementation of the proposed project, no conflicts with existing land use designations would occur. The existing land uses on lands outside the authorized POU are consistent with the general plan designations. Relocating the authorized POU boundary so that it is coincident with the boundaries of the CVP water contractors would not conflict with existing general plan land use designations if the proposed use of land is a designated use in that area.

4.12.2 Effects of Alternative 1 (No Project)

Comparison to Existing Conditions

Seven of the 26 affected CVP water contractors receive CVP water to irrigate lands for agricultural purposes only. Five of the seven water contractors have no alternative source of water and would not have developed into agricultural land uses if CVP water not been available. These lands have an agriculture land use designation. Without CVP water, they would revert to dryland agriculture or discontinue agricultural production. The five CVP water contractors are:

- Colusa County Water District
- Corning Water District
- Del Puerto Water District
- Glenn Valley Water District
- Westside Water District

Dryland agriculture, grazing, open space, or recreation uses associated with implementation of Alternative 1 would be compatible with the land use designations of the lands of the agricultural CVP water contractors.

Five CVP water contractors have relied to some degree on CVP water to support development of municipal and rural residential lands outside the authorized POU. The five CVP water contractors are:

- City of Coalinga
- Mountain Gate Community Services District
- Shasta Community Services District
- Silverthorn Summer Homes, Inc.
- Westlands Water District

With adoption of Alternative 1, CVP water would no longer be delivered to these lands, and the water contractors would have to secure other sources of water to maintain existing service. Obtaining another source of water may be difficult or expensive; however, no change in land use is expected if Alternative 1 is implemented.

There is one CVP water contractor that has relied on CVP water to some degree to support development of industrial land use outside the authorized POU. Without CVP water, SMUD's Rancho Seco power generation facility (although not currently in operation) would require an alternative water source. Obtaining another source of water may be difficult or expensive; however, no change in land use is expected if Alternative 1 is implemented. The land could be developed as specified by its existing general plan land use designation (public/quasi public) and zoning (agriculture) with other types of uses, although this may not be preferable.

4.12.3 Effects of Alternative 2 (Existing Conditions)

Comparison to Permitted Conditions

Existing uses of lands outside the authorized POU in the 26 affected CVP water contractors are consistent with county land use designations; therefore, implementation of this alternative would not conflict with existing land use designation.

4.12.4 Effects of Alternative 3 (Permit Consolidation and Conformance)

Comparison to Existing Conditions

Alternative 3 would have similar impacts on local land use policies as Alternative 1. Seven of the 26 affected CVP water contractors receive CVP water to irrigate lands for agricultural purposes only. Five of the seven water contractors have no alternative source of water and would not have developed into agricultural land uses if CVP water had not been available.

These lands have an agriculture land use designation. Without CVP water, they would revert to dryland agriculture or discontinue agricultural production. The five CVP water contractors are:

- Colusa County Water District
- Corning Water District
- Del Puerto Water District
- Glenn Valley Water District
- Westside Water District

Dryland agriculture, grazing, open space, or recreation uses associated with implementation of Alternative 1 would be compatible with the land use designations of the lands of the agricultural CVP water contractors.

Five CVP water contractors have relied to some degree on CVP water to support development of municipal and rural residential lands outside the authorized POU. The five CVP water contractors are:

- City of Coalinga
- Mountain Gate Community Services District
- Shasta Community Services District
- Silverthorn Summer Homes, Inc.
- Westlands Water District

With adoption of Alternative 1, CVP water would no longer be delivered to these lands, and the water contractors would have to secure other sources of water to maintain existing service. Obtaining another source of water may be difficult or expensive; however, no change in land use is expected if Alternative 1 is implemented.

There is one CVP water contractor that has relied on CVP water to some degree to support development of industrial land use outside the authorized POU. Without CVP water, SMUD's Rancho Seco power generation facility (although not currently in operation) would require an alternative water source. Obtaining another source of water may be difficult or expensive; however, no change in land use is expected if Alternative 1 is implemented. The land could be developed as specified by its existing general plan land use designation (public/quasi public) and zoning (agriculture) with other types of uses, although this may not be preferable.

4.13 Effects on Recreation and Visual Resources

4.13.1 Effects on Recreation Resources

The Proposed Project or three alternatives would not significantly affect recreation resources on either developed parks or on undeveloped lands. Land use changes that could occur on undeveloped lands may alter recreational opportunities such as hiking, hunting, and other activities associated with open space if they are developed into agricultural or M&I land uses.

If developed into M&I land uses, local land management authorities would require the development of appropriate recreation facilities to serve the resident population, therefore, existing recreational resources would be converted from undeveloped open space forms of recreation to formal developed forms of recreation common to urban environments.

The conversion of undeveloped land to agriculture would not preclude recreational activities, and may promote hunting various game birds and other species. The replacement of one form of recreation with another, which may occur with future land use changes is not considered a significant adverse impact on local and regional recreation resources.

4.13.2 Effects on Visual Resources

The Proposed Project and three alternatives would not directly alter the aesthetic quality of the local environments, however, in areas where future land use changes take place, change to existing visual resources is expected. The specific future land uses that are implemented would create a visual landscape that is commensurate with future land use activities and the environment.

It would be speculative to conclude that changes to the visual landscape of specific areas would be either adverse or beneficial. Local land management authorities control visual quality through land use regulations and restrictions that can be applied to future land development proposals.

4.14 Economics

4.14.1 Introduction

This section addresses the economic effects of modifying the authorized POU for the delivery of CVP water to CVP contractors from the proposed project and Alternatives 1 and 2. Effects from Alternative 3 would be the same as for Alternative 1. For purposes of full disclosure, this EIR addresses effects to economic conditions, although CEQA does not require a discussion of this issue. The effects are quantified in terms of changes in the value of crop production, wage and salary earnings related to agriculture, and the number of jobs affected by these modifications. In addition, the implications of modifying the authorized POU for M&I water contractors are qualitatively discussed.

The discussion presents the economic consequences from both a qualitative and quantitative perspective, discussing the possible impacts of increasing or decreasing irrigation water available to individual growers, and subsequently estimating the gross farm income, earnings, and employment impacts on the regional economy. The analysis distinguishes between direct farm-level benefits (and costs) felt by individual growers as a result of implementing an alternative and those indirect benefits that accrue to the regional economy when considering other industries in the Central Valley.

The Proposed Project would result in the expansion of irrigated acreage within the CVP service area. Compared to Alternative 1, this would result in a potential crop output increase of about $51.8 million, a wage earnings increase of about $24.4 million, and job growth of approximately 1,977. Compared to Alternative 2, the Proposed Project would increase crop receipts by $3.8 million, earnings by $1.5 million, and jobs by 153.

Alternative 1 would reduce farm receipts by about $47.9 million, reduce wage earnings by over $22.5 million, and reduce employment by about 1,825 jobs relative to Alternative 2. Although substantial, these dollar figures are small in relation to the total crop receipts generated over the entire CVP system and the state as a whole.

Alternative 2 would increase farm receipts by about $47.9 million, increase wage earnings by over $22.5 million, and increase employment by about 1,825 jobs relative to Alternative 1. Because Alternative 2 is existing conditions, these are increases that have occurred relative to Alternative 1 (permitted conditions).

The Proposed Project and alternatives do not involve changing the volume of contracted CVP water delivered to contractors, but rather changing the boundary of the authorized POU. If water is a limiting factor, economic gains (or losses) to growers in one area may be offset by losses (or gains) to growers elsewhere within the boundaries of an individual CVP contractor because the water will merely be reallocated to those in need. This analysis estimates the net change of irrigated lands expected to occur within the boundaries of each CVP water contractor assuming that water is not a limiting factor. It should be recognized that, even if water is not a limiting factor, the economic costs associated with loss

of irrigated land may not occur if non-CVP water can be supplied to the unpermitted area. The analysis does not quantify economic effects resulting from changes to M&I land use.

Table 4-10 summarizes the results of the economic analysis. Net changes could represent relatively large economic impacts for individuals within these boundaries. However, it is not yet known whether displaced water would irrigate previously unirrigated acres within a water contractor boundary or replace another water source. Therefore, this section addresses impacts on individual growers in a qualitative manner rather than in terms of quantitative effects.

4.14.2 Proposed Project

Farm-Level Effects

Compared to Alternative 2, approximately 399 acres would change from dryland farming to irrigated production, and 3,717 acres would change from undeveloped land to irrigated agricultural production. Producers developing newly irrigated lands would incur costs above the delivery costs of CVP water because they would most likely need to install a farm-level irrigation system. Compared to Alternative 1, 51,468 acres would change from dryland to irrigated agricultural use, and 3,717 acres would change from undeveloped to irrigated agricultural use. Assuming CVP water was available to irrigate these acres, an increase in net farm income is expected. If CVP water is not available, gains in the unpermitted area may be offset by losses elsewhere.

Regional Economic Effects

Adoption of the Proposed Project would cause some regional economic changes. Compared to Alternative 2, it would increase the value of farm output about $3.8 million in the unpermitted area of the CVP service area, produce about $1.8 million in additional earnings, and add 153 full-time jobs in the CVP region. Over 74 percent of these benefits accrue to the SCVWD area; about 11 percent of the benefits would be felt in the Westside area.

Table 4-10
Economic Effects of Implementing the Alternatives

CVP Water Contractor	Economic Effects of Implementing Alternative 1 (Permitted Conditions) Relative to Alternative 2 (Existing Conditions)		Economic Effects of Implementing Alternative 2 (Existing Conditions) Relative to Alternative 1 (Permitted Conditions)		Economic Effect of Implementing Proposed Project Relative to Alternative 1 (Permitted Conditions)	
	Cropping Pattern Changes	Regional Economic Consequences[a]	Cropping Pattern Changes	Regional Economic Consequences	Cropping Pattern Changes	Regional Economic Consequences
Anderson-Cottonwood Irrigation District	None	None[b]	None	None[c]	None	None[b]
Arvin-Edison Water Storage District	None	None[b]	None	None[c]	None	None[b]
Avenal, City of	None	None[b]	None	None[c]	None	None[b,d]
Bella Vista Water District	None	None[b]	None	None[c]	None	None[b,d]
Coalinga, City of	None	None[b]	None	None[c]	None	None[b,d]
Colusa County Water District	1,499 fewer irrigated acres	Adverse impacts to region: GFI: ($800,000) Earnings: ($509.000) Employment: (41 FTE jobs)	1,499 additional irrigated acres	Benefit to CVP region: GFI: $800,000 Earnings: $509,000 Employment: 41 FTE jobs	1,709 additional irrigated acres	Benefit to CVP region: GFI: $910,000 Earnings: $581,000 Employment: 46 FTE jobs
Contra Costa Water District	None	None	None	None	None	None
Corning Water District	1,647 fewer irrigated acres	Adverse impacts to CVP region: GFI: ($260,000) Earnings: ($131,000) Employment: (10 FTE jobs)	1,647 additional irrigated acres	Benefit to CVP region: GFI: $260,000 Earnings: $131,000 Employment: 10 FTE jobs	1,647 additional irrigated acres	Benefit to CVP region: GFI: $260,000 Earnings: $131,000 Employment: 10 FTE jobs
Del Puerto Water District	1,000 fewer irrigated acres	Adverse impacts to CVP region: GFI: ($1,990,000) Earnings: ($960,000) Employment: (83 FTE jobs)	1,000 additional irrigated acres	Benefit to CVP region: GFI: $1,990,000 Earnings: $960,000 Employment: 83 FTE jobs	1,000 additional irrigated acres	Benefit to CVP region: GFI: $1,990,000 Earnings: $960,000 Employment: 83 FTE jobs
East Bay Municipal Utility District	None	None[b]	None	None[c]	None	None[b]
El Dorado Irrigation District	None	None[b]	None	None[c]	None	None[b]
Glenn Valley Water District	None	None	None	None	159 additional irrigated acres	Benefit to CVP region: GFI: $70,000 Earnings: $45,200 Employment: 4 FTE jobs
Kanawha Water District	689 fewer irrigated acres	Adverse impacts to CVP region: GFI: ($240,000) Earnings: ($150,000) Employment: (12 FTE jobs)	689 additional irrigated acres	Benefit to CVP region: GFI: $240,000 Earnings: $150,000 Employment: 12 FTE jobs	902 additional irrigated acres	Benefit to CVP region: GFI: $320,000 Earnings: $204,000 Employment: 17 FTE jobs
Mountain Gate Community Services District	None	None[b]	None	None[c]	None	None[b,d]
Orland-Artois Water District	None	None[b]	None	None[c]	None	None
Sacramento Municipal Utility District	None	None[b]	None	None[c]	None	None[b]

Table 4-10
Economic Effects of Implementing the Alternatives

CVP Water Contractor	Economic Effects of Implementing Alternative 1 (Permitted Conditions) Relative to Alternative 2 (Existing Conditions)		Economic Effects of Implementing Alternative 2 (Existing Conditions) Relative to Alternative 1 (Permitted Conditions)		Economic Effect of Implementing Proposed Project Relative to Alternative 1 (Permitted Conditions)	
	Cropping Pattern Changes	Regional Economic Consequences[a]	Cropping Pattern Changes	Regional Economic Consequences	Cropping Pattern Changes	Regional Economic Consequences
San Benito County Water District	None	None[b]	None	None[c]	None	None
San Luis Water District	9,609 fewer irrigated acres	Adverse impacts to CVP region: GFI: ($7,500,000) Earnings: ($3,640,000) Employment: (303 FTE jobs)	9,609 additional irrigated acres	Benefit to CVP region: GFI: $7,500,000 Earnings: $3,640,000 Employment: 303 FTE jobs	9,609 additional irrigated acres	Benefit to CVP region: GFI: $7,500,0000 Earnings: $3,640,000 Employment: 303 FTE jobs
Santa Clara Valley Water District	None	None[b]	None	None[c]	2,039 additional irrigated acres	Benefit to CVP region: GFI: $2,860,000 Earnings: $1,286,000 Employment: 107 FTE jobs
Shasta Community Services District	None	None[b]	None	None[c]	None	None[b,d]
Shasta County Service Area No. 6 - Jones Valley	None	None[b]	None	None[c]	None	None[b]
Shasta County Service Area No. 25 - Keswick	None	None[b]	None	None[c]	None	None[b,d]
Shasta Lake, City of	None	None[b]	None	None[c]	None	None[b,d]
Silverthorn Summer Homes, Inc.	None	None[b]	None	None[c]	None	None[b]
Westlands Water District	36,386 fewer irrigated acres	Adverse impacts to CVP region: GFI: ($37,020,000) Earnings: ($17,070,000) Employment: (1,370 FTE jobs)	36,386 additional irrigated acres	Benefit to CVP region: GFI: $37,020,000 Earnings: $17,070,000 Employment: 1,370 FTE jobs	36,386 additional irrigated acres	Benefit to CVP region: GFI: $37,020,000 Earnings: $17,070,000 Employment: 1,370 FTE jobs
Westside Water District	239 fewer irrigated acres	Adverse impacts to CVP region: GFI: ($140,000) Earnings: ($85,000) Employment: (7 FTE jobs)	239 additional irrigated acres	Benefit to CVP region: GFI: $140,000 Earnings: $85,000 Employment: 7 FTE jobs	997 additional irrigated acres	Benefit to CVP region: GFI: $580,000 Earnings: $364,000 Employment: 29 FTE jobs
Total	**51,069 fewer irrigated acres**	**Adverse impacts to CVP region:** **GFI: ($47,950,000)** **Earnings: ($22,545,000)** **Employment: (1,825 FTE jobs)**	**51,069 additional irrigated acres**	**Benefit to CVP region:** **GFI: $47,950,000** **Earnings: $22,545,000** **Employment: 1,825 FTE jobs**	**54,483 additional irrigated acres**	**Benefit to CVP region:** **GFI: $51,510,000** **Earnings: $24,281,200** **Employment: 1,977 FTE jobs**

[a]Loss of estimated income would be partially offset by using CVP water elsewhere within the CVP service area.
[b]Except that substitution to more expensive water supplies may increase water costs.
[c]Except that less expensive CVP water supplies may decrease water costs.

Table 4-10
Economic Effects of Implementing the Alternatives

CVP Water Contractor	Economic Effects of Implementing Alternative 1 (Permitted Conditions) Relative to Alternative 2 (Existing Conditions)		Economic Effects of Implementing Alternative 2 (Existing Conditions) Relative to Alternative 1 (Permitted Conditions)		Economic Effect of Implementing Proposed Project Relative to Alternative 1 (Permitted Conditions)	
	Cropping Pattern Changes	Regional Economic Consequences[a]	Cropping Pattern Changes	Regional Economic Consequences	Cropping Pattern Changes	Regional Economic Consequences

[d]Poposed growth would require more use of CVP water supplies. It is assumed that this growth would not occur under permitted conditions.

Table 4-11 summarizes the potential change in farm receipts associated with the proposed project relative to Alternative 1. In comparison to Alternative 1, the value of farm output would increase $51.8 million, earnings would increase $24.4 million, and employment would increase by 1,977 jobs. Most of these impacts (72 percent) would be obtained in Westlands, with SLWD receiving more than 14 percent.

Table 4-11
Gross Farm Receipts of the Proposed Project When Compared to Alternative 1

CVP Contractor	Alternative 1 Gross Farm Receipts	Proposed Project Gross Farm Receipts	Change in Receipts	Percent Change
Anderson-Cottonwood Irrigation District	$6,710,000	$6,710,000	$0	0.0
Arvin-Edison Water Storage District	$217,490,000	$217,490,000	$0	0.0
Bella Vista Water District	$340,000	$340,000	$0	0.0
Colusa County Water District	$34,240,000	$33,330,000	$910,000	2.7
Corning Water District	$4,200,000	$3,940,000	$260,000	6.6
Del Puerto Water District	$85,210,000	$83,220,000	$1,990,000	2.4
Glenn Valley Water District	$410,000	$340,000	$70,000	20.6
Kanawha Water District	$5,220,000	$4,900,000	$320,000	6.5
San Benito County Water District	$47,790,000	$47,520,000	$270,000	0.6
San Luis Water District	$56,7000,000	$49,200,000	$7,500,000	15.2
Santa Clara Valley Water District	$5,160,000	$2,300,000	$2,860,000	124.3
Westlands Water District	$710,680,000	$673,660,000	$37,020,000	5.5
Westside Water District	$9,320,000	$8,740,000	$580,000	6.6
Total	**$1,183,470,000**	**$1,131,690,000**	**$51,780,000**	**4.6**

Potential Economic Effects on Municipal and Industrial CVP Contractors Associated with the Proposed Project and Alternatives

M&I CVP water contractors affected by Reclamation's petition and alternatives include:

- Arvin-Edison Water Storage District
- City of Avenal
- City of Coalinga
- Contra Costa Water District
- East Bay Municipal Utility District

- El Dorado Irrigation District
- Mountain Gate Community Services District
- Sacramento Municipal Utility District
- San Benito County Water District
- San Luis Water District
- Santa Clara Valley Water District
- Shasta Community Services District
- Shasta County Service Area No. 6 - Jones Valley
- Shasta County Service Area No. 25 - Keswick
- City of Shasta Lake
- Silverthorn Summer Homes, Inc.
- Westlands Water District

The above CVP contractors serve varied needs, ranging from potable water for human consumption to cooling water for electrical power generation.

The economic effects of changing the availability of CVP water for these water contractors would vary depending on the alternative sources of water available to the water contractors. In the areas that have alternative water sources, the effect of conforming the authorized POU to Alternative 1 would likely be substantial, but less than the effect experienced in areas without alternative water sources. The areas without identified alternative water sources include the following:

- City of Coalinga
- Mountain Gate Community Services District
- Shasta Community Services District
- Silverthorn Summer Homes, Inc.
- Westlands Water District

For these CVP water contractors, the adverse economic effects associated with permitted conditions might be substantial. Water transfers or other new supplies would have to be developed.

4.14.3 Effects of Alternative 1 (No Project)

Farm-Level Effects

Removal of CVP water supplies from irrigated lands outside the authorized POU would cause a net decrease in irrigated acreage. If water is not a limiting factor, about 51,069 acres would change from irrigated agricultural production to dryland farming. A decrease in net farm income in the unpermitted area and an uncertain, less-than-proportional increase in net farm income in the permitted area is expected. Economic impacts would depend on water year type, opportunities for irrigation development within the permitted area, water allocation rules, crop mix and quality within the unpermitted area, and other factors. However, the actual loss of investment stemming from both the district delivery and farm distribution systems is also uncertain and depends on site-specific conditions.

Regional Economic Effects

Implementing Alternative 1 would cause substantial regional economic changes if water is not a limiting factor. The value of gross farm income would decrease by about $47.9 million in the unpermitted area. This translates to about $22.6 million in lost earnings and 1,825 fewer full-time jobs in the CVP region. These impacts would be partially offset from income from using the CVP water elsewhere.

To give some perspective, the statewide gross crop value from CVP water sources during 1987 to 1989 was $3.341 billion (USBR, 1989). The contractors cited in this analysis contributed slightly over $1 billion to this total. A maximum decrease of $47.9 million in value of farm output is approximately 1.4 percent of the state's agricultural output from CVP water sources. When considering all water sources (CVP, state, or local), this is less than 1 percent of the statewide value of farm output (U.S. Department of Commerce, Bureau of the Census, 1989).

In terms of cumulative impacts, which are discussed further in Section 6 of this EIR, this loss is not considered significant because it is only a small percentage of the state's earnings and jobs. However, the economic impact more significantly affects CVP water contractors that rely on CVP water for all or a large part of their agricultural uses.

Westlands would bear more than 75 percent of the total economic impact. The loss of 36,386 irrigated acres, or about 7 percent of the total irrigated acreage within its boundary, results in losses of nearly $37 million in gross farm income, $17 million in earnings, and more than 1,370 jobs in the CVP region. This would be a significant adverse impact to Westlands' overall earnings and jobs.

Some of these effects would be offset by use of the water no longer needed for irrigation of unpermitted lands elsewhere in the District. Westlands would continue to use its current contracted water more intensively within its current place of use boundary. More intensive water use could include growing more water-intensive crops such as alfalfa. If acreage is available, Westlands' irrigators may also decide to irrigate or develop additional irrigated lands within the permitted area and this would offset some of the negative effects discussed above. Regardless, there would most likely be a net decrease in irrigated acreage (especially in wet years), which could have a wide range of impacts on Westlands' regional economy; the lower end of the range is zero, or minimal impact, and the maximum impact has been cited above. Although switching crops and using water more intensively may mitigate some of the adverse impacts resulting from reducing overall irrigated acreage, the average impact to the regional economy might be substantial.

SLWD would bear about 15 percent of the total economic impact. If water is not a limiting factor, losses to gross farm income, earnings, and employment total approximately $7.5 million, $3.6 million, and 303 jobs, respectively. This impact affects 22 percent of SLWD's total irrigated acres and might constitute a substantial regional impact.

Similar to Westlands, it is unlikely that SLWD would have excess water resulting from limiting CVP water use to the place of use boundary. SLWD would also likely use water more intensively and, if available, irrigate or develop additional lands within the permitted area. However, it is also unlikely that it could maintain its current level of irrigated acreage and, as a result, the same range of regional impacts would result as those cited for Westlands.

The remaining contractors receive approximately 7 percent of the total economic impact. The impact on these contractors is relatively minor compared to the loss affecting Westlands and SLWD. However, for

some of these smaller contractors, the loss could be a significant portion of their income, earnings, and job losses, and may also be significant.

Table 4-12 identifies the affected CVP contractors and the percentage of loss that could occur to their entire district if Alternative 1 were adopted.

Table 4-12
Gross Farm Receipts of Alternative 1 (Permitted Conditions)
When Compared to Alternative 2 (Existing Conditions)

CVP Contractor	Alternative 1 Gross Farm Receipts	Alternative 2 Gross Farm Receipts	Change in Receipts[a]	Percent Change
Anderson-Cottonwood Irrigation District	$6,710,000	$6,710,000	$0	0.0
Arvin-Edison Water Storage District	$217,490,000	$217,490,000	$0	0.0
Bella Vista Water District	$340,000	$340,000	$0	0.0
Colusa County Water District	$33,330,000	$34,130,000	($800,000)	-2.3
Corning Water District	$3,940,000	$4,200,000	($260,000)	-6.2
Del Puerto Water District	$83,220,000	$85,210,000	($1,990,000)	-2.3
Glenn Valley Water District	$340,000	$340,000	$0	0.0
Kanawha Water District	$4,900,000	$5,140,000	($240,000)	-4.7
San Benito County Water District	$47,520,000	$47,520,000	$0	0.0
San Luis Water District	$49,200,000	$56,700,000	($7,500,000)	-13.2
Santa Clara Valley Water District	$2,300,000	$2,300,000	$0	0.0
Westlands Water District	$673,660,000	$710,680,000	($37,020,000)	-5.2
Westside Water District	$8,740,000	$8,880,000	($140,000)	-1.6
Total	**$1,131,690,000**	**$1,179,640,000**	**($47,950,000)**	**-4.1**

[a] Loss of estimated gross farm receipts would be partially offset by using CVP water elsewhere within the CVP service area.

From a statewide and CVP-region perspective, the loss of agricultural land within the boundaries of these contractors would not have a significant impact. But the effect on individual districts that have more than minor revenue/earnings and local employment reductions is considered significant. The loss would increase proportionately with the share of years in which water is not a limiting factor, and the amount of land that would be taken out of irrigated agricultural production.

4.14.4 Effects of Alternative 2 (Existing Conditions)

Farm-Level Effects

Adoption of Alternative 2 would cause a net increase in irrigated acreage relative to Alternative 1. Overall, the land use of about 51,069 acres has changed from dryland farming to irrigated agricultural production. Assuming excess CVP water was available to irrigate these lands, an increase in net farm income in the unpermitted area has occurred. An uncertain, less-than-proportionate reduction of net farm income in the permitted area has occurred to the extent that excess supplies have not been available (water has been a limiting factor). The reduction of income is termed less than proportional because it is uncertain whether the lands within the permitted areas were converted to non-irrigated uses or irrigated with water from another source. In either case, net farm income within the permitted area would drop, but the magnitude of the drop is unknown.

Regional Economic Effects

Adoption of Alternative 2 would cause substantial regional economic changes. If water was not a limiting factor, it would increase the value of farm output about $47.9 million, raise about $22.5 million in additional earnings, and add 1,825 full-time jobs in the CVP region. Similar to Alternative 1, more than 75 percent of these benefits would accrue to the Westlands area, and about 15 percent of the benefits would accrue to the SLWD area. Table 4-13 summarizes the potential change in farm receipts associated with Alternative 2.

Table 4-13
Gross Farm Receipts of Alternative 2 (Existing Conditions)
When Compared to Alternative 1 (Permitted Conditions)

CVP Contractor	Alternative 2 Gross Farm Receipts	Alternative 1 Gross Farm Receipts	Change in Receipts	Percent Change
Anderson-Cottonwood Irrigation District	$6,710,000	$6,710,000	$0	0.0
Arvin-Edison Water Storage District	$217,490,000	$217,490,000	$0	0.0
Bella Vista Water District	$340,000	$340,000	$0	0.0
Colusa County Water District	$34,130,000	$33,330,000	$800,000	2.4
Corning Water District	$4,200,000	$3,940,000	$260,000	6.6
Del Puerto Water District	$85,210,000	$83,220,000	$1,990,000	2.4
Glenn Valley Water District	$340,000	$340,000	$0	0.0
Kanawha Water District	$5,140,000	$4,900,000	$240,000	4.9
San Benito County Water District	$47,520,000	$47,520,000	$0	0.0
San Luis Water District	$56,700,000	$49,200,000	$7,500,000	15.2
Santa Clara Valley Water District	$2,300,000	$2,300,000	$0	0.0
Westlands Water District	$710,680,000	$673,660,000	$37,020,000	5.5
Westside Water District	$8,880,000	$8,740,000	$140,000	1.6
Total	**$1,179,640,000**	**$1,131,690,000**	**$47,950,000**	**4.2**