3.6 LAND USES

This chapter describes existing land uses and related socioeconomic conditions in the San Joaquin Valley project area and vicinity with comparisons to other geographic areas as appropriate. The affected environment is the socioeconomic context in which the alternative actions to provide additional water for instream flows occurs. The primary issue for the subsequent impact analyses in Section 4.6 is the potential for the alternative actions to affect agricultural activity and land use. In this section, population data are presented for the counties and cities comprising the project area, including population density. Employment in the agricultural industry spotlights the significance of agriculture to the regional economy. This is followed by a discussion of land uses in the project area focusing on agriculture, the primary land use.

3.6.1 Socioeconomic Environment

The boundaries of 14 counties are partially or wholly within the entire San Joaquin River basin. Of these, seven contain the major facilities and irrigation districts associated with the no action, proposed action, and other alternative action; these are used to represent the San Joaquin River project area and vicinity. An eighth county, Calaveras, contains part of the New Melones and Tulloch Reservoirs because the Calaveras/Tuolumne county boundary runs through the reservoirs. Calaveras County is not included in the tables in this section because it covers an extensive area unrelated to the alternatives. Tuloumne County covers portions of these reservoirs and all of New Don Pedro Reservoir, while all of Lake McClure is located in Mariposa County.

The districts who are willing sellers have service areas that are located in the following counties (see Figure 3.1-1):

- Exchange Contractors Water Authority: Fresno, Merced, Madera, Stanislaus counties
- Oakdale Irrigation District: San Joaquin and Stanislaus counties
- South San Joaquin Irrigation District: San Joaquin County

- Modesto Irrigation District: Stanislaus County
- Turlock Irrigation District: Stanislaus and Merced counties
- Merced Irrigation District: Merced County

Either these seven counties or other geographic approximations of the project area are used to describe the affected rural environment, depending on the availability of information. The other geographic areas used are:

- Reclamation's San Joaquin River Region comprised of eight counties and used in the 1997 Draft PEIS on the CVPIA (USBR 1997d), and
- San Joaquin River Region as described in the 1998 Draft PEIS/EIR (CALFED 1998).

These two regions are explained further in the text the first time each is used. For information on poverty and ethnicity, see Section 3.11, Environmental Justice.

3.6.1.1 Population

The total county population and recent growth in the San Joaquin River project area and vicinity (Table 3.6-1) document that growth for the area since the 1990 Census was 106,162 people or 5.2 percent, which is close to the rate of growth in the state as a whole. Both Fresno and Madera counties have higher growth rates, 6.7 percent and 6.8 percent respectively, which reflect more rapid urbanization here than in many other counties in California.

Table 3.6-1: POPULATION GROWTH, 1990-1998

County	Total Population* January 1, 1998	Total Population** April 1, 1990	Numerical Increase 1990 - 1998	Percent Increase 1990-1998
Fresno	786,800	737,289	49,511	6.7
Madera	114,300	107,004	7,296	6.8
Mariposa	16,150	15,772	378	2.4
Merced	204,400	194,407	9,993	5.1
San Joaquin	545,200	523,969	21,231	4.1
Stanislaus	427,600	410,870	16,730	3.9
Tuolumne	52,800	51,777	1,023	2.0
San Joaquin River Area	2,147,250	2,041,088	106,162	5.2
State	33,252,000	31,589,153	1,662,847	5.3

Sources:
***California Department of Finance, Demographic Research Unit, *City/County Population Estimates,* May 1998.**
****Hall and Gaquin, 1997 *City and County Extra,* pp. 66-67.**

The centers of municipal and industrial land use in the San Joaquin River project area and vicinity include the cities of Fresno, Stockton, Modesto, and Merced. The cities of Stockton and Tracy have grown recently, largely in response to job development and housing constraints in the nearby San Francisco Bay Area. Fresno continues to be the major municipal and industrial center of the San Joaquin Valley (USBR 1997d), and it contains 19 percent of the San Joaquin River Area's 1998 population. Table 3.6-2 contains the 1998 population totals for the major cities located within the seven San Joaquin River project area counties.

Table 3.6-2: CITY POPULATIONS, 1998

City	County	Total Population January 1, 1998
Fresno	Fresno	411,600
Clovis	Fresno	67,700
Madera	Madera	36,350
Merced	Merced	62,100
Lodi	San Joaquin	55,700
Los Banos	Merced	21,400
Manteca	San Joaquin	47,100
Stockton	San Joaquin	241,100
Tracy	San Joaquin	47,550
Modesto	Stanislaus	182,700
Turlock	Stanislaus	50,900

Source: California Department of Finance, Demographic Research Unit, *City/County Population Estimates*, May 1998.

3.6.1.2 Population Density

Although the project area contains major cities (Table 3.6-2), it also contains substantial nonurbanized or rural land which reduces overall population density. The San Joaquin River area's population density rounded to the nearest person is 50 persons per square kilometer (sq km), which is 39 percent less dense than the state as a whole with 82 persons per sq km (Table 3.6-3). San Joaquin County's population density is the highest in part because the land area excludes portions in the Delta usually covered by water.

Table 3.6-3: POPULATION DENSITY, 1998

County	Land Area (sq km)*	Total Population** January 1, 1998	Population Density (persons/sq km)
Fresno	15,445	786,800	51
Madera	5,539	114,300	21
Mariposa	3,759	16,150	4
Merced	4,996	204,400	41
San Joaquin	3,625	545,200	150
Stanislaus	3,871	427,600	110
Tuolumne	5,790	52,800	9
Total Region	43,025	2,147,250	50
State	403,970	33,252,000	82

Sources:
*Hall and Gaguin, *1997 County and City Extra*, pp. 2, 66.
**California Department of Finance, Demographic Research Unit, *City/County Population Estimates*, May 1998.

3.6.1.3 Employment

As reported by Reclamation in the Draft PEIS on the CVPIA, the San Joaquin River Region is comprised of eight counties: Calaveras, Fresno, Madera, Mariposa, Merced, San Joaquin, Stanislaus, and Tuolumne counties (USBR 1997d). This region is slightly larger than the San Joaquin River area project and vicinity discussed above which excludes Calaveras County (population 37,100 for January 1, 1998). Employment in the San Joaquin River Region is described in Technical Appendix, Volume 5 and summarized here (USBR 1997i).

In 1940, agriculture was the largest single employer out of the following industry sectors: agriculture, mining, construction, manufacturing, transportation/communications/utilities, trade,

finance/insurance/real estate, services, and government. At that time, agricultural production provided 34.9 percent of total household employment in the region. By 1992, agricultural production provided only 8.3 percent of total wage and salary employment in the area or about 56,000 jobs. Currently, the largest proportions of wage and salary jobs in the region are in services, wholesale and retail trade, and government sectors, respectively (USBR 1997i).

More recent data on agricultural wage and salary employment is available from the California Employment Development Department (EDD 1998). Table 3.6-4 presents the average employment during March 1996, with March used as a benchmark since agricultural employment peaks during the period May through September with short term and migrant labor. Total agricultural wage and salary employment in the seven county San Joaquin River area averaged 118,290 jobs or nearly 15 percent of all wage and salary jobs in the region. In contrast, only 3 percent of all the jobs in the state were in agriculture in 1996. About 25 percent of the state's farm employment of 408,300 is located in the San Joaquin River area. Wage and salary workers are all employees receiving compensation from agricultural employers, both production workers and other staff not involved in production.

Table 3.6-4: ANNUAL AVERAGE INDUSTRY EMPLOYMENT, MARCH 1996 BENCHMARK

County	Total Employment All Industries	Farm Employment		
		Total	Production	Services
Fresno	312,700	65,900	25,800	40,100
Madera	33,880	10,010	5,180	4,830
Mariposa	5,210	30	NA	NA
Merced	58,700	11,000	7,500	3,500
Stockton-Lodi MSA[1] (San Joaquin County)	179,500	16,000	10,600	5,400
Modesto MSA[1] (Stanislaus County)	143,000	15,200	8,800	6,400
Tuolumne	14,060	150	NA	NA
San Joaquin River Area	747,050	118,290	57,880	60,230
State	13,151,700	408,300	225,700	182,600

Source: EDD, *Annual Average Industry Employment, 1983-1996*, 1998.
NA = Data not available.
[1]1990 Census Metropolitan Statistical Area

3.6.2 Land Uses

The following discussion of land uses refers to other geographic areas that approximate the San Joaquin River project area and vicinity. These areas are defined in the text as appropriate.

3.6.2.1 General Land Uses

Land use within the San Joaquin River Region (i.e., CALFED's San Joaquin and Tulare Lake hydrologic basins) consists largely of agriculture, particularly in the western portion of the San Joaquin River basin. The foothills of the Sierra Nevada range, located in the eastern portion of the basin is largely open space. Watershed lands, such as the Merced River watershed, contain forest resources at the higher elevations: ponderosa pine, sugar pine, Douglas fir, white fir, incense cedar, black cottonwood, black oak, broad-leaf maple, and California dogwood (Storer and Usinger 1963).

In 1990, urban land use was approximately 295,000 acres (CALFED 1998). Urban areas include the cities of Stockton, Modesto, Merced, and Tracy, as well as smaller communities such as Lodi, Galt, Madera, and Manteca. The western side of the region is sparsely populated. Small farming communities, all along Highway 33, provide services for farms and ranches in the area. CALFED reports that about 4,750,000 acres of important farmland were mapped in the San Joaquin River Region in 1994, excluding the legal Delta portion of San Joaquin County (CALFED 1998).

San Joaquin River

The San Joaquin River flows through an extensive area in the eastern San Joaquin Valley including the counties of San Joaquin, Stanislaus, Merced, and Fresno. In the upper reaches of the project area, it flows through San Luis and Kesterson National Wildlife Refuges. It runs though rural residential and agricultural areas until it enters the Delta near the community of Vernalis, below the confluence with the Stanislaus River.

Stanislaus River

Upstream of Knight's Ferry, the Stanislaus River is the boundary between Calaveras and Tuolumne counties which splits New Melones and Tulloch Reservoirs. Predominant land use within the Stanislaus County portion of the Stanislaus River watershed is agriculture. As the Stanislaus River passes through the city of Oakdale, land uses consist of urban uses including commercial and residential. In the San Joaquin County portion of the watershed, land uses are primarily agriculture and open space. The community of Ripon is located within the lower reaches of the watershed.

Tuolumne River

Land use in the Tuolumne River watershed is primarily agriculture. Urban land uses in the lower reaches of the Tuolumne River watershed include the city of Modesto and the communities of Waterford and Ceres.

Merced River

Land use in the Merced River watershed is primarily open space (foothill pasture) within the upper reaches, and agriculture in the lower reaches. A few rural communities are located within the watershed with the largest being the town of Livingston.

3.6.2.2 Agricultural Land Use

The San Joaquin River Region is located in Central Valley and includes the San Joaquin and the Tulare Lake hydrologic basins. Statistically, CALFED's San Joaquin River Region is comprised of the following counties: Fresno, Kern, King, Madera, Merced, 54 percent of San Joaquin, Stanislaus, and Tulare. The Tulare Lake area is in King County and is, therefore, within the San Joaquin River Region. This area is an important agricultural region for both California and the United States. California has one of the most diversified economies in the world, producing more than 250 crop and livestock commodities. The San Joaquin River Region encompasses approximately 64 percent of farmland in the Central Valley (CALFED 1998).

The importance of agricultural land in the San Joaquin River project area and vicinity (seven counties) is shown in Table 3.6-5 which provides information on land devoted to agriculture: land in farms, cropland, and irrigated acreage. The San Joaquin River area contains 5,391,000 acres of farmland as of 1992. This acreage represents nearly 51 percent of the total land area in the seven counties (10,631,331 total acres) and nearly 19 percent of the total farmland in California. Irrigated acreage in the San Joaquin River area was 2,511,000 acres, over 46 percent of the area's total farmland, which is substantially higher than the 26 percent irrigated farmland for the state.

Table 3.6-5: AGRICULTURAL LAND AND IRRIGATED ACREAGE, 1992

County	Total Land in Farms (1,000 acres)	Total Cropland (1,000 acres)	Total Irrigated Acreage (1,000 acres)	Percent Irrigated Farmland
Fresno	1,775	1,208	999	56.3

Madera	749	322	276	36.8
Mariposa	206	17	1	0.5
Merced	979	534	428	54.6
San Joaquin	784	556	468	59.7
Stanislaus	760	372	334	43.9
Tuolumne	138	11	5	3.6
San Joaquin River Area	5,391	3,202	2,511	46.6
State Total	28,979	10,479	7,571	26.1

Source: Hall and Gaquin, *1997 City and County Extra*, pp 13, 74-75.

California leads all other states in the value of crops produced, and Central Valley crops, which account for about 10 percent of total U.S. market value of agricultural crops, are responsible for most of this production (USBR 1997d). In the San Joaquin River Region, fruit and nuts, vegetables and cotton account for approximately 50 percent, 20 percent, and 10 percent respectively of the total value of crop production (CALFED 1998).

Cotton is the number one crop in the CALFED San Joaquin River Region in terms of irrigated/harvested acres. It accounts for 25 percent of the region's total irrigated acres. Other important crops in the region are field crops (15 percent), orchards (13 percent), grapes (10 percent), and alfalfa (10 percent). Between 1986 and 1995, grapes and orchards together accounted for less than 25 percent of the total harvest acreage, but they produced about 50 percent of the total production value. Pasture, alfalfa, grains, and field crops produced less than 20 percent of total production value with more than 50 percent of total irrigated acres. Table 3.6-6 presents this irrigated acreage by crop category and the production value of that acreage (CALFED 1998).

Table 3.6-6: IRRIGATED ACRES AND PRODUCTION VALUE IN THE SAN JOAQUIN RIVER REGION, 1986 TO 1995

Crop Category	Irrigated Acres (1,000 acres)	Production Value (million dollars)
Pasture	290	34
Rice	527	374
Truck crops	51	54
Tomatoes	786	532
Alfalfa	18	12
Sugar beets	301	982
Field crops	180	433
Orchards	668	2,074
Grains	344	103
Grapes	507	1,681
Cotton	1,269	1,153
Subtropical orchards	221	973
Total	5,162	8,403

Source: CALFED, *Bay-Delta Draft Programmatic EIR/EIS*, 1998 pp. 8.1-10.

Agriculture in the CALFED San Joaquin River Region receives irrigation water from the CVP, the SWP, local water rights and water projects, and groundwater as shown in Table 3.6-7. Most of this water is delivered to farmers through irrigation districts and other water agencies (CALFED 1988). About 40 percent of irrigation water sources in the San Joaquin River Region are from local water rights or local water projects. CVP water provides 35 percent of total irrigation water uses, mostly to the Westlands Water District, which is south of the project area. The rest of the region's water is from the SWP and groundwater pumping (CALFED 1998).

Table 3.6-7: IRRIGATION APPLIED WATER USE IN THE SAN JOAQUIN RIVER REGION, 1985 TO 1990

Water Source	Thousands of acre-feet (TAF)
Local Surface Water	4,854
CVP Water	4,268
SWP Water	1,168
Local Groundwater	1,803
Total Water	12,093

Source: CALFED, *Bay-Delta Draft Programmatic EIR/EIS,* 1998, pp. 8.1-11.

Agriculture's importance as a land use is also reflected in data on the number and size of farms. According to CALFED, the number of farms in the San Joaquin River Region decreased from 28,742 in 1987 to 26,731 in 1992, partly due to the loss of farmland (439,000 acres) to industrial and urban uses, and partly due to the accumulation of farmland into fewer and larger farms. The average farm size increased from 351 to 361 acres (CALFED 1998). This resulted in an effective reduction of 4.35 percent of the total number of acres farmed.