WATER PLANNING AREA #5 – Five Cities

WPA 5 includes the Five Cities area from Pismo Creek to Arroyo Grande Creek watersheds. WPA 5 also encompasses Lopez Lake watershed. Purveyors include: the City of Arroyo Grande; the City of Grover Beach; the City of Pismo Beach; Oceano CSD; and the Southern California Water Company. Private purveyors include the following:

- Ball Tagawa Growers
- Biddle Regional County Park
- Blue Sky Water Assn.
- Branch Elementary School
- Deer Valley
- Fowler Mobile Home Estates
- Grande Mobile Home Manor
- Lopez Recreational Area
- Mesa Dunes MH Estates
- Mutual Water Assn
- Newsom Spring MWC
- Nunes Water Supply
- Oak Park Manor
- Sweet Springs Mobile Park
- Talley Farms Labor Housing
- Terra De Oro Water Co.
- Varian Ranch MWC
- Vista De Las Flores Wtr Co
- Woodland Park
- Circle II (Tract 1323)

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 WPAs. 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 WPAs.

The total existing and future demands for WPA 5 are listed in Table 1. A discussion of demands by each category follows.

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Table 1
WPA 5 Demand Totals by Category[a]

Category of Demand	Existing Demand (ac-ft/yr)	Projected Demand (ac-ft/yr)
Urban	7,040	10,200-11,990
Agricultural	14,460	12,230-16,230
Rural	3,060	3,940
Environmental	NA	NA
Subtotal	**24,560**	**26,370-32,160**

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

Urban Demand

This section documents existing and projected urban water demands for WPA 5. The existing and projected figures have been prepared upon review of the water master plans of the cities of Arroyo Grande, Grover Beach, and Pismo Beach. Demand figures were also prepared upon review of the County growth figures and historical per capita demand levels for the community of Oceano. Table 2 summarizes the current and projected urban water demands for WPA 5.

Table 2
WPA 5 Urban Water Demands[a]

Existing Demand (ac-ft/yr)	2020 Demand (ac-ft/yr)	Buildout Demand (ac-ft/yr)
7,040	10,200	11,990

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

Many incorporated cities within the County and/or purveyors to those cities have prepared water master plans for planning purposes. The City of Arroyo Grande is currently in the draft stage of an updated urban Water Management Program. Arroyo Grande has prepared data for existing water use (1995) and projected water use for six main customer sectors: single-family residential, multi-family residential, commercial/institutional, governmental, landscape irrigation and unaccounted for losses. A gross per capita of 155 gpcd was estimated based upon a total 1995 water use of 2,628 AF. Future water demand is estimated at 3,540 AF/y by 2015, which equates to a gross per capita of 171 gpcd. Interim annual demands for the years 2000, 2005 and 2010 are estimated at 3,090 AF, 3,240 AF, and 3,390 AF, respectively.

Urban water demand data for Grover Beach was derived through production records for the City's wells and surface water supply (Lopez Lake). Annual water production for Grover Beach over the period 1992 to 1997 has grown from 1,774 to 2,041 AF. Garing Taylor and Associates (engineers for Grover Beach) projected future demands by using a County projected population of 15,225 for the year 2020 and a city-generated per capita water use of 149 gpcd.

Limited recent information is available for Pismo Beach. Annual water production was 1742 AF and gross per capita was 195 gpcd . According to County data, the population of Pismo Beach is projected to increase to 13,178 by the year 2020. Assuming a 195 gpcd, water demand would increase to approximately 2,878 AF annually.

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Table 3 includes the existing and projected water demand for the cities of Arroyo Grande, Grover Beach and Pismo Beach.

Table 3
Summary of Urban Water Demands for the Incorporated Cities in WPA5

City/Purveyor	Existing Demand (ac-ft/yr)	2020 Demand (ac-ft/yr)	Buildout Demand (ac-ft/yr)
Arroyo Grande	2,628	3,540	3,540
Grover Beach	1,794	2,547	2,547
Pismo Beach	1,742	2,878	2,878

In order to determine additional existing and future urban water demand for WPA 5, an average water production figure of 878 AF was calculated from the County's *Annual Resource Summary Report* for the period 1993 to 1997 for the unincorporated community of Oceano. This average production figure was then used in combination with a 1995 population figure (see Table 4) to determine an existing per capita water use rate of 124 gpcd.

In order to determine future water demands for Oceano, the existing per capita water value was applied to the projected 2020 and buildout population figures obtained from the County. Projected population figures are shown in Table 4 and the future water demands are reflected in Table 5.

Although per capita use is expected to go down in the future, the number of people per households is generally expected to increase. Therefore, the same per capita value was maintained under existing and future scenarios. A discussion on the uncertainty of per capita water use is discussed in Chapter 2.

Table 4
Existing and Projected Population Figures for Oceano

Unincorporated Communities	1990[1]	1995[2]	2020[3]	Buildout[4]
Oceano	6,127	6,300	8,917	21,781

Source: San Luis Obispo County Planning Department.

1. Population numbers are from the U.S. Census of Population and Housing. Avila Beach and Santa Margarita were developed by County Planning Department.
2. 1995 figures based upon the California Department of Finance and County Planning, and include group quarters.
3. 2020 figures have been projected by the County.
4. Buildout figures were obtained from the County

Table 5
Summary of Urban Water Demands for Oceano

Community	Existing Demand (ac-ft/yr)	2020 Demand (ac-ft/yr)	Buildout Demand (ac-ft/yr)
Oceano	834	1,238	3,025

Agricultural Demand

This section documents existing and projected Gross Irrigation Water Requirements (GIWRs) for WPA 5. The existing and projected demand figures relied upon published data and accepted methods, along with information gathered from extension agents, consultants,

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growers, and irrigation specialists. Tables 6 and 7 summarize the current and projected agricultural water demands for WPA 5. Anticipated changes in cropping acreage in the Five Cities WPA include an increase in vegetable, vineyard, and deciduous crops, coupled with declining irrigated pasture. The combined effect of these anticipated changes contributes to a fairly steady agricultural water demand.

Table 6
Existing GIWR for WPA 5 (AF/Yr).

Low	High	Average
12,391	16,529	14,460

Table 7
Future GIWR for WPA 5 (AF/Yr).

Low	High	Average
12,227	16,230	14,229

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 WPA.

Cropping Patterns
Table 8 summarizes estimates of irrigated cropping acreage for WPA 5.

Table 8
Estimated cropping acreage for WPA 5

Nursery	Pasture	Permanent		Veg.	Vineyard	Total
		Citrus	Decid.			
30	600	0	600	8,000	700	9,930

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 Arroyo Grande climate group (40 in/yr) were assigned to WPA 5 and Kc values are specific to the crop groupings (see Chapter 2). Yearly ETc totals for WPA 5 are summarized in Table 9.

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Table 9
Yearly crop evapotranspiration (ft) for each crop group in WPA 5

Nursery	Pasture	Permanent		Vegetable	Vineyard
		Citrus	Decid.		
1.7	2.6	NA	2.2	1.3	1.0

Effective Rainfall

WPA 5 was assigned the Nipomo rainfall group (16.4 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 5 and are listed in Table 5. Higher percentages were assigned to the deeper rooted crops according to their larger rootzone water holding capacity.

Table 10
Assigned ranges of typical effective precipitation for crop groups in WPA 5

Crop Group	Effective Precipitation Range (%) [1]	
	Low	High
Nursery	30	50
Pasture	40	60
Permanent		
Deciduous	40	60
Vegetable [2]	15	25
Vineyard	30	50

1 As a percentage of total annual rainfall.

2 2x adjustment factor for multiple cropping.

Frost Protection

Irrigation water is commonly applied for frost protection on grapes and strawberries in WPA 5. The amount of water used for frost protection varies from season to season depending on the weather, and it varies from farm to farm depending on the system application rate. For the purpose of calculating applied water, 0.5 AF/Ac/Year is utilized for the water applied for frost protection on grapes. For the purpose of calculating applied water, 0.8 AF/Ac/Year is utilized for the water applied for frost protection on strawberries

Leaching Requirements

The amount of extra irrigation water that 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:

Irrigation Efficiency = Distribution Uniformity x (1 – Losses)

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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 11).

Table 11
Assigned irrigation efficiency averages for each crop group in WPA 5

Crop Group	Irrigation Efficiency Range (%)	
	Low	High
Nursery	60	70
Pasture	60	70
Permanent	60	70
Vegetable	65	75
Vineyard	65	75

Existing Gross Irrigation Water Requirement by Crop Group
Existing GIWRs for WPA 5 are summarized in Table 12. The ranges provided in Table 12 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 12 summarizes the current agricultural water demands for WPA 5.

Table 12
Summary of Existing GIWR for WPA 5 by crop group (AF/Ac/Yr)

Nursery		Pasture		Permanent-Deciduous		Vegetable		Vineyard	
Low	High	Low	High	Low	High	Low	High	Low	High
1.4	2.1	2.6	3.5	2.8	3.6	1.3	1.7	0.9	1.4

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 13 summarizes projected crop acreages in WPA 5.

Table 13
Projected cropping acreage for WPA 5

Nursery	Permanent		Veg.	Vineyard	Total
	Citrus	Decid.			
50	0	650	8,300	1,100	10,600

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Irrigation Methods

Table 14 reflects the projected irrigation efficiencies by crop group in WPA 5.

Table 14
Projected irrigation efficiencies by crop group in WPA 5

Crop Group	Irrigation Efficiency Range (%)	
	Low	High
Nursery	60	70
Pasture	60	70
Permanent	70	80
Vegetable	70	80
Vineyard	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 15 summarizes the projected agricultural demands for WPA 5.

Table 15
Summary of Projected GIWR by crop group for WPA 5 (AF/Ac/Yr)

Nursery		Pasture		Permanent-Deciduous		Vegetable		Vineyard	
Low	High	Low	High	Low	High	Low	High	Low	High
1.4	2.1	2.6	3.5	2.6	3.2	1.2	1.6	0.9	1.4

Rural Demand

Rural water demands in the Five Cities WPA include dwelling units scattered throughout the hills and valleys, especially in the Arroyo fringe area. The commercial areas are not included in Tables 16 and 17 below, but included in the urban demand for Arroyo Grande, Pismo Beach, and Grover Beach. Water is produced in private wells from the groundwater basins in the area.

Table 16
Current Demand – 1995

Population	Pop/Du	Houses	Duty (ac-ft/ac)	Demand[a] (ac-ft/ac/yr)
6,729	2.86	2,353	1.3	3,060

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

Table 17
Projected Demand – 2020

Population	Pop/Du	Houses	Duty (ac-ft/ac)	Demand[a] (ac-ft/ac/yr)
8,675	2.86	3,033	1.3	3,940

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

Data Deficiencies

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

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- **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 WPA. This information would be derived from assessor data.

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

- **Golf Courses.** There are golf courses in the area that may not be accounted for in the urban demand section. 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.

Environmental Demands

Current Demands

Information on current environmental water demands is available from two sources: 1) conditions on water rights permits and licenses and associated orders on file with the State Water Resources Control Board, and 2) agreements between the California Department of Fish and Game and other entities. A discussion of current environmental demands in WPA 5, as reflected in actual permit conditions, is presented below.

Pismo Creek Basin

West Corral de Piedra

"Permittees shall allow all of the surface and underground inflow to pass through the reservoir undiminished in quantity during the period from June 1 to November 30 of each year". For the protection of fish and wildlife habitat, permittee shall during the period from December 1 through May 31 bypass a flow of 1.5 cubic feet per second or the natural flow, whichever is less, to the natural stream channel immediately below the dam. The natural flow is the total subsurface and surface flow in the creek immediately above the reservoir. The natural flow shall be bypassed whenever permittee demonstrates, through streamflow measurements acceptable to the chief of the Division of Water Quality and Water Rights, that mean daily flow is less than 1.5 cubic feet per second. (App 17840 and 21061 App 28883, Permit 20496)

"No diversion to storage shall commence in any year until the unnamed stream below diversion point No. 1 has a visible surface flow from Licensee's Dam to the road bridge located about 100 feet upstream from the confluence of the unnamed stream with West Corral de Piedra Creek and diversion shall continue only so long as such visible flow continues except that licensee shall not be required to bypass more than the natural inflow to his on-stream reservoir nor shall he be required to release stored water to maintain visible flow in the streambed between his dam and said bridge. #1 NE ¼ of nw ¼ of section 16, t31s, r13e, MDB&M. #2 se ¼ of sw ¼ of section 9, t31s, r13e, MDB&M" (App 22050, permit 15209, lic. 10893)

Future Demands

The CDFG is currently developing a protocol for determining stream flow needs to protect environmental values (Waithman, CDFG, Yountville, personal communication, February

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1998). This protocol is under development and has not been formally accepted or even formally proposed. It is presented here to indicate one estimate of possible future demand. This protocol has not been adopted by CDFG and if it were, other groups or agencies may not accept it. Key provisions may include the following:

- Reservation of 60% of the average annual unimpaired wet-season flow for instream habitat.
- Bypass of all natural flow during dry season (June to September).
- No diversions until stream flows to the ocean (sandbar breached).

Watersheds on the west side of the coast range generally receive higher rainfall than the streams draining inland areas. These watersheds are also somewhat cooler during the summer than inland areas and are more likely to support steelhead. Tidewater goby are also found in lagoons at the mouths of streams in the coastal watersheds. Annual runoff during drought years in these streams can be 10% or less of the average runoff and result in extreme conditions for aquatic life. Extreme high flow events can also occur and these can also be detrimental to aquatic life in the streams. Based on these considerations future environmental water demand for minimum instream uses in WPA 5 was estimated to range from 10% of unimpaired average annual runoff during drought years to 100% of unimpaired average annual runoff in wet years. This assumes that some uncontrolled high flows will still occur with a frequency that maintains basic stream habitat features.

Data Deficiencies

There has been no organized complete effort to quantify instream flow needs in streams of San Luis Obispo County. Studies have been conducted on some streams and restrictions have been placed on certain water rights permit holders to protect instream uses but these have generally focused on the needs of one or a few key species and have not resulted in clear, objective assessments of instream flow needs.

There is not sufficient data to complete a detailed analysis of environmental water demands for all streams in the County. There is no known data for unimpaired runoff for any stream though it is possible estimates could be developed from available rainfall data. The only readily available (electronic) data is from USGS and County maintained streamflow gaging stations. The USGS data presents average runoff estimates as well as minimum and maximum runoff for each station but this data reflects existing water use and water project operations and in most cases does not reflect unimpaired conditions. Average runoff estimates could also be developed for the SLO gage data and discontinued USGS gages but the information would need to be in an accessible database.

A generic approach to instream flow needs assessment may be useful and data for such an assessment may be available. The County should consider a Tennant type approach using unimpaired runoff estimates generated from rainfall data. Given the wide annual variability in rainfall and runoff, an instream flow needs assessment should account for differences in normal, wet, and dry year flow needs. The County should also have all streamflow data entered in a computer database to facilitate its use.

Uncertainties

In many cases permit or license conditions do not specify a reservation of stream flow for environmental benefit. Rather, they are restrictions on use by individual rights holders. These restrictions are intended to provide benefits to fish and wildlife. However, it is not usually clear how restrictions on an individual water right interact with other water rights and

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effect streamflows. In addition, it is not always clear how permit conditions are interpreted in terms of an environmental demand. For example, many of the permit conditions call for a "visible surface flow" in a given stream but it is not clear how much water this represents.

Future environmental water demand is subject to great uncertainty due to lack of knowledge of instream flow needed to protect the aquatic resources, lack of information on existing runoff conditions and diversions, and the inherent annual variability in rainfall and runoff. For planning purposes, one could assume that the upper range of future demand will be defined by a percentage of the average annual unimpaired runoff (UAAR) during the wet season and no diversion during the dry season. This task is complicated since many streams are not gaged streams and unimpaired flow must be estimated using hydrologic modeling. This information is not presently available.

References

Stalnaker, C., B.L.Lamb, J. Henriksen, K. Bovee, and J. Bartholow. 1995. The Instream Flow Incremental Methodology: A primer for IFIM. Biological Report 29. U.S.D.I., National Biological Survey, Washington, D.C.

SWRCB, 1997. Staff Report Russian River Watershed. Proposed Actions to be taken by the Division of Water Rights on Pending Water Right Applications within the Russian River Watershed. Division of Water Rights. Sacramento, California

SUPPLY

The Five Cities (Arroyo Grande, Pismo Beach, Shell Beach, Oceano, and Grover Beach) are all on ground water wells and the Lopez system as previously described. The systems share common service area boundaries that do facilitate emergency interconnections; several system interties are in place today. Purveyors in WPA 5 that are State Water Contractors include Oceano Community Services District and Pismo Beach.

Groundwater Supply

Table 18 lists the ground water basins in WPA 5. 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 5 includes the Edna/Pismo Creek Basin and the Arroyo Grande Plain/Tri-Cities Mesa portion of the Santa Maria Valley Basin. Studies performed in these basins include those prepared by the DWR, consultants to the County of San Luis Obispo (LFM/Hoover & Associates) and consultants to the Cities of Pismo Beach, Arroyo Grande and Grover Beach. Management issues in these areas include the impact of Lopez Dam modifications, increasing demands on water resources, wastewater reuse, and localized high levels of nitrate concentrations. Sea water intrusion is a potential impact which could result from excessive pumping and inadequate recharge. The DWR investigations of the Edna/Pismo Basin and the Nipomo Mesa-TriCities Mesa area are nearing completion and will provide the most recent information for these basin areas for planning purposes.

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Table 18
WPA 5 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
5	Pismo Creek-Edna Valley	10 [12]	2,000 safe seasonal yield [6]	1,000 – 1,958 [6]
5	Arroyo Grande Plain & Tri-Cities Mesa	22 [13]	7,320 - 8,320 replenishment [13]	5,900 – 1,975 [13]

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

12. California Department of Water Resources, 1975, California's Ground Water: Bulletin 118.

13. California Department of Water Resources, 1979, Ground Water in the Arroyo Grande Area: Southern District Report.

Data Deficiencies

The estimates in Table 18 represent the results of published data from numerous sources, some of which are as much as 40 years old. 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. Most of the estimates of ground water extraction are at least 10 years old.

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

A list of existing water supplies in WPA 5 is included in Table 19. Lopez Reservoir is the major source of surface supplies to the Five Cities Area, supplying an estimated 8,665 AFY. This figure is under review now as the State Division of Safety of Dams requires seismic evaluations at the dam, and is also mandating that the reservoir level be kept at or below 83% of capacity until such evaluations are completed. Several communities in WPA 5 also hold entitlements to State Water Project. Other than water rights associated with stored water in Lopez Reservoir, appropriated stream flows are a small portion of overall water supplies in WPA 5.

Table 19
Existing, Developed Water Sources Other Than Ground Water (Approx. Yield, acre-feet per year)

Existing Source	Approximate Yield
Lopez Reservoir	8,665
State Water Supply Project	1,990
Appropriated Stream Flows	2
TOTAL NON-GROUND WATER YIELD 1	**10,657**

1. Source: Water Rights Information Management System printout dated April 23, 1998 from the State Water Resources Control Board for all water rights in SLO County. Figures shown are "Maximum Annual Use" totals by WPA as noted in water rights filings. Figures do not include estimated supplies to entities whose app. rights state a max. direct diversion (in cfs) or a max. storage volume (in acre-feet). Due to this, appropriated stream flows stated here are probably under-stated.

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Uncertainties

While the water rights information states the amount of water individuals and agencies are entitled to withdraw, it does not tabulate actual withdrawals. For example, an owner may be entitled to divert 86,000 gallons per day from May through October of each year. This does not mean that the owner typically diverts this each and every day for six months. On the other hand, this same owner may, in a dry year, want to divert his full entitlement over the six month period. However, if there is not enough water in the creek to support his diversion, it may not be physically possible to divert the full amount.

The reader is alerted to this especially when interpreting the estimates of appropriated stream flows stated in Table 19.

DEFICIENCIES

Edna Valley is experiencing rapid development of vineyards with some additional residential activity. Competition for limited ground water resources will intensify. Lopez Lake is currently under study for new yield estimates and the dam is slated for seismic improvements. South County cities have relatively large urban demand and some are projecting considerable growth, especially Pismo and Arroyo.

Table 20
Existing (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance[a] (Deficiency)
24,560	9,320	10,657	19,997	(4,560)

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

Table 21
Projected (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance[a] Deficiency)
26,370-32,160	9,320	10,657	19,997	(6,370)-(12,160)

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

ALTERNATIVES

No Future Water Supply Options considered.

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