WATER PLANNING AREA #6 -- Nipomo Mesa

WPA 6 includes that portion of San Luis Obispo County that lies within the Santa Maria River watershed. Purveyors include the Nipomo CSD and the Southern California Water Company. Private water purveyors include the following:

- Arroyo Grande Mushroom Farm
- Black Lake Canyon Wtr. Supply
- Callender Water Assn
- Country Hills Estates
- Greenheart Farms
- Heritage Lane MWC
- Hetrick Water Co.
- Ken Mar Gardens
- La Mesa Water Co
- Rancho Nipomo Water Co.
- Guadalupe Cooling
- Clearwater Nursery
- Cuyama Lane Water Co
- Dana Elementary School
- La Colonia Water Assn
- Laguna Negra (Tract 610)
- Mesa Mutual Water Co
- Rim Rock Water Co
- Santa Maria Speedway
- Speeding, Inc.
- True Water Supply

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 6 are listed in Table 1. A discussion of demands by each category follows.

Table 1
WPA 6 Demand Totals by Category

Category of Demand	Existing Demand (ac-ft/yr)	Projected Demand (ac-ft/yr)
Urban	2,820	5,030
Agricultural	28,590	23,860-31,700
Rural	3,800	5,940
Environmental	NA	NA
Subtotal	**35,210**	**34,830-42,740**

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

Urban Demand

This section documents existing and projected urban water demands for WPA 6. The existing and projected demand figures relied upon a water master plan prepared for the community of Nipomo. Table 2 summarizes the current and projected urban water demands for WPA 6.

Table 2
WPA 6 Urban Water Demands

Existing Demand (AF)	2020 Demand (AF)	Buildout Demand (AF)
2,820	5,030	5,030

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

A few unincorporated communities within the County and/or purveyors to those communities have prepared water master plans for planning purposes. The Nipomo Community Services District and Southern California Water Company for the Nipomo System have prepared such plans. Where such recent plans were available, the analyses within these plans were relied on rather than the use of County data.

Nipomo Community Services District (CSD) completed a Water and Sewer Master Plan in 1995 addressing existing and future demands. The estimated service area population in 1995 was 9,650 people. Overall water production was outlined based upon residential per capita rates and non-residential water duties and historical use, resulting in a total existing demand of 1,718 AF. Water use calculated included the Main Nipomo Water System and the Black Lake Water System.

Future demand in the Nipomo CSD was calculated based upon the total number of acres for residential uses factoring occupancy rates and residential per capita use. Growth was based upon an increase of 61 dwelling units per year to reach approximately 15,080 people by the year 2020. Non-residential use and water duties were also applied similarly to those for existing use. Based on these assumptions, total future demand was estimated at 2,580 AF annually.

Southern California Water Company (SCWC) is a public utility that provides water to a portion of Nipomo. SCWC prepared a system master plan for their Nipomo service area in January 1996. The portion of Nipomo served by the SCWC is in the southwestern corner of the unincorporated area of San Luis Obispo County, bounded by Tejas Place, Hazel Lane and Orchard Road on the northeast, near Cielo Lane on the southwest, and near Scenic View on the west. Development is generally semi-rural consisting of 1-acre lots with custom homes. In 1995, annual water demand was 1,102 AF.

Future demand for the service area includes all development in this area north of Riverside Road. Future demand in the year 2010 was calculated at 1,992 AF annually. Because the year 2020 is used within the San Luis Obispo Master Water Plan, we have taken the growth line prepared by SCWC and extended it to the year 2020 to reflect a future demand for that year of 2,450 AF annually. Table 3 includes the existing and projected water demand for Nipomo.

Table 3
Summary of Water Demands for Nipomo

Community	Existing Demand (AF)	2020 Demand (AF)	Buildout Demand (AF)
Nipomo CSD	1,718	2,580	2,580
Cal. Cities - Nipomo	1,102	2,450	2,450

Agricultural Demand

This section documents existing and projected Gross Irrigated Water Requirements (GIWRs) for WPA 6. 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 4 and 5 summarize the current and projected agricultural water demands for WPA 6. Anticipated future changes in cropping acreage in the Nipomo Mesa WPA include an increase in nursery and vegetable, coupled with declining citrus. The combined effect of these anticipated changes contributes to a fairly steady agricultural water demand.

Table 4
Existing GIWR for WPA 6 (AF/Yr).

Low	High	Average
24,434	32,737	28,585

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

Low	High	Average
23,857	31,766	27,812

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 (WPA

Cropping Patterns

Table 6 summarizes estimates of irrigated cropping acreage for WPA 6

Table 6
Estimated cropping acreage for WPA 6

Nursery	Permanent		Veg.	Vineyard	Total
	Citrus	Decid.			
950	800	0	17,000	400	19,150

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 (40.0 in/yr) were assigned to WPA 6 and Kc values are specific to the crop groupings (see Chapter 2). Yearly ETc totals for WPA 6 are summarized in Table 7.

Table 7
Yearly crop evapotranspiration (ft) for each crop group in WPA 6

Nursery	Permanent		Vegetable	Vineyard
	Citrus	Decid.		
1.7	1.9	NA	1.3	1.0

Effective Rainfall
WPA 6 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 6 and are listed in Table 8. Higher percentages were assigned to the deeper rooted crops according to their larger rootzone water holding capacity.

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

Crop Group	Effective Precipitation Range (%) [1]	
	Low	High
Nursery	30	50
Permanent		
Citrus	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 in WPA 6. 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.

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:

Irrigation Efficiency = Distribution Uniformity x (1 – 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 9).

Table 9
Assigned irrigation efficiency averages for each crop group in WPA 6

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

Existing Gross Irrigation Water Requirement by Crop Group

Existing GIWRs for WPA 6 are summarized in Table 10. The ranges provided in Table 7 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 10 summarizes the current agricultural water demands for WPA 6.

Table 10
Summary of Existing GIWR for WPA 6 by crop group (AF/Ac/Yr)

Nursery		Permanent-Citrus		Vegetable		Vineyard	
Low	High	Low	High	Low	High	Low	High
1.4	2.1	1.5	2.2	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 11 summarizes projected crop acreages in WPA 6.

Table 11
Projected cropping acreage for WPA 6

Nursery	Permanent		Veg.	Vineyard	Total
	Citrus	Decid.			
1,350	900	0	17,200	400	19,850

Irrigation Methods

Table 12 reflects the projected irrigation efficiencies by crop group in WPA 6.

Table 12

Projected irrigation efficiencies by crop group in WPA 6

Crop Group	Irrigation Efficiency Range (%)	
	Low	High
Nursery	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 13 summarizes the projected agricultural water demands for WPA 6.

Table 13
Summary of Projected GIWR by crop group for WPA 6 (AF/Ac/Yr)

Nursery		Permanent-Citrus		Permanent-Deciduous		Vegetable		Vineyard	
Low	High	Low	High	Low	High	Low	High	Low	High
1.4	2.1	1.3	1.9	NA	NA	1.2	1.8	0.9	1.4

Rural Demand

Rural water demands in the Nipomo WPA include dwelling units scattered throughout the hills and valleys, especially in the Nipomo Mesa area. The commercial areas are not included in Tables 14 and 15 below, but included in the urban demand for Nipomo. Water is produced in private wells from the groundwater basin in the area.

Table 14
Current Demand – 1995

Population	Pop/Du	Houses	Duty (ac-ft/ac)	Demand[a] (ac-ft/yr)
8,370	2.86	2,927	1.3	3,810

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

Table 15
Projected Demand – 2020

Population	Pop/Du	Houses	Duty (ac-ft/ac)	Demand[a] (ac-ft/yr)
13,073	2.86	4,571	1.3	5,940

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

Data Deficiencies

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

- **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 in the area 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 Demand

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. There are no current environmental demands, as reflected in water rights and regulating agreements, for WPA 6.

Future Demands

The CDFG is currently developing a protocol for determining stream flow needs to protect environmental values (Waithman, CDFG, Yountville, personal communication, February 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 6 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 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

Nipomo Community Services District and Cal Cities Water Co. are the largest purveyors in WPA 6. There are many smaller purveyors in the area such as Rural Water Company, Black Lake Canyon Water, Mesa Dunes Mobile Home Park, Evergreen, Challenger, and Laguna Negra Mutual Water Companies, and Rim Rock Water Company. Opportunities for system interties exist. Some purveyors share common service area boundaries while others are miles apart. The Coastal Branch of the State Water Project traverses WPA 6. One turnout to agricultural users (Nipomo Valley CSD) is planned for WPA 6.

Cal Cities and Nipomo CSD have an emergency intertie in place, which was most recently activated in February 1998. Nipomo CSD supplied 200-300 gpm of water to Cal Cities during a power outage. The Nipomo CSD distribution system is approximately five miles from the Arroyo Grande water system.

Groundwater Supply

Table 16 lists the ground water basins inWPA 6. 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 6 includes the Nipomo Mesa and Oso Flaco portions of the Santa Maria Basin, which are within San Luis Obispo County. The water management issues in these areas revolve around the available yield for future development, the potential for increased ground water recharge and the water quality issues related to agricultural returnflow and domestic wastewater returnflow. The DWR investigation currently in draft form will provide the information for future planning. The ground water basin extends across the County line into Santa Barbara County, which is the boundary of the studies performed by the DWR. Future water planning for the area may require an understanding of ground water conditions and issues in the adjacent areas within Santa Barbara County as well as those within San Luis Obispo County.

Table 16
WPA 6 Ground Water Basins

WPA	Basin Name	Basin Area in Square Miles	Basin yield with original descriptive term in acre-feet per year	Production - year in acre-feet
6	Nipomo Mesa	33 [13]	4,800 replenishment [13]	6,840 - 1987 [14]
6	Santa Maria (SLO Co.)	28 [13]	36,500 replenishment [13]	29,000 - 1975 [13]

13. California Department of Water Resources, 1979, Ground Water in the Arroyo Grande Area: Southern District Report.
14. The Morro Group, July 1990, South County Area Plan, Draft EIR.

Data Deficiencies
It is 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

Ground water is by far the largest source of water supply in WPA 6. Non-ground water supplies consist of some reclaimed water being used for irrigation purposes. Surface water yield is assumed to be 0 AF for the purposes of this study.

DEFICIENCIES

Urban demands may be understated. Agricultural demand is using an "average" level of water use. Nipomo will see considerable growth within the planning horizon. Competition for ground water is increasing. New DWR study indicates problems on the Mesa. Several mutual companies and development potential make management a challenge.

Table 17
Existing (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance (Deficiency)
35,210	41,300	0	41,300	6,090

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

Table 18
Projected (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance (Deficiency)
34,830-42,740	41,300	0	41,300	6,470-(1,440)

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

ALTERNATIVES

This section is an evaluation of future water supply options for WPA. The criteria previously selected by the WRAC are:

- Cost
- Risk
- Reliability
- Water Rights
- Local Control
- Water Quality
- Timing
- Environmental Impacts
- Agricultural Impacts
- Institutional Constraints
- Recreation
- Hydroelectric Potential

Each water supply option summary includes a comparative ranking of the criteria listed above. The rankings are based on the following:

Comparative Rankings

Features of water supply options are ranked 1 to 5, with 5 being the best. A "0" implies a fatal flaw which may render the supply option infeasible. The basis of comparison, in general, is:

Cost: The lower the unit cost ($/AFY), the higher the ranking.

Risk: Primarily a subjective comparison of the potential for project cost escalation.

Reliability: Primarily a comparison of project yield, AFY, during years of below-average rainfall.

Water Rights: A favorable 5 ranking indicates no known problems; a 3 indicates potential challenges; and a 1 indicates known opposition which may stop the project.

Local Control: A favorable 5 indicates physically located in and administered by an agency within the County; a 3 indicates some involvement of outside agencies; and a 1 indicates control from outside the County.

Water Quality: A favorable 5 indicates projects which enhance water quality; a 3 indicates no change; and a 1 indicates a negative impact on water quality.

Timing: A favorable 5 indicates projects with designs complete; a 3 indicates projects for which predesign at least is underway; and a 1 indicates projects for which design is 5 years or more away.

Environmental: A favorable 5 indicates certified EIR in place; a 3 indicates environmental review underway and no significant unmitigable issues identified; and

a 1 indicates significant impacts foreseen. A "0" in this category indicates a potential environmental fatal flaw.

Agricultural Impacts: A favorable 5 indicates projects which help agricultural, particularly by reducing competition for ground water and by other means.

Institutional Constraints: Reflects the degree of organizational support. A low ranking is indicative of the need for complex agreements.

Recreation: Reflects the degree to which the project may enhance recreational opportunities. A 3 indicates no direct impact.

Hydroelectric Potential: Indicates the degree to which the project may provide opportunities for hydroelectric power generation. Little information is available regarding hydroelectric power generation opportunities for the supply options examined. In general, options with little or no opportunity for power generation were ranked "1". Options that may expand existing power generation facilities were ranked "3".

At this point, the ranking is subjective and left to the discretion of the author and to the extent of data available for a particular option. WRAC input on the supply source ranking as discussed at the April 1998 meeting has also been included.

Potential water supply projects that may benefit this WPA (and for which information exists), include the South County Sanitation District Reclamation. This is not to say that these are the only supplemental water sources available. Rather, published data are currently available for only these potential sources.

South County Sanitation District Reclamation

The south county reclamation project examined herein is based on the February 1998 Plan of Study submitted to the Califronia State Water Resources Control Board by the South San Luis Obispo County Sanitation District. The project includes upgrade of the existing wastewater treatment plant from oxidized secondary treatment to disinfected tertiary treatment. It also includes construction of transmission facilities to deliver water to area golf courses, highway landscaping, schools, and City parks.

Category	Remarks	Comparative Ranking
Cost[i]	▪ $4.95 million to $16.17 million depending on capacity of tertiary train, plus an estimated $2.03 million transmission costs. ▪ Est. unit costs range from $840 to $1,011/AFY plus transmission costs	4
Risk	▪ Construction cost estimates based on feasibility level study only; possibility of escalation.	3
Reliability[i]	▪ Est. yield ranges from 1,100 to 4,400 AFY depending on capacity of planned tertiary train and no. of days in use annually.	3
Water Rights	▪ Current treated effluent disposal to ocean; "downstream" protests not anticipated. ▪ Potable water generated by two cities and one community services district.	3
Local Control	▪ Two cities, one community services district, and one overlying sanitation district involved.	3
Water Quality	▪ Disinfected tertiary treated water would be distributed with a chlorine residual. ▪ Demineralization may be needed depending on end user quality requirements.	4
Timing	▪ Grant application submitted in Feb 1998; final facilities plan due in 1999. ▪ No estimate of delivery date provided.	3
Environmental Impacts	▪ Yet to be studied.	3
Agricultural Impacts	▪ Benefits ag by reducing competition for ground water supplies.	4
Institutional Constraints	▪ CEQA process yet to be initiated.	3
Recreation	▪ Provides alt. source of irrigation supply to area parks.	3
Hydroelectric Potential	▪ Not applicable.	1

Data Deficiencies

No data exist for Water Conservation Programs or the use of unallocated State Water Project entitlements

References

[i] Plan of Study prepared by South San Luis Obispo County Santitation District for the Ca. State Water Resources Control Board dated February 1998.