

This section addresses agricultural, wetland habitat, and recreational land uses that could be affected by the water transfer program, both water development and use.

7.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

The San Joaquin Valley consists of flat terrain with several irrigation facilities and canals. The primary land use in the project area is agriculture, consisting mostly of field and grain crops, hay, alfalfa, and pasture crops. Orchard and vineyard uses include fruit crops (primarily raisins and table grapes) and nut crops (primarily pistachios and almonds). Rural residences, mostly associated with agricultural land uses, are found throughout the area. Other land uses pertinent to the action alternatives include recreational opportunities associated with wetland habitat and wildlife refuges.

7.1.1 Resources

7.1.1.1 Agricultural Land Use

Agricultural land uses in the Exchange Contractors service area (from which water would be developed and transferred) include cotton, melons, alfalfa hay, grains, vegetables, field crops, orchards, and vineyards. Farmers in the Exchange Contractors service area produce crops with a farm value of \$305,625,000 annually. Within the Exchange Contractors service area, the largest-acreage crops are cotton, alfalfa hay and seed, miscellaneous field crops, grains, vegetables, and permanent crops. Cotton is the largest single crop grown in the area, accounting for 28.7 percent of total acreage and 29.6 percent of total production value. Alfalfa, the second largest crop in the area, is grown on 59,865 acres and is used extensively by the local dairy industry (see Section 8.1.1.4).

The agricultural water users that would benefit from the potential transfers are located in Stanislaus, San Joaquin, Merced, Madera, Fresno, San Benito, Santa Clara, Tulare, Kings, and Kern counties. Table 7-1 shows the importance of agriculture in each county in the project area based on the 1997 Census of Agriculture. The 10-county project area contains 29,036 farms, 39 percent of the farms in the State. Most of these are small farms of less than 50 acres in size. In Kern County, 35.1 percent of farms are less than 50 acres in size but 30.3 percent are 500 acres and over. San Benito, Kings, Madera, and Kern counties have proportionately more large farms than the State as a whole. The percentage of farm operators whose principal occupation is farming ranges from 47.6 percent in Santa Clara County to 63.8 percent in Kern County. In contrast, 53 percent of farm operators in the State identify their principal occupation as farming.

Land in farms consists primarily of agricultural land used for crops, pasture, or grazing. Table 7-2 shows the total farm acreage in comparison to the total land area of each county and estimates irrigated land and cropland. Irrigated land is land to which water was artificially applied in 1997 for producing a harvested crop, for pasture or grazing lands, for cultivated summer fallow, or for land planted with a crop intended for future harvest. Cropland consists of land that could have been used for crops without additional improvements. Kern County contains almost 23 percent of the total farm acreage, and Fresno County has over 22 percent of the irrigated acreage in the project area counties. The largest average farm size (1,428 acres) is in Kern County. Of the 10,596,000 acres of farmland in the project area, nearly 46 percent (4,848,000 acres) is irrigated.

**Table 7-1
Farm and Farm Operators in Project Area, 1997**

County	Farms			Farm Operators
	Number	Less Than 50 Acres (%)	500 Acres and Over (%)	
Fresno	6,592	58.6	11.2	62.3
Kern	1,997	35.1	30.3	63.8
Kings	1,079	50.6	18.9	62.2
Madera	1,673	44.6	13.8	58.4
Merced	2,831	52.5	10.8	61.9
San Benito	562	48.0	24.9	55.2
San Joaquin	3,862	62.6	8.3	59.3
Santa Clara	985	74.5	7.8	47.6
Stanislaus	4,009	65.5	6.5	55.8
Tulare	5,446	59.7	8.2	55.5
Project Area (Subtotal)	29,036	NA	NA	NA
State	74,126	60.6	11.7	53.0

Source: Gaquin and DeBrandt 2002.
NA = not available

**Table 7-2
Land in Farms in Project Area, 1997**

County	Acres				
	Total Land Area (000)	Farm Acreage (000)	Average Size of Farm	Total Irrigated (000)	Total Cropland (000)
Fresno	3,817	1,881	285	1,154	1,251
Kern	5,210	2,851	1,428	913	1,054
Kings	889	657	609	421	526
Madera	1,369	642	383	309	333
Merced	1,235	882	311	493	532
San Benito	889	512	910	36	73
San Joaquin	896	809	209	519	559
Santa Clara	826	319	324	19	32
Stanislaus	957	733	183	359	382
Tulare	3,087	1,310	240	625	703
Project Area (Subtotal)	19,175	10,596	NA	4,848	5,445
State	99,823	27,699	374	8,713	10,804

Source: Gaquin and DeBrandt 2002.
NA = not available

The value of agricultural products sold in 1997 is reported in Table 7-3. The value of farm products sold by farms represents the gross market value before taxes and production expenses of all agricultural products sold or removed in 1997 (regardless of who received the payment). The total value of agricultural products sold in the 10-county project area was \$11,991,000,000, which represents 52.1 percent of all agricultural products sold in the State. Fresno County had the largest total value with \$2,773,000,000, and 76.3 percent came from crops. Kern County had the largest value of products sold per farm (\$985,735).

Table 7-3
Value of Agricultural Products Sold in Project Area, 1997

County	Total (\$ Million)	Average per Farm (\$)	% From Crops	% From Livestock and Poultry
Fresno	2,773	420,629	76.3	23.7
Kern	1,969	985,735	90.8	9.2
Kings	694	642,889	53.2	46.8
Madera	627	374,901	81.0	19.0
Merced	1,273	449,832	45.4	54.6
San Benito	157	278,838	84.8	15.2
San Joaquin	1,180	305,465	73.4	26.6
Santa Clara	188	191,355	89.6	10.4
Stanislaus	1,209	301,453	45.5	54.5
Tulare	1,921	352,806	58.4	41.6
Project Area (Subtotal)	11,991	NA	NA	NA
State	23,032	310,718	74.0	26.0

Source: Gaquin and DeBrandt 2002.
NA = not available

Table 7-4 shows the irrigated acreage in the agricultural areas affected by the action alternatives. For the Exchange Contractors' member agencies, very little land is not irrigated. For the proposed water users, all but three have greater than 80 percent of their land area under irrigation.

Agricultural lands in California may be protected under the California Land Conservation Act, commonly called the Williamson Act. Local governments can enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. Landowners receive substantially reduced property tax assessments in return for enrollment under Williamson Act contracts. Property tax assessments of Williamson Act-contracted land are based on the generated income of the land as opposed to the potential market value of the property (DLRP 2004). The percentage of acreage under Williamson Act contracts by county is summarized in Table 7-5. Three of the counties in the 10-county project area, Kings, Stanislaus, and San Benito, have the highest percentage of Williamson Act lands in the State, and all 10 counties are among the top 20 counties in the State with Williamson Act lands.

Table 7-4
Irrigated Acreage by Agricultural Area

Area/District	Total Acreage in Service Area ¹	Irrigated Acreage	
		Number ²	% of Total
Exchange Contractors			
CCID	152,691	147,254	96.4
San Luis CC	42,069	41,913	99.6
Firebaugh Canal WD	21,731	20,739	95.4
Columbia CC	15,043	13,279	88.3
Agricultural Water Users			
Plainview WD	6,396	4,120	64.4
Del Puerto WD	45,228	39,986	88.4
Patterson WD	13,500	13,316	98.6
San Luis WD	65,000	45,758	70.4
Pacheco WD	4,900	4,900	100
Panoche WD	38,000	35,073	92.3
Westlands WD	604,540	529,050	87.5
San Benito County WD	47,542	29,119	61.2
Friant Division	--	850,348	--
Santa Clara Valley WD ³	--	25,677	--

Sources:

¹ Information for the Exchange Contractors from State Water Resources Control Board, Report No. 64-1, Kc Values. Information for agricultural water users provided by individual districts to Exchange Contractors, January 2000.

² Information for the Exchange Contractors from State Water Resources Control Board, Report No. 64-1, Kc Values. Information provided by Reclamation for either an average of years or as best available data.

³ Santa Clara County 2002.

Table 7-5
Percentage of County Acreage in Williamson Act

County	Percent Acreage
Fresno	39.65
Kern	32.37
Kings	70.44
Madera	35.85
Merced	26.25
San Benito	63.73
San Joaquin	55.88
Santa Clara	39.29
Stanislaus	68.89
Tulare	35.85

Source: CSAC 2004.

The project area also contains Prime Farmlands, Unique Farmlands, and Farmland of Statewide and Local Importance (FSI and FLI). As defined by the U.S. Department of Agriculture, Prime Farmlands consist of soils that are best suited to producing food, seed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the production of sustained high yields of crops. Unique Farmlands include land used for production of the state's major crops on soils not qualifying for prime or statewide importance. This land is usually irrigated, but may include non-irrigated fruits and vegetables as found in some climatic zones in California. No specific statewide criteria for FSI or FLI are available other than the lands must have been irrigated within the past 3 years and have a good combination of physical and chemical features, but have minor shortcomings such as greater slopes or with less ability to hold and store moisture. FSI and FLI lands include those lands of agricultural importance to the local economy, as defined by each county's local advisory committee and adopted by its board of supervisors.

Figure 7-1 shows these lands within the project area. Table 7-6 estimates the acres and percentages of these farmland categories by county in the project area, based on the Geographic Information System map layers obtained from the California Department of Conservation.

Urban growth will continue in California, and conversion of agricultural land to urban purposes will continue as well. The last California Water Plan published by the DWR, 160-98, showed that between 1995 and 2020 cropland in California was projected to decline by 325,000 acres. The South Coast region was projected to decline by 123,000 acres, Tulare Lake Basin by 142,000 acres, and San Joaquin region by 70,000 acres.

A recent publication by the California Department of Finance, Demographic Research Unit, shows that from 2000 to 2050 total population in the state is projected to grow by 9.4 million people. Of this total, approximately 0.7 million are projected to be in the four-county area making up the service area of the San Joaquin River Exchange Contractors Water Authority. Fresno is projected to grow the most rapidly, by about 0.3 million, followed by Stanislaus at 0.2 million and Merced at 0.15 million. While projections for individual cities are not available from the same source, it is likely that most of the urban growth in the San Joaquin Valley and elsewhere will be in or proximate to population centers, which for the San Joaquin Valley include Fresno, Merced, and Modesto.

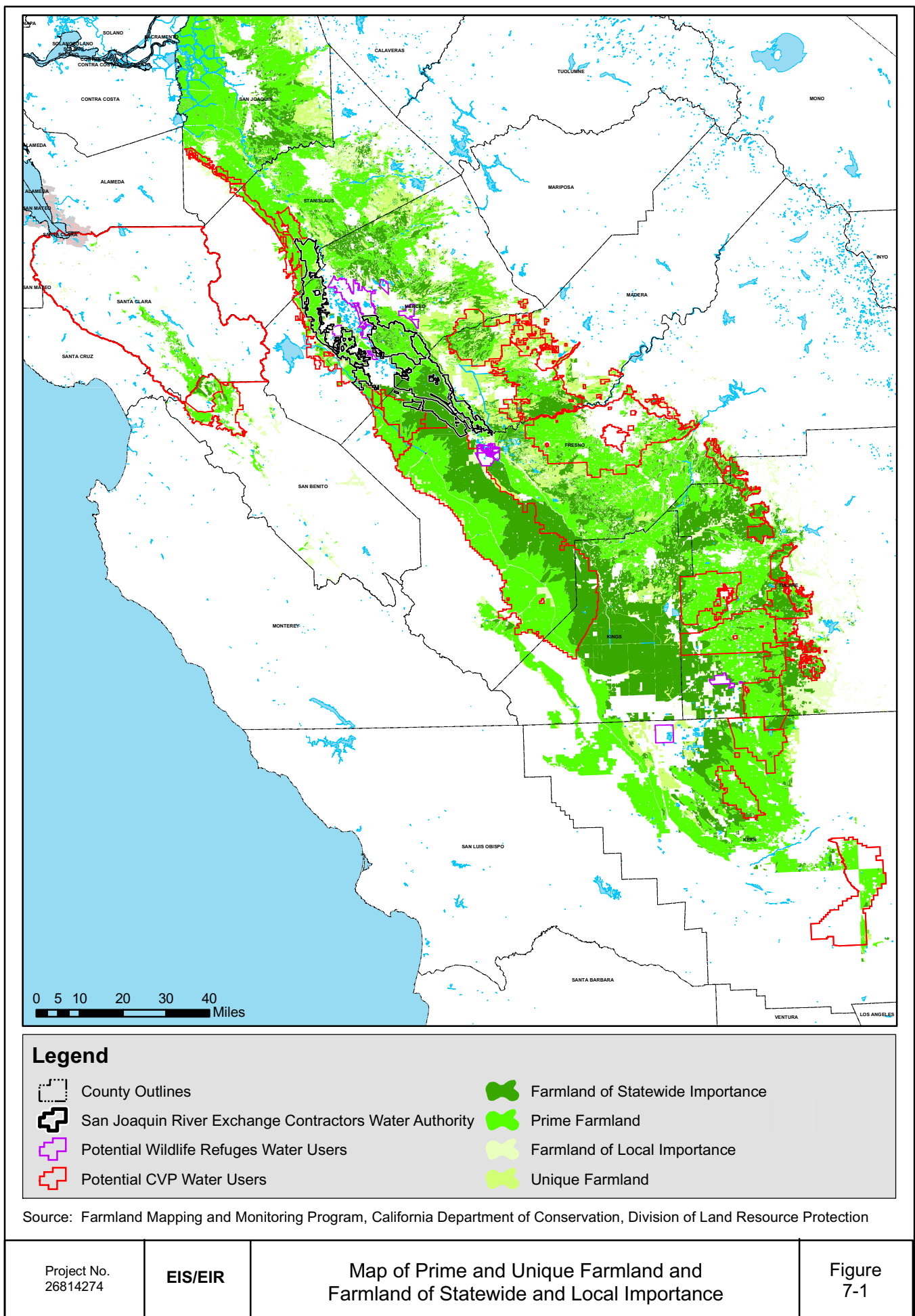
7.1.1.2 Wetland Habitat

The wetland habitat areas that would potentially receive transfer water are located in Merced, Fresno, Tulare, and Kern counties. Seasonal wetland habitat at refuges and at private hunting clubs is integral to the maintenance of waterfowl populations along the Pacific Flyway. Wildlife refuges include the San Luis and Merced NWRs, owned and operated by the Service, and the Los Banos and Volta WMAs, owned and operated by the DFG. In addition, DFG operates the Grasslands WMA, but the public is not allowed access. The primary objective of the Grasslands WMA is wetland habitat protection, particularly for wintering waterfowl. The Kern and Pixley NWRs, owned and operated by the Service, are located in the historic Tulare Basin. Figure 2-3 shows the wildlife refuges and management areas in the project vicinity. Table 7-6 identifies the wildlife refuges and management areas in the project area. Existing land uses in these wetland habitat areas are managed to provide wildlife habitat, hunting, and bird-watching opportunities.

**Table 7-6
Prime and Unique Farmland and Farmland of Statewide and Local Importance in the Project Area**

County	Total Land Area	Prime Farmland		Unique Farmland		Farmland of Statewide Importance		Farmland of Local Importance	
	Acres (000)	Acres (000)	%	Acres (000)	%	Acres (000)	%	Acres (000)	%
Fresno	3,817	731	19	103	3	490	13	74	2
Kern	5,210	530	10	51	1	109	2	0	0
Kings	889	141	16	28	3	431	49	8	1
Madera	1,369	101	7	165	12	85	6	21	2
Merced	1,235	286	23	101	8	158	13	42	3
San Benito	889	34	4	2	0	9	1	33	4
San Joaquin	896	416	46	62	7	93	10	57	6
Santa Clara	826	29	3	1	0	4	1	8	1
Stanislaus	957	261	27	61	6	30	3	30	3
Tulare	3,087	388	13	11	0	347	11	133	4
Total Project Area	19,175	2,915	15	585	3	1,757	9	405	2

Source: Farmland Mapping and Monitoring Program. California Department of Conservation, Division of Land Resource Protection.



**Table 7-7
Wildlife Refuges and Management Areas in the Project Area**

Name	Size (acres)	Owner/Manager	Year Established	Auto Tour	Trails	Hunting
San Luis NWR Complex						
San Luis Unit	7,430	Service	1966	Yes	Yes	Yes
West Bear Creek Unit	3,892	Service	1990	Yes	Yes	Yes
Kesterson Unit	5,900	Service	1969	Yes	Yes	Yes
Freitas Unit	5,600	Service	1990	Yes	Yes	NA
East Bear Creek Unit	4,000	Service	1951	Yes	Yes	NA
Merced NWR	8,357	Service	1951	Yes	No	Yes
Los Banos WMA	6,217	DFG	1929	Yes	Yes	Yes
Volta WMA	2,891	DFG	1952	No	No	Yes
Mendota WMA	11,802	DFG	1954-66			Yes
Grasslands WMA	85,000, with 63,000 in conservation easements	Private/DFG	1979	No	No	No
North Grasslands WMA						
China Island Unit	3,315	DFG	1990	NA	NA	Yes
Salt Slough Unit	2,241	DFG	1990	NA	NA	Yes
Kern NWR	10,618	Service	1961	Yes	NA	Yes
Pixley NWR	5,992	Service	1959	No	Yes	No

Sources: Great Outdoor Recreation Web site, www.gorp.com/gorp/resources/us_nwr; www.theworks.com; Service Web site, www.r1.fws.gov/sanluis/; DFG Web site, www.dfg.ca.gov/hunting/index.html.
NA = not available

7.1.1.3 Recreation Resources

Major recreational opportunities in the San Joaquin Valley include fishing, boating, camping, wildlife observation, and reservoir boating and fishing. Recreation facilities at the San Joaquin Valley wetland habitat areas are primarily designed to enhance hunting and wildlife observation opportunities. Most recreational opportunities are associated with waterfowl and include both nonconsumptive uses (wildlife observation and hiking) and consumptive uses (hunting). All activities associated with wildlife refuges and management areas are water enhanced.

The hunting of ducks, geese, and pheasants is permitted between October and January in portions of each refuge and in Los Banos WMA. Fishing is permitted at San Luis NWR and Los Banos WMA. San Luis and Merced NWRs provide self-guided tours, and camping is permitted at the staging areas during hunting season. Camping is also permitted at Los Banos WMA in the parking lots, and the management area is open to hiking and bike riding all year. Special blind access sites are available for mobility-impaired hunters at the Los Banos and Mendota WMAs.

In 1992, combined recreation use at the wildlife refuges and management areas totaled approximately 56,000 5-hour recreation visitor days. The most popular activities were nonconsumptive uses, such as wildlife viewing. Between 1985 and 1990, nonconsumptive uses accounted for approximately 69 percent of total use, hunting accounted for approximately

22 percent, and fishing accounted for the remaining 9 percent. An estimated 15 percent of the visitors to the refuges originate in the local area (Reclamation 1997c).

Most visitation to the wildlife refuges and management areas occurs during winter when the waterfowl are present. Approximately 45 percent of the total use occurs between October and January. The June through August period accounts for approximately 20 percent of total use. All hunting occurs between October and January, and fishing occurs year-round (Reclamation 1997c).

7.1.2 Regulatory Setting

7.1.2.1 Federal Regulatory Environment

The primary Federal requirements regarding agricultural land uses, recreation, and wetland habitat land uses are:

- Memorandum on Farmland Preservation and the Farmland Protection Policy Act
- Federal Agriculture Improvement and Reform Act of 1996 and 1985 Food Security Act
- Endangered Species Act
- Fish and Wildlife Coordination Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Migratory Bird Treaty Act
- Executive Order 11990 – Protection of Wetlands
- Federal Water Project Recreation Act

For more information about these requirements, see Section 15.

7.1.2.2 State Regulatory Environment

The primary State requirements regarding agricultural land use, recreation, and land use are:

- CESA
- Delta Protection Act of 1959

For more information about these requirements, see Section 15.

7.1.2.3 County General Plan Goals and Policies

Each county and city in the State is required by Section 65300 of the California Government Code to have a comprehensive, long-term general plan for the physical development of the county or city. Mandatory elements of the general plan that have bearing on the Proposed Action are land use, agriculture, fish and wildlife habitat, water resources, open space, and conservation.

This section summarizes key goals and policies contained in the general plans for the 10 counties in the project vicinity. Since the Proposed Action does not involve urban development, the key

issue is whether the 10-year Water Transfer Program is consistent with county policies for resource conservation and agriculture support.

The goals and policies of each county relevant to the Proposed Action are summarized in Table 7-8.

**Table 7-8
County General Plan Policy Summary**

County	Goals and Objectives
Fresno	<ul style="list-style-type: none"> • Promote the long-term conservation of productive and potentially productive agricultural lands and to accommodate agricultural-support services and agriculturally related activities that support the viability of agriculture and further Fresno County's economic development goals. • Conserve the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate. Protection of these resource functions will positively affect aesthetics, water quality, floodplain management, ecological function, and recreation/tourism. • Protect and enhance the water quality and quantity in Fresno County's streams, creeks, and groundwater basins. • Help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels. • Preserve and protect the valuable vegetation resources of Fresno County. • Designate land for and promote the development and expansion of public and private recreational facilities to serve the needs of residents and visitors.
Kern	<ul style="list-style-type: none"> • Protect areas designated agricultural use, which include Class I and II agricultural soils with surface delivery water systems, against residential and commercial subdivision and development activities. • Since rivers and streams in Kern County are important visual and recreational resources and wildlife habitats, preserve areas of riparian vegetation along rivers and streams when feasible to do so. • Protect habitats of threatened or endangered species to the greatest extent possible.
Kings	<ul style="list-style-type: none"> • Support agriculture by preserving the right of farmers to operate efficiently, based on customary and usual agricultural practices. • Beneficially use, conserve, and protect water resources to assure an adequate long-term supply of water. • Preserve land that contains important natural plant and animal habitats. • Maintain the quality of natural wetland areas identified by the DFG and the Service. • Protect and manage riparian environments as valuable resources. • Manage natural stream environments to provide protection for fish habitat.

Table 7-8 (continued)
County General Plan Policy Summary

County	Goals and Objectives
Madera	<ul style="list-style-type: none"> • Encourage continued agricultural use and, where possible, increase agricultural use on lands designated for such use. • Ensure availability of and maintain high quality water sources. • Protect and enhance natural quality of county's streams, creeks, and groundwater. • Protect, restore, and enhance habitats that support fish and wildlife species. • Preserve and enhance open space lands to maintain the natural resources of the county.
Merced	<ul style="list-style-type: none"> • Rural areas are appropriately designated to meet the agricultural, grazing, wildlife habitat, recreational, natural resource, and other open space needs of the county. • Protect rare and endangered species from urban development and recognize them in rural areas. • Protect surface and groundwater resources from contamination, evaporation, and inefficient use. • Support measures to protect and improve water quality.
San Benito	<ul style="list-style-type: none"> • Continue agriculture as an industry in the county and preserve present agricultural resources for future generations. • Preserve natural wildlife habitats, including environmentally significant areas. • Protect and preserve natural resources in the county, including prime agricultural areas, significant mineral lands, and plant and animal life with emphasis on threatened or endangered species, habitat for fish and wildlife, watersheds, wetlands, and rivers. • Attain a well-balanced system of recreation recognizing the natural, recreational, cultural, and historical attributes inherent to the county within existing Federal, State, and county parks and on private and Bureau of Land Management lands.
San Joaquin	<ul style="list-style-type: none"> • Preserve open-space land for the continuation of commercial agricultural and productive uses, enjoyment of scenic beauty and recreation, protection and use of natural resources, and for protection from natural hazards. • Ensure adequate quantity and quality of water resources for municipal and industrial uses, agriculture, recreation, and fish and wildlife. • Obtain sufficient supplemental water supplies to meet all municipal and agricultural needs. • Protect the groundwater basins of the county from further overdraft. • Recognize the surface waters of the county as resources of State and national significance for which environmental and scenic values must be protected. • Protect and improve the county's vegetation, fish, and wildlife resources. • Provide undeveloped open space for nature study, protection of endangered species, and preservation of wildlife habitat.

**Table 7-8 (concluded)
County General Plan Policy Summary**

County	Goals and Objectives
Santa Clara	<ul style="list-style-type: none"> • Inventory, map, and monitor the status of agricultural lands. • Enhance the long-term economic viability of agriculture. • Conserve and reclaim water. • Obtain additional sources of imported water. • Restore wetlands, riparian areas, and other habitats that improve Bay water quality. • Protect the biological integrity of critical habitat areas. • Balance recreation and environmental objectives.
Stanislaus	<ul style="list-style-type: none"> • Provide for the long-term conservation and use of agricultural lands. • Conserve water resources and protect water quality in the county. • Protect fish and wildlife species in the county. • Protect the natural resources that sustain agriculture in the county.
Tulare	<ul style="list-style-type: none"> • Attempt to maintain agriculture as a primary, extensive land use, not only in recognition of the economic importance of agriculture, but also in terms of agriculture's real contribution to the economic conservation of open space and natural resources. • Agricultural and ranching interests should be encouraged to maintain or develop areas of natural habitat where terrain or soil is not conducive to maximum agricultural production. • Surface waters, which serve as substantial recharge sources for groundwater basins, should be maintained at levels of purity suitable for agricultural and domestic use, except that certain particulate materials may be tolerated because of natural filtration available. • Expedite the continuance and enlargement of wetland preserves, which will provide waterfowl habitat necessary to the maintenance of the flyway route through the valley. Such wetlands should also be protected through flood control, water quality enhancement and air pollution control programs. • The county should give the highest of priorities to designating land uses to assure protection of rare and endangered species. It should provide for other wildlife uses as much as possible which will also serve to meet open space needs. • The County and Cities should adopt a policy of preservation of unique and endangered species through habitat protection. Such necessary areas of habitat should be protected through open space zoning, which would envision only compatible uses.

Sources: Fresno County 2000; Kern County Planning Department 1994; Kings County Planning Department 2002; Madera County 1995; Merced County 1990; San Benito County 1994; San Joaquin County 1992; Santa Clara County 1994; Stanislaus County 1994; Tulare County 2001.

7.2 ENVIRONMENTAL CONSEQUENCES

This section addresses the concern of whether any agricultural, wetland habitat, and recreational land uses would be significantly impacted by any one of the alternatives. The action alternatives involve multiple sources of developed water and multiple users of that water. The Exchange Contractors propose to develop water from an expanded conservation program, groundwater pumping, and crop idling. The action alternatives are designed based on quantity, how the water is developed, with numerous options for how the water is used (as reported in Appendix B and Section 4).

7.2.1 Key Impact and Evaluation Criteria

The evaluation criteria for agricultural land uses are whether any of the alternatives would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use or a Williamson Act contract.
- Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use.

The evaluation criteria for recreation resources are whether any of the alternatives would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

The evaluation criteria for land uses are whether any of the alternatives would:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable HCP or natural community conservation plan.

7.2.2 Environmental Impacts and Mitigation

7.2.2.1 No Action/No Project Alternative

Under the No Action/No Project Alternative, no transfer or exchange of water would occur from the Exchange Contractors to either Interior or to any of the other potential water users. Under No Action, deliveries to the wetlands would consist of Level 2 and Replacement Water quantities plus a portion of the Incremental Level 4 need that could reasonably be obtained from other

sources. For No Project, the practical result would be a reduction in deliveries to the refuges from the Exchange Contractors and a commensurate acquisition of water from other entities through purchases by Reclamation's WAP. Agricultural and M&I water users would get their CVP contractual supplies subject to the limitations in their contracts. Under No Action/No Project, the CVP water users may obtain water from other sources or they would continue to experience shortages.

No Action under NEPA is similar to existing conditions in terms of the potential effect of the transferred water upon San Joaquin River flows. If the water was not transferred from the Exchange Contractors, water would be transferred from others. Existing conditions reflect the current environment of the system including the recent actions of the Exchange Contractors that provide transfer water to Interior.

Agricultural Land Use

The No Action/No Project Alternative includes several key points relevant to the agricultural land use the analysis:

- Deliveries to wetlands would include Level 2 and Replacement Water as well as 75,694 acre-feet of Level 4 Incremental Water Supply. A substantial portion of the Level 4 Incremental Water Supply is used for seasonal irrigation needs at the refuges.
- The Exchange Contractors would reuse the same amount of tailwater flows that have recently been otherwise transferred.
- CVP users, both agricultural and M&I, would receive their contractual supplies, subject to restrictions due to hydrology or other limitations.

Under the No Action/No Project Alternative, shortages could be expected to occur over the 2005–2014 water service years due to the water year type and CVPIA requirements. Depending on the shortages, either less land would be cultivated due to crop idling on existing acreages or less irrigation water would be applied, resulting in lower production on existing lands. These changes would be temporary because water year types change from year to year, and land that may have been taken out of production during a dry or critical year could be irrigated during wet or above normal years. Crop idling or land fallowing would occur as necessary under normal land management practices. Any Williamson Act lands would remain in agricultural use. Therefore, less-than-significant impacts would occur to agricultural land use under CEQA.

The small-scale land fallowing occurring under existing conditions would also occur under No Action with one exception, Westlands WD. Westlands WD is proposing to retire 150,000 to 200,000 acres of agricultural land due to subsurface drainage and salinity problems and insufficient water supplies. Some of these lands could be brought back into production with the provision of drainage service by Reclamation. This large-scale land retirement proposal is under discussion and has not been fully evaluated for environmental impacts. Consequently, it has not been included in No Action/No Project Alternative for this water transfer EIS/EIR (Exchange Contractors et al. 2003).

Recreation Resources

Under the No Action/No Project Alternative, deliveries to wetland habitat areas in the San Joaquin Valley are assumed to consist of Level 2 and Replacement Water quantities plus 75,694

acre-feet of the Level 4 Incremental Water Supply. In 2002 and 2003, the WAP obtained an annual average of approximately 79,963 acre-feet from all sources, including 62,250 acre-feet from the Exchange Contractors. Interior would continue to seek to acquire water from other sources and expects that up to the same amount could be purchased (assuming a continuation of recent water prices and recent WAP budget). Table 7-9 summarizes the quantities of water to be delivered to the wetlands under No Action/No Project Alternative. Of the 75,694 acre-feet in total Incremental Level 4 water, 63,994 could be obtained for San Joaquin River refuges and 11,700 acre-feet for Kern NWR. Additional lands beyond those historically managed for wetland habitat could be flooded at the wetland habitat areas, but the refuges would not extend beyond present boundaries.

Table 7-9
San Joaquin Valley Refuge Annual Water Supplies
No Action/No Project Alternative

San Joaquin Valley Refuges	Level 2 (acre-feet)	Incremental Level 4 (acre-feet)	No Action Total
San Luis NWR Complex			
San Luis Unit	19,000*	0	19,000
West Bear Creek Unit (formerly West Gallo)	7,207	3,082	10,289
Kesterson Unit	10,000*	0	10,000
Freitas Unit	5,290*	0	5,290
East Bear Creek Unit (formerly East Gallo)	8,863	0	8,863
Los Banos WMA	16,670	7,280	23,950
Volta WMA	13,000*	168	13,168
Mendota WMA	27,594*	629	28,223
Grassland RCD	125,000	47,822	172,822
North Grassland WMA			
China Island Unit	6,967	1,969	8,936
Salt Slough Unit	6,680	3,044	9,724
Kern NWR	9,950	11,700	21,650
Pixley NWR	1,280	0	1,280
Total for San Joaquin Valley Refuges	257,501	75,694	333,195

Sources: Reclamation 1989, 2001k, 2001l; D. Meier, pers. comm., 2004.

Note: Acre-feet of water delivered at refuge boundary. Average of 2002 and 2003 deliveries.

* Includes Replacement Water as defined in Appendix B.

Given the criteria listed above for recreation resources, the application of Level 2 water, Replacement Water, and Incremental Level 4 water to the wildlife refuges would not increase the existing refuge boundaries, nor would any new facilities or expanded facilities be required. Hunters and wildlife viewers would be able to continue to access the lands because if the Exchange Contractors could not supply the refuge water, it is expected that Interior would acquire water from other sources up to the same amount that could be purchased. Under the No

Action/No Project Alternative no adverse impacts would occur to recreation resources relative to existing conditions.

Other Land Uses

Application of existing CVP water supplies would not physically divide any existing communities. The land use policies of each of the counties that could receive this wildlife refuge water all include policies to preserve agricultural use while maintaining wildlife and wetland habitat. Only Santa Clara County has an HCP in the planning stages, but no species would be affected in that county by current water supplies. Therefore, no adverse impacts would occur to land use relative to existing conditions.

7.2.2.2 *Alternative A: 80,000 Acre-Feet*

Under Alternative A, up to 80,000 acre-feet of water per year would be available from conservation measures, defined as tailwater recapture, recovery of irretrievable losses, and reductions in operational spills and from crop idling. This alternative includes groundwater pumping of up to 20,000 acre-feet per year. During critical water years, up to 50,000 acre-feet of water from crop idling would be available, but no water would be available from conservation or groundwater pumping measures.

Agricultural Land Use

No significant reduction in irrigated acreage would occur within the Exchange Contractors service area due to the proposed conservation and tailwater recovery efforts. Current crop idling activity by the Exchange Contractors consists of withholding irrigation water from selected lands for one year. Within that year, one crop such as hay would occupy the land for 6 months (May to December), such that the land would lie idle for only part of the year. In 1995, only 3,382 acres (or 1.5 percent of 228,943 acres) of cropland were idled in the Exchange Contractors service area, representing a decrease of 70 percent from 1985 (Exchange Contractors 1997a).

During both noncritical and critical water years, however, approximately 20,000 acres of crops would be idled (using 50,000 acre-feet of water and an average of 2.5 acre-feet per acre of water applied). Of the 240,000 irrigated acres in the Exchange Contractors service area, this amount represents less than 9 percent of the total if all 50,000 acre-feet of transfer water were supplied by crop idling. The land would remain in agricultural use over the long term, and conditions of the California Water Code 1745.05(b) and Reclamation's *Interim Guidelines for Implementation of Water Transfers Under Title XXXIV of Public Law 102-575* would be met (see Section 2.4; California Water Code 1745.05(b); Reclamation 1993). Therefore, primarily during critical years, an impact could occur to agricultural lands due to crop idling, but because the amount idled would be less than 10 percent and the idling is temporary, this impact to land use would be considered less than significant or minimal. In addition, crop idling in the source area could be offset by reductions in land fallowing in agricultural areas receiving the water, especially in critical years.

Agricultural land would not be converted to other non-agricultural uses, so there would not be a loss of designated prime/unique/FSI farmlands within the Exchange Contractors Service Area. There is no adverse impact (a neutral effect).

In the districts that would receive up to 80,000 acre-feet of additional water, no new lands would be brought under production. Rather, existing water shortages of up to 25 percent of CVP-contracted supplies for the affected CVP contractors are such that the additional water would reduce the shortage of irrigation water in a particular year. Overall agricultural land use would not change, but production on that land could be higher compared to existing conditions. Higher production on existing lands would have a beneficial impact, but the impact is not significant due to no new lands being brought into production, the small amount of water applied in a particular year relative to total contract amounts, and the temporary nature of the water transfer. Long-term contract renewals for CVP water users are subject to separate NEPA analysis and documentation.

Recreation Resources

Under Alternative A, up to 80,000 acre-feet of water could be applied to wildlife refuges. Table 7-10 shows the difference between water supplies for optimum refuge management (Incremental Level 4) and the average annual water deliveries (Level 2) without Level 4. The differences in water delivery affect habitat diversity, duration of late winter flooding, broodwater, irrigated areas for wildlife food production, and pond areas. The effect that would occur to recreation is shown in the change in public use days from an average water supply to a Level 4 supply. While the total habitat acreage would not be changed for several refuges, the habitat quality would improve with additional water supplies.

Table 7-10
Summary of Wildlife Resources in the Project Area
with Level 2 and Incremental Level 4 Water Supplies

Name	Habitat Acreage		Bird Use Days (000) ^a		Public Use Days ^b	
	Level 2 Water Supply	Incremental Level 4 Water Supply	Level 2 Water Supply	Level 4 Water Supply	Level 2 Water Supply	Level 4 Water Supply
San Luis NWR	3,030	3,550	13,362.1	19,927.2	22,400	35,100
Merced NWR	700	1,200	7,522.4	9,808.1	2,800	10,200
Los Banos WMA	3,208	3,208	23,768.0	26,869.0	34,400	39,200
Grasslands WMA	56,000	56,000	127,210.0	159,250.0	109,000	136,000
Volta WMA	3,000	3,000	25,000.0	28,100.0	7,000	13,000
Mendota WMA	9,440	9,440	2,600.0	12,200.0	4,800	22,500
Kern NWR	2,800	7,000	7,197.5	72,996.0	6,700	15,500
Pixley NWR	0	1,600	6.0	4,193.4	300	10,300
Total for San Joaquin Valley Refuges	78,180	85,002	206,668.0	333,347.7	187,402	281,804

Source: Reclamation 1989.

Notes:

^a Bird use days consist of the total of all birds, including wading and shorebirds, waterfowl, upland game birds, and threatened and endangered species.

^b Public use days were estimated by refuge managers.

More water would be available to the San Joaquin Valley wetland habitat areas under Alternative A compared to Level 2. With this additional water, wetland habitat area lands could be managed for improved waterfowl and wildlife habitat, which would in turn improve the recreational opportunities for hunting and wildlife viewing. This impact would be beneficial but is less than significant or minimal due to ongoing management of recreational activity at the refuges through controlled access and the provision of viewing platforms. If all water is transferred to agricultural or M&I users, the water supplies to the refuges would be met by other suppliers, similar to No Action/No Project.

Other Land Uses

Application of up to 80,000 acre-feet of water for agriculture, M&I, or wildlife refuges would not physically divide any existing communities. The land use policies of each of the counties that could receive this water all include policies to preserve agricultural use while maintaining wildlife and wetland habitat. Only Santa Clara County has an HCP in the planning stages, but no species would be affected in that county by the application of water supplies within that county for agriculture or M&I purposes. Therefore, no adverse or neutral impacts would occur to land use under Alternative A.

7.2.2.3 *Alternative B: 50,000 Acre-Feet*

Under Alternative B, up to 50,000 acre-feet of water would be transferred annually using only crop idling as the source of transfer water. Approximately 20,000 acres of land would be idled using an average of 2.5 acre-feet of water applied to each acre. The water could be developed from this source in all water years, both critical and noncritical.

Agricultural Land Use

During critical years, the only available water would be supplied from crop idling. Of the 240,000 irrigated acres in the Exchange Contractors service area, crop idling of approximately 20,000 acres represents less than 9 percent of the total if all 50,000 acre-feet of water were supplied by crop idling. The land would remain in agricultural use over the long term, and conditions of the California Water Code 1745.05(b) and Reclamation's *Interim Guidelines for Implementation of Water Transfers Under Title XXXIV of Public Law 102-575* would be met (see Section 2.4; California Water Code 1745.05(b); Reclamation 1993). Therefore, during critical years, an impact could occur to agricultural lands due to crop idling, but because the amount idled would be less than 10 percent and the idling would be temporary, this impact would be considered less than significant or minimal.

Agricultural land would not be converted to other non-agricultural uses, so there would not be a loss of designated prime/unique/FSI farmlands within the Exchange Contractors Service Area. There is no adverse impact (a neutral effect).

Recreation Resources

Water could be available from crop idling in both noncritical and critical years. With crop idling alone, the additional water provided to wildlife refuges during these years would improve wetland habitats and thus improve hunting and wildlife viewing. This impact would be beneficial, but it is less than significant or minimal due to ongoing management of recreational

activity at the refuges through controlled access and the provision of viewing platforms. If all water is transferred to agricultural or M&I users, the water supplies to the refuges would be met by other suppliers, similar to No Action/No Project.

Other Land Uses

Application of up to 50,000 acre-feet of water for agriculture, M&I, or wildlife refuges would not physically divide any existing communities. The land use policies of each of the counties that could receive this water all include policies to preserve agricultural use while maintaining wildlife and wetland habitat. Only Santa Clara County has an HCP in the planning stages, but no species would be affected in that county by the application of water supplies within that county. Therefore, no adverse or neutral impacts would occur to land use under Alternative B.

7.2.2.4 *Alternative C: 130,000 Acre-Feet*

Under Alternative C, up to 130,000 acre-feet of water would be transferred in noncritical water years and up to 50,000 acre-feet of water would be transferred in critical water years. During critical years, only water from crop idling would be available. A maximum of 80,000 acre-feet would be available for transfer to the wildlife management areas.

Agricultural Land Use

No significant reduction in irrigated acreage would occur within the Exchange Contractors service area due to the proposed conservation and tailwater recovery efforts. Current crop idling activity by the Exchange Contractors consists of withholding irrigation water from selected lands for one year. Within that year, one crop such as hay would occupy the land for 6 months (May to December), such that the land would lie idle for only part of the year.

During critical water years, however, approximately 20,000 acres of crops would be idled. Of the 240,000 irrigated acres in the Exchange Contractors service area, this amount represents less than 9 percent of the total if all 50,000 acre-feet of water were supplied by crop idling. The land would remain in agricultural use over the long term, and conditions of the California Water Code 1745.05(b) and Reclamation's *Interim Guidelines for Implementation of Water Transfers Under Title XXXIV of Public Law 102-575* would be met (see Section 2.4; California Water Code 1745.05(b); Reclamation 1993). Therefore, during critical years, an impact could occur to agricultural lands due to crop idling, but because the amount idled would be less than 10 percent and temporary, this impact would be considered less than significant or minimal.

Agricultural land would not be converted to other non-agricultural uses, so there would not be a loss of designated prime/unique/FSI farmlands within the Exchange Contractors Service Area. There is no adverse impact (a neutral effect).

In the districts that would receive up to 130,000 acre-feet of additional water, no new lands would be brought under production. Rather, existing water shortages for the affected CVP contractors are such that the additional water would reduce the shortage of irrigation water in a particular year. Overall agricultural land use would not change, but production on that land could be higher compared to existing conditions. Higher production on existing lands would have a beneficial effect, but the effect is not significant and minimal due to the small amount of water applied in a particular year relative to total contract amounts and the temporary nature of the

water transfer. Long-term contact renewals for CVP water users are subject to separate NEPA analysis and documentation.

Recreation Resources

Under Alternative C, up to 80,000 acre-feet of water would be transferred to the refuges in noncritical water years and up to 50,000 acre-feet of water would be transferred in critical water years. However, under CVPIA Section 3406(d)(2) the proposed annual water transfers could provide up to 62 percent of the water needed by the wetland habitat areas (128,767 acre-feet) to meet Incremental Level 4 refuge water requirements with a transfer of 80,000 acre-feet. This impact would be beneficial to recreation because the additional water provided to wildlife refuges would improve wetland habitats and thus improve hunting and wildlife viewing. This impact would be beneficial but is less than significant or minimal due to ongoing management of recreational activity at the refuges through controlled access and the provision of viewing platforms. If all water is transferred to agricultural or M&I users, the water supplies to the refuges would be met by other suppliers, similar to No Action/No Project.

Other Land Uses

Application of up to 130,000 acre-feet of water for agriculture, M&I, and/or wildlife refuges would not physically divide any existing communities. The land use policies of each of the counties that could receive this water all include policies to preserve agricultural use while maintaining wildlife and wetland habitat. Only Santa Clara County has an HCP in the planning stages, but no species would be affected in that county by the application of water supplies in that county. Therefore, no adverse impacts would occur to land use under Alternative C.

7.2.3 Cumulative Effects

7.2.3.1 Agricultural Land Use

In critical years, approximately 20,000 acres of Exchange Contractors land could be idled under each of the action alternatives to provide up to the 50,000 acre-feet of water. In noncritical years, some land could be idled as well for part of the water supply, but the majority of the water would come from conservation or groundwater supplies. During the project timeframe, however, it is not known whether the water year type would be critical or noncritical, and land that could be idled one year may be brought back into production the next. In the San Joaquin Valley, however, several proposed areas could be idled permanently due to water supply shortages and subsurface drainage problems. Under the CVPIA, Reclamation has a land retirement program that has retired 2,091 acres in Westlands WD, and a total of 7,000 acres could be retired (i.e., permanently removed from production) by 2007. Westlands WD has a proposal to retire up to 200,000 acres over the long term. Thus, if an additional 20,000 acres were idled under this project, even on a temporary basis, the effect on agricultural land use in the short term could be cumulatively considerable and potentially significant if the large-scale land fallowing under consideration by Westlands WD as well as other land retirement programs were implemented in the short term.

7.2.3.2 Recreation

All of the action alternatives would have beneficial impacts on recreation resources because under each alternative, additional water would be supplied to the refuges and improved conditions for hunting or wildlife viewing would result. If all of the water is transferred to agricultural and M&I water users, supplies to the refuges would be met by other suppliers and important recreational opportunities would remain. No adverse impacts would occur to recreation resources due to any of the action alternatives; thus, no cumulative impacts would occur to recreation.

7.2.3.3 Other Land Uses

None of the action alternatives would have significant impacts on land use because under each alternative, no changes would occur to any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, nor would any conflict occur with any applicable HCP or natural community conservation plan. Since no adverse impacts would occur to other land uses (excluding agriculture) due to any of the action alternatives, no cumulative impacts would occur to land use.

7.2.4 Impact and Mitigation Summary

The action alternatives do not result in significant changes over the No Action/No Project Alternative or existing conditions. No adverse impacts would occur to existing land uses (agriculture land uses, recreation, and other land uses), so no mitigation is required.

7.2.4.1 Agricultural Land Use**No Action/No Project**

- Under the No Action/No Project Alternative, some lands could be idled if water shortages occurred. Less-than-significant impacts would occur to agricultural land use under the No Action Alternative in comparison to existing conditions because although the crop idling would be temporary and the existing zoning for agricultural use or Williamson Act lands would not change, less water would be available, resulting in crop idling or lower agricultural production.

Alternative A: 80,000 Acre-Feet

- During both noncritical and critical years, an impact could occur to agricultural lands due to crop idling. Because the amount idled would be less than 10 percent of the Exchange Contractors irrigated acreage and lands receiving the water could be put back in production, this impact would be considered less than significant or minimal.
- Agricultural land would not be converted to other non-agricultural uses, so there would not be a loss of designated prime/unique/FSI farmlands within the Exchange Contractors Service Area. There is no adverse impact (a neutral effect).
- Agricultural land use would not change but production on that land could be higher compared to existing conditions. Higher production on existing lands would have a beneficial

impact, but the impact is not significant due to the small amount of water applied in a particular year relative to total contract amounts and the temporary nature of the water transfer.

Alternative B: 50,000 Acre-Feet

- During critical years, an impact could occur to agricultural lands due to crop idling, but because the amount idled would be less than 10 percent of the Exchange Contractors irrigated acreage and would be temporary, this impact would be considered less than significant or minimal.
- Agricultural land would not be converted to other non-agricultural uses, so there would not be a loss of designated prime/unique/FSI farmlands within the Exchange Contractors Service Area. There is no adverse impact (a neutral effect).

Alternative C: 130,000 Acre-Feet

- During both noncritical and critical years, an impact could occur to agricultural lands due to crop idling, but because the amount idled would be temporary and less than 10 percent of the Exchange Contractors irrigated acreage, this impact would be considered less than significant or minimal.
- Agricultural land would not be converted to other non-agricultural uses, so there would not be a loss of designated prime/unique/FSI farmlands within the Exchange Contractors Service Area. There is no adverse impact (a neutral effect).
- Agricultural land use would not change but production on that land could be higher compared to existing conditions. Higher production on existing lands would have a beneficial impact, but the impact is not significant due to the small amount of water applied in a particular year relative to total contract amounts and the temporary nature of the water transfer.

7.2.4.2 Recreation Resources**No Action/No Project**

- Under the No Action/No Project Alternative, no adverse impacts would occur to recreation resources because hunters and wildlife viewers would be able to access the lands as they currently do. If the Exchange Contractors could not supply the refuge water, it is expected that Interior would be able to acquire water from other sources.

Alternative A: 80,000 Acre-Feet

- With the additional water available under this alternative, wetland areas could be managed for improved waterfowl and wildlife habitat, which would in turn improve the recreational opportunities for hunting and wildlife viewing. Under CEQA, this impact would be beneficial but is less than significant due to ongoing management of recreational activity at the refuges through controlled access and the provision of viewing platforms. Under NEPA, a minimal effect would occur.

- If all water is transferred to agricultural and M&I users, the reduction in supplies to the refuges would be less than significant or minimal. Important recreational opportunities would remain because Interior would be able to acquire water for the refuges from other sources.

Alternative B: 50,000 Acre-Feet

- With crop idling alone, the additional water provided to wildlife refuges would improve wetland habitats during critical years and thus improve hunting and wildlife viewing. This impact would be beneficial but is less than significant or minimal due to ongoing management of recreational activity at the refuges through controlled access and the provision of viewing platforms.
- If all water is transferred to agricultural and M&I users, the reduction in supplies to the refuges would be less than significant or minimal. Important recreational opportunities would remain because Interior would be able to acquire water for the refuges from other sources.

Alternative C: 130,000 Acre-Feet

- Under Alternative C, up to 80,000 acre-feet could be made available to the wildlife refuges. This impact would be beneficial to recreation because the additional water provided to wildlife refuges would improve wetland habitats and thus improve hunting and wildlife viewing. Under CEQA, this impact would be beneficial but is less than significant due to ongoing management of recreational activity at the refuges through controlled access and the provision of viewing platforms. Under NEPA, a minimal effect would occur.
- If all water is transferred to agricultural and M&I users, the reduction in supplies to the refuges would be less than significant or minimal. Important recreational opportunities would remain because Interior would be able to acquire water for the refuges from other sources.

7.2.4.3 Other Land Uses**No Action/No Project**

- Under CEQA, no adverse impacts would occur to land use because application of existing CVP water supplies would not physically divide any existing communities, and local land use policies would be met. Only Santa Clara County has a proposed HCP, and no species would be affected in that county by current water supplies.

Alternative A: 80,000 Acre-Feet

- No adverse or neutral impacts would occur to land use because application of up to 80,000 acre-feet of water for agriculture, M&I, or wildlife refuges would not physically divide any existing communities, and all land use policies would be met. Only Santa Clara County has a proposed HCP, and no species would be affected in that county by the application of up to 62,950 acre-feet of water supplies.

Alternative B: 50,000 Acre-Feet

- Under Alternative B, no adverse or neutral impacts would occur to land use because application of up to 50,000 acre-feet of water for agriculture, M&I, or wildlife refuges would

not physically divide any existing communities, and all land use policies would be met. Only Santa Clara County has a proposed HCP, and no species would be affected in that county by the application of up to 50,000 acre-feet of water supplies.

Alternative C: 130,000 Acre-Feet

- No adverse or neutral impacts would occur to land use because application of up to 130,000 acre-feet of water for agriculture, M&I, and/or wildlife refuges would not physically divide any existing communities, and all land use policies would be met. Only Santa Clara County has a proposed HCP, and no species would be affected in that county by the application of additional water supplies.

Tables 7-11 through 7-14 summarize the effects of the No Action Alternative and the action alternatives on land uses and recreation. The existing condition sets the baseline against which the alternatives are evaluated for CEQA, while No Action is the baseline for comparison of alternatives for NEPA.

Table 7-11
Summary of Effects of the No Action/No Project Alternative

Affected Resource and Area of Potential Effect	No Action/No Project Compared to Existing Conditions
Agricultural land use	Less-than-significant adverse impact
Recreation resources	No adverse impact
Land use	No adverse impact

Table 7-12
Summary of Effects of Alternative A: 80,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Agricultural land use	Less-than-significant adverse impact	Minimal effect
Recreation resources	Less-than-significant beneficial and no adverse impacts	Minimal effect
Land use	No adverse impact	Neutral effect

Table 7-13
Summary of Effects of Alternative B: 50,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Agricultural land use	Less-than-significant adverse impact	Minimal effect
Recreation resources	Less-than-significant beneficial and no adverse impacts	Minimal effect
Land use	No adverse impact	Neutral effect

Table 7-14
Summary of Effects of Alternative C: 130,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Agricultural land use	Less-than-significant adverse impact	Minimal effect
Recreation resources	Less-than-significant beneficial and no adverse impacts	Minimal effect
Land use	No adverse impact	Neutral effect

The purpose of this section is to analyze the socioeconomic effects of alternative water transfer scenarios presented in Section 2. Section 8 includes analyses of effects in both the transferor's area and in the recipient area(s). The transferor's area, as described below, includes four districts within four counties. The potential recipient areas for the transfers include agricultural users on the western side and other parts of central and southern San Joaquin Valley; agricultural users within the Friant Division of the CVP on the eastern side of the San Joaquin Valley; wildlife refuges in the central San Joaquin Valley; agricultural users within the Santa Clara County and San Benito County areas of the San Felipe Division of the CVP; and M&I users within SCVWD. Because of the diversity among potential recipients, the sectors or variables most likely to be affected vary as well. The discussion incorporates these differences.

The environmental impact analysis is based on the assumption that water transferred under the alternatives would be supplemental supplies to replace shortages in CVP supplies. As discussed in Section 1, reduced CVP supplies to agricultural and urban users have become more common since implementation of the CVPIA of 1992. The water transferred under the alternatives presented in Section 2 would replace some of the reduced CVP supplies. In the case of agricultural transferees, it is assumed that the water would not be used to bring additional land under cultivation. In the case of the M&I transferee (SCVWD), it is assumed that the transferred water would solely supplement reduced CVP deliveries. It is also assumed that water transferred to refuges would be used to enhance the existing acreage of these areas rather than to support increased land areas.

8.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

Socioeconomic analyses typically include two types of investigations. The first is a social analysis, which focuses on demographic and related variables that would be affected by the alternatives. The second is a regional economic analysis, which considers principal production, employment, and income variables in the affected areas.

Several potential sources and quantities of transferred water, water year types, and other variables exist. As discussed in Section 4, because of these differences and the uncertainty regarding other variables, specific transfer amounts cannot be determined for distant years. The analysis, thus, includes the expected socioeconomic effects for a variety of assumed water transfer scenarios defined by water year type and sources and destinations of transferred water.

8.1.1 Exchange Contractors Service Area

Within the Exchange Contractors service area, the key sectors or entities likely to be affected by the transfers are agricultural production and related agribusiness sectors and wildlife refuges and management areas. For purposes of regional economic impact estimation, the analysis is completed at the county level because of the linkages between activities in the Exchange Contractors service area and the rest of the regional economy. The four counties are Fresno, Madera, Merced, and Stanislaus. This section provides a demographic overview of the four-county area, including measures of population, employment, and income. This section also includes a review of agriculture both within the Exchange Contractors service area and the entire four-county region.

8.1.1.1 Population

Principal incorporated cities in Fresno County include Fresno, Clovis, Reedley, and Sanger. Incorporated cities in Madera County are Madera and Chowchilla. Key incorporated cities in Merced County are Merced, Los Banos, and Atwater. Key cities in Stanislaus County include Modesto, Turlock, and Ceres.

By population, Fresno County is the largest of the four and Madera County is the smallest (see Table 8-1). Between 1990 and 2000, population in the four-county area grew by 21 percent, with Merced growing 18 percent, Fresno 19 percent, Stanislaus 20 percent, and Madera 39 percent. Between 2000 and January 2003, population in the four-county area expanded by 6 percent: Fresno by 5 percent, Madera and Merced by 6 percent, and Stanislaus by 7 percent. County growth between 2000 and 2020 is projected at 39 percent in Fresno, 79 percent in Madera, 51 percent in Merced, and 57 percent in Stanislaus counties (California Department of Finance Demographic Research Unit 2001). Total growth in the four-county area between 2000 and 2020 is projected at 49 percent.

Table 8-1
Population and Population Growth, 1990–2003

County/Area	Population			Population Growth	
	1990	2000	2003	1990–2000	2000–2003
Fresno	672,302	802,304	841,400	19%	5%
Madera	89,125	123,667	131,200	39%	6%
Merced	179,953	211,710	225,100	18%	6%
Stanislaus	375,312	449,895	481,600	20%	7%
Four-County Area	1,316,692	1,587,576	1,679,300	21%	6%

Sources:

1990 and 2000: Bureau of Economic Analysis 2003.

2003: California Department of Finance Demographic Research Unit 2003.

8.1.1.2 Employment¹

Between 1990 and 2000, total employment in the four-county area grew by more than 133,000 jobs (see Table 8-2). The largest increases were in services at 39 percent, agriculture and agricultural services at 26 percent, finance-related businesses at 21 percent, and trade and transportation at 17 percent. The slowest growth was in manufacturing at 7 percent. Among the four counties, total employment grew most rapidly in Madera (52 percent) and most slowly in

¹ Data in this section are presented only through 2000. In 2001, the Federal government began tabulating employment and other data under the North American Industrial Classification System, which differs significantly from the previously used Standard Industrial Classification system in both the amount of detail and arrangement of industries within sectors. To date, the earliest data available under the North American Industrial Classification System are for calendar year 2001. To address trends in the study area, the Standard Industrial Classification–based data were used instead.

Merced (21 percent). Service employment growth in Madera County was particularly strong because of the construction and staffing of two large State prisons for women.

Table 8-2
Employment and Employment Change, Four-County Area, 1990–2000

Sector	Employment		Employment Growth 1990–2000	
	1990	2000	Number	Percent
Agriculture/Services	99,982	126,387	26,405	26
Construction/Mining	36,448	40,546	4,098	11
Manufacturing	67,798	72,807	5,009	7
Transportation/Public Utilities	24,878	29,054	4,176	17
Trade	127,815	149,100	21,285	17
Finance-related	39,267	47,403	8,136	21
Services	135,931	188,499	52,568	39
Government	97,868	109,284	11,416	12
Total	629,987	763,080	133,093	21

Source: Bureau of Economic Analysis 2003.

In 2000, the largest employment sector was services, representing 24.7 percent of all jobs (see Table 8-3), followed by trade at 19.5 percent, agriculture and agricultural services at 16.6 percent, and government at 14.3 percent. Since 1990, the percentage of employment in agriculture and agricultural services has risen, as has that in other services. The percentages of jobs in construction and mining, manufacturing, trade, and government have fallen. The increase in agricultural services is primarily in professional farm managers, custom operators, and labor contractors.

Table 8-3
Composition of Total Employment, Four-County Area, 1990 and 2000

Sector	Percent of Total Employment	
	1990	2000
Agriculture/Services	15.9	16.6
Construction/Mining	5.8	5.3
Manufacturing	10.8	9.5
Transport/Public Utilities	3.9	3.8
Trade	20.3	19.5
Finance-related	6.2	6.2
Services	21.6	24.7
Government	15.5	14.3
Total	100.0	100.0

As shown in Table 8-3, agriculture and agricultural services account for 16.6 percent of total employment in the area (in contrast to 2.7 percent for California) (California Employment Development Department 2003). For the entire San Joaquin Valley, farming and farm-related industries account directly and indirectly for 37 percent of jobs and 32 percent of income (Kuminoff, Sumner, and Goldman 2000; these figures represent the total size of the agricultural sector, including both direct and indirect effects.) Within parts of the Exchange Contractors service area, the figures are substantially higher because of the agricultural concentration of those subregions. For example, in 2000, agriculture accounted directly for 22.5 percent of total household employment in Dos Palos, 28.8 percent in Firebaugh, 30.4 percent in Madera, and 55.4 percent in Mendota; the corresponding figure for California in that year was 1.8 percent (U.S. Census Bureau, "Census 2000," SF3, <http://www.census.gov/>.)

8.1.1.3 Income

Total personal income in the four counties in 2000 was \$33.782 billion and represented 3.1 percent of the total for California (see Table 8-4). That percentage is down slightly from 1980, when the four counties collectively accounted for 3.3 percent of the State total. Among the 58 counties in the State, personal income in Fresno County in 2000 was the 13th largest, Madera was 35th, Merced was 31st, and Stanislaus was 21st. Per capita personal income was \$21,508 in Fresno County, \$18,609 in Madera, \$18,536 in Merced, and \$22,889 in Stanislaus. Per capita income for the State averaged \$32,149. For that year, per capita personal income in Fresno County ranked 45th in the State, Madera ranked 53rd, Merced ranked 54th, and Stanislaus ranked 37th.

Table 8-4
Total and Per Capita Personal Income in the Study Area and California, 2000

County/State	Personal Income		
	Total (\$ Million)	Per Capita (\$)	Rank Among Counties for Per Capita Income
Fresno	\$17,256	\$21,508	45
Madera	\$2,300	\$18,609	53
Merced	\$3,924	\$18,536	54
Stanislaus	\$10,302	\$22,889	37
Total Four Counties	\$33,782	---	---
California	\$1,093,065	\$32,149	---

Source: California Department of Finance 2002.

In 1999, median household income was \$34,725 in Fresno, \$36,286 in Madera, \$35,532 in Merced, and \$40,101 in Stanislaus counties (U.S. Census Bureau, "Census 2000," SF3, <http://www.census.gov/>.) In Fresno County, 17.6 percent of families were below the defined poverty level. Corresponding figures for Madera, Merced, and Stanislaus counties were 15.9, 16.9, and 12.3 percent, respectively.

8.1.1.4 Agriculture

Agriculture is the key sector within the Exchange Contractors service area. Primary crops include cotton, melons, alfalfa hay, grains, vegetables, field crops, and orchards and vineyards. Virtually all crops are irrigated because of limited rainfall in the area. Since the service area is large, no single crop dominates. Rather, the agricultural production sector is diversified. Within certain subareas, some crops are more common than others because of climate, water, and soil variations.

Over time, agriculture in the area has evolved away from land-extensive livestock and grain production to intensively farmed crops. With this evolution has gone the development of a comprehensive infrastructure of businesses supporting production farming. These operations include suppliers of purchased inputs, e.g., feed, chemicals, irrigation equipment, and farm machinery; food processors and cotton gins; financial institutions; transportation and shipping companies; and storage businesses. Each of these sectors purchases from and sells to many other businesses, and changes in agriculture consequently have widespread ripple effects throughout the regional economy.

Within the service area, the largest acreage is in cotton, followed by alfalfa hay and seed, miscellaneous field crops, grains, vegetables, and permanent crops (see Table 8-5). The table uses average acreage for 1999–2002 to smooth out normal annual variations due to crop rotations and other influences.

Table 8-5
Average Cropping Pattern in the Exchange Contractors Service Area, 1999–2002

Crop	Acres	Percent of Total Acres
Alfalfa hay and seed	59,865	25.5
Cotton	67,420	28.7
Other field crops	34,624	14.7
Fruits, nuts, trees, vines	9,680	4.1
Melons	7,539	3.2
Vegetables	19,546	8.3
Grains	22,800	9.7
Pasture/hay/forage	8,504	3.6
Fallow	4,849	2.1
Total	234,827	100.0

The total value of crops grown in the Exchange Contractors service area in 2002 is estimated at \$305,625,000 (see Table 8-6). The distribution of crop values differs significantly from the distribution of crop acres because of variations in production value per acre. For example, vegetables account for 8.3 percent of acreage but 22.5 percent of value. Fruits, nuts, trees, and vines account for 4.1 percent of acres but 10.4 percent of value. Conversely, grains account for 9.7 percent of acreage but 2.7 percent of value. The differences have important implications for the regional impacts of producing various crops, as discussed below.

Table 8-6
Crop Value in the Exchange Contractors Service Area,
Based on Average Acreage from 1999–2002 and 2002 Value per Acre

Crop/Group	Acres	Value per Acre	Total Value (\$000)	Percent of Total Value
Alfalfa hay and seed	59,865	\$946	\$56,643	18.5
Cotton	67,420	\$1,340	\$90,343	29.6
Other field crops	34,624	\$785	\$27,190	8.9
Fruits, nuts, trees, vines	9,680	\$3,274	\$31,692	10.4
Melons	7,539	\$2,818	\$21,245	7.0
Vegetables	19,546	\$3,516	\$68,728	22.5
Grains	22,800	\$357	\$8,140	2.7
Pasture/hay/forage	8,504	\$193	\$1,644	0.5
Fallow	4,849	0	0	0
Total	234,827	\$1,301	\$305,625	100.0

Cropping patterns in the Exchange Contractors service area have changed slowly over time. Changes have occurred for several reasons, including market forces, surface water availability, and the development of crop varieties suitable for different soil and climate conditions. Market forces, namely crop prices, accounted for much of the decline in cotton acreage in the mid to late 1990s.

Several important differences exist in cropping patterns between the total four-county area within which the Exchange Contractors service area is located and the service area itself. Permanent crops account for 4.1 percent of acreage within the Exchange Contractors area and 22.8 percent in the total four-county area (see Table 8-7). Vegetables (including melons) account for 11.8 percent of service area land and 13.8 percent of the four-county area. And field crops account for 82.2 percent of service area land and 52.5 percent of the four-county area.

Table 8-7
Crop Acreage and Value in the Four-County Exchange Contractors Area, 2002

Crop Group	Acres	Percent of Acres	Value (\$000)	Percent of Value	Value per Acre
Field crops	1,370,161	52.5	\$975,284	20.3	\$699
Fruits	496,743	19.0	\$1,426,873	30.2	\$2,872
Nursery crops	NA	NA	\$158,503	3.4	NA
Nuts	359,888	13.8	\$931,237	19.7	\$2,588
Seed crops	21,974	0.8	\$62,503	1.3	\$2,844
Vegetables	359,222	13.8	\$1,185,641	25.1	\$3,301
Total	2,607,988	100.0	\$4,722,041	100.0	\$1,811

8.1.1.5 Linkages Between Agriculture and Other Sectors

Agricultural production contributes to substantial additional outputs of goods and services in other farm-related businesses throughout the regional economy. Farmers purchase seed, fertilizers, chemicals, machinery and implements, and other production inputs; and they and their employees purchase clothing, food, and other household items and services from businesses in the area. Farmers also sell to local businesses, e.g., commodity brokers, feedlots, food processors, and cotton gins.

Any change in agricultural production thus sets in motion a series of “ripple effects,” which collectively cause changes in output, employment, and income throughout the regional economy. These linkages are frequently quantified by the use of input-output (I-O) models, which are discussed in Section 8.2, Environmental Consequences.

8.1.2 Seven-County San Joaquin Valley Area

Potential agricultural transferees in the San Joaquin Valley include water agencies in Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern counties (see Figure 2-4). Four of these overlap with the counties in which the Exchange Contractors service area is located. The discussion below applies to the entire seven-county area.

Within this area, the key sectors or entities likely to be affected by the transfers are agricultural production and related sectors and wildlife refuges and management areas. The potential agricultural impacts of the various transfer alternatives depend on the availability and cost of alternative water supplies and crops grown within the district. Irrigators growing trees and vines would likely be willing to pay much higher prices per acre-foot for transferred water than those growing grains, forage, and other annual crops. Irrigators within a district growing few or no permanent crops may be unwilling to pay more than their “normal” costs for irrigation water because of the crops grown and returns from those crops.

8.1.2.1 Population

In addition to the four counties included in the Exchange Contractors service area, the potential impact area within the San Joaquin Valley includes Kern, Kings, and Tulare counties. The principal cities within Kern County are Bakersfield, Delano, Ridgecrest, and Wasco; within Kings County are Hanford, Corcoran, Lemoore, and Avenal; and within Tulare County are Visalia, Tulare, Porterville, and Dinuba.

Among the seven counties, the population is largest in Fresno and smallest in Madera. Between 1990 and 2000, population for the entire area grew by 21 percent (see Table 8-8). The largest growth rate was in Madera County at 39 percent and the smallest was in Tulare County at 17 percent. Between 2000 and January 2003, population in the seven-county area grew by 6 percent: Tulare County by 5 percent, Kern by 6 percent, and Kings by 12 percent. Growth for the other counties is discussed in Section 8.1.1.1. County growth from 2000 through 2020 is projected at 60 percent for Kern, 48 percent for Kings, and 52 percent for Tulare counties (California Department of Finance Demographic Research Unit 2001).

Table 8-8
Seven County Population and Population Growth, 1990–2003

County/Area	Population			Population Growth	
	1990	2000	2003	1990–2000	2000–2003
Fresno	672,302	802,304	841,400	19%	5%
Kern	549,535	663,854	702,900	21%	6%
Kings	101,885	129,909	136,100	28%	12%
Madera	89,125	123,667	131,200	39%	6%
Merced	179,953	211,710	225,100	18%	6%
Stanislaus	375,312	449,895	481,600	20%	7%
Tulare	314,062	368,954	386,200	17%	5%
Seven-County Area	2,282,174	2,750,293	2,904,500	21%	6%

Sources:

1990 and 2000: Bureau of Economic Analysis 2003.

2003: California Department of Finance Demographic Research Unit 2003.

8.1.2.2 Employment²

Between 1990 and 2000, total employment in the seven-county area increased by more than 238,069 (see Table 8-9). The largest absolute increases were in services at 84,183 jobs, agriculture and agricultural services at 66,922 jobs, and trade at 34,049 jobs. The largest percentage increases were in agriculture and agricultural services at 39 percent, services at 37 percent, and transportation and public utilities at 24 percent. Percentage growth in total employment was 23 percent in Kern, 26 percent in Kings, and 24 percent in Tulare counties.

Table 8-9
Employment and Employment Change, Seven-County Area, 1990–2000

Sector	Employment		Employment Growth 1990–2000	
	1990	2000	Number	Percent
Agriculture/Services	173,009	239,931	66,922	39
Construction/Mining	75,837	76,277	440	1
Manufacturing	95,643	100,345	4,702	5
Transportation/Public Utilities	41,103	50,796	9,693	24
Trade	210,162	244,211	34,049	16
Finance-related	61,382	74,030	12,648	21
Services	226,335	310,518	84,183	37
Government	184,966	210,398	25,432	14
Total	1,068,437	1,306,506	238,069	22

Source: Bureau of Economic Analysis 2003.

² See footnote 1.

8.1.2.3 Income

Total personal income in the seven counties in 2000 was \$57.059 billion and represented 5.2 percent of the total for California (see Table 8-10). Among the 58 counties in the State, personal income in Kern County in 2000 was the 16th largest, Kings County was 37th, and Tulare County was 24th. In 2000, per capita personal income in Kern County ranked 47th in the State, Kings County 58th, and Tulare County 48th.

In 1999, median household income was \$35,446 in Kern, \$35,749 in Kings, and \$33,983 in Tulare counties (Census 2000). In Kern County, 16.8 percent of families were below the defined poverty level. Corresponding figures for Kings and Tulare counties were 15.8 and 18.8 percent, respectively.

Table 8-10
Total and Per Capita Personal Income in the Seven-County Area and California, 2000

County/State	Personal Income		
	Total (\$ Million)	Per Capita (\$)	Rank Among Counties for Per Capita Income
Fresno	\$17,256	\$21,508	45
Kern	\$13,787	\$20,767	47
Kings	\$2,094	\$16,112	58
Madera	\$2,300	\$18,609	53
Merced	\$3,924	\$18,536	54
Stanislaus	\$10,302	\$22,889	37
Tulare	\$7,396	\$20,043	48
Total Seven Counties	\$57,059	---	---
California	\$1,093,065	\$32,149	---

Source: California Department of Finance 2002.

8.1.2.4 Agriculture

Potential agricultural transferee agencies are in seven counties throughout the San Joaquin Valley. Total harvested cropland in those seven counties in 2002 was 4,921,488 acres, which produced \$9.273 billion of farmgate value, that is, the value of harvested crops as they leave the farm and excluding off-farm processing or marketing (see Table 8-11). For simplification, the crop categories shown in Tables 8-5 and 8-6 have been aggregated in Table 8-11. In 2002, field crops (excluding range pasture) were 59 percent of total acreage, fruits were 18.5 percent, nuts 11.8 percent, seed crops 0.9 percent, and vegetable crops 9.8 percent. All permanent crops (fruits, nuts, trees, and vines) were 30.3 percent of 2002 acreage and 4.1 percent of acreage in the Exchange Contractors service area. The proportion of vegetables was higher in the Exchange Contractors area, 11.5 percent of acreage, than in the seven counties, where it was 9.8 percent (both figures include melons). The proportion of field crops was higher in the Exchange Contractors area, 82.2 percent, than in the seven counties, where it was 59.0 percent (both figures include all hay, cotton, grains, pasture and forage, and other field crops).

In the seven-county area, field crops accounted for 20.8 percent of total farmgate value, fruits 39.0 percent, nursery crops 3.7 percent, nuts 15.2 percent, seed crops 0.8 percent, and vegetable crops 20.4 percent. The differences in percentage distributions between crop acreages and farmgate values are similar to those previously shown for the Exchange Contractors. The value of field crops is less than half its proportionate share of acreage, while the values of fruits, nuts, and vegetable crops are all substantially higher than their respective shares. One of the most important trends in field crops has been a decline in cotton acreage. Between 1995 and 2002, the amount of land devoted to cotton in the seven counties fell by 825,000 acres, from 1,269,000 to 444,000 acres.

Table 8-11
Crop Acreage and Value in the Seven-County San Joaquin Valley Area, 2002

Crop Group	Acres	Percent of Acres	Value (\$000)	Percent of Value	Value per Acre
Field crops	2,902,670	59.0	\$1,930,629	20.8	\$665
Fruits	911,876	18.5	\$3,613,921	39.0	\$3,963
Nursery crops	NA	NA	\$344,299	3.7	NA
Nuts	579,590	11.8	\$1,413,564	15.2	\$2,439
Seed crops	44,156	0.9	\$74,633	0.8	\$1,690
Vegetables	483,196	9.8	\$1,896,317	20.4	\$3,925
Total	4,921,488	100.0	\$9,273,362	100.0	\$1,884

Source: Agricultural Commissioner reports, 2002, various counties.

8.1.3 San Felipe Division Area

Potential transferees in the San Felipe Division include SCVWD and SBCWD.³ The SCVWD service area covers the 1,300 square miles in Santa Clara County and serves 15 cities, 1.7 million residents, and more than 200,000 commuters (SCVWD Web site, <http://www.valleywater.org>). SCVWD sells water to 13 retail agencies. SCVWD has a contract with the Federal government for the annual delivery of up to 152,500 acre-feet, including 119,400 acre-feet for M&I uses and 33,100 acre-feet for agricultural uses. In addition to CVP supplies, SCVWD uses SWP, Hetch Hetchy project, locally supplied, recycled, and ground water. Collectively, SCVWD supplies about 390,000 acre-feet per year (SCVWD 2003). During normal periods, local surface water and natural groundwater recharge provide approximately 101,000 and 112,000 acre-feet per year, respectively (Reclamation 2000e). In critically dry years, these annual rates drop to 59,000 and 74,000 acre-feet, respectively. The SWP entitlement is 100,000 acre-feet per year, and deliveries have averaged 74,000 acre-feet per year.

³ The San Felipe Division also includes agencies in Santa Cruz and Monterey counties, but they are not included in the analysis.

SCVWD completed an Integrated Water Resources Plan (IWRP) in 1997 (cited in SCVWD 2001). The Preferred Strategy in the IWRP has five basic elements, including long-term transfers or increased water recycling of up to 50,000 acre-feet per year. The IWRP assumes historic reliability levels for both CVP and SWP supplies, and those supplies may be less reliable now than when the IWRP was prepared. Accordingly, in dry years SCVWD may use greater amounts of groundwater, which could aggravate the overdraft in parts of the valley. The potential purchase of Exchange Contractors water as a dry year supply would allow SCVWD to reduce the amount of increased groundwater pumping that would otherwise occur during those years.

SBCWD has a Federal contract for the annual delivery of up to 43,800 acre-feet, including 8,250 acre-feet for M&I uses and 35,550 acre-feet for agricultural uses (Reclamation 2000e). While SBCWD serves all of San Benito County, only Zone 6 in the northern part of the county directly receives CVP water (Reclamation 2000e). Zone 6 water supplies average about 100,000 acre-feet per year, including both CVP and groundwater. CVP and local water are used to recharge groundwater aquifers in the area. In Zone 6, SBCWD provides CVP water directly to most agricultural users. It also provides CVP water indirectly, by recharge, to agricultural and municipal users that depend only on groundwater. SBCWD does not provide water directly to municipal users. When CVP supplies are significantly reduced in dry years, SBCWD relies primarily on groundwater, which may cause a serious overdraft (Reclamation 2000e).

8.1.3.1 Population

Between 1990 and 2000, population in the two-county area increased by 205,749, or 13 percent (see Table 8-12). Growth was much more rapid in San Benito than in Santa Clara County, 46 percent versus 13 percent. Between 2000 and January 2003, population in the area increased by 3 percent. County growth from 2000 through 2020 is projected at 59 percent in San Benito County and 27 percent in Santa Clara County (California Department of Finance Demographic Research Unit 2001).

Table 8-12
Population and Population Growth, 1990–2003

County	Population			Population Growth	
	1990	2000	2003	1990-2000	2000-2003
San Benito	36,835	53,870	56,300	46%	5%
Santa Clara	1,498,307	1,687,021	1,729,900	13%	3%
Two-County Area	1,535,142	1,740,891	1,786,200	13%	3%

Sources:

1990 and 2000: Bureau of Economic Analysis 2003.

2003: California Department of Finance Demographic Research Unit 2003.

8.1.3.2 Employment⁴

Between 1990 and 2000, total employment in the two-county area grew by more than 251,000 jobs (see Table 8-13). The largest increases were in services at 54 percent, transportation and public utilities and construction and mining, both at 39 percent, and agriculture and agricultural services at 25 percent. The slowest growth was in manufacturing, at less than 1 percent. Government employment fell by 2 percent over the period.

Table 8-13
Employment and Employment Change, Two-County Area, 1990–2000

Sector	Employment		Employment Growth 1990–2000	
	1990	2000	Number	Percent
Agriculture/Services	16,619	20,708	4,089	25
Construction/Mining	47,243	65,689	18,446	39
Manufacturing	273,506	274,223	717	0
Transportation/Public Utilities	27,361	38,060	10,699	39
Trade	205,547	236,512	30,965	15
Finance-related	65,675	81,075	15,400	23
Services	320,724	494,077	173,353	54
Government	103,806	101,793	(2,013)	(2)
Total	1,060,481	1,312,137	251,656	24

Source: Bureau of Economic Analysis 2003.

8.1.3.3 Income

Total personal income in the two counties in 2000 was \$94.221 billion and represented 8.7 percent of the total for California (see Table 8-14). Among the 58 counties in the State, personal income in 2000 was 40th largest in San Benito County and 3rd largest in Santa Clara County. In 2000, per capita personal income in San Benito County ranked 29th in the State, and Santa Clara County ranked 4th.

In 1999, median household income was \$57,469 in San Benito and \$74,335 in Santa Clara counties (Census 2000). The percentage of families below the defined poverty level was 6.7 percent in San Benito County and 4.9 percent in Santa Clara County.

⁴ See footnote 1.

Table 8-14
Total and Per Capita Personal Income in the Two-County Area and California, 2000

County/State	Personal Income		
	Total (\$ Million)	Per Capita (\$)	Rank Among Counties for Per Capita Income
San Benito	\$1,341	\$24,883	29
Santa Clara	\$92,880	\$55,157	4
Total Two Counties	\$94,221	---	---
California	\$1,093,065	\$32,149	---

Source: California Department of Finance 2002.

8.1.3.4 Agriculture

In 2002, total harvested cropland in San Benito and Santa Clara counties was 74,307 acres, which produced \$466.2 million of farmgate value that year (see Table 8-15). Field crops (excluding range pasture) were 34 percent of total acreage, fruits 12.2 percent, nuts 3 percent, seed crops 0.9 percent, and vegetables 50 percent. Field crops accounted for 1.1 percent of farmgate value, fruits 8 percent, nursery crops 32.4 percent, nuts 8 percent, seed crops 0.3 percent, and vegetables 50.2 percent.

Table 8-15
Crop Acreage and Value in San Benito and Santa Clara Counties, 2002

Crop Group	Acres	Percent of Acres	Value (\$000)	Percent of Value	Value per Acre
Field crops	25,244	34.0	\$5,124	1.1	\$203
Fruits	9,056	12.2	\$37,410	8.0	\$4,131
Nursery crops	NA	NA	\$151,072	32.4	NA
Nuts	2,205	3.0	\$37,154	8.0	\$16,850
Seed crops	671	0.9	\$1,377	0.3	\$2,052
Vegetables	37,131	50.0	\$234,016	50.2	\$6,302
Total	74,307	100.0	\$466,153	100.0	\$5,803

Source: Agricultural Commissioner reports, 2002, San Benito and Santa Clara counties.

Agriculture in Santa Clara County is highly intensive and specialized, as land remaining in agriculture is very valuable and a small fraction of the agricultural base in the 1950s and 1960s. Much of the farmland in the county has been converted to nonagricultural purposes, including the south county area. Because of the high value of the land, as well as soils and climate, the main crops in the county are nursery crops, mushrooms, cut flowers, and vegetables (Santa Clara County Department of Agriculture 2003).

8.2 ENVIRONMENTAL CONSEQUENCES

As discussed elsewhere in this EIS/EIR, the amount of water transferred by the Exchange Contractors depends on such variables as hydrologic conditions, sources of water, characteristics of transferees, and negotiable terms between the Exchange Contractors and willing buyers. The following discussion incorporates estimated impacts for several possible combinations of sources and amounts of water, transferees, and year types. In each case, it is assumed that water provided by the Exchange Contractors would be only to supplement supplies that would otherwise be insufficient to meet the normal needs of the transferees, and no new lands would be brought under production.

Table 8-16 shows the combination of variables that are analyzed in this section. (The scenarios are explained further in Section 4.2 and Appendix B.) The amounts shown transferred to refuges are net, that is, after losses of 20 percent. No losses are assumed for transfers to seven-county agriculture or San Felipe Division agriculture or M&I. The allocations of water among transferees do not include all possibilities, but rather a range that is intended to represent logical alternatives and that would disclose the full range of potential impacts.

Table 8-16
Combinations of Variables Analyzed

Alternative	A		A		A	
Scenario	Refuge Focus A-1-1-C		Agriculture Focus A-1-2-C		Out-of-Basin Focus A-1-3-C	
Year Type	Noncritical	Critical	Noncritical	Critical	Noncritical	Critical
Water Sources:						
Conservation	80,000	0	80,000	0	80,000	0
Groundwater	0	0	0	0	0	0
Fallowing	0	50,000	0	50,000	0	50,000
Transferees:						
Refuges	64,000	40,000	0	0	0	0
7-County Agriculture Area	0	0	80,000	50,000	17,050	0
San Felipe Agriculture Area	0	0			33,100	20,150
San Felipe M&I	0	0	0	0	29,850	29,850

**Table 8-16 (concluded)
Combinations of Variables Analyzed**

Alternative	B		B		B	
Scenario	Refuge Focus B-3-1-C		Agriculture Focus B-3-2-C		Out-of-Basin Focus B-3-3-C	
Year Type	Noncritical	Critical	Noncritical	Critical	Noncritical	Critical
Water Sources:						
Conservation	0	0	0	0	0	0
Groundwater	0	0	0	0	0	0
Fallowing	50,000	50,000	50,000	50,000	50,000	50,000
Transferees:						
Refuges	40,000	40,000	0	0	0	0
7-County Agriculture Area	0	0	50,000	50,000	0	0
San Felipe Agriculture Area	0	0	0	0	33,100	33,100
San Felipe M&I	0	0	0	0	16,900	16,900

Alternative	C		C		C	
Scenario	Refuge Focus C-1-1-C		Agriculture Focus C-1-2-C		Out-of-Basin Focus C-1-3-C	
Year Type	Noncritical	Critical	Noncritical	Critical	Noncritical	Critical
Water Sources:						
Conservation	80,000	0	80,000	0	80,000	
Groundwater	0	0	0	0	16,635	0
Fallowing	50,000	50,000	50,000	50,000	33,365	50,000
Transferees:						
Refuges	64,000	40,000	0	0	0	0
7-County Agriculture Area	50,000	0	130,000	50,000	67,050	0
San Felipe Agriculture Area	0	0	0	0	33,100	20,150
San Felipe M&I	0	0	0	0	29,850	29,850

8.2.1 Key Impact and Evaluation Criteria**8.2.1.1 Data Needs and Sources**

Historic and current demographic, agricultural economic, and land use data were collected for the areas studied in this report. The data collected provided both a historical perspective on the economics of the areas and the data needed to analyze the impacts of the alternatives included.

The primary sources of data included:

- California Department of Finance Demographic Unit for intercensal population and income estimates
- California County Agricultural Commissioners reports for acreage, yield, and value figures for crops in various counties
- U.S. Census of Population for decennial population and income figures
- U.S. Census of Agriculture for information on irrigated acreage
- U.S. Bureau of Economic Analysis for employment and earnings by industry in various counties
- University of California Cooperative Extension Service for production budgets for key crops grown in each of the areas
- Exchange Contractors for data on crop acreage within member districts
- CVPIA Programmatic EIS and other Reclamation publications for background information and data

8.2.1.2 Issues Analyzed

The following issues are evaluated to determine potential impacts and their level of significance under CEQA:

- How agricultural, M&I, and refuge water supplies are affected by the alternatives
- How crop production is affected in both the Exchange Contractors study area and the areas of the transferee(s)
- How refuges are affected in both the Exchange Contractors study area and the areas of the transferee(s)
- How businesses related to agriculture and refuges are affected by the alternatives
- The impacts of the alternatives on the overall regional economies in the areas of both the Exchange Contractors and the transferee(s)
- Would a transfer of water to M&I induce population or economic growth?

8.2.2 Environmental Impacts and Mitigation**8.2.2.1 *Methods and Assumptions Used to Estimate Socioeconomic Impacts of Alternatives***

The impacts of the alternatives and scenarios in Table 8-16 are shown in several tables below. Direct impacts are estimated first followed by total regional impacts. The types and magnitude of each impact vary between the four-county transferor and transferee areas. In each, direct impacts include those most directly or explicitly related to the affected sector. In this study, the key direct impacts are on output, employment, and income in agriculture. For example, the direct employment impacts of temporary land fallowing would include changes in employment at all businesses for which the primary activity is crop production.

Indirect impacts are output, employment, and income impacts in businesses that are closely related to the directly impacted businesses. These may be either “forward” or “backward” inter-industry linkages. The former occur in the cases where the agricultural products are used in the production of other products, for example, vegetables used in food processing. The latter are in cases of such sectors as crop and soil custom services, farm management services, and suppliers of such inputs as seed, chemicals, feed, and other intermediate goods all used in production agriculture.

Induced output, employment, and income impacts occur because of changes in local incomes and population. Direct and indirect impacts influence the incomes of employees of the impacted businesses. As these income levels change, they induce changes in the consumption of goods and services.

The direct impacts of the alternatives and scenarios within the Exchange Contractors service area would trigger indirect impacts throughout the four-county area. For example, Alternative B includes land idling to provide up to 50,000 acre-feet per year of water. Direct impacts would include the loss of crop production from idled land and income to irrigators for water sold.⁵ It is assumed that land idled for the purpose of selling water that is normally applied would not be irrigated with other water sources. It is also assumed that land farmed without irrigation generates little regional economic impact.

Sectors experiencing indirect impacts would include those selling production inputs to Exchange Contractor irrigators, e.g., dealers of farm machinery, seed, chemicals, and fertilizers. Because of water payments to participating farmers, they would also include other businesses that sell to farm homes, such as retailers of household goods and a wide variety of other goods and services.

The direct impacts on transferees of the alternatives depend on the uses of the water. Agricultural agencies are assumed to use the supplemental supplies to reduce or eliminate the irrigation deficits shown in the water balance analysis (Appendix A). It is assumed that Exchange

⁵ In addition, impacts might include greater depths to groundwater and higher pumping costs because of reduced recharge. However, these impacts potentially attributable to land idling are not quantified here. See Section 5, Groundwater Resources.

Contractors water would be used on the crops for which the marginal value per acre-foot is highest.

The marginal value of water is estimated using production budgets from the University of California Cooperative Extension Service for representative crops grown in the receiving areas.⁶ For the seven-county San Joaquin Valley area, budgets for cotton, peaches, almonds, and processing tomatoes are used. For the San Felipe Division, budgets for lettuce and bell peppers are used.

Thus, the total direct effects for water sold to agricultural transferees, across all regions, would include:

- Value of lost crop production in the Exchange Contractors service area
- Cost of water provided by conservation and related methods and by groundwater pumping⁷
- Payments to farmers for water sold
- Value of transferred water used in crop production in the receiving areas
- Higher cost of transferred water relative to normal supplies in receiving areas.

The first two of these measures would have a negative impact and the third would have a positive impact on the Exchange Contractors regional economy. The fourth would have a positive impact and the fifth would have a negative impact on the regional economy in which the transferee is located.

Historically, the acreage of annual crops has varied within the Exchange Contractors service area. Such variations, typical in any agricultural setting, are due to many influences such as crop rotations to control pests and restore soil fertility. Excluding fallowed land, acreage of annual crops within the service area has varied by an average of 4,857 acres per year since 1991 (excluding 1996, for which data were not available), or about 2.2 percent of average annual cropland acreage. Fallowing has averaged 5,862 acres per year over the same period, but has varied by an average of 47.7 percent or 2,798 acres between years. Thus, between the normal variation in annual crop acreage (excluding fallowing) and fallowing, crop acreage may vary as much as 7,655 (4,857 + 2,798) acres between years in the service area.

M&I Purchases and Growth Inducement

One potential M&I purchaser of Exchange Contractors water is SCVWD in the San Felipe Division as an out-of-basin transfer. It is assumed that sales to the district are limited to 62,950 acre-feet per year for both agricultural and M&I purposes in the scenarios for which such sales

⁶ Marginal value of water is calculated by subtracting all per-acre cash operating costs, except irrigation, from per-acre gross revenue for the crop in question. Overhead and fixed costs are not included because the transfers to individual purchasers are short term, during which time only variable costs, measured as cash operating costs, are relevant.

⁷ S. Chedester, pers. comm., 2003. For water provided by groundwater pumping, cost is assumed to be \$40 per acre-foot. For water provided by conservation or tailwater recovery or related measures, cost is assumed to be \$10 per acre-foot.

are included. That figure represents a combination of up to 33,100 acre-feet for agriculture and up to 29,850 acre-feet for M&I purposes per year.

M&I purchases of 29,850 acre-feet per year or less are determined to be non-growth inducing, because the delivery would not result in exceedance of SCVWD's CVP contract supply and could be transferred only to alleviate shortages in CVP contract supply. An Environmental Assessment was prepared on the renewal of SCVWD's CVP contract (Reclamation 2000b).

The value of water for agricultural users can be estimated using the procedure described above. However, the value of purchased water for M&I users is not estimated. The incremental supplies represented by the transferred water would represent a relatively small part of the Division's total water supplies. Thus, it is difficult to estimate the value of the M&I part of that usage without arbitrary assumptions on quantities and costs of all other water sources.

Refuges

Wildlife refuges provide a variety of recreational benefits, both consumptive (hunting and fishing) and nonconsumptive (e.g., bird viewing and hiking). A recent study estimated the expenditures related to wetlands in Merced County (Grassland Water District 2001). The study reported more than 300,000 annual visits to the Grassland Ecological Area for hunting, fishing, and nonconsumptive wildlife recreation. The corresponding number for all of Merced County is almost 550,000 visits. Nonconsumptive recreation was estimated to account for 64 percent of user days in the Grassland Ecological Area and 78 percent in all of Merced County. The expenditures per trip were estimated to vary from \$37 for nonconsumptive recreation to \$115 for hunting. The expenditures per visit were disaggregated into five separate categories based on recreation spending within the San Joaquin River Basin, as reported in the *CVPIA Programmatic Environmental Impact Statement* (Reclamation 1997c).⁸

These figures and several others included in the Grassland Water District 2001 report were combined with data from other sources to estimate the recreational impacts of increased water flows to refuges under the proposed program.⁹ The impacts on public use days of increasing refuge water supplies were taken from another section of this EIS/EIR. Based on the data in that section and the projected increase in visitor days resulting from larger refuge water supplies, it was estimated that each acre-foot of incremental water supplies to the refuges would increase public usage by 0.718 use days.

Use days were then disaggregated into hunting, fishing, and nonconsumptive activities using data from the 2001 Grassland Water District report for locations that are within the study area for the proposed program. The figures were 6.9 percent for hunting, 23.6 percent for fishing, and 69.5

⁸ *Central Valley Project Improvement Act Programmatic Environmental Impact Statement*, Technical Appendix Volume 5, p. III-12 (Reclamation 1997c). The categories include food stores, service stations, eating and drinking establishments, hotels and lodging, and miscellaneous retail businesses. The expenditures in these categories are the direct impacts of recreation and are input into an I-O model to estimate the regional impacts of the alternatives.

⁹ Because it is assumed that the incremental water supplies would not be used to expand the acreage within refuge boundaries, expenditures for incremental infrastructure or land management activities are not included in the analysis of the alternatives. Neither are fiscal impacts included in the analysis.

percent for nonconsumptive use, and were assumed to be representative for all refuges within the seven-county San Joaquin Valley area.

Impacts were then estimated for each alternative and scenario. The number of acre-feet to refuges was used to estimate the increase in public use days. The number of public use days was then spread among hunting, fishing, and nonconsumptive activities using the figures from the Grassland Water District report for locations within the study area. Expenditures per use day were taken from the Grassland Water District report and were disaggregated into five categories based on the CVPIA document. Impacts were estimated separately for hunting, fishing, and nonconsumptive activities, then aggregated to direct impacts for each alternative. The direct impacts were then used as an input into the regional I-O model as part of the estimation of total regional impacts of the alternatives.

Water Prices

It is assumed that all transfers are between willing sellers and willing buyers. It is also assumed that buyers will remit funds to the Exchange Contractors, which will then distribute the funds to its member districts in proportion to the amounts of water they provided for the transfers. It is assumed that member districts will then remit to individual irrigators who provided the water by conservation, groundwater pumping, and land idling.

The negotiated price between the Exchange Contractors and transferees will likely depend on many factors. Market conditions are clearly important, but so are such factors as the types of buyer (agricultural, M&I, or environmental) and their respective abilities to pay; the tenure and other terms and conditions of the transaction; and the type of water year and sequence of water year types.

To analyze trends in water prices, a database of water transactions in the San Joaquin Valley was developed for drought and nondrought years beginning in 1990. To be consistent with the Exchange Contractors transfers, only lease transactions were selected. Approximately 90 transactions were analyzed. Transactions were ranked on the basis of price, from lowest to highest, for dry years and wet or normal years. The cumulative volume of water involved in the leases was then calculated, and the information was graphed to show the relationship between price per acre-foot and cumulative volume of water. A linear relationship was fit to the data points. The price associated with each point on the curve, or increment of supply, is assumed to represent the minimum offer necessary to induce the seller to sell that increment of water.

The results show that over time, with all other factors held constant, lease prices in the San Joaquin Valley have increased approximately \$8 per acre-foot per year. In addition, lease prices were found to be \$30 to \$40 per acre-foot higher in dry years than in wet or normal years. Further, prices for leases of groundwater are about \$35 per acre-foot greater than for surface water.

Given the above and input from the Exchange Contractors (J. Toscano, pers. comm., 2004b), Table 8-17 summarizes the prices used in this analysis for agricultural users, refuges, and M&I users in noncritical and critical years.

Table 8-17
Assumed Water Prices to Different Groups of Transferees in
Noncritical and Critical Years (per Acre-Foot)

Transferee Group	Noncritical Years	Critical Years
Agricultural	\$90	\$150
Refuges	\$125	\$200
M&I	\$185	\$300

Impact Estimation

The total impacts of each entry shown in Table 8-16 are shown below and include direct, indirect, induced, and total impacts. Each is as defined above. The direct impacts are used as inputs into the I-O models, which are then used for the estimation of indirect, induced, and total impacts. Impacts shown are aggregated for the affected regions. Disaggregated impacts are shown for noncritical and critical years for the first scenario of Alternative A following the tables showing aggregate impacts for all alternatives. For simplicity, disaggregated results are not shown for other scenarios for the various alternatives.

I-O analysis is an approach frequently used to analyze relationships within an economy, at the national, state, county, or even less aggregate levels. The relationships include those among businesses as they purchase from and sell to each other, and among businesses and final consumers.

A set of I-O accounts is a snapshot of the economic structure of an area at one point in time. For this analysis, data for 2000 were used to develop three models: the four-county area (Fresno, Madera, Merced, and Stanislaus) in which the Exchange Contractors service area is located; the seven-county area to which water may be transferred in the San Joaquin Valley (including, in addition to the above, Kern, Kings, and Tulare counties); and a two-county area in the San Felipe Division of the CVP (San Benito and Santa Clara counties).

The I-O models were developed using IMPLAN software, used extensively in economic impact analyses since the late 1970s (Minnesota IMPLAN Group 1997). The steps used in constructing an I-O model can be found in the *Grassland Bypass Project Environmental Impact Statement and Environmental Impact Report* (Reclamation and San Luis & Delta-Mendota Water Authority 2001, Volume II, Appendix G, Economic Evaluation).

8.2.2.2 No Action/No Project Alternative

No Action/No Project includes several key assumptions relevant to the socioeconomic impact analysis:

- Deliveries to wetlands would include Level 2 and Replacement Water as well as 75,694 acre-feet of Level 4 Incremental Water Supply.
- The Exchange Contractors would reuse the same amount of tailwater flows that have recently been otherwise transferred and reduce groundwater pumping by that amount of tailwater recovery

- CVP users, both agricultural and M&I, would receive their contractual supplies, subject to restrictions due to hydrology or other limitations, and may obtain water from other sources to make up for shortages.

No Action and No Project conditions are similar because in both cases the Exchange Contractors would not develop water for transfer. Instead, potential buyers of Exchange Contractors water would, depending on the year, either incur shortages or find other water sources.

Existing conditions is similar to the No Action/No Project “baseline conditions” and reflects sales by the Exchange Contractors of water to refugees and agriculture. Since 2002, the majority of such sales have been to refugees. Hereafter the term No Action refers to both No Action and No Project.

No Action includes both qualitative and quantitative elements. It is reasonable to expect that depths to groundwater, thus pumping costs, would be affected by the measures in the action alternatives, namely transfer of water conserved or tailwater recovered, groundwater pumped, or water not applied to fallowed land. The development of No Action should, therefore, include the “avoided costs” of not implementing those measures.¹⁰ Because significant changes in pumping costs are not anticipated and have not been estimated, they are not included in the analysis of socioeconomic effects compared to No Action.¹¹

The socioeconomic impacts on refugees of the action alternatives compared to No Action are not quantified, although any changes from No Action because of increased water supplies are estimated. While the economic impacts of refugees in the Grassland Ecological Area and Merced County have been estimated in another study (Grassland Water District 2001), comparable “baseline” data for all refugees in the study area are not available.

Finally, the effects of the action alternatives relative to No Action on M&I users’ water costs are unknown. As discussed above, M&I purchases are assumed to be no more than 29,850 acre-feet per year to the SCVWD in the San Felipe Division. Because the SCVWD has diverse sources of water, the effects on water costs and use of the incremental supplies are not known.

Thus, the only quantified elements in No Action relate to the usage of CVP deliveries to agricultural contractors under current conditions and restrictions. Table 8-18 summarizes these data. They represent elements of both No Action and existing conditions. It can be assumed that under No Action, with no developed water transferred by the Exchange Contractors, potential buyers would locate other sources of water. The data in the table indicate current representative figures in assuming that each region shown has purchased any water needed from sources other than the Exchange Contractors.

¹⁰ Similarly, the analysis of the action alternatives should include the effects of these measures on groundwater levels and pumping costs.

¹¹ Section 5 does not identify a lowering of groundwater levels that would potentially increase pumping costs.

Table 8-18
No Action/No Project Baseline (in \$ Millions¹ and Number of Jobs)

Type of Year and Measure	Exchange Contractors Area	Four-County Area	Seven-County San Joaquin Valley Area	Two-County San Felipe Area
Noncritical Year				
Value of Crop Production (\$ million)	\$306	\$4,740	\$9,273	\$466
Regional Effects of Crop Production				
Total Output (\$ million)	\$542	\$8,322	\$16,816	\$667
Total Employment	6,992	117,842	219,765	9,873
Total Income (\$ million)	\$153	\$2,610	\$4,958	\$280
Critical Year				
Value of Crop Production (\$ million)	\$217	\$3,703	\$7,611	NM ²
Regional Effects of Crop Production				
Total Output (\$ million)	\$385	\$6,502	\$13,802	NM ²
Total Employment	4,966	92,067	180,369	NM ²
Total Income (\$ million)	\$109	\$2,039	\$4,069	NM ²

¹ Amounts are rounded and indexed to year 2000 dollars.

² Not measured. Assumes additional groundwater pumping to make up CVP supply deficit for single year.

8.2.2.3 *Alternative A: 80,000 Acre-Feet*

Alternative A includes the transfer of up to 80,000 acre-feet in noncritical years and up to 50,000 acre-feet in critical years. The sources of the water and transferees in either type of year are shown as various scenarios in Table 8-16.

The costs of these sources vary and are assumed to apply for all alternatives and scenarios. Conservation and tailwater recovery is assumed to cost \$10 per acre-foot, and groundwater pumping is assumed to cost \$40 per acre-foot (S. Chedester, pers. comm., 2003). The cost for temporary land fallowing is derived as the lost value of agricultural production per acre. For the crops that would be fallowed (cotton, alfalfa, sugar beets, melons, and wheat), the average value is \$520 per acre-foot of water.¹²

In critical years, the source of the entire 50,000 acre-feet is assumed to be land fallowing. It is assumed that only the average consumptive use of crops grown can be transferred. For this study, that figure is assumed to be approximately 2.5 acre-feet per acre (Reclamation 2003a) for all

¹² Crops that would normally be grown on fallowed land. Cotton is estimated at 60 percent, alfalfa and sugar beets at 15 percent each, and melons and wheat at 5 percent each (S. Chedester, pers. comm., 2003). Figure of \$520 per acre-foot calculated using weighted average gross crop value for crops shown of \$1,301 per acre and use of 2.5 acre-feet per acre.

alternatives and scenarios. Thus, for Alternative A, maximum crop idling would involve approximately 20,000 acres in any year.

For Alternative A, three different scenarios are considered, with prices of transferred water as shown in Table 8-17. Losses from transfers to refuges are assumed to be 20 percent. The amounts shown transferred to refuges are net of those losses. In critical years, the only source of transferred water is land fallowing. The alternatives are as follows:

- A-1-1-C: All water is sold to **refuges** in the seven-county area in both noncritical and critical years. In noncritical years, all water is provided by conservation (including tailwater recapture). The net amounts to the refuges in noncritical and critical years are 64,000 acre-feet and 40,000 acre-feet, respectively, after losses.
- A-1-2-C: All water is sold to **agricultural buyers** in the seven-county area in both noncritical and critical years. In noncritical years, all water is provided by conservation.
- A-1-3-C: Water is sold to agricultural buyers **outside of the San Joaquin River drainage basin** in the seven-county area as well as to the San Felipe Division for both agricultural and M&I uses in noncritical years. In critical years, water is assumed sold only to the San Felipe Division. In noncritical years, all water is provided by conservation (including tailwater recapture).

The impacts of the three scenarios for Alternative A in noncritical years are shown in Table 8-19. Corresponding impacts for a critical year are shown in Table 8-20.

For a noncritical year, the impacts vary considerably among the scenarios. Considering total economic impacts to all areas, all of which are positive, the largest impacts would be from scenario A-1-2-C. All water transferred would be from conservation and would be sold to other agricultural users within the seven-county area. The output, income, and employment impacts across all sectors and areas would be \$48.2 million, \$11.8 million, and 386 jobs. The smallest impacts would be from scenario A-1-1-C. Total output, income, and employment impacts would be \$15.9 million, \$4.5 million, and 161 jobs.

The primary difference between the scenarios showing the largest and smallest estimated impacts relates to the transferee. The largest impacts result from sales of water to agriculture in the seven-county area and the value of crops grown with that water. The smallest impacts result from sales of water to refuges and are attributable to expected increased visitation as discussed previously. The impacts shown include the increased visitation estimates, and while positive, exclude any intrinsic or nonmarket values which might result from increased refuge water supplies. These latter measures include “option values,” which in this case would reflect values that people place on the option of visiting these refuges, even if they do not visit them. Studies to estimate these values are beyond the scope of this analysis. However, to the extent these types of nonmarket impacts could result from providing additional water supplies to refuges, the estimated positive impacts shown for all scenarios and alternatives that include transfers to refuges could be somewhat understated.

Table 8-19
Impacts of Alternative A, Three Scenarios, Noncritical Year

Scenario/Impact	Output (\$ Million)		Income (\$ Million)		Employment (Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Scenario A-1-1-C, Refuge Focus						
Four-County	8.8	12.4	1.8	3.1	59	101
Seven-County	2.2	3.5	1.0	1.4	45	60
Two-County						
All Areas	11.0	15.9	2.8	4.5	104	161
Scenario A-1-2-C, Agriculture Focus						
Four-County	6.4	9.0	1.3	2.3	43	73
Seven-County	27.6	39.2	5.5	9.5	186	313
Two-County						
All Areas	34.0	48.2	6.8	11.8	229	386
Scenario A-1-3-C, Out-of-Basin Focus						
Four-County	9.2	13.1	1.9	3.3	62	106
Seven-County	5.9	8.3	1.1	2.0	40	67
Two-County	4.7	6.3	1.2	1.8	22	34
All Areas	19.8	27.7	4.2	7.1	124	207

Table 8-20
Impacts of Alternative A, Three Scenarios, Critical Year

Scenario/Impact	Output (\$ Million)		Income (\$ Million)		Employment (Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Scenario A-1-1-C, Refuge Focus						
Four-County	-14.8	-29.3	-2.7	-7.8	-123	-422
Seven-County	2.2	3.5	1.0	1.4	45	60
Two-County						
All Areas	-12.6	-25.8	-1.7	-6.4	-78	-362
Scenario A-1-2-C, Agriculture Focus						
Four-County	-16.9	-32.2	-3.2	-8.6	-137	-446
Seven-County	20.1	28.5	4.0	6.9	135	228
Two-County						
All Areas	3.2	-3.7	0.8	-1.7	-2	-218
Scenario A-1-3-C, Out-of-Basin Focus						
Four-County	-12.4	-25.9	-2.2	-7.0	-107	-395
Seven-County						
Two-County	2.7	3.9	0.8	1.3	12	21
All Areas	-9.7	-22.0	-1.4	-5.7	-95	-374

Measured against the noncritical year baseline variables for the four-county area in which the Exchange Contractors service area is located, the largest impacts would be approximately 0.2 percent of output and 0.1 percent of income and employment.

For a critical year, the impacts also vary considerably among the scenarios. Considering total economic impacts to all areas, all of which are negative, the smallest negative impacts would be from scenario A-1-2-C. All water would be based on fallowing, and all water would be sold to other agricultural users within the seven-county area. The output, income, and employment impacts across all sectors and areas would be -\$3.7 million, -\$1.7 million, and a loss of 218 jobs. The largest negative output and income impacts would be from scenario A-1-1-C, and the largest negative employment impacts would be from scenario A-1-3-C. The output, income, and employment impacts from A-1-1-C would be -\$25.8 million, -\$6.4 million, and a loss of 362 jobs. The comparable impacts from A-1-3-C would be -\$22.0 million, -\$5.7 million, and a loss of 374 jobs. The difference in scenarios for the largest negative impacts for output and income and for employment arises because of the difference in impacted areas, in particular the transferee sectors and the assumed prices for water to each. Scenario A-1-1-C includes impacts in the four- and seven-county areas, while Scenario A-1-3-C includes impacts in the four- and two-county areas.

In general, the net declines are attributable to several factors:

- Costs of land fallowing, conservation/tailwater recovery, and groundwater pumping
- Partially-offsetting income received from water sales by irrigators in the Exchange Contractors service area
- Use of water in the San Felipe Division
- Increased value of agricultural production in the seven-county area.

Measured against the critical year baseline variables for the four-county area in which the Exchange Contractors service area is located, the largest impacts would be approximately 0.5 percent of output, 0.4 percent of income, and 0.5 percent of employment.

The impacts for the seven-county area do not include those for the four-county area. The impacts in the larger area are solely those attributable to uses of the water in the receiving districts and their respective regional impacts. The four-county impacts are attributable solely to actions taken within the Exchange Contractors service area.

8.2.2.4 *Alternative B: 50,000 Acre-Feet*

Alternative B includes the transfer of up to 50,000 acre-feet in both noncritical and critical years. Temporary land fallowing (crop idling) is assumed to be the source of the water for all scenarios, while transferees vary and are shown in Table 8-16. It is assumed that only the average consumptive use of crops grown can be transferred. Based on an assumed approximate 2.5 acre-feet per acre, maximum land idling would be approximately 20,000 acres for all scenarios and all years for Alternative B.

For Alternative B, three different scenarios are considered, with prices of transferred water as shown in Table 8-17. Losses from transfers to refuges are assumed to be 20 percent. The amounts shown transferred to refuges are net of those losses. The alternatives are as follows:

- B-1-1-C: All water is sold to **refuges** in the seven-county area in both noncritical and critical years. The net amount in all years is 40,000 acre-feet after losses.
- B-1-2-C: All water is sold to **agricultural buyers** in the seven-county area in both noncritical and critical years.
- B-1-3-C: Water is sold **out-of-basin** to San Felipe Division for both agricultural and M&I uses in both noncritical and critical years.

The impacts of the three scenarios for Alternative B in noncritical years are shown in Table 8-21. Corresponding impacts for a critical year are shown in Table 8-22.

For both noncritical and critical years, wide variation exists among the impacts of the scenarios. Considering total economic impacts to all areas in noncritical years, all of which are negative, the largest negative impacts would be from scenario B-3-1-C for output and employment and B-3-3-C for employment. For the former scenario, all water transferred would be sold to refuges, and in the latter, to San Felipe Division M&I and agricultural users. The output, income, and employment impacts across all sectors and areas for B-3-1-C would be -\$30.9 million, -\$7.7 million, and a loss of 403 jobs. For Scenario B-3-3-C, the corresponding losses would be -\$27.9 million, -\$7.2 million, and 428 jobs. The smallest impacts would be from scenario B-3-2-C. Total output, income, and employment losses would be -\$12.0 million, -\$3.7 million, and 285 jobs.

The primary difference between the scenarios showing the largest and smallest estimated impacts relates to the transferee. The lowest negative impacts result from sales of water to agriculture in the seven-county area and the value of crops grown with that water. The largest negative impacts result from sales of water to refuges and are attributable to expected increased visitation as discussed previously. The same caveats discussed previously regarding other intrinsic or nonmarket values apply equally well for Alternative B.

Measured against the noncritical year baseline variables for the four-county area in which the Exchange Contractors service area is located, the largest impacts would be approximately 0.4 percent of output, income, and employment.

Considering total economic impacts to all areas in a critical year, all of which are negative, the largest negative impacts would be from scenario B-3-1-C for output and B-3-3-C for income and employment. The losses in output, income, and employment impacts for B-3-1-C would be -\$25.8 million, -\$6.4 million, and 362 jobs, respectively. The corresponding impacts for B-3-3-C would be -\$24.7 million, -\$6.4 million, and 396 jobs. The difference in scenarios for the largest negative impacts for output and for income and employment arises because of the difference in impacted areas, in particular the transferee sectors and the assumed prices for water to each. Scenario B-3-1-C includes impacts in the four- and seven-county areas, while Scenario B-3-3-C includes impacts in the four- and two-county areas.

Measured against the critical year baseline variables for the four-county area in which the Exchange Contractors service area is located, the largest negative impacts would be approximately 0.5 percent of output and employment and 0.4 percent of income.

Table 8-21
Impacts of Alternative B, Three Scenarios, Noncritical Year

Scenario/Impact	Output (\$ Million)		Income (\$ Million)		Employment (Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Scenario B-3-1-C, Refuge Focus						
Four-County	-18.4	-34.3	-3.5	-4.1	-147	-463
Seven-County	2.2	3.5	1.0	1.4	45	60
Two-County						
All Areas	-16.2	-30.9	-2.5	-7.7	-102	-403
Scenario B-3-2-C, Agriculture Focus						
Four-County	-19.9	-36.5	-3.8	-9.6	-157	-481
Seven-County	17.2	24.5	3.4	5.9	116	196
Two-County						
All Areas	-2.7	-12.0	-0.4	-3.7	-41	-285
Scenario B-3-3-C, Out-of-Basin Focus						
Four-County	-18.3	-34.2	-3.4	-9.1	-146	-462
Seven-County						
Two-County	4.7	6.3	1.2	1.8	22	34
All Areas	-13.6	-27.9	-2.3	-7.2	-124	-428

Table 8-22
Impacts of Alternative B, Three Scenarios, Critical Year

Scenario/Impact	Output (\$ Million)		Income (\$ Million)		Employment (Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Scenario B-3-1-C, Refuge Focus						
Four-County	-14.8	-29.3	-2.7	-7.8	-123	-422
Seven-County	2.2	3.5	1.0	1.4	45	60
Two-County						
All Areas	-12.6	-25.8	-1.7	-6.4	-78	-362
Scenario B-3-2-C, Agriculture Focus						
Four-County	-16.9	-32.2	-3.2	-8.6	-137	-446
Seven-County	20.1	28.5	4.0	6.9	135	228
Two-County						
All Areas	3.2	-3.7	0.8	-1.7	-2	-218
Scenario B-3-3-C, Out-of-Basin Focus						
Four-County	-14.3	-28.6	-2.6	-7.7	-120	-417
Seven-County						
Two-County	2.7	3.9	0.8	1.3	12	21
All Areas	-11.6	-24.7	-1.8	-6.4	-108	-396

8.2.2.5 Alternative C: 130,000 Acre-Feet

Alternative C includes the transfer of up to 130,000 acre-feet in noncritical and 50,000 acre-feet in critical years. In noncritical years, sources for the three scenarios include a variety of sources: conservation/tailwater recovery, groundwater pumping, and temporary land fallowing. In critical years, the only source is temporary land fallowing. The costs of each of these sources are assumed to be as those shown previously.

For Alternative C, three different scenarios are considered, with prices of transferred water as shown in Table 8-17. Losses from transfers to refuges are assumed to be 20 percent. The amounts shown transferred to refuges are net of those losses. The alternatives are as follows:

- C-1-1-C: For the **refuge focus** scenario, water for transfer is from conservation, 80,000 acre-feet, and fallowing, 50,000 acre-feet, in noncritical years; water is only from fallowing in critical years. The WAP purchases 80,000 acre-feet in noncritical years and 50,000 acre-feet in critical years. Net deliveries at the refuge boundaries are 64,000 and 40,000 acre-feet, respectively, after losses. Transfers also include 50,000 acre-feet to agricultural users in the seven-county area in noncritical years.
- C-1-2-C: All water is sold to **agricultural buyers** in the seven-county area in both noncritical and critical years. Sources are the same as those for C-1-1-C.
- C-1-3-C: Water for **out-of-basin** transfers is from conservation/tailwater recovery, groundwater pumping, and temporary land fallowing in noncritical years and from fallowing in critical years. Water is sold to agricultural users in the seven-county area and the San Felipe Division in noncritical years and to only the San Felipe Division in critical years.

The impacts of Alternative C and the three scenarios are shown in Table 8-23 for a noncritical year, and the impacts for a critical year are shown in Table 8-24.

For both noncritical and critical years, wide variation exists among the impacts of the scenarios. Considering total economic impacts to all areas in noncritical years, some of which are negative and some positive, the largest positive output, income, and employment impacts would be from scenario C-1-2-C. The largest negative impact would be for employment only in scenario C-1-3-C. In the former case, all water transferred would be sold to other agricultural users in the seven-county area. In the latter case, water would be sold to both other agricultural users in the seven-county area and to M&I and agricultural users in the San Felipe Division. The output, income, and employment gains across all sectors and areas for C-1-2-C would be \$36.3 million, \$8.1 million, and 102 jobs.

The primary difference between the scenarios showing the largest and smallest estimated impacts relates to the transferee. The largest impacts result from sales of water to agriculture in the seven-county area and the value of crops grown with that water. The smallest output and income impacts result from sales of water to refuges and are attributable to expected increased visitation as discussed previously. The same caveats discussed previously regarding other intrinsic or nonmarket values apply equally well for Alternative C.

Measured against the noncritical year baseline variables for the four-county area in which the Exchange Contractors service area is located, the largest positive impacts would be about 0.4 percent, 0.3 percent, and 0.1 percent of output, income, and employment, respectively.

Table 8-23
Impacts of Alternative C, Three Scenarios, Noncritical Year

Scenario/Impact	Output (\$ Million)		Income (\$ Million)		Employment (Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Scenario C-1-1-C, Refuge Focus						
Four-County	-11.1	-24.0	-2.0	-6.5	-98	-380
Seven-County	19.4	28.0	4.4	7.4	161	256
Two-County						
All Areas	8.4	4.0	2.5	0.9	63	-124
Scenario C-1-2-C, Agriculture Focus						
Four-County	-13.5	-27.4	-2.5	-7.4	-114	-407
Seven-County	44.8	63.7	8.9	15.4	302	509
Two-County						
All Areas	31.3	36.3	6.4	8.1	188	102
Scenario C-1-3-C, Out-of-Basin Focus						
Four-County	-16.3	-31.5	11.9	-8.4	-133	-440
Seven-County	23.1	32.9	4.6	8.0	156	263
Two-County	4.7	6.3	1.2	1.8	22	34
All Areas	11.4	7.7	17.7	1.4	44	-143

Table 8-24
Impacts of Alternative C, Three Scenarios, Critical Year

Scenario/Impact	Output (\$ Million)		Income (\$ Million)		Employment (Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Scenario C-1-1-C, Refuge Focus						
Four-County	-14.8	-29.3	-2.7	-7.8	-123	-422
Seven-County	2.2	3.5	1.0	1.4	45	60
Two-County						
All Areas	-12.6	-25.8	-1.7	-6.4	-78	-362
Scenario C-1-2-C, Agriculture Focus						
Four-County	-16.9	-32.2	-3.2	-8.6	-137	-446
Seven-County	17.2	24.5	3.4	5.9	116	196
Two-County						
All Areas	0.3	-7.73	0.3	-2.6	-21	-250
Scenario C-1-3-C, Out-of-Basin Focus						
Four-County	-12.4	-25.9	-2.2	-7.0	-107	-395
Seven-County						
Two-County	-0.6	-0.3	-0.0	0.1	-4	-3
All Areas	-13.0	-26.2	-2.2	-6.8	-111	-398

Considering total economic impacts to all areas in a critical year, all of which are negative, the largest negative impacts would be from scenario C-1-3-C. The output, income, and employment losses for that scenario would be -\$26.2 million, -\$6.8 million, and 398 jobs, respectively.

Measured against the critical year baseline variables for the four-county area in which the Exchange Contractors service area is located, the largest negative impacts would be approximately 0.4 percent of output and employment and 0.3 percent of income.

8.2.2.6 Impacts by Sector

The previous tables have shown the impacts of the various scenarios and alternatives in aggregate form, i.e. across all sectors in each region analyzed. For insights into the individual sectors of each region that would be most affected, Table 8-25 shows such impacts for Alternative A, Scenario A-1-1-C (Refuge Focus) for a noncritical year. For that scenario, which includes 80,000 acre-feet of conserved water sold to refuges (netting 64,000 acre-feet after losses), the largest output impacts are expected to be in manufacturing. It is assumed that the proceeds that irrigators receive for water sold would be split equally between farm machinery and other farm-related investments and household expenditures. The impact to manufacturing reflects this investment. The next largest output impact, for similar reasons, is in trade, which includes both wholesale and retail levels. Given that a part of the water sales proceeds is assumed to be allocated to household expenditures, the increase in trade activity is expected. The largest income and employment impacts are expected to be in trade and services.

Table 8-25
Impacts of Alternative A, Scenario A-1-1-C, Noncritical Year, by Sector

Sector	Output		Income		Employment	
	Direct	Total	Direct	Total	Direct	Total
Agriculture	0.028	0.154	0.008	0.039	0	2
Mining	0.000	0.022	0.000	0.004	0	0
Construction	-	0.140	-	0.078	0	2
Manufacturing	4.573	5.334	0.890	1.048	26	31
Transportation	0.137	0.662	0.036	0.187	1	4
Trade	2.436	3.413	1.132	1.560	49	66
Finance	0.718	1.714	0.096	0.297	3	9
Services	1.329	2.553	0.627	1.276	24	47
Government	0.070	0.196	0.019	0.070	0	1
Other	0.006	0.013	0.003	0.007	0	1
Institutions	1.732	1.732	-	-	0	0
Total	11.028	15.932	2.811	4.567	104	161

8.2.3 Cumulative Effects

Cumulative effects include those of the alternatives discussed in this EIS/EIR and, potentially, several policies in different stages of implementation, some quantifiable, others not. By themselves, the socioeconomic impacts estimated for the various scenarios, including those with land fallowing (the primary physical change in the environment leading to socioeconomic

impacts), are not significant. Moreover, the total amount of cropland harvested in the four-county area in which the Exchange Contractors service area is located has changed little since 1990. Field crop acreage has declined, while that for fruits, nuts, and vegetables has increased. For the entire four-county area, annual cropland harvested has varied by as much as 35,000 acres per year. Thus, idling of approximately 20,000 acres of Exchange Contractors land, as described under the alternatives, would be within the normal range of variation and would not be significant cumulatively in the four-county area, all other factors unchanged.

However, as discussed in the Section 7, several areas within the San Joaquin Valley could be idled permanently because of water supply shortages and subsurface drainage problems. Within Westlands WD, Reclamation could retire up to 7,000 acres of land by 2007, in addition to the 200,000 acres that Westlands itself has proposed to retire. Assuming all retired land would be in Fresno County, approximately 10 percent of the total agricultural acreage would be taken out of production. Thus, the fallowing of approximately 20,000 acres under the proposed program could have cumulative employment and income impacts because of other land retirement programs if these were fully implemented by 2014, which is unlikely. The impacts would be most noticeable among the industries that provide inputs to agriculture (e.g., fertilizer, farm machinery, and custom services) and those that purchase products from farmers (e.g., cotton gins, vegetable packing sheds, and brokers). The impacts of fallowing would be offset, at least in part, by the payments for water sold and are not cumulatively significant.

Relative to overall economic measures for the four counties, the impacts may be relatively small. However, impacts within smaller communities, particularly those on the west side of the San Joaquin Valley, may be significant if fallowing activity is concentrated in these communities rather than dispersed.

Other potential cumulative impacts are not quantified. For example, the provisions of CALFED are not yet fully implemented and the effects on Delta exports are not fully known. Other laws or policies that may affect parties that would be affected by the alternatives in this study include, but are not limited to, Total Maximum Daily Load limits on agricultural discharges and restrictions on on-farm stationary engines. And the potential impacts of the EWA are not included. Because the conditions underlying such purchases are unpredictable, other than CALFED's goal of purchasing at least 190,000 acre-feet of water each year, and because such transfers may be "repaid" with additional water releases at other times, the impacts are unknown.

8.2.4 Impact and Mitigation Summary

All scenarios for Alternative A and one scenario for Alternative C in a noncritical year would result in uniformly positive aggregate output, income, and employment impacts across all affected regions. The largest positive impacts across scenarios would be for Alternative A and the sale of all 130,000 acre-feet of transferred water to agricultural users in the seven-county area. The total impacts of all other alternatives and scenarios in noncritical years across all regions would be positive and negative, with negative impacts quite small other.

The largest negative impacts in noncritical years are for scenarios that involve temporary land fallowing as the exclusive source for transferred water (Alternative B). The primary causes include:

- Because of the multiplied effects on regional economic activity from temporary land fallowing, any offsetting positive impacts within the four-county, seven-county, or two-county areas would be insufficient to outweigh the effects of fallowing.
- Income from water sales and increased visitor usage of refuges, as well as the regional economic impacts of those revenues, are not sufficient to completely offset the negative impacts of land idling at the water prices assumed.
- The value of incremental supplies for M&I users (in the San Felipe Division) was not included as an offsetting positive impact. If the transactions are established as dry year options, with initial payments followed by payment for all water purchased, the overall negative impacts of the alternatives and scenarios in which such transactions were included would be reduced.

The largest negative impacts during critical years would be for Alternative C and, in particular, out-of-basin scenario C-1-3-C. That scenario involves fallowing as the source of transferred water and sale to San Felipe Division agricultural and M&I users. The higher costs of water to both groups and the reduced agricultural production from fallowing would more than outweigh the income that irrigators would receive for their water. The smallest negative impacts during a critical year would be from the scenarios involving the sales of water to agricultural users in the seven-county area.

None of the action alternatives would cause significant impacts relative to existing conditions and No Action/No Project Alternative in either noncritical or critical years. Impacts of the alternatives on farm and regional output, income, and employment would all be less than 0.5 percent of those totals. The impacts are measured for relatively large areas, however, and the localized impacts may be more pronounced. In particular, farm laborers, who have few alternative employment opportunities in small agriculturally dependent communities within the Exchange Contractors service area, may be adversely affected by some of the alternatives and scenarios. However, based on current cropping patterns of the Exchange Contractors, those impacts would be less than significant. With socioeconomic impacts either minimal or less than significant, no mitigation is identified.

8.2.4.1 *Agricultural Production and Income*

No Action/No Project Alternative

- Under the No Action Alternative, the CVP supplies of agricultural and M&I contractors would be subject to restrictions and reliability measures affected by climate and regulations. Farmland may be idled if insufficient water supplies are available for irrigating all lands within the CVP contractors' service areas. However, no significant impacts would occur to agricultural production and income in the study areas under existing conditions and the No Action Alternative, in either noncritical or critical years, because the idling that does occur would be temporary. In addition, land farmed in the study areas varies between years because of crop rotations and other variables, and the variation expected under the No Action Alternative would not be significantly greater than that degree of variation.

Alternative A: 80,000 Acre-Feet

- In critical years, approximately 20,000 acres of cropland in the Exchange Contractors service area could be idled, with resultant impacts on crop production and farm income. The impacts would be less than significant, assuming a change in land use of at least 10 percent is required for significance. The impacts on farm production in a critical year would be partially offset by the income that irrigators receive for the water they provide for transfer. The net effects on regional output, income, and employment would be less than significant.
- Increased conservation and tailwater recovery could improve efficiency and increase farm income on affected lands. The increment in production is not quantified, but would be small because of the amount of water relative to total Exchange Contractor supplies.

Alternative B: 50,000 Acre-Feet

- During critical years, approximately 20,000 acres of cropland in the Exchange Contractors service area could be idled, with resultant impacts on crop production and farm income. The impacts would be less than significant, assuming a change in land use of at least 10 percent is required for significance. The impacts on farm production in a critical year would be partially offset by the income that irrigators receive for the water they provide for transfer. The net effects on regional output, income, and employment would be less than significant.

Alternative C: 130,000 Acre-Feet

- In critical years, approximately 20,000 acres of cropland in the Exchange Contractors service area could be idled, with resultant impacts on crop production and farm income. The impacts would be less than significant, assuming a change in land use of at least 10 percent is required for significance. The impacts on farm production in a critical year would be partially offset by the income that irrigators receive for the water they provide for transfer. The net effects on regional output, income, and employment would be less than significant.
- Increased conservation and tailwater recovery could improve efficiency and increase farm income on affected lands. The increment in production is not quantified, but would be small because of the amount of water relative to total Exchange Contractor supplies.

8.2.4.2 *Regional Demographics and Income***No Action/No Project Alternative**

- No significant impacts would occur to regional employment or income attributable to the No Action Alternative in noncritical and critical years. Changes in employment and income under No Action are more likely to be due to broad economic factors such as recession, inflation, and crop prices than to a continuation of the Exchange Contractors existing program for water transfers.

Alternative A: 80,000 Acre-Feet

- No significant impacts would occur to regional employment or income attributable to the Conservation/Groundwater Alternative in noncritical and critical years. Changes in employment and income under this alternative are less than significant in both types of years.

Alternative B: 50,000 Acre-Feet

- No significant impacts would occur to regional employment or income attributable to the Crop Idling Alternative in noncritical and critical years. Changes in employment and income under this alternative are less than significant in both types of years.

Alternative C: 130,000 Acre-Feet

- No significant impacts would occur to regional employment or income attributable to the Combined Sources Alternative in noncritical and critical years. Changes in employment and income under this alternative are less than significant in both types of years.

The effects of the No Action/No Project Alternative and action alternatives on agricultural production and income and on regional demographics and income are summarized in Tables 8-26 through 8-29.

**Table 8-26
Summary of Effects of the No Action/No Project Alternative**

Affected Resource and Area of Potential Effect	No Action/No Project Compared to Existing Conditions
Agricultural production and income	
Four-county area	No adverse impact
Seven-county area	No adverse impact
Two-county area	No adverse impact
Regional demographics and income	
Four-county area	No adverse impact
Seven-county area	No adverse impact
Two-county area	No adverse impact

**Table 8-27
Summary of Effects of Alternative A: 80,000 Acre-Feet**

Affected Resource and Area of Potential Effect	CEQA	NEPA
Agricultural production and income		
Four-county area	Less-than-significant adverse impact	Minimal effect
Seven-county area	Less-than-significant adverse impact	Minimal effect
Two-county area	Less-than-significant adverse impact	Minimal effect
Regional demographics and income		
Four-county area	Less-than-significant adverse impact	Minimal effect
Seven-county area	Less-than-significant adverse impact	Minimal effect
Two-county area	Less-than-significant adverse impact	Minimal effect

Table 8-28
Summary of Effects of Alternative B: 50,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Agricultural production and income		
Four-county area	Less-than-significant adverse impact	Minimal effect
Seven-county area	Less-than-significant adverse impact	Minimal effect
Two-county area	Less-than-significant adverse impact	Minimal effect
Regional demographics and income		
Four-county area	Less-than-significant adverse impact	Minimal effect
Seven-county area	Less-than-significant adverse impact	Minimal effect
Two-county area	Less-than-significant adverse impact	Minimal effect

Table 8-29
Summary of Effects of Alternative C: 130,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Agricultural production and income		
Four-county area	Less-than-significant adverse impact	Minimal effect
Seven-county area	Less-than-significant adverse impact	Minimal effect
Two-county area	Less-than-significant adverse impact	Minimal effect
Regional demographics and income		
Four-county area	Less-than-significant adverse impact	Minimal effect
Seven-county area	Less-than-significant adverse impact	Minimal effect
Two-county area	Less-than-significant adverse impact	Minimal effect

Executive Order 12898 requires each Federal agency to achieve environmental justice as part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects, including social or economic effects, of programs, policies, and activities on minority populations and low-income populations of the United States. The U.S. Environmental Protection Agency's (USEPA's) Office of Environmental Justice (U.S. Department of Energy, Office of Environmental Policy and Assistance 1997) offers the following definition:

The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, State, local, and tribal programs and policies.

This section provides baseline demographic information used in an analysis of environmental justice impacts. The analysis focuses on the Exchange Contractors service area where crop idling/temporary land fallowing could occur to develop the transfer water, because this is the area of potential effect.

9.1 AFFECTED ENVIRONMENT

9.1.1 Race and Ethnicity

The minority population in the Exchange Contractors service area (Fresno, Madera, Merced, and Stanislaus counties) is based on an analysis of race and ethnicity population data for four counties that approximate the area of potential impact from the action alternatives (see Section 8.1). Population data for the year 2000 are divided into five racial categories: White (and other), Black, American Indian/Eskimo/Aleut, Asian/Pacific Islander, and Hispanic (Table 9-1). These categories, as used in the 2000 Census, relied on self-identification of racial/ethnic categories by respondents. Persons of Hispanic origin may be of any race, so this ethnic category is summarized separately.

In comparison to the California state demographics, the four-county area is proportionately higher in Hispanic population (40.7 percent) than is the State (32.4). Racially, the area contains greater percentages of whites and persons of other races (63.6 percent) and Native Americans (2.6 percent) than does the State (63.4 percent and 1.9 percent, respectively).

**Table 9-1
Population by Race and Ethnicity, 2000**

County	Total Persons, 2000	Race (percent)				
		White/ Other	Black	American Indian/ Eskimo/ Aleut	Asian/Pacific Islander	Hispanic
Fresno	799,407	58.0	5.9	2.6	9.5	44.0
Madera	123,109	66.7	4.7	4.0	2.3	44.3
Merced	210,554	60.9	4.5	2.3	8.5	45.3
Stanislaus	446,997	73.9	3.2	2.5	6.3	31.7
Project Area*	1,580,067	63.6	4.9	2.6	7.9	40.7
State	33,871,648	63.4	7.4	1.9	13.0	32.4

Source: Gaquin and DeBrandt 2002: 136, 150.

* Calculated from county percent distributions.

9.1.2 Low Income

Low-income populations in the four-county area are identified by several socioeconomic characteristics. As categorized by the 2000 Census, specific characteristics used in this description of the existing environment are per capita income, persons below the poverty level, families below the poverty level, substandard housing, and unemployment rates (Table 9-2).

**Table 9-2
Income and Poverty, 1998**

County	Money Income (\$)		Percent Below Poverty Level All Persons, 1998
	Per Capita*	Median Household, 1998	
Fresno	21,508	32,023	24.3
Madera	18,609	31,499	22.9
Merced	18,536	29,859	24.7
Stanislaus	22,889	36,207	17.2
Project Area	NA	NA	NA
State	32,149	41,003	14.9

Source: Gaquin and DeBrandt 2002: 139, 153.

* See Table 8-4.

NA = not available. Averages and percentages were given and are not additive.

Income and poverty, based on income in 1998 as reported in the 2000 Census, illustrates that the four-county area's per capita and median household incomes are all lower than the averages for the State (Table 9-2). Merced County had the lowest per capita income, only \$18,536 (1998 dollars). Similar results are found for the percentages of persons living below the poverty level. Poverty status is based on the definition prescribed by the Federal Office of Management and Budget. Families and persons are below the poverty level if their total family income or

unrelated individual income was less than the poverty threshold specified for the applicable family size, age of householder, and number of related children present under age 18 years. For persons not in families, poverty status is determined by their income in relation to the appropriate poverty threshold. For example, the 1995 poverty threshold for one person under age 65 was \$7,929; for a family of four persons it was \$15,569; and for a family of eight persons it was \$26,237 (Gaquin and Littmann 1999).

Other measures of low income, such as substandard housing and unemployment, also characterize demographic data in relation to environmental justice (Table 9-3). Substandard housing units are occupied units that are overcrowded (1.01 persons or more per room) or lack complete plumbing facilities. Fresno and Merced counties have higher percentages of substandard housing (13.7 percent and 15.6 percent respectively) than does the State. The civilian labor force is composed of civilians 16 years old and older who were either “at work” or “with a job, but not at work” during the reference week. It includes those who worked 15 hours or more as unpaid workers in a family farm or business. The four-county area unemployment rate in 2001 was 12.6 percent, significantly higher than the State unemployment rate of 5.3 percent. The highest unemployment rate was in Merced County (14.0 percent).

Table 9-3
Housing, Labor Force, and Employment, 1990 and 2001

County	Housing Units 1990		Civilian Labor Force 2001	
	Total	Percent Substandard	Total	Unemployment Rate (percent)
Fresno	235,563	13.7	387,366	13.7
Madera	30,831	12.0	54,378	12.1
Merced	58,410	15.6	84,218	14.0
Stanislaus	132,027	10.4	210,264	10.2
Project Area*	456,831	12.9	736,226	12.6
State	11,182,882	12.0	17,362,231	5.3

Source: Gaquin and DeBrandt 2002: 142, 156.

*Calculated from county percentage distributions.

9.2 ENVIRONMENTAL CONSEQUENCES

This section addresses the concern of whether any group of people, including racial, ethnic, or socioeconomic group, would bear a disproportionate share of adverse environmental effects from implementation of any of the action alternatives. Consideration of environmental justice is a Federal requirement based on Executive Order 12898; CEQA has no corresponding requirement. Under CEQA, economic and social changes resulting from a project are not treated as a significant effect unless related to a physical change in the environment. The socioeconomic effects identified in Section 8 affect the social concern of environmental justice, but environmental justice effects do not result directly from or produce physical changes in the environment.

9.2.1 Impact and Evaluation Criteria

To address environmental justice concerns, the following issues are evaluated to determine potential impacts and their level of significance:

- Are affected resources used by a minority or low-income community?
- Are minority or low-income communities disproportionately subject to environmental or human health or economic impacts?
- Do the resources used for the project support subsistence living?

9.2.2 Environmental Impacts and Mitigation

The four-county area contains high percentages of Hispanics and persons/families living below the poverty level. Unemployment is significantly higher in the four-county area and vicinity than in other regions of the State. The importance of agriculture to the local economy was described in Section 8.2.2. Consequently, the potential exists for low-income and minority groups to be disproportionately affected because these groups are heavily employed in the agricultural and food processing industries. Environmental justice issues are focused on environmental impacts on natural resources (and associated human health impacts) and potential socioeconomic impacts. Impacts to employment would occur from the action alternatives during critical years (see Section 8.2.2), so the potential exists for a socioeconomic impact on minority or low-income groups. No human health effects are associated with the proposed water transfer program.

Environmental resources used by low-income and Hispanic groups in the four-county area primarily consist of the wildlife refuges. Existing minority and low-income groups in the four-county area use the wildlife refuges for hunting and wildlife viewing. This use is expected to continue over the 2005–2015 period. However, this use is recreational in nature and does not provide subsistence level value. In addition, it is not known whether these groups use these resources disproportionately to the overall population. Therefore, an effect would not occur to environmental justice based on recreation resources for any of the alternatives.

Because no effect would occur to recreation resources, only effects to economic resources are evaluated for the No Action/No Project Alternative and the action alternatives.

9.2.2.1 No Action/No Project Alternative

Under the No Action/No Project Alternative, agricultural and M&I water users would get their CVP contractual supplies subject to the limitations in their contracts and may obtain water from other sources to alleviate shortages. The crop idling that could occur would be temporary, unless water shortages extend into the long term, resulting in multiyear land fallowing. Because the land farmed in the study area varies among years due to crop rotations and other economic factors, the variation expected under the No Action/No Project Alternative would not be significantly greater than existing conditions. Economic impacts to the regional income and employment would be considered minimal; therefore, low-income and minority groups in the project area would not be affected significantly.

9.2.2.2 *Alternative A: 80,000 Acre-Feet*

Under Alternative A, approximately 20,000 acres of cropland in the Exchange Contractors service area could be idled in noncritical and critical years, with resultant impacts on crop production and farm income. However, if agricultural lands receive the water, beneficial impacts would occur to crop production and farm income in those areas. Thus, the impacts to environmental justice of idling cropland would be considered minimal if the water is applied to agricultural lands within the San Joaquin Valley. If the water were applied to wildlife refuges or out of basin, no offsetting beneficial impacts would occur to crop production and farm income.

Measured against the critical year baseline for the Exchange Contractors service area, the largest impacts would be loss of 0.4 percent of income and 0.5 percent of employment (Section 8.2.2.3). The economic impacts to the regional income and employment would be less than significant; therefore, low income and minority group households relying on jobs and income in the agricultural sector would be minimally affected, both regionally and locally.

9.2.2.3 *Alternative B: 50,000 Acre-Feet*

During noncritical and critical years the only water available for Alternative B would be from idling of approximately 20,000 acres of cropland in the Exchange Contractors service area, with resultant impacts on crop production and farm income. However, if agricultural lands receive the water, beneficial impacts would occur to crop production and farm income in those areas. Thus, the impacts of idling cropland to environmental justice would be considered minimal if the water is applied to agricultural lands. If the water were to go to wildlife refuges or out of basin, no offsetting beneficial impacts would occur to crop production and farm income.

Measured against the critical year baseline for the Exchange Contractors service area, the largest impacts would be loss of approximately 0.4 percent of income and 0.5 percent of employment (Section 8.2.2.4). Economic impacts to the regional income and employment are considered minimal; therefore, low-income and minority households relying on jobs and income in the agricultural sector would be minimally affected, both regionally and locally.

9.2.2.4 *Alternative C: 130,000 Acre-Feet*

Under Alternative C, approximately 20,000 acres of cropland in the Exchange Contractors service area could be idled in noncritical and critical years, with resultant impacts on crop production and farm income. However, if agricultural lands receive the water, beneficial impacts would occur to crop production and farm income in those areas. Thus, the impacts of idling cropland to environmental justice would be considered minimal if the water is applied to agricultural lands. If the water were to go to wildlife refuges or out of basin, no offsetting beneficial impacts would occur to crop production and farm income.

Measured against the critical year baseline for the Exchange Contractors service area, the largest impacts would be loss of approximately 0.4 percent of employment and 0.3 percent of income (Section 8.2.2.5). Economic impacts to the regional income and employment are minimal; therefore, low-income and minority group households relying on jobs and income in the agricultural sector would be minimally affected, both regionally and locally.

9.2.3 Cumulative Effects

In critical years, approximately 20,000 acres of Exchange Contractors land could be idled under each of the action alternatives to provide up to the 50,000 acre-feet of water. In noncritical years, some land could be idled as well for part of the water supply, but much of the water would come from conservation or groundwater supplies. In the San Joaquin Valley, however, several proposed areas could be retired permanently due to water supply shortages and subsurface drainage problems. Westlands WD has proposed to retire up to 200,000 acres. Thus, if an additional 20,000 acres were idled under this project, low-income and minority groups could be affected. Households relying on jobs and income in the agricultural sector would be most affected, but the effects would not be disproportionate over the region. While the incremental economic effects of the proposed transfer program's temporary land fallowing are not significant, the larger area's permanent land fallowing and loss of jobs and income could exacerbate socioeconomic effects, especially to the Hispanic community. The transfer program's effects are not cumulatively considerable and significant.

9.2.4 Impact and Mitigation Summary

For each of the alternatives, the following sections summarize potential effects to environmental justice. No effect would occur to recreation resources; therefore, only effects to economic resources are summarized. No mitigation measures are needed.

No Action/No Project Alternative

- Minimal adverse effect on the Hispanic community due to minimal effects on the service area economy.

Alternative A: 80,000 Acre-Feet

- Impact to the regional Hispanic community is minimal if the water is applied to agricultural lands. No mitigation is required.
- Minimal adverse effect on the Hispanic community from minimal income and employment losses if croplands are idled and the water is applied all to wildlife refuges or out of basin.

Alternative B: 50,000 Acre-Feet

- Impact to the regional Hispanic community is minimal if the water is applied to agricultural lands. No mitigation is required.
- Minimal adverse effect on the Hispanic community from minimal income and employment losses if croplands are idled and the water is applied all to wildlife refuges or out of basin.

Alternative C: 130,000 Acre-Feet

- Impact to the regional Hispanic community is minimal if the water is applied to agricultural lands. No mitigation is required.
- Minimal adverse effect on the Hispanic community from minimal income and employment losses if croplands are idled and the water is applied all to wildlife refuges or out of basin.

Tables 9-4 through 9-7 summarize the effects of the No Action/No Project Alternative and the action alternatives on environmental justice.

Table 9-4
Summary of Effects of the No Action/No Project Alternative

Affected Resource and Area of Potential Effect	No Action/No Project Compared to Existing Conditions
Economic resources	Minimal impact

Table 9-5
Summary of Effects of Alternative A: 80,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Economic resources	Not applicable	Minimal effect if water applied to agricultural lands, wildlife refuges, or out of basin.

Table 9-6
Summary of Effects of Alternative B: 50,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Economic resources	Not applicable	Minimal effect if water applied to agricultural lands, wildlife refuges, or out of basin.

Table 9-7
Summary of Effects of Alternative C: 130,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Economic resources	Not applicable	Minimal effect if water applied to agricultural lands, wildlife refuges, or out of basin.

10.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

Indian Trust Assets (ITAs) are defined as follows (Reclamation 1999a):

Although there is no concise legal definition of Indian Trust Assets (ITA), the courts have traditionally interpreted them as being tied to real property. ITAs are property interests held in trust by the United States for the benefit of Indian tribes or individuals. Indian reservations, rancherias and public domain allotments are common ITAs. The land associated with these ITAs as well as the resources within the boundaries, such as trees, minerals, oil and gas, are also considered trust assets. Other ITAs include traditional-use areas and fishery resources. Hunting and fishing rights may be ITAs, although under P.L. 280 fishing and hunting are regulated by the California Department of Fish and Game, both on and off reservations (CALFED 1998).

Types of actions which could affect ITAs include an interference with the exercise of a reserved water right, degradation of water quality where there is a water right, impacts to fish and wildlife where there is a hunting or fishing right, or noise near a land asset where it adversely impacts uses of the reserved land (Reclamation 1997b).

10.1.1 Project Area

The Exchange Contractors' 10-Year Water Transfer Program encompasses 10 counties within central California: Fresno, Kern, Kings, Madera, Merced, San Benito, Santa Clara, San Joaquin, Stanislaus, and Tulare.

Waters under the jurisdiction of the Exchange Contractors are located within Fresno, Madera, Merced, and Stanislaus counties. The specific entities within the Exchange Contractors are the CCID, Columbia Canal Company, Firebaugh Canal WD, and San Luis Canal Company. These components of the Exchange Contractors can be viewed as potential transferors (or "donor" districts) from which water would be developed and provided to potential "recipient" (water user) entities. Refer to Figure 2-1 for a depiction of the project area and Figure 2-4 for potential donor and recipient entities.

The potential recipients are located within the 10 counties listed above. The specific entities that could receive waters include both lands set aside for wildlife and irrigation and water districts. Recipient national wildlife refuges and wildlife management areas include Kern NWR, Los Banos WMA, Mendota WMA, Merced NWR, Mud Slough WMA, North Grasslands WMA, Pixley NWR, San Luis NWR, and Volta WMA.

Potential recipients including irrigation districts, water districts, and municipal utility districts (listed in Figure 2-4) are Arvin-Edison Water Service District, Chowchilla WD, Delano-Earlimart ID, Exeter ID, Garfield WD, Gravelly Ford WD, International WD, Ivanhoe ID, Lewis Creek WD, Lindmore ID, Lindsay-Strathmore ID, Lower Tule River ID, Madera ID, Orange Cove ID, Pacheco WD, Panoche WD, Patterson WD, Plainview WD, Porterville ID, San Benito County WD, San Luis WD, Santa Clara Valley WD, Sausalito ID, Southern San Joaquin MUD, Stone Corral ID, Tea Pot Dome WD, Terra Bella ID, Tulare ID, and Westlands WD.

10.1.2 Indian Trust Assets In or Adjacent to the Project Area

The identification of ITAs within the potential donor and recipient areas as well as those located up to 2 miles outside of the donor or recipient areas was facilitated through Reclamation's Mid-Pacific Region. During October 2003, Mr. Patrick Welch, who is the coordinator for that office's ITA database, examined Reclamation's geographical information system coverages for ITAs. These coverages were created in the mid-1990s in support of the CVPIA EIS. The coverages depict Indian lands in California and include reservations, rancherias, and public domain allotments (PDAs). Reservations and rancherias are lands held in trust by the federal government for federally recognized Indian tribes. PDAs are small tracts of land that are owned by Indian individuals and are frequently held in trust as well.

The proposed Exchange Contractors Water Transfer Program 2005-2014 involves districts that would develop water and recipient water districts and wildlife refuges that would receive water. The search conducted by Reclamation concluded that no ITAs are located within the donor or recipient lands. One rancheria (Table Mountain) and one PDA are located within 2 miles of the Fresno ID, and one PDA is located within 2 miles of the Orange Cove ID. Both IDs are potential recipient districts.

10.2 ENVIRONMENTAL CONSEQUENCES

This section addresses the concern of whether any ITA, including PDAs, would be adversely affected or beneficially affected by any of the alternatives under consideration. Types of actions that could affect ITAs and PDAs include interference with the exercise of a reserved water right, degradation of water quality where a water right exists, impacts to fish and wildlife where a hunting or fishing right exists, or noise near a land asset where it adversely impacts uses of the reserved land.

10.2.1 Key Impact and Evaluation Criteria

To address environmental consequences related to ITAs, the following issues are evaluated to determine potential impacts and their level of significance:

- Are ITAs present in or adjacent to either the donor or recipient areas?
- If an ITA were present, would any of the alternatives under consideration impede, change, or potentially benefit current activities within the ITA?

10.2.2 Environmental Impacts and Mitigation

None of the donor or recipient areas contain ITAs. One ITA and two PDAs are located outside, but within 2 miles, of recipient areas. The only potential for adverse effects to ITAs would be within or adjacent to donor areas where the transfer of water could affect existing uses. No such ITAs exist in the donor areas. Increasing water supply in the recipient areas would be considered a beneficial effect. However, no ITAs exist within the recipient areas.

10.2.2.1 No Action/No Project Alternative

Because no ITAs are located in either the donor or recipient areas, no ITAs would be affected adversely or beneficially by this alternative.

10.2.2.2 Alternative A: 80,000 Acre-Feet

Under this alternative a potential would exist for reduction in available water in the donor areas through conservation, groundwater pumping, or crop idling (i.e., temporary land fallowing). Conversely a potential would exist for an increase in available water in the recipient areas. No ITAs are located within or adjacent to the donor areas, so no impacts to ITAs would occur in these areas. No ITAs are located in the recipient areas, but one ITA and two PDAs are adjacent to the recipient areas. Under this alternative no adverse or beneficial effects would occur as increased water deliveries would accrue only to two users within the recipient areas, and no ITAs are present in these areas.

10.2.2.3 Alternative B: 50,000 Acre-Feet

Under this alternative a potential would exist for reduction in available water in the donor areas only through crop idling/temporary land fallowing, which would free up water for export to the recipient areas. Conversely a potential would exist for an increase in available water in the recipient areas. No ITAs are located within or adjacent to the donor areas, so no impacts to ITAs would occur in these areas. No ITAs are located in the recipient areas, but one ITA and two PDAs are adjacent to the recipient areas. Under this alternative no adverse or beneficial effects would occur as increased water deliveries would accrue only to users within the recipient areas, and no ITAs are present in these areas.

10.2.2.4 Alternative C: 130,000 Acre-Feet

Under this alternative all available transfer water would be developed through conservation (including tailwater recovery), groundwater pumping, and crop idling/temporary land fallowing. A number of transfer scenarios could play out, including any or all of the water going to refuges, any or all to agriculture, and a portion to M&I users. No ITAs are located within or adjacent to the Exchange Contractors/donor areas, so no impacts to ITAs would occur in these areas. No ITAs are located in the recipient areas, but one ITA and two PDAs are adjacent to the recipient areas. Under this alternative no adverse or beneficial effects would occur as increased water deliveries would accrue only to users within the recipient areas, and no ITAs are present in these areas.

10.2.2.5 Cumulative Effects

No conflicts would occur with any Indian lands and the four donor water districts. Also, no conflicts would occur between Indian lands and the recipient water districts and wildlife refuges. Given that no Indian lands exist within any of the water users in this program, no effect to ITAs would occur as a result of implementing any of the action alternatives. Because no effects would occur to ITAs, no incremental effects would occur from the proposed water development and transfer, and, therefore, no cumulative effects would occur to ITAs.

10.2.3 Impact and Mitigation Summary

For each of the alternatives, the following sections summarize potential impacts to ITAs and proposed mitigation measures (see Tables 10-1 through 10-4).

10.2.3.1 No Action/No Project Alternative

No effects to ITAs would occur. No mitigation is required.

10.2.3.2 Alternative A: 80,000 Acre-Feet

No effects to ITAs would occur. No mitigation is required.

10.2.3.3 Alternative B: 50,000 Acre-Feet

No effects to ITAs would occur. No mitigation is required.

10.2.3.4 Alternative C: 130,000 Acre-Feet

No effects to ITAs would occur. No mitigation is required.

Table 10-1
Summary of Effects of the No Action/No Project Alternative

Affected Resource and Area of Potential Effect	No Action/No Project Compared to Existing Conditions
Indian Trust Assets	No significant adverse or beneficial impact

Table 10-2
Summary of Effects of Alternative A: 80,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Indian Trust Assets	No significant adverse or beneficial impact	Neutral effect

Table 10-3
Summary of Effects of Alternative B: 50,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Indian Trust Assets	No significant adverse or beneficial impact	Neutral effect

Table 10-4
Summary of Effects of Alternative C: 130,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Indian Trust Assets	No significant adverse or beneficial impact	Neutral effect

11.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL SETTING

This section briefly describes the air quality setting for the Exchange Contractors' proposed 10-Year Water Transfer Program and identifies the environmental effects of the alternatives.

11.1.1 Climate and Weather

The primary factors affecting local air quality are the locations of air pollutant sources and the amounts of pollutants emitted. However, meteorological and topographical conditions are also important. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

As shown in Figure 2-1, the project area is located in the western San Joaquin Valley and consists primarily of the lands lying within the boundary of the CVP's San Luis Unit. Climatologically, the summer weather pattern for this area is dominated by a semipermanent, subtropical high-pressure area that covers the eastern Pacific and the majority of California. The annual rainfall in the project area averages 6 to 8 inches, with 90 percent of the amount falling between November and April.

11.1.2 Existing Air Quality

As noted above, topography and climate affect the level of regional air pollution. The relatively long and narrow San Joaquin Valley provides almost no escape for pollution. The setting of the San Joaquin Valley, coupled with high temperatures and inversions that create additional natural barriers to pollution dispersion, creates difficulties in meeting State and Federal air quality standards. In addition, rapid population growth, the presence of two major interstate highways, and a diversity of urban and rural sources have a negative impact on regional air quality. With more stringent air quality management regulations, emission levels in the San Joaquin Valley have been decreasing over the past 15 years except for emissions of particulate matter of less than 10 microns in diameter (PM₁₀). Based on the information presented in California Air Resources Board's *2002 California Almanac of Emissions and Air Quality* (available at <http://www.arb.ca.gov/aqd/aqd.htm>), it appears that the downward trend in emission levels is expected to continue. These decreases are predominately due to motor vehicle controls and reductions in evaporative and fugitive emissions.

The Exchange Contractors service area and the locations of potential recipients cover a number of air quality management districts. The air quality attainment status of these air districts for each of the alternatives is discussed below.

11.1.3 Current Sources of Air Pollution – Project Area

Air quality in the San Joaquin Valley is not dominated by emissions from one large urban area. Instead, a number of moderately sized urban areas are located throughout the valley. On-road vehicles are the largest contributor to carbon monoxide emissions as well as a large contributor to nitrogen oxide emissions. A large portion of the stationary source reactive organic carbon gas emissions is fugitive emissions from oil and gas production operations. PM₁₀ emissions primarily result from paved and unpaved roads, agricultural operations, and waste burning.

11.1.4 Regulatory Environment

11.1.4.1 Standards

Both the State and Federal governments have established health-based Ambient Air Quality Standards for the following six air pollutants: ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. The State of California has also established standards for hydrogen sulfide, sulfates, and visibility-reducing particles. These standards were established to ensure an adequate margin of safety to protect the public health.

The California Ambient Air Quality Standards and the National Ambient Air Quality Standards, together with the effects potentially resulting from emissions that exceed those standards, are listed in Table 11-1.

**Table 11-1
Applicable State and Federal Ambient Air Quality Standards**

Air Pollutant	State Standard (Concentration/Averaging Time)	Federal Primary Standard (Concentration/Averaging Time)	Most Relevant Effects
Ozone	0.09 ppm, 1-hr avg	0.12 ppm, 1-hr avg 0.08 ppm, 8-hr avg	(a) Short-term exposures: pulmonary function decrements and localized lung edema in humans and animals, and risk to public health implied by alterations in pulmonary morphology and host defense in animals (b) Long-term exposures: risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans (c) Vegetation damage (d) Property damage
Carbon monoxide	9.0 ppm, 8-hr avg 20 ppm, 1-hr avg	9 ppm, 8-hr avg 35 ppm, 1-hr avg	(a) Aggravation of angina pectoris and other aspects of coronary heart disease (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease (c) Impairment of central nervous system functions (d) Possible increased risk to fetuses
Nitrogen dioxide	0.25 ppm, 1-hr avg	0.053 ppm, annual arithmetic mean	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups (b) Risk to public health implied by pulmonary and extrapulmonary biochemical and cellular changes and pulmonary structural changes (c) Contribution to atmospheric discoloration
Sulfur dioxide	0.04 ppm, 24-hr avg 0.25 ppm, 1-hr avg	0.03 ppm, annual arithmetic mean 0.14 ppm, 24-hr avg	Bronchoconstriction accompanied by symptoms that may include wheezing, shortness of breath, and chest tightness during exercise or physical activity in persons with asthma

Table 11-1 (concluded)
Applicable State and Federal Ambient Air Quality Standards

Air Pollutant	State Standard (Concentration/Averaging Time)	Federal Primary Standard (Concentration/Averaging Time)	Most Relevant Effects
Suspended particulate matter (PM ₁₀)	30 µg/m ³ , annual; geometric mean 50 µg/m ³ , 24-hr avg	50 µg/m ³ , annual arithmetic mean 150 µg/m ³ , 24-hr avg	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease (b) Excess seasonal declines in pulmonary function, especially in children (c) Increased risk of premature death from heart or lung diseases in elderly
Suspended particulate matter (PM _{2.5})	No separate standard	15 µg/m ³ , annual arithmetic mean 65 µg/m ³ , 24-hr avg	
Sulfates	25 µg/m ³ , 24-hr avg	No Federal standard	(a) Decrease in ventilatory function (b) Aggravation of asthmatic symptoms (c) Aggravation of cardiopulmonary disease (d) Vegetation damage (e) Degradation of visibility (f) Property damage
Lead	1.5 µg/m ³ , 30-day avg	1.5 µg/m ³ , calendar quarter	(a) Increased body burden (b) Impairment of blood formation and nerve conduction
Hydrogen sulfide	0.03 ppm, 1-hr avg	No Federal standard	Nuisance odor (rotten egg smell), headache, and breathing difficulties in higher concentrations
Visibility-reducing particles	In sufficient amount to reduce the visual range to less than 10 miles at relative humidity of less than 70 percent, 8-hr avg (10 AM–6 PM)	No Federal standard	Visibility impairment on days when relative humidity is less than 70 percent
Vinyl chloride	0.01 ppm, 24-hr avg.	No Federal standard	

Sources: South Coast Air Quality Management District 2003; California Air Resources Board *Air Quality Standards* page (<http://www.arb.ca.gov/aqs/aqs2.pdf>).

ppm = parts per million

hr avg = hour average

µg/m³ = microgram per cubic meter

11.1.4.2 Attainment Status

The project area encompasses three air quality management districts. For this reason, the attainment statuses for air pollutant standards in the impacted areas can vary. Table 11-2 provides the ozone and PM₁₀ State and Federal attainment statuses of the various districts that appear to be potentially affected by the alternatives. With respect to all other Ambient Air Quality Standards (i.e., carbon monoxide, nitrogen oxide, sulfur oxide, suspended particulate matter of less than 2.5 microns in diameter [PM_{2.5}], sulfates, lead, hydrogen sulfide, visibility-

reducing particles, and vinyl chloride), the affected areas are considered to be unclassified or in attainment.

Table 11-2
State and Federal Attainment Status Classifications

Air Basin	Air District	County Impacting Air Quality	State Ozone Attainment Status (1-hour standard)	State PM₁₀ Attainment Status	Federal Ozone Attainment Status (1-hour standard)	Federal PM₁₀ Attainment Status
San Joaquin Valley	San Joaquin Valley Air Pollution Control District	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare	Nonattainment	Nonattainment	Nonattainment	Nonattainment
San Francisco Bay	Bay Area Air Quality Management District	Santa Clara	Nonattainment	Nonattainment	Nonattainment	Unclassified
North Central Coast	Monterey Bay Unified Air Pollution Control District	San Benito	Nonattainment /Transitional	Nonattainment	Unclassified/ Attainment	Unclassified

Source: California Air Resources Board 2002.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) asked USEPA to reclassify the San Joaquin Valley as an “extreme” nonattainment area for purposes of the Federal ozone standard. The effects of the reclassification would be the inclusion of more stationary sources in the federal Title V program and an increase in emission offset ratios for new or modified sources in the San Joaquin Valley.¹ The San Joaquin Valley was reclassified as an “extreme” nonattainment area as of May 17, 2004.

The SJVAPCD has also released its plan for attaining the federal ambient standard for large particulates (PM₁₀). The new plan contains eleven control measures covering agricultural sources of particulates, cotton gins, agricultural dryers, oil field equipment, wineries, and other sources. Participation in the Agricultural Conservation Management Program commits agricultural operations to file a plan with the SJVAPCD to explain how they will use best management practices (BMPs) to reduce emissions from unpaved roads, unpaved vehicle/equipment traffic

¹ On November 13, 2003, the Regional Administrator for USEPA Region 9 signed a final rule returning the Title V Operating Permit program to 34 California air districts. As a result of this rule, USEPA will not issue any Title V permits to agricultural sources, since the 34 air districts will have the authority to issue Title V Permits to major agricultural stationary sources beginning on January 1, 2004.

areas, land preparation, harvest, and other sources (including windblown PM₁₀ coming from other areas). The BMPs include:

- Practices that reduce or eliminate the need to disturb the soil
- Practices that protect the soil from wind erosion
- Equipment modifications that reduce PM₁₀ emissions
- The application of water or dust suppressants in off-field high-traffic areas
- The reduction of speed or access on unpaved roads and parking areas
- Alternative practices to waste burning
- The reduction of pesticide applications

Individual operations will be free to choose the measures that best fit their operation. Although the plan does not contain specific emission reduction targets, the new regulation associated with the plan will contain an enforcement mechanism (California Environmental Insider 2003).

Rule 4550 (May 2004) includes land preparation/cultivation PM₁₀ fugitive dust control measures that include conservation irrigation, conservation tillage, cover crops, land fallowing, and other activities. Land fallowing is defined as temporary or permanent removal from production that eliminates entire operation/passes or reduces activities. Therefore, land fallowing is a dust control measure that would benefit air quality (SJVAPCD 2004).

11.2 ENVIRONMENTAL CONSEQUENCES

This section addresses whether air quality would be significantly impacted by any one of the action alternatives. The action alternatives involve multiple sources of developed water and multiple users of that water. The Exchange Contractors propose to develop water from an expanded conservation program, groundwater pumping, and crop idling/temporary land fallowing. The action alternatives are designed based on how the water is developed, with numerous options for how the water is used.

11.2.1 Key Impact and Evaluation Criteria

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied on to make the following determinations. Would the project:

- Conflict with or obstruct implementation of the applicable air quality plan?
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable Federal or State ambient air quality standard (including release of emissions that exceed quantitative thresholds for ozone precursors)?
- Expose sensitive receptors to substantial pollutant concentrations?
- Create objectionable odors affecting a substantial number of people?

11.2.2 Environmental Impacts and Mitigation**11.2.2.1 No Action/No Project Alternative**

No Action and No Project are similar. Both represent existing conditions with reasonably foreseeable future actions in the absence of the proposed transfer program.

Under the No Action/No Project Alternative, agricultural water users would receive their CVP contractual supplies subject to the limitations and/or shortages in their contracts with Reclamation using existing conveyance facilities. They would also rely on groundwater pumping to supplement surface water deliveries or obtain water from other sources. Absent the transfer of water, at times these agricultural water users would fallow lands. SCVWD would receive its CVP contractual supply subject to the limitations and/or shortages in its contract with Reclamation and using existing conveyance facilities.

Shortages could be expected to occur over the 2005–2014 water service years due to the water year type and CVPIA requirements. Depending on the shortages, either less land would be cultivated due to crop idling on existing acreages or less irrigation water would be applied, resulting in lower production on existing lands. These changes would be temporary because water year types change from year to year, and land that may have been taken out of production during a dry or critical year could be irrigated during wet or above normal years. Crop idling or land fallowing would occur as necessary under normal land management practices.

At issue is the potential for dust from agricultural operations to contribute to increased suspended particulate matter. Land subject to temporary crop idling (due to water supply shortages) is normally disked for weed control or planted with a cover crop, which is subsequently disked. These soil management practices serve to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. Therefore, no change would occur to air quality under No Action/No Project, and existing conditions represent reasonably expected future conditions.

11.2.2.2 Alternative A: 80,000 Acre-Feet

Under Alternative A, up to 80,000 acre-feet of water per year would be available from conservation measures (defined as tailwater recapture, recovery of irretrievable losses, and reductions in operational spills) and from crop idling. This alternative includes groundwater pumping of approximately 20,000 acre-feet per year. During critical water years, approximately 50,000 acre-feet of water would be available from crop idling, but no water would be available from conservation or groundwater pumping measures.

The proposed water transfer program would not have an impact on air quality because the Exchange Contractors' groundwater pumps are electric, not diesel, and would therefore not increase emissions of air pollutants associated with petroleum products to develop transfer water. In the Exchange Contractors service area (source area) during both noncritical and critical water years, approximately 20,000 acres of crops could be idled (using 50,000 acre-feet of water and an average of 2.5 acre-feet per acre of water applied). Large, contiguous blocks of land would not be idled; rather, the idled land would be spread over the entire service area's irrigable acreage (240,000 acres) and would be rotated. Land subject to temporary crop idling is normally disked for weed control or planted with a cover crop, which is subsequently disked. These soil management practices serve to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land

fallowing in the agricultural areas receiving the water, especially in critical years. No new lands would be brought into production in the receiving areas. Therefore, less-than-significant impacts or minimal effects would occur.

11.2.2.3 *Alternative B: 50,000 Acre-Feet*

Under Alternative B, up to 50,000 acre-feet of water would be transferred annually using only crop idling as the source of transfer water. Approximately 20,000 acres of land would be idled using an average of 2.5 acre-feet of water applied to each acre. The water could be developed from this source in all water years, both critical and noncritical.

During critical years, the only available water would be supplied from crop idling. Of the irrigated acres in the Exchange Contractors service area, crop idling of approximately 20,000 acres represents less than 9 percent of the total. Large, contiguous blocks of land would not be idled; rather, the idled land would be spread over the entire service area's irrigable acreage and would be rotated. Land subject to temporary crop idling is normally disked for weed control or planted with a cover crop, which is subsequently disked. These soil management practices serve to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land fallowing in the agricultural areas receiving the water, especially in critical years. Therefore, less-than-significant impacts or minimal effects would occur.

11.2.2.4 *Alternative C: 130,000 Acre-Feet*

Under Alternative C, up to 130,000 acre-feet of water would be transferred in noncritical water years and up to 50,000 acre-feet of water would be transferred in critical water years. During critical years, only water from crop idling would be available.

The proposed water transfer program would not have an impact on air quality because the groundwater pumps are electric, not diesel, and would therefore not increase emissions of air pollutants. No new lands would be brought into production in the receiving areas. During both noncritical and critical water years, approximately 20,000 acres of crops would be idled. Large, contiguous blocks of land would not be idled; rather, the idled land would be spread over the entire service area's irrigable acreage and would be rotated. Land subject to temporary crop idling is normally disked for weed control or planted with a cover crop, which is subsequently disked. These soil management practices serve to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land fallowing in the agricultural areas receiving the water, especially in critical years. Therefore, less-than-significant impacts or minimal effects would occur.

11.2.3 Cumulative Effects

In critical years, approximately 20,000 acres of Exchange Contractors land could be idled under each of the action alternatives to provide up to the 50,000 acre-feet of water. In noncritical years, some land could be idled as well for part of the water supply, but the majority of the water would come from conservation or groundwater supplies. During the project timeframe, whether the water year type will be critical or noncritical is not known, and land that could be idled one year might be brought back into production the next. Large, contiguous blocks of land would not be

idled; rather, the idled land would be spread over the entire service area's irrigable acreage (240,000 acres) and would be rotated.

At issue is the potential for dust from agricultural operations to contribute to increased suspended particulate matter. Land subject to temporary crop idling is normally disked for weed control or planted with a cover crop, which is subsequently disked. These soil management practices serve to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land fallowing in the agricultural areas receiving the water, especially in critical years. Thus, while land idling could occur in each of the action alternatives, the impacts from soil management practices would be similar to or less than ongoing impacts from lands managed for crops and would not be considered cumulatively significant.

11.2.4 Impact and Mitigation Summary

The action alternatives do not result in significant changes over the No Action/No Project Alternative and existing conditions. No adverse impacts would occur to air quality, so no mitigation is required.

No Action/No Project

- Under the No Action/No Project Alternative, some agricultural lands could be temporarily fallowed if water shortages occurred. No change to air quality would occur because land subject to temporary crop idling is normally disked for weed control or planted with a cover crop, which is subsequently disked. These soil management practices serve to minimize dust, erosion and loss of topsoil, and the development of noxious weeds.

Alternative A: 80,000 Acre-Feet

- The proposed water transfer program of up to 80,000 acre-feet would not have an adverse impact on air quality because the source area groundwater pumps are electric, not diesel, and would therefore not increase emissions of air pollutants. During both noncritical and critical years, large, contiguous blocks of land would not be idled; rather, the idled land would be spread over the entire service area's irrigable acreage and would be rotated. Common soil management practices would be used to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land fallowing in agricultural areas receiving the water, especially in critical water years. Therefore, less-than-significant impacts would occur to air quality under CEQA, and minimal effects would occur under NEPA.

Alternative B: 50,000 Acre-Feet

- During critical years, the only available water would be supplied from crop idling. Of the irrigated acres in the Exchange Contractors service area, crop idling of approximately 20,000 acres represents less than 9 percent of the total. Large, contiguous blocks of land would not be idled; rather, the idled land would be spread over the entire service area's irrigable acreage and would be rotated. Common soil management practices would be used to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land fallowing in agricultural areas receiving

the water, especially in critical water years. Therefore, less-than-significant impacts would occur to air quality under CEQA, and minimal effects would occur under NEPA.

Alternative C: 130,000 Acre-Feet

- The proposed water transfer program of up to 130,000 acre-feet would not have an adverse impact on air quality because the groundwater pumps are electric, not diesel, and would therefore not increase emissions of air pollutants. No new lands would be brought into production in the receiving areas. During both noncritical and critical years, an impact could occur to agricultural lands due to crop idling. Large, contiguous blocks of land would not be idled; rather, the idled land would be spread over the entire service area's irrigable acreage and would be rotated. Common soil management practices would be used to minimize dust, erosion and loss of topsoil, and the development of noxious weeds. In addition, crop idling in the source area could be offset by reductions in land fallowing in agricultural areas receiving the water, especially in critical water years. Therefore, less-than-significant impacts would occur to air quality under CEQA, and neutral or minimal effects would occur under NEPA.

Tables 11-3 through 11-6 summarize the effects of the No Action/No Project Alternative and the action alternatives on air quality. The existing conditions set the baseline against which the alternatives are evaluated for CEQA, and No Action is the baseline for comparison of alternatives for NEPA.

Table 11-3
Summary of Effects of the No Action/No Project Alternative

Affected Resource and Area of Potential Effect	No Action/No Project Compared to Existing Conditions
Air quality	No impact

Table 11-4
Summary of Effects of Alternative A: 80,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Air quality	Less-than-significant impact	Minimal effect

Table 11-5
Summary of Effects of Alternative B: 50,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Air quality	Less-than-significant impact	Minimal effect

Table 11-6
Summary of Effects of Alternative C: 130,000 Acre-Feet

Affected Resource and Area of Potential Effect	CEQA	NEPA
Air quality	Less-than-significant impact	Minimal effect

This section addresses other potential effects as required by CEQA and/or NEPA: relationship between short-term uses and maintenance of long-term productivity, irreversible or irretrievable commitment of natural resources, unavoidable adverse impacts, and growth-inducing effects.

12.1 RELATIONSHIP BETWEEN SHORT-TERM USES AND MAINTENANCE OF LONG-TERM PRODUCTIVITY

The relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity of the affected resources (identified below) for the three action alternatives (annual transfers of 80,000; 50,000; and 130,000 acre-feet to one or more CVP contractors and/or wildlife refuges) is described below. At issue is whether short-term effects are counterbalanced by long-term effects.

Short-term effects are associated with the potential for (1) water development sources to vary on an annual basis and (2) water users to change on an annual basis, e.g., refuges receiving water one year but possibly not the next or receiving substantially different quantities than before. These effects occur within a highly managed system of surface and groundwater resources, and they occur over a short period (10 years).

However, the maintenance of long-term resource productivity benefits of improved water quality on the San Joaquin River ecosystem, protection and enhancement of biological resources, and/or maintenance of agricultural production in receiving areas outweigh short-term adverse effects on individual resources and the local economy. The productivity benefits for some resources may come at the expense of other resources (agricultural versus wetland habitat). Because the proposed water transfers involve a range of water users, any of the uses (refuge enhancement, agricultural production, and/or limited M&I uses) could occur in any particular year and vary from one year to the next.

The short-term uses of water and their effects associated with the three action alternatives are addressed below by resource category.

12.1.1 Surface Water Resources

The potential for the water transfer to change on an annual basis, from how the water is developed and how it is used, results in a range of short-term impacts:

- Increases in consumptive use by agricultural and out-of-basin water users if water is used to increase productivity rather than to replace other sources, and by the wildlife refuges from expanded irrigation to produce food for wildlife
- Decreases in flow in the San Joaquin River if the water is developed primarily through tailwater recovery and is transferred to agriculture or out-of-basin users
- Small decreases in storage (up to 5,600 acre-feet) at New Melones Reservoir in all water years due to releases to react to water quality and flow changes from in-basin refuge releases
- At different times, changes in inflow to the Delta and CVP/SWP Delta supply

12.1.2 Groundwater Resources

Short-term effects on groundwater supply range from an annual loss of 24,000 acre-feet to a gain of 2,500 acre-feet, depending on the source of the developed water and the water user/receiving area. The greatest short-term impact occurs with water developed from conservation, followed by crop idling. However, the effects are less than significant. Impacts to groundwater quality, land subsidence, and surface water flows from groundwater accretion are not significant.

12.1.3 Biological Resources

The short-term adverse effects on special-status species are related primarily to reductions in foraging habitat from crop idling in the Exchange Contractors service area. The crop idling involves rotations in acreage, so the effects on species in the affected area are short term. Both tailwater recovery and land fallowing reduce the amount of water in Mud and Salt sloughs but would not significantly affect special-status species.

12.1.4 Land Use and Recreation

All of the effects to agricultural and other land uses are short term because the crop idling component is short term. The beneficial effects of increasing farmland productivity and enhancing refuges outside of the Exchange Contractors service area offset the lands removed from production on a temporary basis to develop water. If the wildlife refuges do not receive additional Level 4 deliveries, recreation opportunities would be minimally affected.

12.1.5 Socioeconomics

Impacts on crop production and farm income are temporary, and the net effects on the regional economy are less than significant. At issue are the local effects due to crop idling and loss of jobs and income if water is not used to support other agricultural activities.

12.1.6 Environmental Justice

Small short-term effects occur to the region and would be experienced by the Hispanic community if croplands are idled to develop the water and the transfer water is not used for agricultural production.

12.1.7 Indian Trust Assets

No short-term effects to Indian Trust Assets would occur.

12.1.8 Air Quality

For temporary land fallowing in the Exchange Contractors service area, soil management practices to minimize dust would minimize the potential for air quality degradation in the San Joaquin Valley.

12.2 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF NATURAL RESOURCES

Irreversible commitments are those that either directly or indirectly cause the use of natural resources so that they cannot be restored or returned to their original condition. Irreversible decisions affect renewable resources such as soils, wetlands, and waterfowl habitats. They are considered irreversible because their implementation would affect a resource that has deteriorated such that renewal takes extensive time or financial resources or because they would destroy the resource.

Irretrievable commitments of natural resources mean the decision would result in loss of production or use of the resource. They represent opportunities forgone for a substantial period of time that the resource cannot be used.

For all of the action alternatives, these potential irreversible and irretrievable effects are associated with consumptive use of water resources, which depends upon the ultimate water user. For the Exchange Contractors' development of water for transfer, consumptive use in the source area would decrease. The receiving areas, wildlife refuges, and other CVP contractors would increase their consumptive use of water resources.

12.3 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are environmental consequences of an action that cannot be avoided, either by changing the nature of the action or through mitigation if the action is undertaken. None of the action alternatives' direct or indirect effects are unavoidable.

12.4 GROWTH-INDUCING EFFECTS

Growth-inducing effects fall under the category of potential indirect effects. Indirect effects occur later in time or farther away in distance but are still reasonably foreseeable. Growth-inducing projects remove obstacles to population growth or encourage and facilitate other activities that could stimulate future growth.

Sections 7.2 and 8.2 discuss the effects of the action alternatives on agricultural land use and the regional economy and employment. Changes in agricultural land use include up to approximately 20,000 acres of land with crop idling to develop the water, and all three alternatives include options for agriculture to use the water. The effects on income and employment are less than significant and therefore are not expected to stimulate demand for housing and local services.

Furthermore, all of the transfers to agricultural and M&I water users would not exceed their CVP contractual supplies. They would be transfers to alleviate shortages of CVP water. The only M&I purchaser of Exchange Contractors transfer water is SCVWD in the San Felipe Division. Sales to the district would be limited to 62,950 acre-feet per year for both agricultural and M&I purposes. The maximum potential transfer to SCVWD represents a combination of up to 33,100 acre-feet for agriculture and up to 29,850 acre-feet for M&I purposes per year, because these quantities may not be delivered by the CVP.

M&I purchases of 29,850 acre-feet per year or less are determined to be non-growth inducing, because the delivery would not result in exceedance of SCVWD's CVP contract supply and

could be transferred to alleviate shortages in CVP contract supply. Even if a multiyear agreement were to provide this water, it would not support development beyond that considered in the SCVWD's needs assessment for its CVP contract supply.

12.5 ENVIRONMENTALLY PREFERRED/SUPERIOR ALTERNATIVE

As reported in Section 2.7, Summary Comparison of Alternatives, no one action alternative is clearly environmentally preferred or superior. Rather, the environmentally preferred alternative depends upon the particular resource under evaluation for environmental impacts and benefits. The key resource issues of water quality at Vernalis and New Melones Reservoir operation (including storage) point to Alternative C as the alternative with the fewest adverse impacts combined with benefits under some scenarios. Alternative C would provide greater benefits to wetland habitat than Alternatives A or B and is the environmentally preferred/superior alternative.

13.1 INTRODUCTION

The requirement for a mitigation monitoring or reporting program is introduced in Section 15091 of Title 14, California Code of Regulations, Chapter 3, Guidelines for Implementation of the California Environmental Quality Act. This section directs the public agency approving or carrying out the proposed project (San Joaquin River Exchange Contractors Water Authority [Exchange Contractors]) to make specific written findings for each significant impact identified in the EIR. When making the required findings, the agency will also adopt a program for reporting on or monitoring the changes that it has either required in the project or made a condition of approval to avoid or substantially lessen significant environmental effects. These mitigation measures must be fully enforceable through permit conditions, agreements, or other measures.

Section 15097 was added to the CEQA Guidelines on October 23, 1998. It requires the public agency to adopt a program for monitoring or reporting on the revisions that it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects. Reporting or monitoring responsibilities may be delegated to another public agency or private entity. However, until mitigation measures have been completed, the lead agency (the Exchange Contractors) remains responsible for ensuring that implementation of the mitigation measures occurs in accordance with the program.

The Exchange Contractors may choose whether its program will monitor mitigation, report on mitigation, or both.

- Reporting generally consists of a written compliance review that is presented to the decision-making body or authorized staff person. A report may be required at various stages during project implementation or upon completion of the mitigation measure. It is suited to projects that have readily measurable or quantitative mitigation measures or that already involve regular review.
- Monitoring is generally an ongoing or periodic process of project oversight. It is suited to projects with complex mitigation measures that are expected to be implemented over a period of time.

This proposed mitigation program consists of a summary of impacts (Section 13.2) for the proposed water transfer program, Alternative C (Proposed Action), followed by a description of the mitigation program and principal mitigation monitoring activities (Section 13.3). The mitigation monitoring program for the Final EIS/EIR is recommended to be a “reporting program” similar to the current reporting program on annual water transfers and covering other mitigation measures if required. The implementation action required, the timing required for implementation, and the agency responsible for ensuring that the action occurs are discussed in Section 13.3. The compliance monitoring plan is outlined in Section 13.4, followed by other environmental commitments carried forward from the environmental impact analyses in Section 13.5.

13.2 IMPACT SUMMARY

The Draft EIS/EIR identifies potentially significant effects, and proposed mitigation to reduce these effects to less than significant, for the Proposed Action: an annual transfer of up to

130,000 acre-feet (up to 80,000 acre-feet from conservation/tailwater recovery and groundwater pumping combined in noncritical years, and up to 50,000 acre-feet from crop idling in all years). The only potentially significant impacts identified in the environmental impact analyses were to surface water resources. The analysis identifies the potential for flows and water quality on the San Joaquin River at Vernalis to change such that absent a change in New Melones Reservoir operations, the Vernalis standards would not be met in some years. The analysis also identifies the potential for change in the CVP/SWP's Delta water supply resulting from changed inflows from the San Joaquin River in combination with changes in releases from New Melones Reservoir to address the effects at Vernalis (Section 4.2, Appendix B).

The hydrologic impact analyses look at the effects of water development by the Exchange Contractors and in combination with water use by a variety of users including Reclamation. The greatest potential adverse effects to New Melones Reservoir operations occur when all the available water is transferred to the refuges in the San Joaquin River Basin. The greatest potential adverse effects to the CVP/SWP's Delta water supply occur when all the available water is transferred to entities without hydraulic connectivity to the San Joaquin River (based on the hydrologic definition of in-basin/out-of-basin). A summary of the potentially significant adverse effects and how these effects may be lessened is provided below, first for water development only and then for combined water development and transfer.

13.2.1 Water Development Only

13.2.1.1 New Melones Reservoir Operation

New Melones Reservoir storage typically would gain or remain neutral under all source scenarios, with the modeled gain in storage within a year being up to 3,000 acre-feet. Commensurately, releases from New Melones Reservoir to the Stanislaus River would be slightly reduced at times, if the water gained at New Melones Reservoir remains in storage. A minor reduction in storage could occur in certain years if New Melones Reservoir makes releases to maintain flow at Vernalis. Although relatively minor in magnitude, the change in storage is potentially significant in its effect upon water supply allocations under the New Melones Interim Plan of Operation.

13.2.1.2 Delta Supply

Under various combinations of year type and source, there is a modeled risk of impact to CVP/SWP Delta water supply. While identified in the analysis as a potential reduction in CVP/SWP Delta water supply in a year, it is not anticipated that such a single-year change in supply will affect allocations to CVP or SWP contractors. Cumulative years of effect would need to occur to affect allocations. Also, little likelihood exists that a transfer would be predicated on a size and source combination that resulted in such a potential effect. However, there is a potential for the impact to result in reduced carryover storage in upstream reservoirs.

13.2.2 Combined Water Development and Transfer**13.2.2.1 New Melones Reservoir Operation**

Water development alone has an insignificant impact to water quality at Vernalis and will actually improve water quality in the San Joaquin River. At issue is when water quality (and flow) releases from New Melones cause a reduction in storage that is potentially significant in its impact upon water supply allocations under the New Melones Interim Plan of Operation. The disposition of the transfer water shows the following impacts:

- If water is transferred to the refuges, return flows from the refuges could require additional releases from New Melones Reservoir to maintain water quality objectives. These additional releases would negate or diminish the potential gains in New Melones Reservoir storage derived from developing the transfer water.
- If water is delivered to agriculture hydraulically connected to the San Joaquin River, water quality improvement in the San Joaquin River is anticipated to be compounded, providing additional potential gains in storage at New Melones Reservoir.
- If water is delivered to entities without hydraulic connectivity with the San Joaquin River, water quality and flow in the San Joaquin River will be nearly the same as the result of only developing the water.

13.2.2.2 CVP/SWP Delta Water Supply

Potentially significant impacts occur to the CVP/SWP Delta supply for all disposition scenarios.

- When delivering to the refuges, the depletion effects of developing water would be partially offset with additional return flows and releases from New Melones for water quality and flow objectives. Thus, the risk to CVP/SWP Delta water supply would be reduced from that occurring from water development only. During critical years, a gain in CVP/SWP Delta water supply is anticipated.
- If water is delivered to agriculture hydraulically connected to the San Joaquin River, the risk to CVP/SWP Delta water supply would also be reduced from the level occurring from water development only.
- If water is delivered to entities without hydraulic connectivity with the San Joaquin River, the potential risk to CVP/SWP Delta water supply is slightly aggravated from the level occurring from water development only.
- As noted for the effects of developing water alone, while identified in the analysis as a potential reduction in CVP/SWP Delta water supply in a year, it is not anticipated that such a single-year change in supply would affect allocations to CVP or SWP contractors.
- The maximization of conservation/tailwater recapture source potentially affects the CVP/SWP Delta water supply the most. Utilization of groundwater instead of conservation within a scenario reduces the potential negative effect.

13.3 MITIGATION AND MONITORING

The primary mechanism for mitigation of impacts identified above is Reclamation's transfer approval process, which determines any limitations on the sources of water developed by the Exchange Contractors as well as any limitations on the disposition of water by the parties to whom the transfer is made in the year of the transfer or in a subsequent year. The mitigation requirements of the transfer approval process will provide for three objectives: no significant adverse impact to the CVP as a whole (i.e., the CVP must be made whole); no significant adverse impact to the federal investment in the CVP; and no significant adverse impact to the affected environment. Reclamation is responsible, through the transfer approval process, for ensuring that the transfer is consistent with the transfer requirements, the mitigation requirements and any applicable monitoring requirements. Potential impacts from releases from New Melones Reservoir triggered by the Proposed Action are also addressed in the transfer approval process. New Melones will be operated consistent with the current Interim Plan of Operation, and no changes to the IOP are proposed for the proposed transfer program.

13.3.1 Mitigation Responsibilities

The Exchange Contractors will be responsible for mitigation of impacts caused by the manner in which water is made available for transfer, to the extent such impacts are identified through the analysis and transfer approval process described herein. The United States and the refuge entities (USFWS, DFG, Grasslands, pursuant to their water supply contracts with Reclamation) will be responsible for mitigation of impacts caused by the use and management of water on the wildlife areas. Reclamation expects that operations of New Melones in accordance with the Interim Operations Plan will make any additional mitigation unnecessary. However, the refuges will still be subject to applicable requirements to address water quality impacts from use of water on the refuges pursuant to their water supply contracts with Reclamation, and their obligations under the San Joaquin River Salinity Management Plan, State Water Resources Control Board discharge requirements, or other applicable requirements. Transfers to CVP agriculture and M&I contractors will not result in deliveries of water in excess of full contract amounts, and therefore, adverse impacts are not anticipated beyond those identified and analyzed in long-term contract renewal environmental documentation.

13.3.2 Previous Transfer Monitoring

The current 5-year water transfer program has not identified significant impacts to the San Joaquin River. The hydrologic analysis performed in 1999 and used each year was based on different refuge operational assumptions and hydrology assumptions. Since that time, the San Joaquin River hydrology and refuge models have been updated, and new information, assumptions and revised models were used for the Draft EIS/EIR for the proposed program for 2005 to 2014. In addition to analysis, the 2000–2004 transfer approval process included several measures to address adverse impacts to the CVP and other legal users of water if they were to occur. These measures are the basis of the mitigation program for the proposed 2005–2014 program.

13.3.3 Proposed Transfer Program Approval Process/Mitigation Monitoring

The following mitigation measures and monitoring procedures are proposed for the 2005–2014 Water Transfer Program by the Exchange Contractors.

- (1) Although not precluding the establishment of multi-year transfers, the amount of and methods of a transfer from the Exchange Contractors will be reviewed by Reclamation on an annual basis. At the beginning of each calendar year (February–March), the Exchange Contractors will prepare a “pre-forecast” of the upcoming water transfer to identify the size of the upcoming transfer and any possible concerns based on known hydrology at that point for the water year. This pre-forecast is submitted to Reclamation. The quantity, sources (tailwater recovery, conservation, groundwater substitution, crop idling/land fallowing), and recipients of the transfer water will be identified in each year’s proposed transfer. The effect of the transfer will be estimated based upon an analysis of: (a) the current year’s hydrologic forecast, and (b) the current year’s CVP operations plan, including, if necessary, a forward-looking forecast of exports and reservoir storage operations. The hydrologic analysis will be part of the transfer approval process.
- (2) After the completion of the transfers, the Exchange Contractors will prepare a “post-transfer” analysis that incorporates the transfers and the recorded hydrology to estimate the transfer’s effects upon New Melones Reservoir and the Delta. The analyses will extend from the current calendar year through February of the following year.
- (3) For each year of transfer, a mutual agreement will be reached by Reclamation and the Exchange Contractors as to the quantity, sources, and recipients of the transfer water and the methods and timing of developing and delivering the transfer water. Reclamation will review and approve the analysis on the calculation of the impact, if any, and make a determination of whether it is a significant impact.
- (4) If, based on the post-transfer analysis, Reclamation determines that a significant impact to the usable Delta water supply has occurred; the CVP will make the SWP whole through a mutually agreed-upon accounting protocol consistent with the Coordinated Operations Agreement.
- (5) If significant impact results from the water development action of the Exchange Contractors as determined by the post transfer analysis, the Exchange Contractors will implement appropriate mitigation measures. Because the extent of any significant adverse impacts resulting from water development may not be known in the year of the transfer, the Exchange Contractors will not be responsible for mitigation of impacts to the CVP/SWP, including impacts, if any, to carryover storage, in the year of the transfer. However, mitigation measures for impacts to New Melones Reservoir, or other CVP water supply operations, including upstream carryover storage, will be resolved during the transfer approval process in the following year, or in the year in which the impacts are identified and measured, or as soon thereafter as practicable.
- (6) The Exchange Contractors and Reclamation believe that, except for extraordinary conditions, no significant adverse impacts on carryover storage in New Melones Reservoir are likely. However, adverse impacts may occur to upstream storage (Shasta and Folsom) during the period of transfer. The annual transfer approval requirements will identify those impacts and will include measures as described above to reduce those impacts on the CVP to a less-than-

significant level, provided, however, that the Exchange Contractors will not be required to provide mitigation water because of conditions described in Paragraph 7, below.

- (7) If Level 4 deliveries exacerbate water quality conditions in the San Joaquin River to the point of triggering a water quality release from New Melones Reservoir, Reclamation and/or the refuges will mitigate such impacts through refuge management practices or other mechanisms available to Reclamation and the refuge management agencies, such as reservation of Incremental Level 4 acquisitions for dilution purposes.

The compliance monitoring plan for the 10-Year Water Transfer Program would be based on the format of reports currently submitted on an annual basis and is discussed in the following section.

13.4 COMPLIANCE MONITORING PLAN

The compliance monitoring plan for the 10-Year Water Transfer Program would be based on the reports currently submitted on an annual basis. The Exchange Contractors submit annual reports to Reclamation prior to the annual transfer and after the transfer is quantified. At the beginning of each calendar year (February–March), the Exchange Contractors prepare a “pre-forecast” of the upcoming water transfer to identify the size of the upcoming transfer and any possible concerns based on known hydrology at that point for the water year. This pre-forecast is submitted to Reclamation (Central Valley Project Operations and Mid-Pacific Regional Office). Shortly after the completion of the transfer in a year, the Exchange Contractors prepare a post-transfer analysis that incorporates the transfer and the actual hydrologic occurrences of the year to determine the specific changes in hydrology and impacts to New Melones Reservoir and the Delta. The post-transfer analysis extends from the current calendar year of the transfer through February of the following year. Any impact issues with respect to CVP operations that would need to be addressed (and how they would be addressed) are identified and resolved.

The post-transfer analysis is an accounting of the actual transfer and its impacts to flows and water supply. It has been implemented for the 1999–2004 transfers and would continue for the proposed 2005–2015 transfers.

13.5 OTHER MITIGATION AND ENVIRONMENTAL COMMITMENTS

Environmental commitments that will be carried out as part of the implementation of the Proposed Action/preferred alternative (to reduce potentially significant effects to less than significant) are identified above in Section 13.3.3.

In addition, the Exchange Contractors will continue to manage groundwater pumping to result in no net depletion of groundwater over the 10-year life of the water transfer program. Past groundwater management has been effective, so impacts to groundwater supply were identified as minimal or less than significant.

The alternatives under consideration would be subject to a variety of regulatory compliance actions that are in place to safeguard the environment. Table 14-1 provides a quick reference to the regulatory compliance actions that may apply to each of the alternatives. Many of the regulatory compliance actions would require Reclamation, the Exchange Contractors, or water purchaser to obtain, or ensure that, the applicable approvals are obtained.

**Table 14-1
Federal, State, and Local Compliance Actions, Legislation, Requirements,
Regulations, Permits, Licenses, and Approvals That May Be Necessary for the
Exchange Contractors 10-Year Water Transfer Program**

Compliance Action	Regulatory Agency
Environmental Compliance Regulations	
California Environmental Quality Act	State
National Environmental Policy Act	Federal
Biological Resource Legislation and Requirements	
Fish and Wildlife Coordination Act	Federal, State
Migratory Bird Treaty Act	Federal
Endangered Species Act	Federal
California Endangered Species Act	State
Magnuson-Stevens Fishery Conservation and Management Act	Federal
Executive Order 11990 (Protection of Wetlands)	Federal
Hydrology-Related Requirements, Permits, and/or Approvals	
Surface Water Rights and Compliance	State
Groundwater Rights and Management and Compliance	Federal, State, Local
Bureau of Reclamation's Interim Guidelines for Implementation of Water Transfers Under Title XXXIV of Public Law 102-575	Federal
Delta Protection Act of 1959	State
Land Use Requirements and Regional, County, and Local Requirements, Permits, and/or Approvals	
California County Permits	Local
State, Areawide, and Local Plan and Program Consistency	State, Local
Coordination with related Federal, State, and Local Programs	Federal, State, Local
Additional Environmental Legislation and Requirements	
Federal Water Project Recreation Act	Federal
Executive Order 12898 (Environmental Justice)	Federal
Indian Trust Assets	Federal
Executive Order 13007 (Indian Sacred Sites on Federal Land)	Federal
American Indian Religious Freedom Act	Federal
Farmland Protection Policy Act and Farmland Preservation	Federal
Federal Agricultural Improvement and Reform Act of 1996 and 1985 Food Security Act	Federal

The following sections describe the regulatory compliance actions identified in Table 14-1 in greater detail.

14.1 ENVIRONMENTAL COMPLIANCE REGULATIONS

CEQA and NEPA apply to actions that a State or Federal agency may undertake directly, approve by issuing a permit or other authorization, or fund wholly or in part. CEQA requires the preparation on an EIR for major State and local actions significantly affecting the quality of the physical and social environment. The NEPA requirements are similar to the CEQA requirements in that they require an EIS be prepared for all major Federal actions with significant environmental effects. The President's Council on Environmental Quality regulations encourage the preparation of joint environmental documents to reduce duplication of analysis and paperwork. Both CEQA and NEPA require that an agency considers the environmental effects of its actions at the earliest point in time in which the analysis is meaningful. CEQA and NEPA are intended to inform decision makers and the public of the environmental consequences of the proposed action, provide an analysis of alternatives, and ensure consideration of mitigation options. Under both statutes, the environmental documentation and analysis are circulated for public review and comment before a final document is completed and before a decision is made to approve the proposed action or other alternative.

- **CEQA Compliance:** This document has been written to facilitate State and local agencies using the document to meet their CEQA obligations.
- **NEPA Compliance:** The Draft EIS is being circulated for public review. Following the Final EIS and signature of the Record of Decision, Reclamation will have fully complied with NEPA.

14.2 BIOLOGICAL RESOURCE LEGISLATION AND REQUIREMENTS

Both the State and Federal governments have enacted biological resource legislation and requirements to ensure that projects do not needlessly harm these resources. The major biological resource legislation's applicable to the alternatives under consideration are discussed below.

14.2.1 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, as amended, provides an opportunity for the "appropriate wildlife agencies" (the Service or National Marine Fisheries Service [now NOAA Fisheries]) to consult on Federal water development projects or on non-Federal projects that require a Federal permit or license. The agencies are provided the opportunity to conduct surveys and investigations to determine the potential damage to fish and wildlife resources with project implementation and to identify the mitigation measures that should be undertaken. The findings are incorporated into an official Section 2(b) report.

Similarly, Sections 13450 et seq. of the California Fish and Game Code provide opportunities for DFG to report its recommendations for wildlife conservation and development, indicate the expected results, and describe the damage to wildlife attributable to the project and the measures proposed for mitigating or compensating for these damages. These provisions, however, do not

apply to fish in irrigation canals or works, or to mammals destroyed or birds killed while damaging crops.

Compliance: The Service, NOAA Fisheries, and DFG will have an opportunity to provide input through their review of the EIS/EIR and consultations directly with the lead agencies. See Section 15.1.1.

14.2.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 USC 703–711) provides protection to migratory birds whose welfare is a Federal responsibility. This act makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered a “take” and is potentially punishable by fines and/or imprisonment.

Compliance: Water that would be transferred to wetlands and wildlife refuges would benefit migratory birds by providing additional habitat.

14.2.3 Endangered Species Act

FESA, as amended (16 USC 1536), establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the preservation of the ecosystems upon which they depend. FESA Section 7(a)(2) requires Federal agencies to consult with the Service and/or NOAA Fisheries on any activities that may affect any species listed as threatened or endangered. These potential effects require initiation of the Section 7 consultation process.

Compliance: A list of Federal and State threatened, endangered, proposed, candidate, rare, species of concern, and/or species of special concern that may occur in the project area has been requested from the Service and NOAA Fisheries. Preliminary lists have been prepared for inclusion in this EIS/EIR as Appendices C and D. Pursuant to Section 7 of the FESA, information that is normally included in a Biological Assessment addressing potential adverse effects on listed and proposed species has been incorporated into this EIS/EIR. Based on Reclamation’s effects determination, formal consultation with the Service and NOAA Fisheries may be requested in compliance with Section 7.

14.2.4 California Endangered Species Act

CESA is similar to FESA.

Compliance: A list of State threatened, endangered, proposed, candidate, rare, species of concern, and/or species of special concern that may occur in the project area is included in this EIS/EIR as Appendices C and D. Review of this list will be requested from DFG. Information addressing potential impacts on listed and proposed species has been incorporated into this EIS/EIR, as appropriate, which has been provided to DFG for their analysis and comment.

14.2.5 Magnuson-Stevens Fishery Conservation and Management Act

This act requires all Federal agencies to consult with NOAA Fisheries on all actions or proposed actions, permitted, funded, or undertaken by an agency, that may adversely affect EFH, defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Only species managed under a Federal fishery management plan are covered. Species for which this act applies are Sacramento River winter-run salmon, Central Valley spring-run salmon, Central Valley fall/late fall-run salmon, and Central Valley steelhead. Consultation generally requires that an EFH Assessment be prepared and submitted to NOAA Fisheries. Information that is normally included in an EFH Assessment may be incorporated into the NEPA document.

Compliance: None of the action alternatives would affect the species subject to this act.

14.2.6 Executive Order 11990 (Protection of Wetlands)

Executive Order 11990 (Protection of Wetlands) requires Federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking Federal activities and programs. Any agency considering a proposal that might affect wetlands must evaluate factors affecting wetland quality and survival. These factors should include the proposal’s effects on the public health, safety, and welfare due to modifications in water supply and water quality; maintenance of natural ecosystems and conservation of flora and fauna; and other recreational, scientific, and cultural uses.

Compliance: Water that would be transferred to wetlands and wildlife refuges would benefit wetland resources.

14.3 HYDROLOGY-RELATED REQUIREMENTS, PERMITS, AND/OR APPROVALS**14.3.1 Surface Water Rights and Compliance**

Applies to all projects that involve any change to surface water rights and/or existing diversions, and no changes to existing rights or diversions would occur due to the temporary water transfer program.

14.3.2 Groundwater Rights and Management and Compliance

Actions may be subject to a county ordinance, approval by a local agency or district, or the terms of judicial adjudication, if they involve: (1) the use, replenishment, transfer, or sale of groundwater; (2) the use of a groundwater basin for storage; or (3) the construction, abandonment, or destruction of a well. See Section 14.4.1 for a discussion of Fresno County’s MOU with the Exchange Contractors.

14.3.3 Bureau of Reclamation's Interim Guidelines for Implementation of Water Transfers Under Title XXXIV of Public Law 102-575 (Water Transfer)

Reclamation's *Interim Guidelines for Implementation of Water Transfers Under Title XXXIV of Public Law 102-575* (Water Transfer) address all water transfers equitably, to provide for a more efficient and effective use of the water supply developed by the CVP and to provide greater flexibility to water users in transferring water developed by the CVP. Section 3405(a) of Public Law 102-575 authorizes all individuals or districts who receive CVP water under water service or repayment contracts, water rights settlement contracts, or exchange contracts to transfer, subject to certain conditions, all or a portion of the water subject to such contracts to any California water user or agency, State or Federal agency, Indian tribe, or private nonprofit organization for CVP purposes or any purpose recognized as beneficial under State law (Reclamation 1993).

All transfers implemented in accordance with Section 3405(a) will be deemed to be a beneficial use of water for purposes of Section 8 of the Reclamation Act of 1902 (32 Stat. 390; 43 USC 372). In addition, all transfers implemented in accordance with Section 3405(a) will be consistent with State law. Long-term transfers will also be subject to all subsequent State laws enacted during the period of the transfer. Long-term transfers will be those transfers for a period or periods of more than one year with the maximum period being limited by the term of the CVP contract under which the transfer is being made (Reclamation 1993).

See Section 2.4 for more information on use of the guidelines for this 10-Year Water Transfer Program.

14.3.4 Delta Protection Act of 1959

The Delta Protection Act of 1959 requires adequate water supplies for multiple uses (for example, agriculture, industry, urban, and recreation) within the Delta and for export. Various water quality and flow objectives have been established by the State Board and the Regional Board since the passing of this act (CALFED 1998).

Compliance: Water quality impacts to the Delta (measured at Vernalis on the San Joaquin River) would be significant but would be mitigated with releases from New Melones Reservoir under the Interim Plan of Operation and measures contained in the transfer approval process (see Section 13).

14.4 LAND USE REQUIREMENTS AND REGIONAL, COUNTY, AND LOCAL REQUIREMENTS, PERMITS, AND/OR APPROVALS

Both the Federal and State governments have enacted land use and regional, county, and local legislation and requirements to ensure that projects do not needlessly harm the environment. These major requirements are discussed below.

14.4.1 County Regulatory Compliance

Local regulatory compliance would include actions that involve Williamson Act compliance. The Williamson Act program enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open

space use. The minimum term for contracts is 10 years, but the contract automatically renews on each anniversary date of the contract. Landowners receive reduced property tax assessments in return for enrollment under Williamson Act contract.

Fresno County and the Exchange Contractors and its member agencies have a MOU that exempts the Exchange Contractors from regulation of groundwater resources within Fresno County. Fresno County and the Exchange Contractors agree that agricultural production is vital to the county and that groundwater, used conjunctively with surface water, is essential for continued agricultural production. The MOU specifically exempts the Exchange Contractors from the newly adopted Title 14, Chapter 3 of the Fresno County Ordinance Code, in accordance with Section 14.03.05E of the code. Fresno County recognizes that the Exchange Contractors' management, protection, and control of groundwater resources are consistent with Title 14, Chapter 3; therefore, the MOU exempts the Exchange Contractors from this code requirement (Fresno County and Exchange Contractors 2001).

14.4.2 State, Areawide, and Local Plan and Program Consistency

Agencies must consider the consistency of a proposed action with approved State and local plans and laws. Given the extremely large number of State and local jurisdictions within the study area, not all of the individual plans and laws were reviewed. In accordance with Executive Order 12372, the environmental documents are being prepared with input from the Cooperating Agencies and Consulting Agencies. During the NEPA and CEQA review periods, the environmental documents will be circulated to the appropriate State agencies and to the State Clearinghouse to satisfy review and consultation requirements.

14.4.3 Coordination with Related Federal, State, and Local Programs

Reclamation will conduct a formal coordination process to identify other programs that could significantly affect the assumptions, implementation, or effectiveness of the proposed project. Programs may include the following:

- The Westside Integrated Resources Plan
- Various CVP yield improvement studies
- Land retirement studies and implementation
- San Joaquin Valley Drainage Program implementation
- Grassland Bypass Project and related studies

14.5 ADDITIONAL ENVIRONMENTAL LEGISLATION AND REQUIREMENTS

During the NEPA and CEQA environmental documentation process, the following additional environmental legislation and/or requirements are addressed.

14.5.1 Federal Water Project Recreation Act

Section 4(f) of the Federal Water Project Recreation Act establishes requirements applicable to water resource projects affecting Section 4(f) lands. Under this act, a Federal agency may not

assist the construction of a water resources project that would have a direct and adverse effect on Section 4(f) lands. If the project would affect these lands or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area, such activities should be undertaken in a manner that would minimize adverse effects and should be developed in consultation with the appropriate Federal agency having administrative responsibility (e.g., National Park Service).

Compliance: Transfer of water to wetland areas and wildlife refuges would encourage wildlife use and could provide recreational value, which would be in compliance with this act.

14.5.2 Executive Order 12898 (Environmental Justice)

Executive Order 12898 requires each Federal agency to achieve environmental justice as part of its mission, by identifying and addressing disproportionately high and adverse human health or environmental effects, including social and economic effects, of its programs, policies, and activities on minority populations and low-income populations of the United States.

Compliance: No significant adverse effects would occur to environmental justice from the action alternatives because socioeconomic effects are less than significant.

14.5.3 Indian Trust Assets

The United States Government's trust responsibility for Indian resources requires Reclamation and other agencies to take measures to protect and maintain trust resources. These responsibilities include taking reasonable actions to preserve and restore tribal resources. ITAs are legal interests in property and rights held in trust by the United States for Indian tribes or individuals. Indian reservations, rancherias, and allotments are common ITAs.

Compliance: No ITAs are located in the districts that would supply the transfer water, and one rancheria and two public domain allotments are located within 2 miles of the boundaries of districts that could receive the water. All of the alternatives would be in compliance with this legislation.

14.5.4 Executive Order 13007 (Indian Sacred Sites on Federal Land)

Executive Order 13007 provides that in managing Federal lands, each Federal agency with statutory or administrative responsibility for management of Federal lands will, to the extent practicable and as permitted by law, accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and avoid adversely affecting the physical integrity of such sacred sites.

Compliance: Federal lands are not involved in the proposed water transfer.

14.5.5 American Indian Religious Freedom Act

The American Indian Religious Freedom Act applies to all actions that are located on Federal land, sponsored by a Federal agency, or funded with Federal monies; and that could involve adverse effects on the observance of traditional Native American Religions.

Compliance: The alternatives would not involve adverse effects on the observance of traditional Native American religions.

14.5.6 Farmland Protection Policy Act and Farmland Preservation

Two policies require Federal agencies to include assessments of the potential effects of a project on prime and unique farmland. These policies are the Farmland Protection Policy Act of 1981, and the Memoranda on Farmland Preservation, dated August 30, 1976, and August 11, 1980, respectively, from the President's Council on Environmental Quality. Under requirements set forth in these policies, Federal agencies must determine these effects before taking any action that could result in converting designated prime or unique farmland for nonagricultural purposes. If implementing a project would adversely affect farmland preservation, the agencies must consider alternatives to lessen those effects. Federal agencies also must ensure that their programs, to the extent practicable, are compatible with State, local, and private programs to protect farmland. The Natural Resources Conservation Service is the federal agency responsible for ensuring that these laws and policies are followed.

Compliance: The temporary idling of approximately 20,000 acres of land would not significantly affect prime and unique farmland.

14.5.7 Federal Agriculture Improvement and Reform Act of 1996 and 1985 Food Security Act

The Federal Agriculture Improvement and Reform Act of 1996, also known as the 1996 Farm Bill, includes conservation provisions designed to provide landowners with a variety of incentives programs and technical assistance for incorporating sound conservation practices into farming, grazing, and livestock operations. The 1996 Farm Bill replaces and incorporates portions of previous farm bills, including the Food Security Act of 1985 and the 1990 Farm Bill.

Under Title III, the Wetlands Reserve Program and the Conservation Reserve Program of the Food Security Act of 1985 are extended through 2002. Changes in the programs provide landowners with more options for protecting wetlands and highly erodible lands. Also addressed under Title III is a new Wildlife Habitat Incentives Program to help landowners improve wildlife habitat on private land. A Flood Risk Reduction Program was established to provide incentives to move farming operations from frequently flooded lands (CALFED 1998).

Compliance: The Exchange Contractors will facilitate compliance by farmers participating in the crop idling component of the action alternatives.

This section reviews agency consultation and coordination performed by Reclamation and the Exchange Contractors that occurred prior to and during preparation of this Draft EIS/EIR.

15.1 FEDERAL AGENCIES COORDINATION

Federal agencies were involved with Reclamation and the Exchange Contractors in the development of this EIS/EIR through specific consultations. This section explains how these consultations occurred and the agencies involved. NEPA requires that Reclamation consult with Federal cooperating agencies. For the proposed Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority, 2005–2014, the cooperating Federal agency is the U.S. Fish and Wildlife Service. In addition, written comments to the Notice of Preparation were received from the U.S. Environmental Protection Agency, Region IX.

15.1.1 Fish and Wildlife/Endangered Species Coordination

15.1.1.1 U.S. Fish and Wildlife Service

Section 7(a)(2) of the FESA requires Federal agencies to consult with the Service and/or NOAA Fisheries on any activities that may affect any Federally listed or proposed species. If potential effects to listed or proposed species or their designated critical habitat are identified, these effects will require the initiation of the Section 7 process.

Reclamation and the Service have met to initiate informal consultation for this proposed water transfer program. The Service will be providing information regarding the presence of any Federally listed or proposed species and critical habitat that may occur with the action area. The preferred alternative is Alternative C, and Reclamation will complete the appropriate level of FESA compliance with the Service and NOAA Fisheries. The Service and NOAA Fisheries have been provided copies of the Draft EIS/EIR for review and comment, and responses will be included in the ROD. Any necessary consultation will be completed prior to the signing of the ROD.

15.2 STATE AGENCIES COORDINATION

State and local agencies were involved with Reclamation and the Exchange Contractors in the development of this Draft EIS/EIR through specific consultations. This section explains how these consultations occurred and the agencies that were involved. For the Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority, 2005–2014, the cooperating State agency is DWR.

CEQA requires that the Lead Agency must formally consult with responsible and trustee agencies, and this coordination was initiated with a Notice of Preparation of an EIS/EIR sent directly to several State agencies. The State Clearinghouse distributed the Notice of Preparation to state responsible and trustee agencies as well (SCH# 2003101106). No State agencies commented during the public scoping period, October 21 through November 19, 2003.

The primary tool for State agency coordination is the preparation of a Draft EIS/EIR for review by State agencies coordinated through the State Clearinghouse. Section 15.4 lists all agencies and individuals receiving the document directly from the Exchange Contractors; however,

additional State agencies such as the Department of Food and Agriculture received a copy from the State Clearinghouse.

15.2.1 California Department of Fish and Game

DFG has also been consulted at several stages during the preparation of the EIS/EIR. DFG biologists were consulted pursuant to the Fish and Wildlife Coordination Act and the CESA. DFG was consulted in April 2004 on habitat requirements for the giant garter snake.

15.2.2 California Department of Water Resources

Consultations with DWR have focused on environmental analysis needed to facilitate future water transfers from the Exchange Contractors to the EWA to supplement the EWA EIS/EIR. In addition, each potential water transfer involving SWP facilities will require additional consultations with DWR by the potential water user/transferee. Arrangements with DWR for transfers and exchanges involving SWP facilities are the responsibility of the individual district acquiring water from the Exchange Contractors.

15.3 PUBLIC INVOLVEMENT/PUBLIC SCOPING MEETING

The consultation process began October 21, 2003, with the issuance of a Notice of Preparation of a Joint EIS/EIR on the Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority, 2005–2014. A Notice of Intent was published on the same day in the *Federal Register*. The notices announced one public scoping meeting for November 18, 2003, and requested that comments on the content of the EIS/EIR be submitted by November 25, 2003. Comments addressed the following concerns: project description, water quality/hydraulics/water supply, groundwater, biological resources, economics, agricultural land use, and cumulative impacts. Comments were received from the following organizations: USEPA, Stanislaus County, San Joaquin County Community Development Department, Modesto ID, Oakdale ID, Westlands WD, Stockton East WD, South Delta Water Agency, Grassland RCD, Friant Water Users Authority, the Farm Bureau Federation, SJVAPCD, and Natural Resources Defense Counsel. Other private groups and individuals that commented are Roy L. Thomas.

15.4 DISTRIBUTION LIST

The list of agencies, organizations, and individuals that were mailed a copy of the Draft EIS/EIR (and/or a Notice of Availability), or that subsequently requested a copy and provided comments, is provided on the following pages.

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**Table 16-1
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- Reclamation. 2001d. Long-Term Renewal Contract Between the United States and Pacheco Water District Providing for Project Water Service from San Luis Unit and Delta Division. August 15.
- Reclamation. 2001e. Long-Term Renewal Contract Between the United States and Panoche Water District Providing for Project Water Service from San Luis Unit and Delta Division. August 15.
- Reclamation. 2001f. Long-Term Renewal Contract Between the United States and San Benito County Water District Providing for Project Water Service from San Felipe Division. October 11.
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