

***EXECUTIVE SUMMARY***

***Of***

**"San Luis Obispo County  
Master Water Plan Update"**

**March 1986**

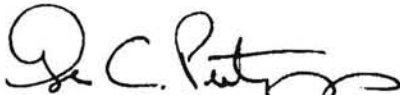
**Published by  
SAN LUIS OBISPO COUNTY  
FLOOD CONTROL AND WATER CONSERVATION DISTRICT**

## PREFACE

Recognizing that changing conditions may have rendered its Master Water and Sewerage Plan, which had been developed in 1972, no longer adequate to serve the needs of the County, San Luis Obispo County contracted with the California Department of Water Resources for a study to update the water portion of its master plan.

The study, which was completed in 1985, has been described in a Department of Water Resources Southern District Report, "San Luis Obispo County Master Water Plan Update", published in March 1986.

This Executive Summary, which contains the Recommendations, Introduction, and Summary of Findings and Conclusions from the Department of Water Resources report, was published by the San Luis Obispo County Flood Control and Water Conservation District to supply residents of the County with a concise report on the findings made in the update study so that they can make an informed decision regarding the future course of action for the County.

  
George C. Protopapas  
County Engineer  
San Luis Obispo County

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## RECOMMENDATIONS

Based on the findings and conclusions in this study, the investigators and the Ad Hoc Committee of the San Luis Obispo County Water Resources Advisory Committee offer six specific recommendations for action by the County.

1. Request that the Department of Water Resources conduct a study of implementation of the State Water Project's Coastal Branch for San Luis Obispo County's full entitlement; this would meet the projected demand (with conservation) for supplemental water to about year 2010.

The study should be coordinated with Santa Barbara County to include a more detailed determination of Coastal Branch alignment, pipe sizes, pumping and power plant capacities, environmental impacts, and economic, financial, and water quality aspects.

Even if Santa Barbara County chooses not to participate in the Coastal Branch, this recommendation stands. The key reasons for making it are:

- o Comparative cost. A comparison of the unit costs to San Luis Obispo County of the various alternative plans evaluated in this study shows that, with Santa Barbara County's participation in the Coastal Branch, the plan that relies on the Coastal Branch (alternative 1 in this study) would be only \$20 per acre-foot, or about 6 percent, more than that of the least expensive alternatives--3, 5, and 6--all of which rely on both the Coastal Branch and the proposed Lower Jack and Santa Rita Dams and Reservoirs. The cost of the leading alternatives could actually be higher than that of alternative 1 if: (a) seismic safety requirements result in higher construction costs of the proposed dams and reservoirs, (b) dependable yields of the proposed dams and reservoirs are less than estimated, or (c) unit costs of developing additional conservation storage facilities for the State Water Project are less than \$200 per acre-foot.

When all the alternatives are compared without Santa Barbara County's participation in the Coastal Branch, alternative 1 is still among the least costly.

- o Availability of future supply. By implementing alternative 1 first, the County would still have

available to meet its future water demand (growing at the rate of about 10,000 acre-feet per decade) the local projects evaluated in this study.

On the other hand, early development of additional local resources as units of the State Water Project would mean elimination of an equal amount of imported water to the County--water that is expected to be needed as demand increases.

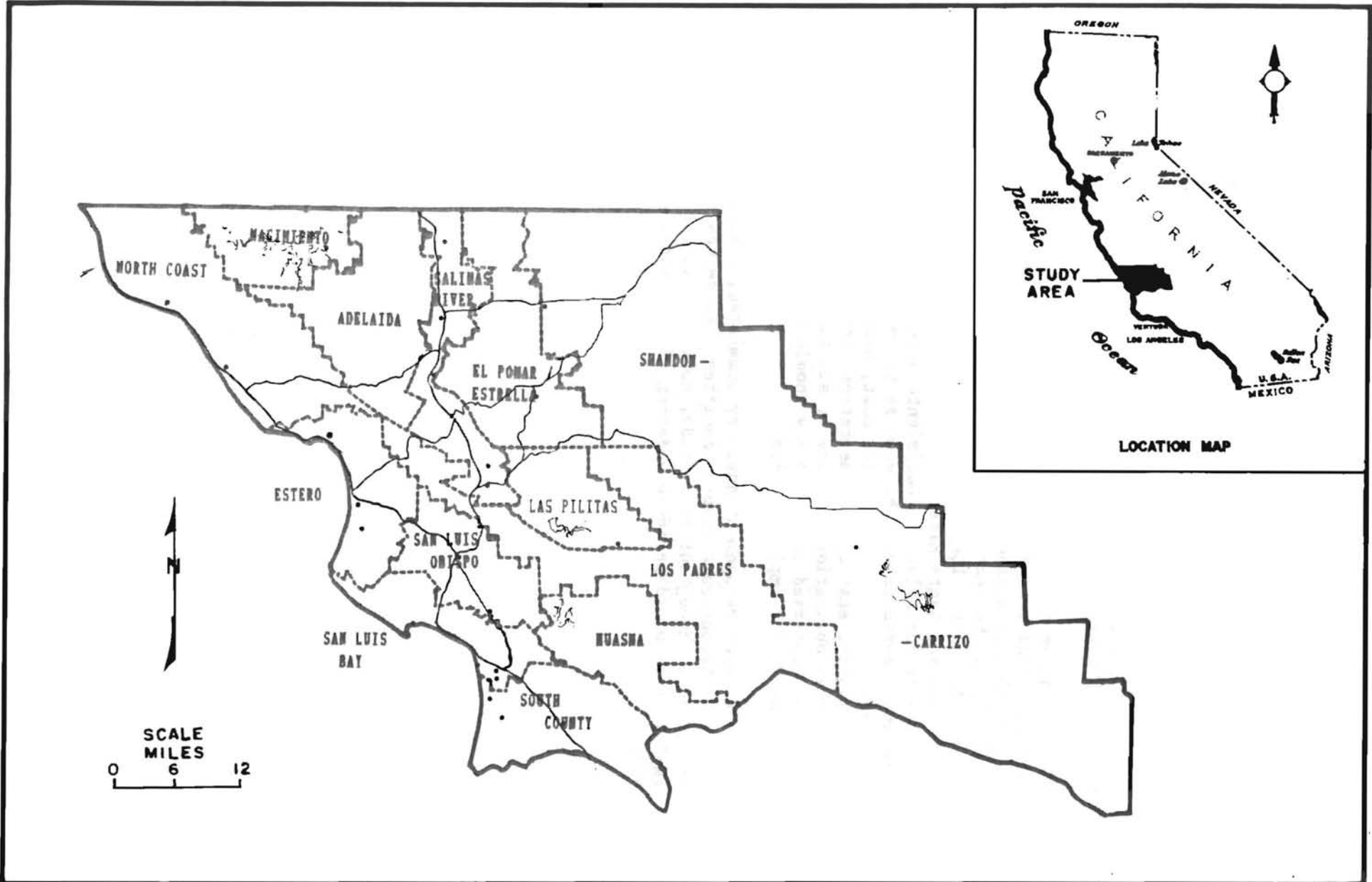
- o Ease of implementation. The implementation of the Coastal Branch would face fewer obstacles than the proposed local dams and reservoirs. Legal, environmental, and institutional constraints on local projects could cause lengthy delays.

The water supply contract, which provides for the construction of the Coastal Branch, has been signed by the Department of Water Resources and the San Luis Obispo County Flood Control and Water Conservation District, whereas none of the local projects identified in this study has been initiated.

- o Existing contractual obligations. The County's ongoing annual costs for the State Water Project are increasing rapidly--from \$547,844 in 1985 to \$903,403 in 1991.
2. Implement the water conservation program presented in the Department of Water Resources report "Recommended Water Management Plan for San Luis Obispo County Flood Control and Water Conservation District" (December 1983). This would bring an estimated savings in municipal and industrial water demand of about 10,000 acre-feet by year 2010. Without this conservation, supplemental municipal and industrial demand in 2010 would exceed the County's entitlement for State Water Project water.
  3. Give added attention to management and protection of all ground water basins in the County. Work with the Regional Water Quality Control Board, the County Health Department, and the State Department of Health Services in identifying and correcting ground water quality problems. Develop specific ground water management plans for the Paso Robles, Edna Valley, Los Osos, Arroyo Grande, San Simeon, and Santa Rosa Ground Water Basins. Be alert for other basins which may need to be added to this list. The ground water resources of the County usually offer the most economical option among alternative supplies. They should be protected and used.
  4. Evaluate programs for artificial ground water recharge and

capture of subsurface discharge to the ocean. If they are found to be an effective means of increasing yield for ground water basins, they could be used to meet near term water demand. They would be of particular importance to areas located far from the reach of such supply elements as the Coastal Branch and Lower Jack, Santa Rita, and Nacimiento Dams and Reservoirs.

5. Start planning now to develop local resources to meet water demands beyond year 2010. Specifically, consider construction of a pipeline to bring water from Nacimiento Reservoir as the next logical step for meeting demand up to about 2025 and the local dams and reservoirs (starting with Lower Jack and Santa Rita) for the demand to about 2060. The reasons for selecting Nacimiento pipeline before local dams and reservoirs are the same as those for selecting the Coastal Branch: its comparative cost, availability of a future supply, ease of implementation, and existing contractual obligations. However, all the water supply elements identified in this study should be periodically reconsidered for implementation.
6. Create a Water Management Advisory Committee, similar to the Water Resources Advisory Committee that served so effectively throughout this study, to assist in the implementation and periodic updating of the Master Water Plan.



**FIGURE 1 - STUDY AREA AND PLANNING AREAS**

## I. INTRODUCTION AND SUMMARY OF FINDINGS AND CONCLUSIONS

### Introduction

The population of San Luis Obispo (SLO) County has been growing steadily, and its water needs have increased proportionally. To meet these growing needs in an orderly fashion, a master water and sewerage plan (CDM, Inc., "Report on Master Water and Sewerage Plan", May 1972) was developed for the County in 1972.

Since 1972, a number of changes have taken place that provide sufficient reason for reexamining the water portion of the master plan. One of these is the adoption of a new land use element of the County's General Plan in 1981--reducing the County's estimated population absorption capacity from about 3 million to one-half million. Another is the significant and uneven inflation of construction costs.

Also, in 1982, the Department of Water Resources (DWR) adopted the concept of constructing local projects as units of the State Water Project (SWP)\*. This concept has been endorsed by the SWP water contractors. Each contract with SWP water contractors has been amended to reflect this concept.

In January 1984, the County and DWR began a cooperative study for updating the water portion of the master water and sewerage plan. Each contributed one-half of the funding for the study.

### Objectives of the Study

The objectives of the study are to:

(1) update estimates of current and projected water use and existing water supplies and determine, in cooperation with the County, needs for supplemental water; (2) identify alternative projects for providing supplemental water supplies and determine their costs; (3) set priorities for the alternative projects or programs; and (4) recommend the sequence for staged implementation of water projects as part of the County master plan.

### Scope and Conduct

The area of investigation includes all San Luis Obispo County (Figure 1). The planning period extends to the year 2010. The planning horizon, considering the full development of the current land use element, is up to year 2060.

The study adopted the County's 13 planning areas. The population, water demand, water supply, and estimated costs of supplying water were distributed among these planning areas.

The County developed population estimates and projections by distributing the County total population from the California Department of Finance. The urban per capita applied water, which was estimated on the basis of historic water use records, was reduced to reflect urban water conservation goals.

The amount of irrigated agriculture by crop was estimated in a land and water use survey in the summer of 1984.

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\*The SWP is a system of reservoirs, pumping and power plants, and conveyance facilities developed by DWR to deliver water from Oroville Reservoir and the Sacramento-San Joaquin Delta to the State's 30 water service contractors. The San Luis Obispo County Flood Control and Water Conservation District is one of the contractors.



Projections to the year 2010 were made with assistance from the County Director, University of California Cooperative Extension Service, who enlisted a group of successful farmers in the County to work with him in making the projections.

These projections and the estimates of urban per capita and agricultural unit water use provided the basis for estimates of water demand.

The quantities of dependable water supplies used in this study were determined from a review of past investigations.

Because of the problems of an overdraft condition in the ground water basins in the County, this study looked into the combinations of previously identified water supply elements (from the 1972 master water and sewerage plan report) as the supply alternatives to meet the supplemental water needs. Recognizing that agricultural water users cannot afford the price of supplemental water supplies and assuming that the municipal and industrial (M&I) users are willing to pay, the supplemental water needs are those from the M&I sector only.

The identified supply elements are the SWP water (through the proposed Coastal Branch), Nacimiento water (through the proposed Nacimiento pipeline), water from development of possible new dams and reservoirs, water from enlargement of existing dams (raising spillway heights), water from waste water reclamation, and water from desalination. Although not called for by the contract for this update study, some evaluation of artificial recharge projects, interception of subsurface discharge to the ocean, and demineralization of inferior quality ground water and discussions of weather modifications and watershed management are provided.

The existing Water Resources Advisory

Committee, consisting of members from throughout the County, served as liaison with DWR and ensured that the study was kept responsive to the needs of the entire County. Working directly with the investigators were members of an ad hoc committee appointed by the chairman of the Water Resources Advisory Committee.

Thus, throughout the study, the investigators had the benefit of timely information and advice on local conditions and needs and the County had the benefit of up-to-date reports on the conduct and progress of the study. The study as reported here reflects the results of this joint effort.

### Study Area

San Luis Obispo County lies midway between the Cities of San Francisco and Los Angeles. It is bounded on the west by the Pacific Ocean, on the north by Monterey County, on the east by Kern County, and on the south by Santa Barbara County.

Its average east-west and north-south dimensions are about 60 miles. Its total area is about 3,300 square miles.

There are five subranges of the California Coastal and Transverse mountain ranges--Santa Lucia, Temblor, La Panza, Caliente, and San Luis. The County is divided into three broad physiographic regions: a coastal plain, coastal mountains and valleys, and interior mountains and valleys.

Major streams are, from north to south, Nacimiento River, Salinas River, San Luis Obispo Creek, Arroyo Grande Creek, Cuyama River, and Santa Maria River.

Climate of the County is mild. Its precipitation ranges from less than 10 inches per year in the eastern portion to more than 40 inches per year at higher elevations in the Santa Lucia Mountain range.

Currently (1985), about 183,000 persons reside in the County. The largest population centers are Paso Robles, Atascadero, Morro Bay, South Bay, San Luis Obispo, Grover City, Pismo Beach, and Arroyo Grande. Agricultural, recreational, and governmental activities are the major bases of the County's economy.

Water demand in the County is met primarily by local ground water and by surface water impounded in Salinas Reservoir (Santa Margarita Lake), Lopez Reservoir, and Whale Rock Reservoir. In some planning areas, ground water levels are declining.

The San Luis Obispo County Flood Control and Water Conservation District (SLOCFCWCD) has water supply responsibility for the County. It was created in 1945 by the State Legislature to: (1) make water available for irrigation, urban, and other beneficial uses; (2) develop necessary distribution works; (3) control and conserve flood and storm waters and streamflows in reservoirs; and (4) provide ground water replenishment.

The Board of Supervisors of the County is empowered to act as the Board of Directors of the District. Numerous water service agencies, both public and private, are located within the District. The District has contracted with the State for imported water from the SWP. Its maximum entitlement is for 25,000 acre-feet per year.

This water would be delivered by the Coastal Branch of the California Aqueduct. Only the first phase of the Coastal Branch has been completed; it provides water to the area in the vicinity of Avenal Gap in Kern County.

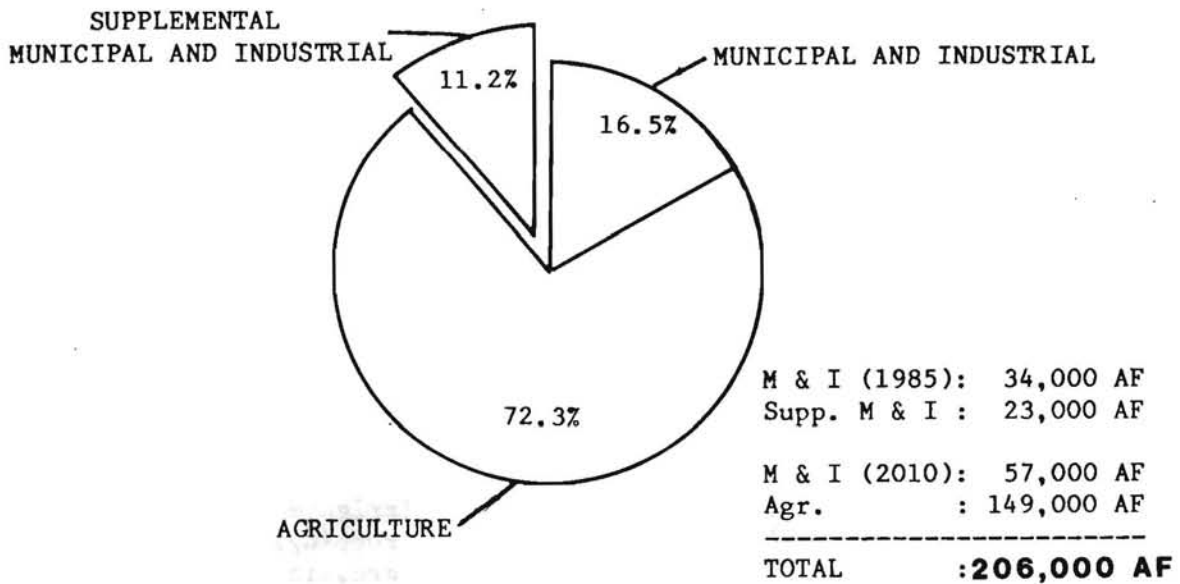
Also scheduled to receive water from the completed Coastal Branch is Santa Barbara County, which has contracted for a maximum of 45,486 acre-feet per year.

## Summary of Findings and Conclusions

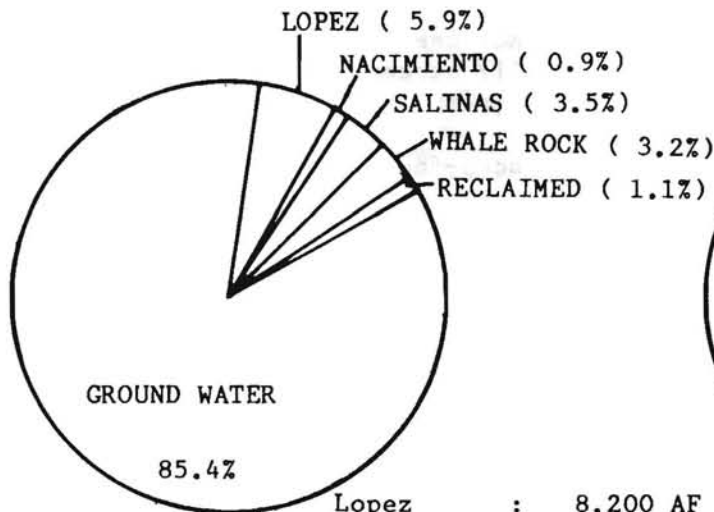
### Findings

1. San Luis Obispo County population in 1985 is estimated to be 183,000, and in 2010, it is projected to be 303,000--an increase of 66 percent. The potential population when all use categories in the adopted land use element are fully developed would be on the order of 530,000 (a 190 percent increase from 1985); such potential development would take place in about 2060. The projected growth rate is generally greater in areas adjacent to the coast than elsewhere in the County.
2. Irrigated land (counted for multiple cropping) is surveyed to be 70,600 acres in 1985 and projected to be 74,700 acres in 2010--an increase of 6 percent.
3. Total applied water in 1985 is about 208,000 acre-feet, of which, irrigated agriculture accounts for 174,000 acre-feet (83 percent) and M&I use for about 34,000 acre-feet (17 percent). By 2010, agricultural demand is projected to be reduced to about 149,000 acre-feet (72 percent) because farmers are expected to switch to lower-water-using crops and to increase irrigation efficiency. M&I use, which is growing at the rate of about 10,000 acre-feet per decade, is expected to increase to about 57,000 acre-feet (28 percent). Therefore, total applied water for 2010 is projected to be 206,000 acre-feet. (See Figure 2.) M&I applied water demand at full development (in year 2060) is estimated to be about 100,000 acre-feet. Projections for both M&I and agricultural applied water uses reflect water conservation goals as outlined in the DWR report "Recommended Water Management Plan for San Luis Obispo County Flood Control and Water Conservation

## PROJECTED WATER DEMAND 2010

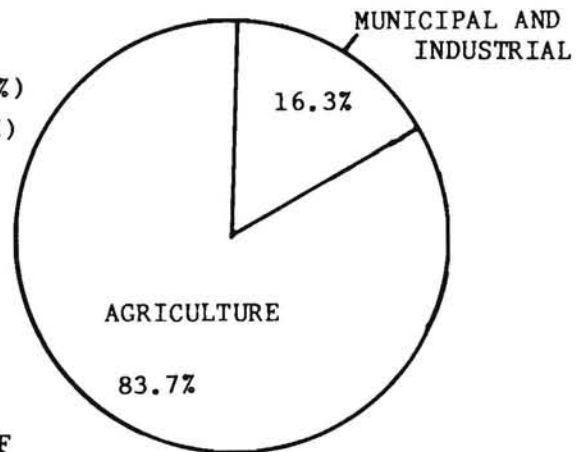


### DEPENDABLE WATER SUPPLY 1985



Lopez	:	8,200 AF
Nacimiento	:	1,300 AF
Salinas	:	4,800 AF
Whale Rock	:	4,400 AF
Reclaimed	:	1,500 AF
Grd. Water	:	118,000 AF
<hr/>		
<b>TOTAL</b>	<b>:</b>	<b>138,000 AF</b>
(Rounded)		

### ESTIMATED WATER DEMAND 1985



M & I :	34,000 AF
Agr. :	174,000 AF
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<b>TOTAL</b>	<b>:208,000 AF</b>

**FIGURE 2 - PRESENT AND FUTURE  
WATER DEMAND AND SUPPLY**

District" (December 1983). Without this conservation, the M&I demand for applied water is estimated to be 10,000 acre-feet greater in 2010.

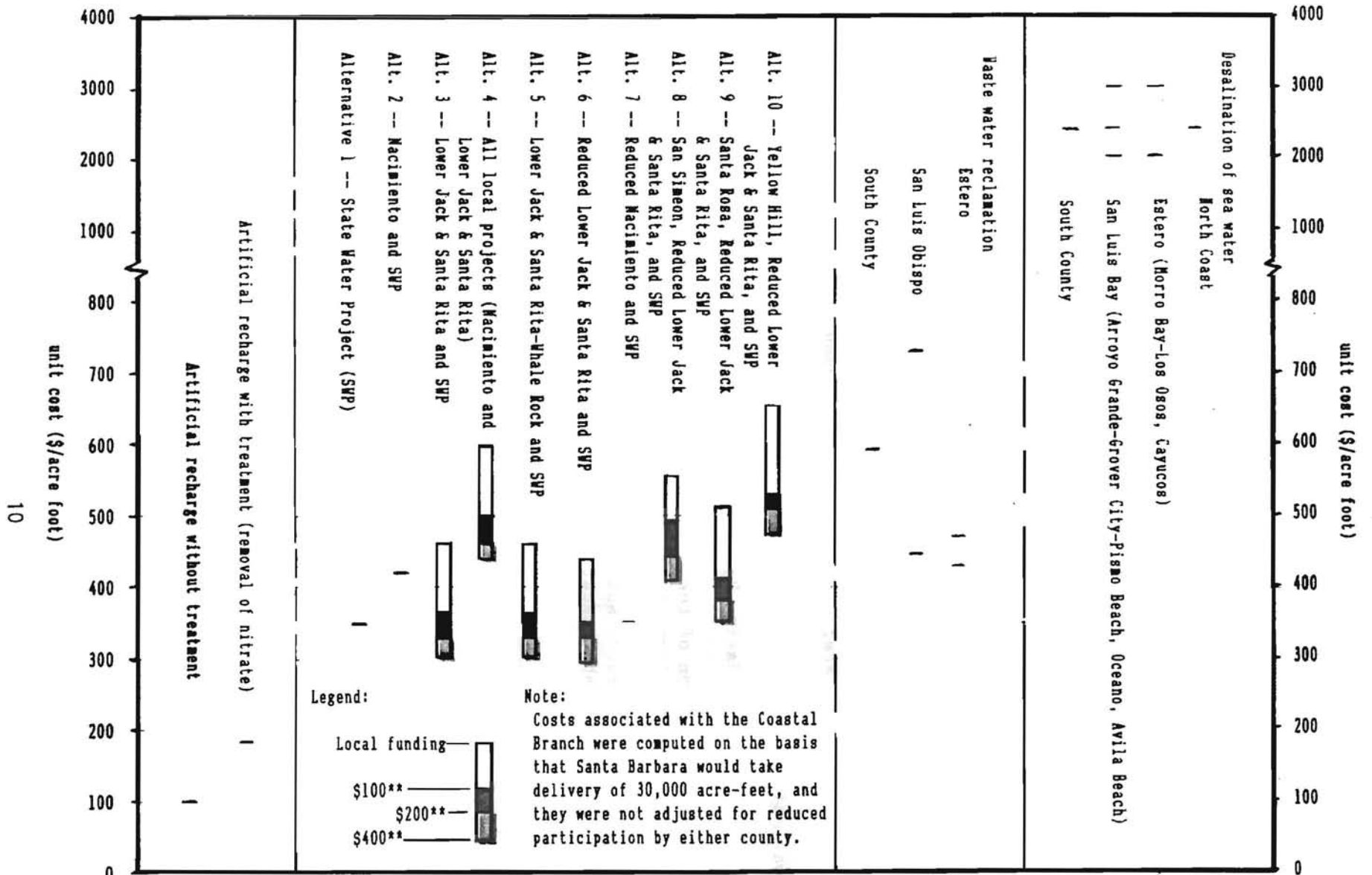
4. Existing (1985) water supplies and their dependable annual yields are: Nacimiento Reservoir, 1,300 acre-feet, of the 17,500-acre-foot entitlement; Whale Rock Reservoir, 4,400 acre-feet; Salinas Reservoir, 4,800 acre-feet; Lopez Reservoir, 8,200 acre-feet; ground water, 118,000 acre-feet; and reclaimed water, 1,500 acre-feet. This gives a total of 138,000 acre-feet annual yield. (See Figure 2.)
5. Water use estimated for 1985 exceeds the total current yield of existing supplies by about 70,000 acre-feet. This is being met by overdrafting the ground water basins. Although no specific attempt was made in this study to identify the basins that are in overdraft, Cuyama Valley Basin, Paso Robles Basin, and the Arroyo Grande-Nipomo Mesa portion of the Santa Maria Basin are believed to be in overdraft. The Edna Valley, San Simeon, and Santa Rosa Ground Water Basins have experienced shortages in dry years.
6. The supplemental water needed for 2010 is estimated to be 23,000 acre-feet and that for 2060 is estimated to be 66,000 acre-feet (the differences between the M&I demands of those years and 1985), thus continuing ground water overdraft. These estimates are based on the assumptions that agricultural water users will continue to use locally available supplies (mainly ground water), because they cannot afford the supplemental water supplies, and that M&I water users will continue

to use existing supplies to meet the 1985 level of use and can afford to purchase supplemental water to meet the demand beyond this level.

7. Average annual ground water overdraft is at present estimated to be 70,000 acre-feet. Overdrafting will continue over the years; however, the annual overdraft will be reduced somewhat by 2010 because:
  - (a) agricultural water use is projected to decline by 25,000 acre-feet and
  - (b) return flow of supplemental water is estimated to be 5,000 acre-feet (20 percent of 23,000 acre-feet). Because the water in storage in the Paso Robles Basin is estimated to be about 26 million acre-feet, overdraft in this basin does not pose critical problems at this time. However, future management plans must recognize and address the overdrafting.
8. The potential water supply elements for meeting supplemental water needs are:
  - o SWP water (through Coastal Branch), 25,000 acre-feet;
  - o Nacimiento water, 16,200 acre-feet\*;
  - o Artificial recharge of ground water basins and interception of subsurface discharge to the ocean, not estimated;
  - o Desalination of sea water for potential users, 9,200 acre-feet;
  - o Demineralization of inferior quality ground water, not estimated;
  - o Reclamation of waste water, 5,600 acre-feet;

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\*Of the 17,500-acre-foot entitlement, 1,300 acre-feet has been contracted for use within the vicinity of the reservoir, leaving 16,200 acre-feet for use by any other portion of the County. No facilities have been built thus far for delivery of this water.



\* Only the ten alternatives can be compared among themselves. Costs shown do not include treatment, local distribution, and administrative costs, which are common to all alternatives. The other supply elements are given only to provide an idea of their costs; some of these elements do include allowances for treatment and distribution.

\*\*These are the unit costs for developing SWP conservation facilities and were used to compute the avoided conservation costs for alternatives involving local projects that may be considered for inclusion in the SWP.

**FIGURE 3 - SUMMARY OF UNIT COSTS OF ALTERNATIVE PLANS AND SELECTED SUPPLY ELEMENTS \***



- o Enlargement of Salinas Dam, 450 to 1,300 acre-feet;
- o Enlargement of Lopez Dam, 640 acre-feet;
- o Enlargement of Nacimiento Dam, 3,300 to 4,000 acre-feet;
- o Watershed management and weather modification, not estimated;
- o Possible new reservoirs: Bald Top, 10,400 acre-feet; Upper Ragged Point, 17,500 acre-feet; Yellow Hill, 27,300 acre-feet; San Simeon, 18,200 acre-feet; Santa Rosa, 11,000 acre-feet; Lower Jack, 6,200 acre-feet; and Santa Rita, 6,000 acre-feet;
- o 1,500 to 2,000 acre-feet of increased ground water use in some small, distant communities where the above supplies are not economically available.

All the above supply elements can be considered as local projects that could be units of the SWP, with the exception of the SWP (Coastal Branch), Nacimiento water, and increased use of ground water. In addition, the City of Morro Bay is considering the possible damming of San Bernardo Creek for an immediate water supply.

9. Although it does not yet have facilities to take water from either project, San Luis Obispo County Flood Control and Water Conservation District is making payments for its entitlements to water from Nacimiento Reservoir and from the SWP. For the Nacimiento entitlement, payment includes \$9 per acre-foot as capital repayment for construction of the dam and approximately \$3 to \$4 per acre-foot for operation and maintenance, making the total annual payment about \$220,000. The capital portion of the cost will be fully repaid by

2004. For the SWP entitlement, payment began in 1964 with \$9,089, increased to \$547,844 by 1985, and is expected to be \$903,403 by 1991. These costs will continue to increase in the future.

10. All the streams on which the possible new dams are located are inhabited by steelhead trout.
11. Five of the seven proposed dam and reservoir sites are under the jurisdiction of the Coastal Commission.
12. Some of the sites of the proposed dams and reservoirs may be on sacred grounds of the Chumash Indian Tribe or have other archaeological value.
13. Quality of the identified surface water supplies is generally good. In terms of total dissolved solids (TDS) concentration, water from the SWP and Nacimiento Reservoir is the lowest--185 milligrams per litre (mg/L) for SWP water (sampled near Devil's Den, at the end of the Coastal Stub in Kern County, in 1984) and 250 mg/L for Nacimiento water--and that from Santa Rosa is the poorest--330 mg/L (sampled near Cambria in 1978).
14. In general, ground water quality is fair; however, a number of water quality problems do exist. For instance, high nitrate concentrations were found in the Arroyo Grande and Los Osos Basins, high level of hydrogen sulfide has been recorded in the vicinity of Paso Robles, and sea water intrusion has been detected during dry years in the Chorro and Morro Basins. These problems are being monitored by SLOCFCWCD and concerned water service agencies in the County.
15. Desalination of sea water is not, at this time, cost competitive with some of the other supply elements, as shown on Figure 3. Use of

reclaimed water for agriculture, landscaping, and certain types of industrial uses may be feasible.

16. Location of the dam in relation to active faults and thickness of the alluvium underlying the dam are factors that could influence the magnitude of the impact of an earthquake on the structure; therefore, they must be included in the seismic analysis made before a dam is constructed. The thicknesses of the alluvium under the proposed dam sites, as reported in Bulletin 18,\* range from 6 to 60 feet, with Lower Jack (6 feet) and Santa Rita (16 feet) the shallowest and Yellow Hill (60 feet) the deepest. Also, dams must be built and operated to withstand a flood of a specified size, from a return period of 1/1000 to probable maximum precipitation.\*\*

17. Ten alternative plans to meet the supplemental needs (23,000 acre-feet) that proved worthy of evaluation are:

- o Alternative 1--SWP alternative, which would use 20,900 acre-feet of SWP water and, for distant areas, an additional 2,100 acre-feet of ground water.
- o Alternative 2--Nacimientto and SWP alternative, which would use 14,700 acre-feet from Nacimientto, 6,500 acre-feet from SWP, and an added 1,800 acre-feet of ground water.
- o Alternative 3--Lower Jack and Santa Rita and SWP alternative, which would use 12,200 acre-feet from Lower Jack and Santa Rita Reservoirs, 8,700 acre-feet from SWP, and an additional 2,100 acre-feet of ground water.
- o Alternative 4--All local water

alternative, which would use 12,200 acre-feet from Lower Jack and Santa Rita, 8,800 acre-feet from Nacimientto, and an additional 2,000 acre-feet of ground water.

- o Alternative 5--Lower Jack and Santa Rita-Whale Rock and SWP alternative, which is the same as alternative 3, except Santa Rita Reservoir would be connected to Whale Rock Reservoir so the existing pipeline could deliver to the City of San Luis Obispo.
- o Alternative 6--Reduced Lower Jack and Santa Rita and SWP alternative, which is the same as alternative 3, except using only 7,000 acre-feet from Lower Jack and Santa Rita and 13,900 acre-feet from SWP.
- o Alternative 7--Reduced Nacimientto and SWP alternative, which is the same as alternative 2, except using only 7,300 acre-feet from Nacimientto and 13,900 acre-feet from SWP.
- o Alternative 8--San Simeon, reduced Lower Jack and Santa Rita, and SWP alternative, which would add 14,200 acre-feet from San Simeon Reservoir to alternative 6, with only 300 acre-feet from SWP and 1,500 acre-feet of ground water.
- o Alternative 9--Santa Rosa, reduced Lower Jack and Santa Rita, and SWP alternative, which would add 8,000 acre-feet from Santa Rosa Reservoir to alternative 6, with only 6,500 acre-feet from SWP and 1,500 acre-feet of ground water.
- o Alternative 10--Yellow Hill, reduced Lower Jack and Santa Rita, and SWP alternative, which would add 14,200 acre-feet from Yellow Hill Reservoir to alternative 6,

\*California Water Resources Board, "San Luis Obispo County Investigation", Bulletin 18, May 1955.

\*\*Hydrometeorological Report by the U. S. Weather Bureau.

with only 300 acre-feet from SWP and 1,500 acre-feet of ground water.

18. The DWR report "Santa Barbara County State Water Project Alternatives" (April 1985) indicates that taking delivery of 30,000 acre-feet of its 45,486 acre-feet of SWP entitlement through the Coastal Branch is among the least costly alternative plans for Santa Barbara County.

19. Results from the evaluation indicate the alternative plans with the least average unit costs to San Luis Obispo County are 3, 5, and 6 (\$330). These are followed by alternatives 1 (\$350), 7, and 9 (\$360). These six alternative plans include the following water supply elements: SWP and Lower Jack, Santa Rita, and Nacimiento Dams and Reservoirs. In the third rank are alternatives 2 (\$420) and 8 (\$440). Completing the rankings are alternative 4 (\$460) in fourth and alternative 10 (\$510) in fifth rank. It should be noted that these cost figures were computed with the assumption that the applicable local projects would be units of the SWP, that the unit developmental cost of SWP conservation facilities would be \$200 per acre-foot, and that the delivery to Santa Barbara County would be 30,000 acre-feet. (The unit costs shown above were not adjusted for reduced participation in the Coastal Branch. If the applicable local projects in either county are financed as units of the SWP, that county will have to mitigate the effects of increasing the cost to the other county.)

20. Under alternative 1, if Santa Barbara County's participation in the Coastal Branch dropped to zero, the unit cost of only the SWP portion to San Luis Obispo County could increase from \$300 (Santa

Barbara, 30,000 acre-feet, and San Luis Obispo, 21,000 acre-feet) to \$410 (Santa Barbara, 0, and San Luis Obispo, 21,000 acre-feet). The corresponding increase in the total unit cost (including costs of intra-county pipelines and others) would be \$350 to \$450. Furthermore, this \$450 per acre-foot of alternative 1 is among the least costly of all the alternatives in the case of zero participation by Santa Barbara County.

21. Evaluation of the results of each alternative plan indicates that the unit costs to each planning area of San Luis Obispo County vary (some significantly) from the average County unit cost, depending on the amount of delivery (size of pipes) and distance from the source to the point of delivery (users). For instance, for alternative 1, the range of costs (the SWP portion) to the planning areas is \$140 to \$480 per acre-foot and the average County cost (the SWP portion) is \$360 per acre-foot.

22. Under the criterion of least energy consumption, the rankings and the corresponding energy use are: rank 1--alternative 8 (14,200 megawatthours per year--MWh/yr.); rank 2--alternatives 10 and 9 (15,700 and 16,300 MWh/yr., respectively); rank 3--alternative 3 (17,600 MWh/yr.); rank 4--alternatives 5 and 4 (20,600 and 20,800 MWh/yr., respectively); rank 5--alternative 6 (24,500 MWh/yr.); rank 6--alternatives 2 and 7 (31,400 and 32,100 MWh/yr., respectively); and rank 7--alternative 1 (38,600 MWh/yr.).

23. In terms of least capital investment, alternative 2 ranks first with \$55 million, followed by alternatives 7 with \$57 million and 1 with \$61 million in the second rank. In the third rank,



- alternative 6 shows a \$71 million expenditure. Alternatives 5 with \$80 million, 3 with \$83 million, and 9 with \$84 million are ranked fourth. The fifth, sixth and seventh ranks are occupied by alternatives 4 with \$91 million, 10 with \$100 million, and 8 with \$114 million. It should be noted all the cost factors and economic bases are in 1984 dollars.
24. Under the criterion of highest flexibility (a measure of the amount of water remaining for future development after having implemented the alternatives in question), the rankings of the alternatives and the corresponding amount of water remaining are: rank 1--alternative 1 (89,000 acre-feet); rank 2--alternatives 2 and 7 (88,700 acre-feet for each); rank 3--alternative 6 (82,000 acre-feet); rank 4--alternatives 3, 5, and 4 (76,800, 76,800, and 76,700 acre-feet, respectively); rank 5--alternative 9 (73,500 acre-feet); and rank 6--alternatives 8 and 10 (67,200 acre-feet for each).
  25. Rankings of the alternatives from least to greatest environmental impacts are: 1, 2, 7, 6, 3, 4, 5, 8, 9, and 10. This ordering indicates that alternatives involving only pipeline construction would have less environmental effect than those involving the construction both of pipelines and of dams and reservoirs.
  26. Ranking the alternatives under the criterion of ease of implementation involved consideration not only of the environmental issues, but also of financial aspects, difficulties in construction, and legal and institutional issues. The rankings are as follows: 1, 2, 7, 3, 5, 6, 4, 8, 9, and 10.
  27. If the SWP water supply developmental cost is \$100 or less per acre-foot, alternative 1 (SWP alternative) would probably be the least costly alternative. (See Figure 3.)
  28. If the SWP water supply developmental cost is \$200 per acre-foot, alternatives 3, 5, and 6 would probably be less costly than alternative 1 by a small amount. All these alternatives include a combination of the SWP Coastal Branch and Santa Rita and Lower Jack Dams and Reservoirs. (See Figure 3.)
  29. If the SWP water supply developmental cost is \$400 per acre-foot, alternatives 3, 5, and 6 compare even more favorably with alternative 1; moreover, alternative 9 (combination of Santa Rosa, Lower Jack, and Coastal Branch) would also be competitive with alternative 1. (See Figure 3.)
  30. Use of a Water Resources Advisory Committee (and its ad hoc committee) was helpful in ensuring that the investigation was kept responsive to the needs of the entire County and that the investigators were given timely information on local conditions and concerns.

### Conclusions

Based on the foregoing findings, the following conclusions can be drawn:

1. Water supplies identified in this update study are sufficient to meet future M&I demands as projected, if required storage and transport facilities are built and if ground water basins are protected to ensure continued use.
2. In almost all categories in which the alternative plans were

- evaluated--average unit cost, capital investment, flexibility, environmental impacts, and ease of implementation--alternative 1 (which relies mainly on SWP Coastal Branch) ranks favorably.
3. Alternatives 1 and 2 would require leadtime of less than 10 years; this is less leadtime than the other alternatives because the implementation of alternatives 1 and 2 involves mainly pipelines and would cause the least environmental, legal, and institutional concerns.
  4. Seismic safety requirements, policies and regulations of the Coastal Commission and Department of Fish and Game, and the possibility of areas of archaeological significance being flooded may increase the cost and time required or otherwise limit construction of the proposed new dams. Consequently, both alternatives 1 and 2 could become more economically favorable and require less time than alternatives 3, 5, and 6 because the latter three involve the construction of dams and reservoirs.
  5. Lower Jack and Santa Rita Dams would probably be the least costly among the dams studied in meeting seismic safety requirements.
  6. Water produced by local projects as units of the SWP would be counted as a part of the San Luis Obispo County entitlement, thus replacing an equal amount of imported water.
  7. Unless it sells its entitlements to water from the SWP and Nacimiento Reservoir, San Luis Obispo County will have to continue to make payments for its entitlements, whether it accepts delivery of any of the water or not. In the case of the SWP, the payments are undergoing sizable increases.
  8. Implementation of the water conservation program in the DWR report "Recommended Water Management Plan for San Luis Obispo County Flood Control and Water Conservation District" would mean a significant reduction in water demand.
  9. The values used for overdraft of the ground water basins are based on past studies; they may now be greater or smaller than reported. Overdrafting of the basins needs to be managed and controlled by local agencies in such a way that the economic value of the resources is not impaired.
  10. Ground water basins along the coast, such as the San Simeon, Santa Rosa, Los Osos, and Edna Valley/Pismo Basins could have quantity and quality problems in meeting the growing water needs.
  11. Projects for artificial recharge of ground water basins with local surface runoff could provide additional data for evaluating the effectiveness of such projects in the County. Similarly, interception of subsurface discharge to the ocean may be evaluated for enhancing supplies for coastal communities.
  12. In-place treatment (using the ion-exchange process) of ground water with high nitrate problems can improve the quality economically (\$80 per acre-foot). This could improve the quality sufficiently to overcome this constraint on the use of ground water in several areas.
  13. Consideration should be given to the use of reclaimed water for agriculture, landscaping, and certain types of industrial uses. Consideration of desalination of sea water should be deferred until it becomes cost competitive with other

sources of water.

14. The economic advantage for San Luis Obispo County if Santa Barbara County also participates in the Coastal Branch of the SWP is substantial.

15. The formation and use of an advisory committee similar to that used during this study would be helpful in the selection and implementation of a master water plan to ensure that it serves the needs of the entire County.



