WATER PLANNING AREA #1 -- NORTH COAST

Water Planning Area 1 (WPA1) is situated in the northwest corner of the County and includes the communities of San Simeon and Cambria. The northern boundary of WPA1 is the San Luis Obispo/Monterey County line. The Santa Lucia Range provides the WPA boundary along the northeast side, while the watershed divide between Villa Creek (WPA1) and Cayucos Creek (WPA2) forms the boundary to the south. Other creeks within this WPA include: San Carpoforo, Arroyo Hondo, Arroyo de los Chinos, Arroyo de la Cruz, Burnett, Oak Knoll, Arroyo Laguna, Little Pico, North Fork Pico, South Fork Pico, San Simeon, Steiner, Santa Rosa, and Perry. Water purveyors include Cambria CSD, San Simeon Acres CSD, and the 7X Youth Ranch.

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 (WPAs). Next, data regarding growth and future water use was analyzed to determine a preferred approach for the development of future water demands. These future demands were then prepared and projected in the same four demand categories for each of the WPAs.

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

Table 1
WPA 1 Demand by Category [a]

Category of Demand	Existing Demand (ac-ft/yr)	Projected Demand (ac-ft/yr)
Urban	700	1,230 - 2,770
Agricultural	430	360-540
Rural	440	790
Environmental	NA	NA
Subtotal	**1,570**	**2,380 – 4,100**

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

Urban Demand

This section documents existing and projected urban water demands for WPA 1. The existing and projected demand figures relied upon County growth figures and historical per capita demand levels. Table 2 summarizes the current and projected urban water demands for WPA 1.

Table 2
WPA1 Urban Water Demands [a]

Existing Demand (AF)	2020 Demand (AF)	Buildout Demand (AF)
700	1,230	2,770

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

In order to determine existing urban water demands for WPA 1, an average water production figure of 699 AF was calculated from the County's *Annual Resource Summary Report* for the period 1993 to 1997 for the unincorporated community of Cambria. This average production figure was then used in combination with a 1995 population figure (see Table 3) to determine an existing per capita water use rate of 115 gpcd.

In order to determine future water demands for Cambria, 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 3 and the future water demands are reflected in Table 4.

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 3
Existing and Projected Population Figures for Cambria

1990[1]	1995[2]	2020[3]	Buildout[4]
5,377	5,401	9,536	21,525

Source: San Luis Obispo County Planning Department.

1. Population numbers are from the U.S. Census of Population and Housing.
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 4
Summary of Urban Water Demands for Cambria

Existing Demand (AF/yr)	2020 Demand (AF/yr)	Buildout Demand (AF/yr)
699	1,228	2,772

Uncertainties

During the period 1993 to 1997, water production of the Cambria Community Services District (CSD) ranged from a low of 654 AF in 1995 to a high of 776 AF in 1997, a range of 18.6 percent. Prior to 1993, a mandatory conservation program was responsible for reducing water use by 28 percent compared with 1989 demands. During the period 1990 to 1996, population growth was relatively stable, increasing less than 3 percent from 5,377 to 5,531 (SLO County Dept. of Planning). A per capita value was determined by taking average water production for the period 1993 to 1997 (699 AF), and calculating that against Cambria's 1995 population. This per capita value was determined to be 115 gpcd.

Agricultural Demand

This section documents existing and projected Gross Irrigation Water Requirements (GIWRs) for WPA 1. 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 5 and 6 summarize the current and projected agricultural water demands for WPA 1.

Table 5
Existing GIWR for WPA 1 (AF/Yr).

Low	High	Average
340	514	427

Table 6
Projected GIWR for WPA 1 (AF/Yr).

Low	High	Average
362	537	450

Procedures and Concepts

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

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

This analysis must be completed for each crop group, acreage, and weather pattern to calculate total GIWR (in AF) by Water Planning Area (WPA). The elements of the formula and the corresponding values associated with WPA1 are described in the following sections.

Cropping Patterns
Table 7 summarizes estimates of irrigated cropping acreage for WPA 1.

Table 7
Estimated existing cropping acreage for WPA 1.

Permanent		Veg.	Total
Citrus	Decid.		
50	0	300	350

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 San Simeon climate group (38.2 in/yr) were assigned to WPA 1 and Kc values are specific to the crop groupings (see Chapter 2). Yearly ETc totals for the crops in WPA 1 are summarized in Table 8.

Table 8
Yearly crop evapotranspiration (ft/yr) for each crop group in WPA 1.

Permanent		Vegetable
Citrus	Decid.	
1.8	NA	1.2

Effective Rainfall

WPA 1 was assigned the San Simeon rainfall group (23.0 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 1 and are listed in Table 9. Higher percentages were assigned to the deeper-rooted crops according to their larger rootzone water holding capacity.

Table 9
Assigned ranges of typical effective precipitation for crop groups in WPA 1

Crop Group	Effective Precipitation Range (%) [1]	
	Low	High
Permanent Citrus	40	60
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 1 require frost protection.

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:

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

The Cachuma Resource Conservation District routinely conducts irrigation evaluations in Santa Barbara and San Luis Obispo Counties and are an 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 10).

Table 10
Assigned irrigation efficiency averages for each crop group in WPA 1.

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

Existing Gross Irrigation Water Requirement by Crop Group

Existing GIWRs for crops in WPA 1 are summarized in Table 11. The ranges provided in Table 11 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 5 summarizes the current agricultural water demands for WPA 1.

Table 11
Summary of Existing GIWR by crop group for WPA 1
(AF/Ac/Yr).

Permanent-Citrus		Vegetable	
Low	**High**	**Low**	**High**
0.9	1.7	1.0	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 12 summarizes projected crop acreages in WPA 1.

Table 12
Projected cropping acreage for WPA 1

Permanent		Veg.	Total
Citrus	**Decid.**		
50	0	350	400

Irrigation Methods

Table 13 reflects the projected irrigation efficiencies by crop group in WPA 1.

Table 13
Projected irrigation efficiencies by crop group in WPA 1

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

The same procedures that were utilized to calculate existing agricultural demands were utilized in estimating the projected irrigation water requirements by crop group in WPA 1 (see Table 14). The projected values reflect the changes in cropping acreage and irrigation efficiencies.

Table 14
Summary of Projected GIWR by crop group for WPA 1
(AF/Ac/Yr).

Permanent-Citrus		Vegetable	
Low	**High**	**Low**	**High**
0.8	1.5	0.9	1.3

Rural Demand

Rural water demands in the North Coast WPA include dwelling units scattered throughout the hills, and small commercial areas in San Simeon (including the Hearst Castle facilities) and San Simeon Acres. The commercial areas are not included in Tables 15 and 16 below. Water is produced in private wells from the small, coastal basins in the area.

Table 15
Current Demand – 1995

Population	Pop/Du	Houses	Duty	Demand [a]
866	2.57	337	1.3	440

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

Table 16
Projected Demand – 2020

Population	Pop/Du	Houses	Duty	Demand [a]
1,564	2.57	609	1.3	790

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

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

- **Commercial**. Very few commercial activities exist in the rural areas that were not accounted for in the urban demand. Little specific research was performed on this land use. It represents a very small percentage of the total water used.

- **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.

- **Certificate Lots**. Many parcels of land in the north coast may be buildable. It is difficult to ascertain how many will be built upon, but it seems unlikely that the total number of rural homes will double in the planning horizon.

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 1, as reflected in actual permit conditions, is presented below.

Arroyo de la Cruz

"Pursuant to the Stipulation between the Hearst Corporation, Sunical Division, and the Department of Fish and Game, Protestant, For Withdrawal of Protest, signed on March 31, 1980, and April 8, 1980, respectively, the permit term substantially as therein agreed to is included herein: For the protection and preservation of fish and wildlife, permittee during the period of January 1 through April 30, shall only pump when the flow of the Arroyo de la Cruz immediately upstream from the wells exceeds 38 cubic feet per second. Alternatively, with the approval of the Department of Fish and Game, permittee may, despite reduced flow, utilize mitigation measures to maintain a minimum depth of flow of 0.6 feet over 25 percent of the width of the channel at the critical passage points in the area generally known as the lower basin. Permittee may resume and continue pumping when the flow or depth reach 10 percent below the critical level established above." (App 25881, Per. 19247)

Pico Creek

Application 29588 protested in 1990 by numerous parties including CDFG.; no permit, no license (existing license 12272 may have impacts to California red-legged frog).

Van Gordon Creek

"Diversion of water shall be limited to the periods when there is a continuous, visible flow of water in Van Gordon Creek in the reach between the point on the creek that would be intersected by an extension of the east-west fence line immediately south of Well 9M4, and the fork in Van Gordon Creek approximately 600 feet upstream of this point." (App 29456, Permit 20806)

Santa Rosa Creek

The Cambria Community Services District diversion from Santa Rosa Creek is regulated by SWRCB Decision 1624 filed April 20, 1989. In general provisions include:

- Diversion not to exceed 2.67 cfs
- Withdrawals not to exceed 260 af May 1-October 31
- Limitations Nov 1 to Apr 30 based on surface flow at Highway 1 bridge

Future Demands

The California Department of Fisheries and Game (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. 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 1was 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 Lreport 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 communities of San Simeon and Cambria share no common source of supply nor are their distribution systems intertied. Systems are approximately two miles apart. A supply line from the proposed Cambria desalination plant was to have linked the two systems. Plans for both the desalination plant and the San Simeon supply line are on hold as of this date. No distribution linkages to other WPAs exist.

Groundwater Supply

Table 17 lists the ground water basins inWPA 1. 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.

The northern-most basins (San Carpoforo and Arroyo de la Cruz) are to a great extent within the Hearst Ranch. The Pico Basin, although generally within the Hearst Ranch, is primarily utilized by the San Simeon CSD wells. The San Simeon and Santa Rosa Basins are tapped by Cambria CSD, agricultural and local domestic users. Some artificial ground water recharge occurs at the District wastewater percolation ponds in San Simeon Creek, minimizing the occurrence of sea water intrusion. Villa Basin is tapped by agricultural and local domestic water wells.

Table 17
WPA1 Ground Water Basins

Basin Name	Basin Area in Square Miles	Basin yield with original descriptive term in acre-feet per year	Production - year in acre-feet
San Carpoforo			
Arroyo de la Cruz	1.2 (1)	1,244 safe yield (1)	66 -1989 (2)
Pico	0.1 (3)	120 basin yield (3)	50 - 1985 (3)
San Simeon	0.5 (4)	1,040 safe yield (4)	1,050 - 1988 (5)
Santa Rosa	1.1 (4)	2,260 safe yield (4)	1,110 - 1988 (5)
Villa	1.5 (6)	1,000 safe seasonal yield (6)	100 - 1958 (6)

1. Envicom, May 1982, Final Stage EIR, Hearst Ranch Visitors Services Water Supply Project Development Plan, Application 25881 to Appropriate Unappropriated Water, SCH 80010801.
2. Hoover & Associates, June 1990, Arroyo de la Cruz Annual Monitoring Report - January 1989 to December 1989.
3. Cleath, Timothy, S., March 1986, Ground Water Availability - Pico Creek Ground Water Basin, San Simeon Acres Community Services District.
4. Cambria County Water District, February 1976, Engineering Report on Proposed Water System Improvements and Master Plan.
5. Yates, Eugene B., et al, (1991), Hydrogeology, Water Quality, Water Budges, and Simulated Responses to Hydrologic Changes in Santa Rosa and San Simeon Creek Ground-Water Basins, San Luis Obispo County, USGS Water-Resources Investigations Report 91 - (draft currently unpublished).
6. California Department of Water Resources, 1958, San Luis Obispo County Investigation: State Water Resources Board Bulletin No. 18, vol. I and II.

Data Deficiencies

California Department of Water Resources Bulletin 18, the San Luis Obispo County Investigation (1958), studied the San Carpoforo, Arroyo de la Cruz, San Simeon and Santa Rosa basins for reservoir sites, during which they estimated the basin yields. The basin yields were based on how much water would be required to irrigate the valley floor area downstream of proposed dams (pages 69-70) and not on actual recharge versus pumpage and storage analyses. The estimates are therefore are not appropriate for use in planning, unless reservoirs are constructed as proposed in the DWR 1958 report.

The Arroyo de la Cruz Basin has also been investigated by Envicom Corporation for the Hearst Corporation. The environmental impact report submitted by Envicom Corporation includes information on the yield of this basin and the annual production from this basin is quantified in some of the annual updates on water resources performed for the Hearst Corporation. Consequently, the Envicom EIR safe yield estimate has been selected as the only true effort of determining safe yield for the Arroyo de la Cruz Basin. For similar reasons, the Cleath & Associates safe yield estimate was selected for the Pico Creek Basin.

The San Simeon and Santa Rosa Basins have been studied extensively by consultants for the Cambria CSD as well as by the US Geological Survey. Some of these studies are for conjunctive use of the two basins and therefore do not provide safe yield estimates for each individual basin . Other studies focus on drought reliability under various management scenarios.

The estimates in Table 1 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 1 is included in Table 18. In addition to ground water supplies from several coastal basins, WPA 1 benefits from stream flows with an estimated 4,737 AFY in appropriated stream flows. Approximately one-third of the appropriated flows are along the San Carpoforo Creek, half from San Simeon Creek, and the remainder from Santa Rosa Creek. Cambria CSD and the Hearst Corporation hold significant water rights in WPA 1.

Table 18
Existing, Developed Water Sources Other Than Ground Water
(Approx. Yield, acre-feet per year)

Existing Source	Approx Yield
Seawater Desalination	**??** (Hearst Castle)
Reclaimed water –Other than passive return flow	?
Appropriated Stream Flows	4,737
TOTAL NON-GROUND WATER YIELD [1]	**4,737**

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.

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 18.

DEFICIENCIES

There appears to be a water surplus. However, limited supply is available in many small basins, and is often inaccessible to the urban demands. Larger demands are dependent upon single basins (e.g. Hearst Ranch, East/West Ranch, CCSD, San Simeon Acres). In addition, seasonal peaking in demand coincides with summer shortages in supply.

Table 19
Existing (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance[a] (Deficiency)
1,570	5,664	4,737	10,401	8,830

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

Table 20
Projected (ac-ft/yr)

Demand	Grndwater Supply	NonGrndwater Supply	Total Supplies	Balance[a] (Deficiency)
2,380-4,100	5,664	4,737	10,401	8,020 – 6,300

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 1. 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".

Potential water supply projects that may benefit this WPA (and for which information exists), include the Cambria CSD desalination facility and various coastal reservoirs. 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.

Cambria CSD Desalination Facility

The Cambria CSD desalination facility examined herein is as set forth in the construction documents dated May 1996. The project involves construction of a seawater intake structure, caisson pumping plant, reverse osmosis treatment facility, and ocean outfall facility for brine disposal.

Category	Remarks	Comparative Ranking
Cost	▪ $10,000,000.[i]	1
Risk	▪ Moderate to high risk of construction cost escalations.	3
Reliability[ii]	▪ May not be operable for 3 days after heavy rain due to spikes in turbidity. ▪ Phased to roughly match demand growth. ▪ Three phases of implementation with ultimate capacity of 565 AFY with 6 months of operation.	3
Water Rights	▪ Uses seawater, therefore surface water rights not required.	5
Local Control	▪ Project would be owned and operated by Cambria CSD.	5
Water Quality	▪ All drinking water standards would be satisfied and it is anticipated to have a high consumer satisfaction.	4
Timing	▪ Design and permitting completed. ▪ Construction could be completed in 18 months.[iii]	5
Environmental Impacts[ii]	▪ No long-term unavoidable adverse impacts identified. ▪ Temporary air and noise impacts during construction.	5
Agricultural Impacts	▪ Reduces competition between urban and agricultural groundwater users.	4
Institutional Constraints	▪ All permits completed in early 1997. ▪ Currently exploring utilization of beach wells on State Park property.	3
Recreation	▪ Not applicable.	3
Hydroelectric Potential	▪ Energy recovery on brine stream within plant reduces overall electrical consumption.	2

Coastal Reservoirs

The coastal reservoirs examined herein are based on the July 1987 alternative water resources report prepared for Cambria CSD. Alternative reservoir sites were identified conceptually only at Santa Rosa Creek, Lower San Simeon Creek, and Upper Steiner Creek. The investigation involved conceptual analysis of safe annual yields, capital and annual costs, and projet constraints for each alternative.

Category	Remarks	Comparative Ranking
Cost[iv]	▪ Capital costs range from $9.1 to $78 million (1987 dollars). ▪ Unit costs $365-2750/AFY (1987 dollars)	2
Risk	▪ High potential for construction cost escalations. ▪ Relatively high risk from geologic conditions.	1
Reliability[iv]	▪ 500 to 18,500 AFY depending on size and location of reservoir.	3
Water Rights	▪ No known water rights filings.	1
Local Control	▪ Watershed and dam sites within WPA 1.	5
Water Quality[iv]	▪ Potential water quality issues downstream of dams.	3
Timing	▪ Long lead time would be required for permitting design, and construction activities which would likely render projects infeasible.	1
Environmental Impacts	▪ Major impacts at reservoir sites likely. ▪ Some sites may impact species on the threatened or endangered list.	0
Agricultural Impacts[iv]	▪ Some sites would displace active farms.	1
Institutional Constraints	▪ Complex permitting process including DSOD approvals and impacts to private property. ▪ Coastal Zone restrictions may render some sites infeasible.	0
Recreation	▪ Some small-scale opportunities may exist.	3
Hydroelectric Potential	▪ None identified.	1

Data Deficiencies

No data exist for unallocated State Water, nor for Water Conservation Programs.

References

[i] "Cambria Desalination Project Bid Summary" by North Coast Engineering for Cambria CSD, February 1997.
[ii] "Cambria Desalination EIR" by Robert Bein, William Frost & Associates for Cambria CSD, December 1994.
[iii] "Cambria Desalination Project Timeline" by Greg Luke and Associates for Cambria CSD, January 13, 1997.
[iv] "Economic Analysis Alternative Water Resources Development" by Boyle Engineering Corporation for Cambria CSD, July 1987.