WATER PLANNING AREA #8 – CALIFORNIA VALLEY

WPA 8 consists of the Carrizo Plain area of the County. Purveyors include the California Valley CSD, the CDF-Simmler Fire Station, California Valley Water, and the Carrisa Plains Elementary School.

DEMAND

The development of demands for the San Luis Obispo (SLO) MWP Update involved collection and analysis of four types of existing data: 1) urban demand; 2) agricultural demand; 3) rural demand; and 4) environmental demand. Following the review of existing plans and data, existing demands for each of the four categories were prepared for each of the 12 water planning areas. Next, data regarding growth and future water use was analyzed to develop a preferred approach for the development of future water demands. These future demands were then prepared and projected by the same four demand categories for each of the water planning areas.

The total existing and future demands for WPA 8 are listed in Table 1. Discussion of demands by each category follows.

Table 1
WPA 8 Demand Totals by Category[a]

Category of Demand	Existing Demand (ac-ft/yr)	Projected Demand (ac-ft/yr)
Urban	0	0
Agricultural	200	170-210
Rural	730	1,090
Environmental	NA	NA
Subtotal	**930**	**1,260-1,300**

a. All figures have been rounded to the nearest 10's.

Urban Demand

WPA 8 has no urban water demand for the purposes of this study.

Agricultural Demand

This section documents existing and projected Gross Irrigated Water Requirements (GIWRs) for WPA 8. The existing and projected demand figures relied upon published data and accepted methods, along with information gathered from extension agents, consultants, growers, and irrigation specialists. Tables 2 and 3 summarize the current and projected agricultural water demands for WPA 8.

Table 2
Existing GIWR for WPA 8 (AF/Yr).

Annual Gross Irrigation Water Requirement (AF/Yr)		
Low	**High**	**Average**
180	221	200

Table 3
Projected GIWR for WPA 8 (AF/Yr).

Low	High	Average
168	205	187

Procedures and Concepts

Estimating GIWR for local conditions can be characterized by the following general formula:

$$\text{GIWR} = \frac{\text{Crop ET} - \text{Contrib. from rain or shallow water table}}{(1 - \text{Leaching Requirement}) \times \frac{\text{Irrigation Efficiency}}{100}} + \text{Climate Control}$$

This analysis must be completed for each crop group, acreage, and weather pattern to calculate total GIWR (in AF) by Water Planning Area (WPA).

Cropping Patterns
Table 4 summarizes estimates of irrigated cropping acreage for WPA 8.

Table 4
Estimated cropping acreage for WPA 8

Veg.	Total
100	100

Source: Estimated from annual crop report, county GIS records and pesticide use records.

Crop Evapotranspiration
Several UC Cooperative Extension Leaflets describe estimating crop evapotranspiration (ETc) where:

ETc = ETo x Kc

ETc is estimated by multiplying the weather factor (ETo) with the crop coefficient (Kc). ETo values for the Taft climate group (51.2 in/yr) were assigned to WPA 8 and Kc values are specific to the crop groupings (see Chapter 2). Yearly ETc totals for WPA 8 are summarized in Table 5.

Table 5
Yearly crop evapotranspiration (ft/yr) for each crop group in WPA 8

Vegetable
1.6

Effective Rainfall

WPA 8 was assigned the Shandon rainfall group (10.5 in/yr) for the purpose of estimating effective rainfall (See chapter 2). Ranges of percentage of effective precipitation were applied to the crop groupings in WPA 8 and are listed in Table 6. Higher percentages were assigned to the deeper-rooted crops according to their larger rootzone water holding capacity.

Table 6
Assigned ranges of typical effective precipitation for crop groups in WPA 8

Crop Group	Effective Precipitation Range (%) [1]	
	Low	High
Vegetable [2]	15	25

1. As a percentage of total annual rainfall.
2. 2x adjustment factor for multiple cropping.

Frost Protection

No crops in WPA 8 require frost protection.

Leaching Requirements

The amount of extra irrigation water, which needs to be applied to satisfy the leaching requirement for a particular crop, depends on the salt tolerance of the crop and the irrigation water quality. Ground water quality in San Luis Obispo County is typically adequate for crop production and does not necessitate additional *irrigation* water applied for leaching since it is typically satisfied by normal rainfall. Chipping et al. 1993 reports that of the wells tested in the Paso Robles Ground Water Basin Study, most of the wells tested have EC levels < 1.0 dS/m. Given these water qualities and salt tolerances typical with central coast crops, leaching requirements would be satisfied by rainfall.

Irrigation Efficiencies

Irrigation efficiency can be expressed by the following relationship:

$$\text{Irrigation Efficiency} = \text{Distribution Uniformity} \times (1 - \text{Losses})$$

The Cachuma Resource Conservation District routinely conducts irrigation evaluations in Santa Barbara and San Luis Obispo Counties and are excellent resource in describing the actual performances of irrigation systems in the region. Irrigation efficiencies were assigned to crop group according to prevalent irrigation system type and knowledge of typical local uniformities (Table 7).

Table 7
Assigned irrigation efficiency averages for each crop group in WPA 8

Crop Group	Irrigation Efficiency Range (%)	
	Low	High
Vegetable	65	75

Existing Gross Irrigation Water Requirement by Crop Group

Existing GIWRs for WPA 8 are summarized in Table 8. The ranges provided in Table 8 do not represent the extremes in GIWR, but do represent the typical ranges in a normal year given local variations in effective precipitation and irrigation efficiencies. Table 2 summarizes the current agricultural water demands for WPA 8.

Table 8
Summary of Existing GIWR for WPA 8 by crop group (AF/Ac/Yr)

Vegetable	
Low	**High**
1.8	2.2

Future Gross Irrigation Water Requirements by Crop Group
Several issues would affect changes in future irrigation water requirements:

- Changes in cropping acreage and type of crop
- Changes in irrigation methods

Cropping Patterns

Trends in cropping patterns were examined through historical crop reports and previous water use projections completed by the Department of Water Resources. Table 9 summarizes projected crop acreages in WPA 8.

Table 9
Projected cropping acreage for WPA 8

Veg.	Total
100	100

Irrigation Methods

Table 10 reflects the projected irrigation efficiencies by crop group in WPA 8

Table 10
Projected irrigation efficiencies by crop group in WPA 8

Crop Group	Irrigation Efficiency Range (%)	
	Low	**High**
Vegetable	70	80

The same procedures that were utilized to calculate existing agricultural demands were utilized in estimating projected irrigation water requirements. The projected values reflect the changes in cropping acreage and irrigation efficiencies. Table 3 summarizes the projected agricultural water demands for WPA 8.

Table 11
Summary of Projected GIWR by crop group for WPA 8 (AF/Ac/Yr)

Vegetable	
Low	**High**
1.7	2.1

Rural Demand

Rural water demands in the California Valley water planning area include dwelling units scattered throughout the hills and valleys, especially in the old subdivision creating California Valley. The commercial areas of California Valley not included in Table12 and 13 below. Water is produced in private wells from the groundwater basin in the area.

Table 12
Current Demand – 1995

Population	Pop/Du	Houses	Duty (ac-ft/ac)	Demand[a] (ac-ft/yr)
1,235	2.86	432	1.7	730

a. Demand figure has been rounded to the nearest 10's.

Table 13
Projected Demand – 2020

Population	Pop/Du	Houses	Duty (ac-ft/ac)	Demand[a] (ac-ft/yr)
1,836	2.86	642	1.7	1,090

a. Demand figure has been rounded to the nearest 10's.

Data Deficiencies
The following additional data would improve the accuracy of this study:

- **Commercial**. A few commercial activities exist in the rural areas that were not accounted for in the urban demand. It represents a very small percentage of the total water used. California Valley has the largest unaccounted commercial demand in the rural area and should be added to the total. A small school is in the area as well.

- **Dwelling Units**. The study was based upon population numbers, with an estimate of dwelling units derived from population figures divided by persons per household. Demand should be based upon a count of dwelling units by water planning area. This information would be derived from assessor data.

- **Certificate Lots**. Many parcels of land in the area may be buildable. It is difficult to ascertain how many will be built upon.

Environmental Demand

WPA 8 contains no permanent streams. The environmental demands in WPA 8 for the purposes of this study is 0 AF.

SUPPLY

Water service to the California Valley area is provided by small isolated water systems that lack interties.

Groundwater Supply

Table 14 lists the ground water basins in WPA 8. Estimates of "basin yield" are provided for those basins that have been studied, coupled with estimates of ground water production. An estimate of annual ground water production is provided on the table, along with the year representing the estimate and a reference to the source of information.

WPA 8 includes the Carrizo Plain Basin, which is said to be at its yield limit by the 1958 DWR Bulletin 18. The Carrizo Plain Basin water management issues include water quality problems such as locally high nitrate and salinity concentrations.

Table 14
WPA 8 Ground Water Basins

Water Planning Area	Basin Name	Basin Area in Square Miles	Basin yield with original descriptive term in acre-feet per year	Production - year in acre-feet
8	Carrizo Plain	269 (6)	600 safe seasonal yield (6)	600 (6)

6. California Department of Water Resources, 1958, San Luis Obispo County Investigation: State Water Resources Board Bulletin No.18, vol. I and II.

The estimates in Table 14 represent the results of published data from data as old as 40 years. It is also important to note that most of the basins have not been studied in detail, and true perennial yield values are not known. Thus, much of the information does not reflect current conditions, population, water usage, and agricultural trends. It also tends to point out the necessity of developing new data to more accurately describe the hydrologic conditions of the basins.

Uncertainties
The "basin yield" values described in the table reflect the results of a variety of methods of determining yield, including annual recharge, safe yield, seasonal replenishment, and net safe annual extractions, and thus may or may not reflect an accurate perennial yield value for the basin.

Surface Water Supply

Ground water is the predominant source of water supply in WPA 7. Surface water yield is assumed to be 0 AF for the purposes of this study.

DEFICIENCIES

California Valley is sparsely populated and mostly agricultural. Large areas have recently been converted to wildlife preserves. Water quality is a significant issue.

Table 15
Existing (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance[a] (Deficiency)
930	600	0	600	(-330)

a. Balance (Deficiency) figure has been rounded to the nearest 10's.

Table 16
Projected (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance[a] (Deficiency)
1,260-1,305	600	0	600	(660)-(705)

a. Balance (Deficiency) figure has been rounded to the nearest 10's.

ALTERNATIVES

No future water supply options were considered for the purposes of this study.