December 9, 2008

DOCKET
07-AFC-8
DATE DEC 09 2008
RECD. DEC 23 2008

Mr. John Kessler
Project Manager
Attn Docket No. 07-AFC-08
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, Ca 95814-5512

Subject: Carrizo Energy Solar Farm (07-AFC-08)
Resident Responses to Preliminary Staff Assessment (PSA)

Dear Mr. Kessler:

I Michael Strobridge, resident of Carrisa Plains hereby submit responses to the PSA on the proposed Carrizo Industrial Site on the Carrisa Plains by Ausra. The following are my concerns regarding Soil and Water Resources.

- 4.9-5 Regional Water Resources, CEC states that the natural water resources of the Carrizo Plain are extremely limited and that ground water serves as the primary water supply for the region. The SLO County Master Water Plan Update states that the Carrizo Plains is in an overdraft. (SLO County 2001) This document is the most recent information on the Carrizo water basin. It concerns me that CEC has dismissed this document. It also concerns me that over half of the reference material in this water report was supplied by URS. The Carrizo Plains does not have the water resources to support the CESF and local residents. I have supplied the WPA8 update proving this fact only to be dismissed. As a home owner 2800ft from the proposed CESF site I will continue to persist on seeing the CEC's documentation proving otherwise. I firmly believe that Ausra should be required to perform a ground water basin and aquifer study of the Carrizo Plains since there is no accurate information to back CEC's or URS's theories. The WPA8 states some data is as old as 40 years, example the only reference is to a study done in 1967 by Kemnitzer. 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 water basins. (SLO COUNTY 2001 WPA8)

- 4.9-14 Method and Threshold for Determining Significance-"Impacts associated with the proposed project, including depletion of local/regional water supplies ,... are among those staff believes can be potentially significant" "Both the applicant and staff examined this issue in detail, and determined that groundwater levels in the Upper Aquifer that local domestic users utilize for water supplies are expected to increase..."(PSA Page 4.9-33) Both of these statements are made and I am uncertain on two aspects. Number 1, how can the CEC determine that the

depletion of ground water to be significant and then turn around and say residential water supplies are going to increase? Number 2, if the project is going to increase the upper aquifer, where is the water coming from and what data does the CEC have to support this statement? When water is consumed, the only result is a decrease; this is a simple math equation. If the so called Detention/infiltration areas are the only reason for these conclusions they are extremely inaccurate. SLO County Ag Department has stated that the Carissa Plains is one of the most excellent areas in the county for dryland farming because of our soils exceptional moisture retention. The soil retains moisture because of a clay layer that traps the water and keeps it close to the surface. For this plain fact these detention/infiltration areas will not work like URS states they will. I insist the CEC rethink these infiltration areas and take into consideration the fact that they will not work in the plains.

- 4.9-7 Groundwater, Wells within the Lower Aquifer can yield as much as 500 to 1100 gpm(Kemnitzer, 1967). CEC states that Ausra's onsite well is 591 feet bgs with 14-inch diameter steel casing and screen and that this well will be fitted with a 75 hp, (500 gpm) submersible pump to extract water from the lower aquifer. URS stated in the August 5th workshop that their onsite well only produced 50 gpm(URS 6/5/08 page 125 line 8). If Ausra pumps with a 75 hp, (500gpm) submersible pump they will grossly over pump this well. This would drastically drop the lower aquifer at the property line and beyond. Is a 50 gpm well sufficient to support the CESF? Does Ausra plan on punching more wells ever? CEC states wells that penetrate the Lower Aquifer provide irrigation water supply and community water supply (Bechtel, 1984). The CEC has provided this information proving that community water is supplied by the Lower Aquifer and that the CESF would have an enormous impact on local water supplies. I strongly believe that CEC should take into consideration that some community water supplies come from the lower aquifer. The onsite well planned to be used by the CESF has almost collapsed in the past from previous large scale use(Rowlett 2008). This onsite well cannot support the CESF. This onsite well has a turbine installed on it. This turbine is old and rusted. How did URS remove this turbine to install a submersible pump? If URS actually did test this well what size submersible did they use? I am concerned that URS did not even test this well as I saw no significant amounts of water on ground. I would have to insist that Ausra perform a pump test on this onsite well using the 75 horsepower submersible pump they plan on using. A 72hr test would be sufficient while monitoring the upper aquifer from a test hole. I would like to see a local well driller on site or a CEC representative to make sure all tests are done properly and honestly.

- 4.9-28 Groundwater, CEC states that Ausra used a groundwater model to update Kemnitzers 1967 estimates. The applicant identified 86 wells on the Carrizo Plain and assigned pumping rates of 1 afy to domestic wells and a 35% duty cycle to irrigation wells. This groundwater model is inaccurate.The SLO County Master Water Plan ranchettes of 2.5 acres to 20 acres and more use more water than a conventional home. The average water usage for a ranchette according to SLO County is 1.8 afy for inland areas (SLO County Master Water Plan 2001). The pumping rates for the CESF ground water modeling are incorrect. According to BLM maps, the entire Carrizo Plain extends down to Soda Lake (BLM Monument map 2007). There are more than 86

homes in the entire Carrizo Plain. According to the SLO County Master Water Plan there were 432 homes just in California Valley in 1995 at a water demand of 730 afy. This same document shows a projected demand in 2020 of 1090 afy with 642 homes (SLO County Master water Plan 2001). This does not include homes in the northern Carrizo Plain. Each home has a minimum of 1 well and this does not include irrigation wells. The safe yearly yield for the Carrizo Plains is only 600afy(SLO County WPA8 2001). I insist that CEC count individual homes in the Carrizo Plain to get a better estimate of the number of wells. The CEC cannot ignore these extra wells. They utilize the same water basin as the Northern Carrizo Plain and will be equally affected. I insist CEC rerun water modeling including these extra wells with the proper pumping rates. URS's well information is pathetic to say the least. URS has not made any effort to contact myself or my neighbor Santos Reyes about our wells. We are less than 1 mile from the CESF site.

- 4.9-32 Cumulative Impacts and Mitigation, Staff requested the CESF applicant to also provide groundwater modeling that reflects a combined projects scenario including anticipated groundwater pumping for both the CESF project and Optisolar's Topaz Solar Farm project. The applicant added a second hypothetical pumping well that penetrated the Lower aquifer on Section 21 just north of the CESF project site for Optisolar's Topaz Solar Farm. There is an existing residential well (Strobridge)that is directly between the proposed CESF pumping well and the location of the hypothetical Optisolar Topaz solar Farm well, so this hypothetical location results (i.e. models the greatest potential impact at the residential well). While the materials submitted to date by Optisolar do not identify a specific pumping well or the depth of the planned groundwater withdrawal, it is reasonable to assume that Optisolar will be required to pump from the Lower Aquifer to target the lowest quality groundwater for construction and operations at the Topaz Solar Farm. My home is in section 21. My well only produces 13gpm and will stop running after 4hrs of continuous running. My submersible pump sits at 140ft. This hypothetical well is absurd. I drilled a 450ft well on the North West side of my property in section 21 and never hit a drop of water. The only water available is in the south east corner of my land. What pumping rates and depths was this hypothetical set at? According to Optsolar there are several wells on the TSF site producing 40-60 gpm and there are five old agricultural wells producing 10 gpm (SLO COUNTY Optisolar application 2008). I know for a fact that at least one of these wells is in the upper aquifer located in section 29 adjacent to the CESF. CEC states that they assume Optisolar will be pumping from the lower aquifer. This is unacceptable. I do not appreciate any assumptions that affect the welfare of my family. I demand to see fact with documentation not assumptions. Assumptions that the upper aquifer will increase by 1.4 ft is ridiculous. Storm water detention/infiltration areas will not collect enough water to affect the upper aquifer. CEC is assuming that there will be rain. What happens if there is minimal rain? I insist the CEC show data showing the affects of the CESF on the water supply in minimal precipitation conditions. According to the SLO County Public Works Department the Carrizo Plains received a total of 6.16 inches of rain in 2007-2008 in 2 months of the year. The same document shows the Carrizo Plains receiving 2.32 inches of rain in 2006-2007(Slo County Public Works CDF#175). I firmly believe cumulative impacts need to be revaluated with realistic rain data.

- 4.9-42 References, Per meeting on December 15 Mark Lindley of the CEC water staff stated that his conclusion after Bechtel 1984 was one of his deciding factors of adequate water supply because of the studies done on the Arco Industrial Site. I have searched for this document and it is not available to the public. If this is the most recent information; dated 25yrs ago that CEC is basing its findings of adequate water supply I insist on researching this document since a reference must have adequate access if it is cited as a documented reliable resource.

In Conclusion I adamantly believe the Carrisa Plains cannot support agricultural wells, residential wells and the CESF. Furthermore the extensive amount of water the CESF will use proves the Carrisa Plains is not an appropriate site for Ausra. We are in an overdraft state per SLO County (WPA8 update SLO County) and cannot support an industrial site. Perhaps Ausra should relocate to an appropriate site such as Harper Lake which sits on a water basin of 6.9 million acre ft of water or LoKern which is in close proximity of the California Aqueduct.

Sincerely,
Michael Strobridge
9450 Pronghorn Plains Rd
Santa Margarita,Ca 93453

San Luis Obispo County
Master Water Plan

# Rural Water Needs - Current and Projected

Rural Demand has been defined as water use required by the remaining community areas within the County which fall outside of the categories of either 1) incorporated cities or the purveyors which serve those cities, or 2) unincorporated communities (listed in the urban demand discussion). This demand does not include agriculture. Most of the demand is from rural residential development. There are small amounts of commercial demand as well as some golf courses, which are not included in the demand estimates.

The calculation of water needs for the Rural Areas was fairly straightforward and based primarily upon the number of rural dwelling units, or "ranchettes" multiplied by a water duty developed for each of the Water Planning Areas (WPAs). A number of assumptions were used for development of the water duties based on professional knowledge of the County and development of rural demands in adjacent counties. Interior household water use was assumed to be similar to a household in town. The average is about 1/3-acre feet per acre. This number may go down somewhat in the future as new homes are built with greater water saving devices. However, the change will not result in a significant modification of the estimates of water demand by rural residences.

The calculation of exterior water needs is the more complex. Acreage varies considerably from ranchette to ranchette, ranging from approximately 2 1/2 acres on up to 20 acres or more. Looking at numerous rural developments, it was determined that most places "cultivate" about an acre around the dwelling, leaving the remaining acreage unimproved or in its natural state, or for use as a corral. This is generally true no matter how large the parcel. Most of the exterior water use is within that acre of cultivation. Watering lawns, small orchards, gardens, and stock varies widely from parcel to parcel. However, a reasonable range of 1/2 AFY to 3 AFY per ranchette was developed. For this estimate, total water use of 1.3 AFY was assigned for the coastal areas and 1.8 AFY for inland areas. Coastal areas were presumed to use less because of the cooler, moister climate. Studies have been completed for Monterey County (by members on the Master Water Plan team) and Santa Barbara County for similar water use and these guidelines appear reasonable based upon historical use in the area. Given the relatively small percentage of total demand that constitutes rural demand (approximately 3%), overall figures are not greatly affected by this assumption.

On the following tables, estimates of current and projected water need have been prepared based on the above methodology and have been determined and listed for rural areas within each of the 12 WPAs.

## Current Rural Demand - 1995

| WPA | NAME | POPULATION | POP/DU | HOUSES | DUTY ac-ft/ac | DEMAND ac-ft/yr |
|---|---|---|---|---|---|---|
| 1 | North Coast | 866 | 2.57 | 337 | 1.3 | 440 |
| 2 | Cayucos | 1,020 | 2.57 | 397 | 1.3 | 520 |
| 3 | Los Osos/Morro Bay | 1,223 | 2.57 | 476 | 1.3 | 620 |
| 4 | SLO/Avila | 1,452 | 2.44 | 595 | 1.3 | 770 |
| 5 | Five Cities | 6,729 | 2.86 | 2,353 | 1.3 | 3,060 |
| 6 | Nipomo | 8,370 | 2.86 | 2,927 | 1.3 | 3,800 |
| 7 | Cuyama | 708 | 2.86 | 248 | 1.7 | 420 |
| 8 | California Valley | 1,235 | 2.86 | 432 | 1.7 | 730 |
| 9A | Salinas | 9,356 | 2.92 | 3,204 | 1.7 | 5,450 |
| 9B | Creston | 6,832 | 2.92 | 2,340 | 1.7 | 3,980 |
| 9C | Shandon | 1,235 | 2.92 | 423 | 1.7 | 720 |
| 10 | Nacimiento | 2,700 | 2.92 | 925 | 1.7 | 1,570 |

## Projected Rural Demand - 2020

| WPA | NAME | POPULATION | POP/DU | HOUSES | DUTY ac-ft/ac | DEMAND ac-ft/yr |
|---|---|---|---|---|---|---|
| 1 | North Coast | 1,564 | 2.57 | 609 | 1.3 | 790 |
| 2 | Cayucos | 1,340 | 2.57 | 521 | 1.3 | 680 |
| 3 | Los Osos/Morro Bay | 1,538 | 2.57 | 598 | 1.3 | 780 |
| 4 | SLO/Avila | 2,056 | 2.44 | 843 | 1.3 | 1,100 |
| 5 | Five Cities | 8,675 | 2.86 | 3,033 | 1.3 | 3,940 |
| 6 | Nipomo | 13,073 | 2.86 | 4,571 | 1.3 | 5,940 |
| 7 | Cuyama | 820 | 2.86 | 287 | 1.7 | 490 |
| 8 | California Valley | 1,836 | 2.86 | 642 | 1.7 | 1,090 |
| 9A | Salinas | 12,775 | 2.92 | 4,375 | 1.7 | 7,440 |
| 9B | Creston | 10,703 | 2.92 | 3,665 | 1.7 | 6,230 |
| 9C | Shandon | 1,836 | 2.92 | 629 | 1.7 | 1,070 |
| 10 | Nacimiento | 5,179 | 2.92 | 1,774 | 1.7 | 3,020 |

Source: Population = San Luis Obispo County
Pop/DU = California Department of Finance.

**Data Deficiencies**

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

- **Commercial**. No commercial use is included in this demand analysis. Very 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.

- **Golf Courses**. A number of golf courses are in the rural areas. These use between 1.5 to 2.5 acre feet/acre/year. An 18-hole course would have approximately 100 acres of irrigated turf, resulting in the use of between 150 and 250 acre feet per year. Return flow from golf course irrigation is estimated to be 15%. This information should be added to the rural demand.

- **Dwelling Units**. The study was based upon population numbers, with an estimate of dwelling units derived from population figures divided by persons per household. Using the actual number of dwelling units would develop a more accurate estimate. This would require assigning assessor information to the 12 WPAs.

*Assumptions*

**Water Duty Factors.** Water demand was estimated by multiplying the number of dwelling units in WPAs by a water duty factor. A water duty factor is an estimated volume of water used annually by a particular activity. It is measured in acre-feet per year. Water duties are necessarily estimated averages. Water consumption varies in a number of regards. Over the course of the year, water use is high in the summer and low in the winter. Use varies from residence to residence, depending on number of persons in the dwelling and the intensity of outdoor landscaping. A difference is expected in consumption between development near the coast and development inland. Coastal development is expected to require less water and lose less to evapotranspiration. An estimated half acre-foot differential was applied to the two areas.

Most of the development in the rural portions of the WPAs will take place on relatively large parcels (between one and 40 acres). The exceptions are golf courses and a small amount of commercial development. In this report, the larger parcels are referred to as 'ranchettes', a commonly used term. Specific water duty factors (see below) were developed for these parcels. Water duty factors will decline somewhat for new construction because of conservation requirements contained in the Uniform Building Code.

**Future Dwelling Units.** Water conservation measures are required of new dwelling construction. These include low flow showerheads and toilets. Showerheads now dispense between 1.5 and 2.5 gallons per minute. Previously they sprayed up to 8 gallons per minute. For a ten-minute shower, water consumption has dropped from 80 gallons to 20 gallons. Old toilets released approximately 7 gallons per flush and are now required to release no more than 1.6 gallons. The landscaping or yard requirement of new dwellings was assumed to remain relatively constant.

**Ranchettes.** This term, for the purposes of this report, denotes parcels one acre and larger. There are considerable numbers of parcels in this size range that could be developed. Their development usually includes a residence, accessory buildings, extensive gardening and small orchards, and a few livestock. To make comparable analysis with smaller lot residential parcels possible, the water use was divided into three factors; interior of the house, immediate exterior or yard, and the irrigated activities beyond the yard that comprises the ranch-like activities. There are several advantages to this approach. The interior and yard water use is assumed to be similar no matter the size of the parcel. This allows comparison of ranchettes to typical suburban lots. Further, the least predictable water use from parcel to parcel is that beyond the house and yard. This is also the water most likely to be curtailed during a period of shortage, and therefore provides a cushion to both the supply and the analysis.

- **Interior**. The water duty for inside the residence is estimated to be similar to suburban dwellings. All of these units are serviced by individual septic systems and thus the recharge rate for the interior of the residence is estimated at 80%. Water use records from a number of sources were investigated to determine interior dwelling use. The water duty factor is based upon an average of 350 gallons used in the average residence per day.

- **Yard**. Landscaping immediately surrounding the residence is estimated to be similar to any other residence. This number represents a percentage of the total water applied by homes in several subdivisions in the area. According to the Department of Water Resources, 47% of the water used in the average residence is applied outside (DWR, 1984).

- **Ranching/Farming**. What differentiates the ranchette from the residence is the additional water used for gardening, livestock and other activities beyond the immediate residence. This water duty is the most difficult to estimate. Because this water is used outside, and most is lost to evapotranspiration, its percentage of recharge is considerably less, estimated to average 20%. Water use for all portions of ranchettes beyond the residence and landscaping can vary considerably from parcel to parcel, but for the purposes of analysis, the average consumed was estimated to be one acre foot per year (above that used for the residence and yard). This amount is used in the analysis for all parcels within the size range analyzed. The water use is assumed to be similar because the amount of land given over to water consuming activities is usually similar. The larger parcels are not developed much more (and sometimes less) than the smaller ones. The remaining land on the larger parcels in the county is usually left to non-irrigated grazing and provides a buffer to the residence. Water use tends to increase for several years after initial construction as more water applications are developed on the property.

***Sources***

Johnson, M.J. (1983), Ground Water in North Monterey County, California, U.S. Geological Survey Water Resources Investigations Report 83-4023, Sacramento, California.

Santa Clara Valley Water District (1979), Methodology for Projecting Water Needs in Santa Clara Valley.

Water Conservation in California (1984), Bulletin 198-84, Department of Water Resources, p. 21, July.

# 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:

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

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.