Santa Barbara County *Comprehensive Plan*

Conservation Element

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GROUNDWATER RESOURCES SECTION

Adopted May 24, 1994

~~*Amended November 8, 1994*~~

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TABLE OF CONTENTS

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PART I
INTRODUCTION

A. Purpose and Organization

The purpose of this section of the Conservation Element is to provide background information and policy direction for the conservation, development and utilization of groundwater resources in Santa Barbara County. The specific goals, policies, actions, and development standards are intended to facilitate improved coordination of groundwater supply and land use planning within the County. The County supports groundwater management by appropriate agencies in compliance with state law, although nothing in this section requires the adoption and implementation of groundwater management plans. Further, the County does not assume any authority under this section to make a determination of the water rights of any person or entity.

Part I is the Introduction and contains a brief description of the approach and review process. Part II is an Overview of Groundwater Availability and Use throughout the County. Part II was taken from Section 3.0 of the Program Environmental Impact Report (PEIR) prepared for this Element[1].

The data found in Part II regarding groundwater basins was recently revised by the Santa Barbara County Water Agency, County Planning and Development Department, local water purveyors, the PEIR consultants (Dames & Moore), information extracted and summarized from publications of the United States Geological Survey (U.S.G.S.), and a series of independent reports. These extensive documents were written in coordination with the various water purveyors within the County, Public Utilities Commission, County Health Department, City Planning Agencies and Public Works Departments, and the County Planning and Development Department. The reader is referred to Appendix E of the PEIR and to each individual report for more details regarding assumptions and data sources. A glossary of terms to assist the reader in understanding the information presented is included as Appendix A of this Element.

Part III contains Goals, Policies, Actions, and Development Standards addressing groundwater resources. These constitute the basic policy direction for the County related to groundwater, in conjunction with other related portions of the Comprehensive and Coastal Plans. They form the "heart" of this portion of the Conservation Element. Appendix material follows Part III, including an index of the oversize groundwater basin maps which accompany this text (CONS/GWB Series, 1:24,000 scale topographic base).

[1] *Final Program Environmental Impact Report 91-EIR-15, Groundwater Section, Conservation Element, Santa Barbara County Comprehensive Plan* (3 volumes). Prepared by Dames & Moore for the Santa Barbara County Resource Management Department & County Water Agency, June 1993; State Clearinghouse No. 89082310.

B. Approach and Review Process

The approach taken was to use available data and the expertise of the County's many water purveyors and water managers, to compile the information base and "test" various goal and policy options. Contact was made via letter and, in many instances, personal interviews, with some 30+ water purveyors (including city water departments) throughout the County, to elicit information and opinions early in the planning process. Subsequently, County staff and the County's consultant worked directly with the Santa Barbara County Water Purveyors Agency and others to refine a mutually acceptable set of goals and policies. With some additional changes, these were recommended by the Santa Barbara County Planning Commission for formal initiation by the Board of Supervisors as the "project" for the purpose of environmental review.

The Board of Supervisors initiated, for environmental review, the First Revised Public Draft, Conservation Element in May of 1989. During subsequent preparation of the PEIR, a broad-based working group[2] met several times to develop a wide range of policy alternatives to include in the "project description" for environmental review. A number of public workshops and hearings were held to review the PEIR and its underlying data, assumptions, and policy alternatives.

The County Planning Commission held a workshop and hearings on a revised draft of the Groundwater Resources Section between June and November 1993, and made its final recommendations to the Board of Supervisors in December 1993. The Board held several public hearings on the project in early 1994, directed additional changes, and adopted the Groundwater Resources Section as an amendment to the Conservation Element by Resolution 94-284 (case no. 84-GP-8) on May 24, 1994. The Board subsequently adopted amendments to Part III (Goals, Policies, and Implementing Actions, pp. 51 *et seq.*) by Resolution 94-527 (case no. 94-GP-14) on November 8, 1994.

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[2] This group was organized in early 1992, in response to many comments received during public circulation of the original draft PEIR in late 1991. The group was convened and assisted by County staff, but was comprised of outside parties with a wide range of particular interests and expertise related to this program. Their primary task was to develop a wider range of alternative policy statements for presentation in a revised and recirculated draft PEIR, to allow County staff and decision-makers a broader choice of options in crafting the final adopted Groundwater Resources Section of the Conservation Element.

PART II
OVERVIEW OF EXISTING GROUNDWATER RESOURCES AND USES IN SANTA BARBARA COUNTY

A. SUMMARY OF GROUNDWATER RESOURCES

1. Groundwater Basins

The information presented in this section was developed by the County Water Agency (CWA), the County Planning and Development Department (P&D), water purveyors in the County, and the United States Geological Survey (USGS). A glossary of terms used throughout this section is provided in Appendix A.

Approximately 85% of the total applied water used in the County is derived from groundwater resources. Groundwater in the County is pumped from fifteen major groundwater basins (Figures 1a and 1b, and maps CONS/GWB-1 through -6). A groundwater basin may be loosely defined as a hydrogeologic unit, capable of furnishing a substantial supply of water, containing one large aquifer or several connected and/or interrelated aquifers. The boundaries of a groundwater basin are generally defined by hydrogeologic and geologic barriers such as faults and impermeable rock units, that limit the flow of subsurface water. These boundaries do not necessarily coincide with physiographic surface features or political borders.

The general characteristics of each groundwater basin in the County are summarized in Table 1 including basin size, dominant land uses, and estimated available storage. There is a wide range in the size of the groundwater basins. Individual basins on the South Coast are up to 5,700 acres in area. North County basins encompass as much as 110,000 acres. Perennial yield of the basins ranges from less than 1,000 AFY to 100,000 AFY (gross). The South Coast basins are characterized by urban development and limited agriculture (mostly orchards and greenhouses). In contrast, the North County basins are dominated by extensive irrigated open-field agriculture and grazing lands. A more detailed description of each basin is presented in Section B of this chapter.

Also presented in Table 1 are estimates of **net** groundwater demand, perennial yield, overdraft conditions, and available storage for each groundwater basin. Estimates of these parameters were derived by P&D and the CWA (see Appendix E in the PEIR). These estimates were prepared for land use planning (project review) and groundwater basin management purposes. Below is a brief description of these parameters.

Net groundwater demand is the amount of water actually removed (i.e., pumped) from a groundwater basin after taking into account return flows. Return flow is any deep percolation of water into the subsurface that has been applied on the ground surface. Net groundwater demand may also be defined as the total amount of water pumped from a basin (gross water demand) minus the return flow. It should be noted that the net groundwater demand figures do not include water supply commitments for approved projects and vacant legal lots (future projects not needing additional discretionary County approval).

TABLE 1

SUMMARY OF ESTIMATED GROUNDWATER BASIN CONDITIONS[1]

Basin	Size	Land Use Summary	Estimated Net Groundwater Demand[2] (AFY)	Estimated Perennial Yield (AFY)	Surplus/ (Overdraft) (AFY)	Available Water In Storage (AF)
Carpinteria[3]	6,000 acres	One city; orchards, irrigated crops and greenhouses	3,535	3,865	330	50,000
Montecito	4,300 acres	Primarily low-density residential; unincorporated	1,094	1,215	121	14,400[4]
Toro Canyon[5]	700 acres	Low density residential and agriculture	122	270	148	1,600
Santa Barbara	4,500 acres	Primarily residential, industrial and commercial	424	805[6]	381	15,000
Foothill	2,900 acres	Primarily residential with minor agriculture	837	905	68	5,000
Goleta[7] (north/central)	5,700 acres	Primarily mixed urban uses; variety of agricultural uses; unincorporated	4,603	3,420	(1,183)	28,000[8]
More Ranch[9] [eastern + western unit]	502 acres [238 + 264]	Low density residential and agriculture, including greenhouses	24 [19 + 5]	84 [35 + 49]	60 [16 + 44]	600 [285 + 315]
Goleta (west)[10]	3,500 acres	Primarily mixed urban uses, variety of agricultural uses; unincorporated	255	475	220	--
Buellton Uplands	16,400 acres	Extensive agriculture, one city	2,133	1,300	(833)	153,800
Santa Ynez Uplands	83,200 acres	Three towns, one city, and other low-density residential; varied, high-value agriculture	10,998	8,970	(2,028)	900,000
Lompoc	48,600 acres	One city, unincorporated urban development, Vandenberg AFB; varied agriculture; petroleum	23,386	21,468	(1,918)	170,000
San Antonio	70,400 acres	One town; extensive agriculture; some petroleum; VAFB	15,431	6,500	(8,931)	800,000

TABLE 1 (continued)

Basin	Size	Land Use Summary	Estimated Net Groundwater Demand[2] (AFY)	Estimated Perennial Yield (AFY)	Surplus/ (Overdraft) (AFY)	Available Water In Storage (AF)
Santa Maria	110,000 acres (80,000 within Santa Barbara County)	Two cities, extensive unincorporated urban area (Santa Barbara County); extensive irrigated agriculture; petroleum	100,000	80,000	(20,000)[11]	1,100,000[12]
Cuyama	441,600 acres (81,280 within Santa Barbara County)	Extensive agriculture; some petroleum; very low population density	36,525[13]	8,000	(28,525)	1,500,000
SPECIAL BASINS/LIMITED DATA						
Ellwood to Gaviota Coastal Basins	105 sq. mi.[14]	Agriculture, primarily orchards & grazing; limited M&I	N/A	N/A	N/A	N/A
Gaviota to Pt. Conception Coastal Basins	36 sq. mi.	Agriculture, primarily grazing	N/A	N/A	N/A	N/A
Santa Ynez River Riparian Basins	12,100 acres (3 subunits)	Two cities, 7,300 acres of irrigated croplands	N/A	N/A	N/A	Storage generally maintained by capture of local runoff and by releases of prior rights water banked in Cachuma Lake.

AFY: Acre-Feet Per Year
AF: Acre-Feet

[1]Data from CWA as of July 1992, except as noted for the More Ranch Basin. It should be noted that as new information becomes available, the values presented in Table 1 evolve and change, and therefore should not necessarily be used by land use planners to determine if a specific development project will have adequate water supply. A manual that should be referenced for planning purposes is the Santa Barbara County Groundwater Thresholds Manual.

[2]Net groundwater demand is each basin's gross groundwater demand less groundwater return flow.

TABLE 1 (concluded)

[3]All values exclude Toro Canyon basin and portion of basin in Ventura County.

[4]Available storage for Montecito Basin excludes storage in Toro Canyon Sub-basin.

[5]Toro Canyon is a sub-basin of the Carpinteria Basin and is identified separately due to distinct geologic settings and limited connection to other basins. Available storage estimate from Slade Report (1991).

[6] The City of Santa Barbara estimates that the perennial yield of the Santa Barbara Basin is approximately 1,000 AFY (Steve Mack, personal commu nication, 9/92).

[7]The overdraft status of the Goleta North/Central Basin is based on pumpage by various private and public entities over the last decade. Overdraft of this basin is not projected to continue as a result of the court judgement in the Wright vs. Goleta Water District lawsuit and the efforts of the GWD to comply with the judgement. The judgement requires that the GWD return the basin to a state of hydrologic balance by 1998. On July 14, 1992 the Board of Supervisors determined that water service to Wright litigants and other holders of Can-and-Will-Serve letters from the Goleta Water District does not have the potential to cause overdraft. Project fitting in this description are, therefore, exempt from environmental review as it pertains to questions of groundwater overdraft.

[8]Available storage generally represents remaining "working storage." Goleta Water District believes that total working storage in the Basin is approximately 44,000 acre feet. The available storage has been reduced, on a long-term basis, by approximately 6,000 acre feet due to overdraft.

[9] Data from Brian R. Baca, P&D, November 3, 1993.

[10]The status of the Goleta West Basin (or Sub-basin) has not yet been resolved. This is because of uncertainty associated with several well exchange/service agreements between the GWD and landowners in the West Basin. The issue is the subject of ongoing discussions between P&D and GWD staff and is anticipated to be resolved by late 1992.

[11] The City of Santa Maria is of the opinion that the overdraft of the basin is approximately 30,000 AFY (City of Santa Maria, September 21, 1992).

[12]Santa Maria Groundwater Basin figure taken from 1978 CWA Report titled "Adequacy of Groundwater Basins," and updated in 1991 by City of Santa Maria in their Long Term Water Plan.

[13]Cuyama Demand based on 1985 DWR Land Use Survey.

[14]Watershed acreage.

Todd (1980) defined the perennial yield[3] of a groundwater basin as "the rate at which water can be withdrawn perennially under specified operating conditions without producing an undesired result." An undesired result is an adverse situation such as: (1) a reduction of the yield of a water source; (2) development of uneconomic pumping lifts; (3) degradation of water quality; (4) interference with prior water rights; or (5) subsidence. "Perennial yield" is an estimate of the long-term average annual amount of water which can be withdrawn without inducing a long-term progressive drop in water level. The term safe yield is sometimes used in place of perennial yield.

There are two basic methodologies in determining perennial yield. One method estimates safe yield by examining the hydrologic budget ("inventory analysis") of a groundwater basin and the other method examines pumpage versus change-in-storage in a groundwater basin. Both methods have been used to estimate perennial yields in the Santa Barbara County groundwater basins.

The inventory analysis calculates perennial yield by estimating the hydrologic budget of a groundwater basin. A hydrologic budget is an analysis of the amount of water entering a basin versus amount leaving a basin. The hydrologic budget of a basin generally includes hydrologic parameters for: (1) groundwater withdrawal (i.e., pumping); (2) groundwater recharge; (3) groundwater discharge, and (4) change of storage. These parameters are part of an equation that describe the hydrologic equilibrium of a groundwater basin and facilitates the interpretation of a model or inventory of groundwater flow in and out of a basin. Often the perennial yield of a groundwater basin is estimated to equal the total average groundwater recharge minus the total average natural discharge. Total recharge to a basin can be calculated by estimating the portion of rainfall that percolates into the subsurface, and the amount of stream flow and subsurface underflow that enters the groundwater basin. Return flow of imported water (e.g., Cachuma, state project water) is another source of recharge. Total discharge is calculated by estimating such factors as evapotranspiration, spring flow, net pumpage, and subsurface underflow from the basin.

The second method, an alternative to the examination of the hydrologic budget, is the pumpage vs. change-in-storage method. This method involves monitoring water levels and pumping rates in a basin for a long term period to estimate the amount of water stored in an aquifer over a period representing average hydrologic conditions. The change in storage is compared to the amount pumped and the difference is attributed to groundwater recharge or discharge. In this method the perennial yield is roughly equivalent to total net pumpage plus the net increase (or minus the net decrease) in storage.

The term overdraft is defined as the amount by which average long-term demand in a groundwater basin exceeds the perennial yield of a groundwater basin. The existence of overdraft in a basin implies that the continuation of present management practices could lead to significant adverse impacts on environmental and economic conditions.

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[3] The concept of "perennial yield" is distinguished from the older concept of "safe yield," which generally implies a fixed quantity equivalent to a basin's average annual natural recharge.

The data presented in Table 1 indicate overdraft conditions for the following basins under existing conditions (i.e., July 1993):

- Goleta (North/Central)*
- Buellton Uplands
- Santa Ynez Uplands
- Lompoc
- San Antonio
  - Santa Maria
  - Cuyama

(Basin is subject of Court judgement requiring eventual hydrologic balance.)*

The following basins are not in an overdraft condition:

- Carpinteria
- Toro Canyon
- Montecito
- Santa Barbara
- Foothill
- More Ranch
- Goleta (West)
- Ellwood-Gaviota
- Gaviota-Point Conception
- Santa Ynez Riparian

Another parameter presented in Table 1, available storage is defined as the volume of water in a particular basin which can be withdrawn without substantial environmental and economic effects. It should be noted that the values of available storage presented in Table 1 reflect the amount of water in the basin on a long term basis and not the current storage level in the basin. Theoretically, estimates of available storage along with estimated future net groundwater overdraft may be used to predict the remaining life of a groundwater basin before undesired environmental and economic effects would occur.

It should be noted that as new information becomes available the values presented in Table 1 will evolve and change. Therefore, the information presented in Table 1 should not necessarily be used by land use planners to determine if a specific development project will have adequate water supply. A document that should be referenced is the Santa Barbara County Groundwater Thresholds Manual. The manual presents the thresholds at which a project's contribution to the overuse of groundwater in a groundwater basin or bedrock aquifer is considered significantly adverse. The Thresholds Manual is used to review projects pursuant to CEQA. The groundwater thresholds were most recently revised in August 1992.

2. Gross Water Supply and Demand

A summary of the total water supplies and **gross** water demands within each groundwater basin is provided in Table 2. **Because Table 1 presents net estimates and Table 2 presents gross estimates, the information in the two tables should not be compared.**

TABLE 2 SUMMARY OF ESTIMATED GROSS SUPPLY AND DEMAND FOR GROUNDWATER BASINS[1]

PRIVATE asin	Estimated Gross Supply (AFY)[2]				Estimated Range of Gross Demand (AFY)[2]				Current Surface Water Supplies (Does Not Include State Water)
	Non-Ground[3] Water	Ground-Water	Total	% Ground-Water	Municipal & Industrial[4]	Agricultural[4]	Approx. % Agriculture	Total	
Carpinteria	2,813	4,294	7,107	60%	2,146-2,392	4,282-4,560[5]	64-68[5]%	6,428-6,952	Lake Cachuma
Montecito	3,420-3,580	1,350	4,770-4,930	27%-28%	2,948-4,324	831-1,250	22%	3,779-5,574	Lake Cachuma, Doulton Tunnel, Fox & Alder Creeks, Jameson Lake, Picay Well
Toro Canyon[6]	--	300	--	--	--	--	--	--	(Note: Service by MWD)
Santa Barbara[7,8]	10,200-18,400	847[9]	11,047-19,247	7%-14%	8,880-16,280	120	1%	9,000-16,400	Lake Cachuma, Gibraltar Reservoir, desalination, reclamation
Foothill[11]	--	950	--	--	--	__	__	__	Lake Cachuma, Gibraltar Reservoir, desalination, reclamation (Note: there is limited service by City of Santa Barbara)
Goleta[12] (north/central and west)	9,972	4,100	14,072	29%	10,559-13,378	3,818[10]	22-27%	14,377-17,196	Lake Cachuma, Glen Annie Reservoir, El Capitan Reservoir, McCoy Diversion
More Ranch[13]	--	84	--	--	24	--	--	--	Same as for Goleta basin above (GWD customers)
Santa Ynez Uplands	3,430-4,200	11,500	14,930-15,700	73%-77%	1,634-2,096	13,418[10]	86-89%	15,052-15,514	Lake Cachuma and riparian underflow
Buellton Uplands	900	1,766	2,666[14]	100%	955-1,200	2,502[10,14]	68-72%	3,457-3,617	Santa Ynez River riparian underflow.
Lompoc	0	28,537	28,537	100%	9,444-11,517[15]	23,000[10,16]	67-71%	32,444-34,517	None
San Antonio	0	8,667	8,667	100%	3,380-4,477	17,310[10]	79-84%	20,690-21,787	None
Santa Maria	0	119,000	119,000	100%	24,600-	122,208[10]	81-83%	146,808-	None

TABLE 2 (continued)

PRIVATE asin	Estimated Gross Supply (AFY)[2]				Estimated Range of Gross Demand (AFY)[2]				Current Surface Water Supplies (Does Not Include State Water)
	Non-Ground[3] Water	Ground-Water	Total	% Ground-Water	Municipal & Industrial[4]	Agricultural[4]	Approx. % Agriculture	Total	
					27,826			150,034	
Cuyama	0	10,667	10,667	100%	182-282	48,700[10,17]	99%	48,882-48,982	None
SPECIAL BASINS LIMITED DATA:									
Ellwood - Gaviota	0	6000	6000	100%	--	--	--	--	None
Gaviota - Pt. Conception	0	2000	2000	100%	--	--	--	--	None
Santa Ynez Riparian	0	varies	varies	100%	--	--	--	--	None
Summerland[18]	321	0	321	0%	152-196	62-168			Lake Cachuma

AFY = acre-feet per year.

[1]Data from CWA, P&D, Water Purveyors. Data presented in this table is to be used for illustrative purposes. The values presented are rough estimates and are always evolving and changing. The estimates should not be used by land use planners to determine if a specific project will have adequate water supply. The groundwater data presented is representative of physical characteristics and empirical circumstances, and is not intended to imply either the existence or the lack of any legal rights by districts, municipalities, other purveyors, landowners, or other parties or entities.

[2]Figures of Gross Supply and Gross Demand do not account for return flow.

[3]Range for Non-Groundwater Gross Supplies derived from estimates presented in Cosby Report and estimates by CWA (Santa Ynez River Model Runs).

[4]Figures for range of estimated Gross Demand based on estimates presented in Cosby Report (Tables 4 and 5) and 1991 data collected from Water Purveyors except where noted.

TABLE 2 (concluded)

[5]Robert Lieberknecht (personal communication, 7/92) reported that Carpinteria CWD used 68% of Gross Demand for Agricultural Purposes in 1991 (i.e., 4,560 AF)

[6]Figures for Toro Canyon Basin are included in figures for Montecito Basin.

[7]Gross supply and demand figures reported by Steve Mack, personal communication, 9/92.

[8]These figures include the Foothill basin; however, the Foothill Basin should be considered a separate hydrogeologic unit. The current supply estimate for Santa Barbara Basin includes 400 AFY from the Foothill Basin, 1,200 AFY of reclaimed water and 3,000 AFY of desalinated water.

[9] According to the City, actual production by the City in any one year would range from 0 to 4,500 AF. Note that 400 AFY of the 950 AFY yield of the Foothill Basin is imported into the Santa Barbara Basin.

[10] Assumes agriculture use remains constant (i.e., Cosby Report values (Tables 4 and 5) are equivalent to 1991 values).

[11]Figures for Foothill Basin are currently included in figures for City of Santa Barbara Basin.

[12]Includes both Goleta North/Central and Goleta West Basin. Supply figures presented were reported in Goleta Community Plan EIR. Gross non-groundwater supply includes approximately 250 AFY of imported groundwater.

[13]All pumpage from the More Ranch basin (24 AFY) is for M&I use by private pumpers. Approximately 120 AFY of additional water is provided by the Goleta Water District for overlying agricultural and residential uses; this demand is included in the figures previously included in this table for the Goleta basins.

[14] Based on Cosby Report (Table 5) and Baca (1991). Supply figure includes 900 AFY pumped from the S.Y.R. riparian basin by the City of Buellton.

[15]Includes groundwater imported from San Antonio Basin by Vandenberg Air Force Base.

[16]Based on 21,000 AFY, as reported in USGS Water Resources Investigation Report 91-4172, plus 2,000 AFY used in Santa Rita Valley, as reported by SBCWA (1977).

[17]Source: 1985 DWR Land Use Survey.

[18]Denotes Summerland Water District (not a groundwater basin).

The data used to develop estimates presented in Table 2 were originally collected from water purveyors located in the County. The water purveyor(s) that pump from individual groundwater basins or service areas that overlie individual basins are shown in Table 3. The data collected by the water purveyors were compiled (and analyzed) by P&D and the CWA to estimate gross water supply and demand. The range of gross supply for non-groundwater sources was compiled by the CWA from the Santa Barbara County Growth Inducement Potential of State Water Importation Report (Cosby, 1991). Estimates of gross groundwater supply are equivalent to estimates of gross perennial yield.

The range of gross water demand for municipal & industrial (M&I) use reflects water use during water conservation years under drought conditions (lower limit shown) and water use during normal water years under normal weather conditions (upper range shown). Gross water demand during drought conditions was derived by using 1991 gross water demand data supplied by the water purveyors to CWA and from data presented in the Santa Barbara County Growth Inducement Potential of State Water Importation Report (Cosby, 1991). Gross water demand during normal water and weather conditions was compiled from Cosby (1991).

As shown in Table 2, the South Coast basins of Carpinteria, Montecito, City of Santa Barbara, Foothill, Goleta and Santa Ynez Valley receive a combination of surface and groundwater supplies; in all other basins in the County users rely completely on groundwater resources. The major non-groundwater supplies are Lake Cachuma, Gibraltar Reservoir, Jameson Lake, and the "temporary" desalination plant in the City of Santa Barbara; other minor sources include wastewater reclamation and stream diversions. The approximate percent of total demand allocated to agricultural uses for each basin ranges from 1% in the City of Santa Barbara Basin to 99% in the Cuyama Basin.

It should be noted that the values presented in Table 2 are rough estimates and are always subject to revision as new information becomes available. The estimates should not be used by land use planners to determine if a specific project will have adequate water supply.

3. State Water And Future Water Commitments

In June 1991, voters approved the importation of State Water for certain portions of the County. Completion of the State Water Project (SWP) facilities and delivery of entitlement in the future could reduce the overdraft in all major groundwater basins in the County except the Cuyama basin, which does not have any water purveyor which will receive State Water. Table 3 presents the expected entitlement of State Water to each water purveyor. Existing entitlements range from 50 AFY (Santa Barbara Research) to as high as 16,200 AFY (City of Santa Maria), though actual water deliveries may be less than the entitlement in any given year depending on a number of factors, primarily weather. Factors other than drought that may cause short term delivery reductions of SWP water include: (1) equipment failure; and (2) natural disasters such as floods and earthquakes. Other factors which affect the long term reliability of the State Water Project include timing of additional SWP storage facilities, ongoing environmental challenges to the SWP, and eventual connections of all entitlement holders.

TABLE 3

SUMMARY OF WATER PURVEYORS, STATE WATER ENTITLEMENTS, SUPPLEMENTAL SUPPLY, AND COMMITMENTS

PRIVATE Groundwater Basin	Water Purveyors[1]	Entitlements of State Water (AFY)[2]	Future Supplemental Supply		Gross Water Supply Commitments (AFY)[2]
			Desalinated	Reclaimed	
Carpinteria	Carpinteria CWD	2,000	--	--	310
Montecito	Montecito WD	2,700[3]	1,250	--	608
Toro Canyon	Montecito WD	--[3]	--[3]	--	105
Santa Barbara	City of Santa Barbara	3,000[4]	--[5]	--[5]	250-300[6]
Foothill	City of Santa Barbara	--[4]			
	La Cumbre Mutual	1,000[7]	--[4,8]	--[4,8]	214
	Goleta WD	--[8]			
Goleta (North/Central and Western Basins, More Ranch Basin[9])	Goleta WD	4,500[8]	3,069[8]	1,000[8]	
	La Cumbre Mutual	--[7]			321
	Santa Barbara Research	50			
Buellton Uplands	City of Buellton	578[10]	--	--	119
Santa Ynez Uplands	Santa Ynez Improvement District #1	2,000[11]	--	--	--
Lompoc	Vandenberg Air Force Base	5,500[12]	--	650[13]	--
	City of Lompoc	0			
	Mission Hills CSD	0			

TABLE 3 (continued)

PRIVATE Groundwater Basin	Water Purveyors[1]	Entitlements of State Water (AFY)[2]	Future Supplemental Supply		Gross Water Supply Commitments (AFY)[2]
			Desalinated	Reclaimed	
	Vandenberg Village CSD	0			
San Antonio	Los Alamos CSD Vandenberg Air Force Base	0 --[12]	--	--	--

<u>TABLE 3</u> (continued)

Santa Maria	City of Santa Maria	16,200	--	--	--
	Casmalia CSD	0			
	Southern California Water Company	500[14]			
	City of Guadalupe	550			
Cuyama Valley	Cuyama CSD	0	--	--	--
Special Basins					
Ellwood - Gaviota	Morehart Land Co.[15]	200	--	--	--
Gaviota Point Conception	--	--	--	--	--
Santa Ynez Riparian	City of Buellton	--[10]			
	Santa Ynez Improvement District #1	--[11]	--	--	--
	City of Solvang	--[11]			
Summerland[16]	Summerland CWD	300	--	--	--

[1]Water purveyors that remove groundwater from the groundwater basin or service area overlying the groundwater basin.

[2]Source of data: CWA. Reliability analysis of state water presented in Coastal Branch EIR (DWR, 1991). Actual annual deliveries may be less than the reported entitlement (see section 3.1.3). Expected beginning delivery date of State Water is August 1996.

[3]Montecito WD services the Toro Canyon area. Expected delivery of State Water to Montecito Water District is 2700 AFY. The water district is also expected to participate in the Santa Barbara City Desalination project.

[4]City of Santa Barbara pumps groundwater from the Foothill Basin and City of Santa Barbara Basin. The City expects the average draw from the Foothill Basin will be 400 AFY but, during severe drought years draw from the basin may be as much as 2,000 AFY. Entitlement of State Water to the City is 3,000 AFY.

TABLE 3 (footnotes, continued)

[5]The City of Santa Barbara has an estimated 1,200 AFY supply of reclaimed water. In addition, the City of Santa Barbara currently has an allotment of 3,000 AFY of desalinated water. These estimates were included in the gross supply for City of Santa Barbara Basin in Table 2.

[6] Source: Steve Mack, City of Santa Barbara, personal communication, 9/92.

[7]La Cumbre Mutual pumps water from both the Foothill Basin and Goleta Basin. Expected delivery of State Water to the purveyor is 1,000 AFY.

[8]Goleta Water District services area overlying the Foothill Basin and Goleta Basin. The district pumps groundwater from the Goleta Basins. Expected delivery of State Water to the purveyor is 4,500 AFY.

[9]The More Ranch Basin is within the Goleta Water District's service area, although the GWD produces no water from the basin.

[10]City of Buellton pumps from both the Buellton Uplands Basin and the Santa Ynez Riparian Basin. Expected delivery of state water to the purveyor is 578 AFY.

[11]The Santa Ynez Improvement District #1 pumps from the Santa Ynez Riparian Basin and the Santa Ynez Uplands Basin. The expected delivery of state water to the Santa Ynez Improvement District #1 is 2,000 AFY. The district plans to use only 500 AF of State Water entitlement and sell 1,500 AF to City of Solvang. The City of Solvang pumps from only the Santa Ynez Riparian Basin; however, it does receive some groundwater derived from the Santa Ynez Upland Basin from Santa Ynez Improvement District #1.

[12]Vandenberg Air Force Base pumps from the Lompoc Basin and the San Antonio Basin. Expected delivery of State Water to the purveyor is 5,500 AF.

[13]Source: Cosby, 1991.

[14]As of January 1994, the water company was negotiating with the Central Coast Water Authority for actual annual deliveries of 500 AF, with the possible ability to purchase surplus water (when available) of up to another 2500 AFY (R. Brett, 1/27/94; D. Masnada, 1/28/94).

[15]Services Naples.

[16]Denotes Summerland Water District (Not a groundwater basin).

With existing facilities, long-term average annual M&I deliveries are estimated to be 87% of entitlement according to the Department of Water Resources. However, based on experiences with the most recent drought, fisheries concerns, and water right challenges to the State Water Project, some local environmental groups have suggested that the average annual deliveries may be substantially less than 87% of the entitlements shown in Table 3.

The Coastal Branch, Phase II EIR presents an analysis of the reliability of the SWP to deliver water to Santa Barbara County. The Department of Water Resources selected two years for analysis: the years 2000 and 2010. The year 2000 was selected because it is the likely date in which the Coastal Branch Project would be completed. The annual State Water entitlement for the year 2000 is about 3.7 million AFY. The year 2010 was selected because it represents a year when the demands upon the SWP will approach its maximum annual water entitlements of 4.2 million AFY. The analysis of reliability suggested that with existing facilities and a 3.7 million AFY demand, a 60 percent chance exists for SWP to deliver 3 million AFY. With additional planned facilities and a 4.2 million AFY demand the analysis indicated that a 65 percent chance exists for delivery of 4 million AFY in the year 2010.

In addition to expected deliveries of State Water, the City of Santa Barbara recently constructed a desalination plant which is expected to supplement water supplies in groundwater basins serviced by the City of Santa Barbara, the Goleta Water District (GWD) and the Montecito Water District (MWD) (Table 3). The City currently plans to convert the temporary desalination plant, which has a maximum production capacity of 10,000 AFY, into a permanent facility. The City of Santa Barbara, the GWD and the City of Lompoc also have water reclamation projects that are either projected to or currently supplement their water supplies (Table 2 and Table 3).

Table 3 also presents future water supply commitments such as approved projects and vacant legal lots. Future water commitments in the basins could increase overdraft in some of the groundwater basins at some point in the future.

B. GROUNDWATER BASINS IN SANTA BARBARA COUNTY

This section of the report presents a more detailed overview of the existing characteristics and status of groundwater resources in Santa Barbara County. This overview represents an update of Appendix B of the First Revised Public Draft Conservation Element: Groundwater Resources Section based on data developed by the CWA as of June, 1993. Appendix B of the original Groundwater Resources Section was compiled in 1986 and relied heavily on studies completed by the CWA in, or prior to, 1977. In the past several years, the CWA and P&D have updated the supply/demand status of most of the basins in the County, including several basins which were not discussed in the original appendix (i.e., Buellton Uplands, Foothill and Toro Canyon basins). These basins are under continual study and further updates of the data presented below are anticipated, including changes due to the availability of State Water. Hence, many of the estimates of demand, safe yield, overdraft, and storage will require further refinement, in consultation with local water purveyors, as new information becomes available.

1. **Carpinteria Groundwater Basin**

Description of the Basin

The Carpinteria Basin underlies approximately 6,000 acres between the base of the Santa Ynez Mountains and the Pacific Ocean in a strip of land about seven miles long and up to two miles wide. The watershed is about 37 square miles with five major streams. The Rincon Fault is the main structural feature of the Carpinteria Basin. Most of the basin lies in the structural low (downdropped area) north of the fault. A sequence of marine and non-marine sediments up to 4,000 feet thick filled this structural low as movement occurred on the fault. This sequence is designated Storage Unit #1. South of the Rincon Fault is a thin section of sedimentary rocks (up to 500 feet thick) designated Storage Unit #2. The fault forms a hydrologic barrier between the two units. The water bearing deposits are included in the following five geologic formations, listed from youngest to oldest: Older and Younger Alluvium, Terrace Deposits, Carpinteria Formation, Casitas Formation, and Santa Barbara Formation.

Four distinct aquifers (or production zones) have been identified in Storage Unit #1. One is within the Carpinteria Formation; three are within the Casitas Formation. These aquifers are hydrologically connected. In Storage Unit #2, the main source of water is the Santa Barbara Formation. The Casitas Formation is the generally regarded as the principal source of groundwater water from the basin.

Land Use

The City of Carpinteria is the largest population center in the basin; however, there are scattered pockets of residential development outside the city. Agriculture is the dominant feature in the valley with a great variety of crops being grown. These including orchards (avocado, lemon, walnut); nurseries (chrysanthemums, gypsophilia, orchids, and other ornamentals); and irrigated crops. There are also numerous greenhouses.

Current Overdraft and Supply/Demand Status

The figures presented in this section are revised from those presented in the 1988 Environmental Impact Report on the Carpinteria Water Allocation Program (88-EIR-12) based on analysis conducted by the CWA and P&D between 1990 and 1992 (see Appendix E in Revised Draft PEIR). Results are reported in a letter dated August 27, 1990 (Revised 1-17-91) authored by Brian R. Baca (P&D) and Jon Ahlroth (CWA). Net groundwater demand and perennial yield of the Carpinteria Groundwater Basin were estimated to equal approximately 3,535 AFY and 3,865 AFY, respectively. These estimates represent a net groundwater surplus of 330 AFY in the basin (Table 1).

Water supplies available to the Carpinteria area include groundwater and the 10.938% entitlement to the Cachuma Project held by the Carpinteria County Water District (CCWD). At the current safe yield mode of operation (i.e. no drought shortages) of 25,715 AFY, long-term yield available to the CCWD is 2813 AFY (see Table 2). The total estimated gross supply of water, taking into account both gross perennial yield of the Carpinteria Basin and surface water supplies, was estimated to be approximately 7,107 AFY (Table 2). About 60% of the total estimated gross supply to the basin is comprised of groundwater.

In addition to current water supplies, the Carpinteria CWD has contracted for an entitlement of 2,000 AFY from the State Water Project. Delivery of this supplemental water is anticipated to begin in 1996

(Table 3). The existing surplus of supply in the Carpinteria area would be increased upon the arrival of State Water (see Table 1).

Estimated gross demand in the basin was estimated to range between approximately 6,428 to 6,952 AFY. Agriculture accounts for about 64-68% of the total gross demand in the basin (Table 2).

Water Quality

Structural and stratigraphic features present in the Carpinteria Basin appear to limit migration of seawater into the deeper, primary aquifers of the basin. The Rincon Creek Fault acts as a barrier against intrusion into the lower zones of Storage Unit #1. A thick sequence of clay-rich deposits present near the surface on the oceanward side of the basin serves as a confining layer which greatly limits the potential for downward infiltration of seawater. Similar circumstances are present for Storage Unit #2; impermeable bedrock forms a barrier along the seaward side of this unit and a clay-rich confining layer effectively prevent infiltration from above.

Water quality tests conducted over the past 40 years have shown that basin chloride levels are generally low: less than 100 mg/l. Shallow wells in the western part of the basin have historically encountered water with chloride concentrations from 100 to 200 mg/l. Past and recent investigators attribute this relatively high concentration to the chemical nature of the recent sediments (e.g. connate water content), local degradation by irrigation return flows and/or minor amounts of degradation due to direct contact of the shallow deposits with seawater.

The TDS concentrations in the groundwater have been increasing since 1940, rising by about 300 mg/l over levels then measured. Recent water quality analysis performed by the Carpinteria Water District, indicated TDS level ranging from 436 to 980 mg/l. Degradation of near surface aquifers by infiltration of irrigation water and septic wastewater into the recharge area of the basin has been ongoing. Nitrates have been detected at relatively high levels (greater than 10 mg/l). This is a clear indication that degradation due to irrigation return flows is occurring.

Existing Management Plans/Activities

No artificial recharge programs are now underway in this basin. Water level and quality monitoring are performed by the Carpinteria County Water District and the USGS.

2. **Montecito Groundwater Basin**

Description of the Basin

The Montecito Groundwater Basin encompasses 4,300 acres within a narrow strip of land between the Santa Ynez Mountains and the Pacific Ocean. It is bounded on the east by faults and bedrock outcrops and on the west by a designated line drawn across the connection with the Santa Barbara Groundwater Basin. Six major streams drain into the basin including the Cold Springs, Hot Springs, Oak, San Ysidro, Buena Vista and Romero/Picay Creeks.

The Santa Ynez Mountains are comprised of steeply-dipping sedimentary rocks of Cretaceous to Miocene age. Unconsolidated alluvial fan deposits of Pliocene to Recent age overlie the older bedrock along the coastal plain. These unconsolidated non-marine deposits constitute the Montecito Groundwater Basin. Geologic units include, from oldest to youngest, the Casitas Formation (the primary aquifer), older gravels and alluvium. The marine Santa Barbara Formation may underlie the Casitas near the coast but is not tapped by wells in this basin. Structurally, the east-west trending Arroyo Parida and Montecito Faults separate the basin into three storage units. Water level and water quality differences between the storage units document the sealing nature of the faults. The thickest sections of water-bearing sediments are present in the structural lows (downdropped blocks) north of the Arroyo Parida Fault and south of the Montecito Fault.

Land Use

The Montecito area is a residential community with large parcel sizes (one or more acres). Agriculture is not common and is limited to scattered avocado and citrus orchards.

Current Overdraft and Supply/Demand Status

The groundwater basin conditions listed in Table 1 are those estimated by Hoover (1980), and the CWA and P&D in July, 1992. Net groundwater demand and perennial yield in the Montecito Groundwater Basin was estimate to equal approximately 1,094 AFY and 1,215 AFY, respectively. These estimates represent a net groundwater surplus of approximately 121 AFY in the basin (Table 1).

The supply/demand status of the Montecito Basin was the subject of concerted analysis in late 1989 and early 1990. Following a series of Technical Advisory Committee meetings between the County and the MWD, a letter report was prepared by P&D on February 21, 1990 which included estimates of long-term supply, current demand and commitments to approved projects and contractual obligation for the area within the boundaries of the MWD. The Toro Canyon Sub-basin, hydrologically a portion of the Carpinteria Groundwater Basin, lies within the service area of MWD and is discussed separately in a subsequent section of this report. The Montecito Basin is essentially coincident with the Montecito Planning Area used for the update of the Montecito Community Plan undertaken in 1991. The figures used herein reflect minor revisions of the 1990 analysis as incorporated into the Community Plan EIR. All other sources of supply available to the MWD, including Cachuma Lake, Jameson Lake, Doulton Tunnel, Fox and Alder Creeks, and the Picay bedrock well, were examined in this study.

The total estimated gross supply of water for the basin was recently estimated to range from approximately 4,770 to 4,930 AFY (Table 2). Approximately 28% of the total estimated gross supply to the basin is comprised of groundwater. In addition to these water supplies, the MWD has contracted for an entitlement of 2,700 AFY from the State Water Project. Delivery is anticipated to begin in 1996 (Table 3). MWD has signed up with the City of Santa Barbara for up to 1,250 AFY for the next five years from the desalination project (Table 3). Allocated supplies from the temporary desalination plant are not being utilized by MWD, and are currently anticipated to end upon State Water deliveries.

Estimated gross demand in the basin was estimated to range between approximately 3,779 to 5,574 AFY. Agriculture accounts for about 22% of the total gross demand in the basin (Table 2).

<u>Water Quality</u>

Based on recent analysis conducted by the MWD, groundwater in the basin is characterized by moderate TDS concentrations (423-954 ppm). However, some wells located in the southwestern corner of Montecito Basin are characterized by TDS concentrations up to 3,630 ppm and chloride concentrations up to 2,190 ppm. The high TDS and chloride concentrations indicate salt water intrusion has occurred in shallow zones in this area. The offshore Rincon Creek thrust fault is thought to effectively seal the lower aquifers, although hydraulic communications with the shallow zones may potentially result in some degradation of the deeper aquifers.

<u>Existing Management Plans/Activities</u>

MWD obtained ownership of two wells and water rights for the Edgewood Ranch properties in the Toro Canyon area in exchange for an increased allocation of metered water. MWD intends to use these wells as a conjunctive use facility; Cachuma spillwater (when available) is to be injected into the basin and later "withdrawn" when needed. These wells have not yet been used for injection or extended periods of production.

3. **<u>Toro Canyon Groundwater Sub-basin</u>**

<u>Description of the Basin</u>

Toro Canyon Sub-basin encompasses about 700 acres along Toro Creek. The sub-basin is a subunit of the Carpinteria Groundwater Basin. The geology of this basin is essentially the same as that described for the Montecito Basin (above). This sub-basin is treated separately because it has only a limited hydrologic connection with the Carpinteria Basin, it lies outside of the Carpinteria Water District, and it lies outside of the Montecito Planning area.

Land Use

The Toro canyon area includes residential and agricultural land uses. Field crops (flowers), orchards (avocado and lemon) and irrigated turf (polo fields) constitute the local agriculture. Large residential lots dominate the remainder of this area.

Current Overdraft and Supply/Demand Status

The Toro Canyon area is served by the MWD from general district supplies and through private pumpage. Demand on groundwater resources was analyzed based on the current pumpage and potential future use of parcels not served by MWD (an exception would be the Edgewood Ranch). MWD holds the water rights to this property (already served district water) and may pump from the Toro Sub-basin to satisfy its allocation.

As shown in Table 1, the perennial yield of the groundwater basin is 270 AFY (net) (modified from Hoover, 1980). Based on an estimated net groundwater of demand of 122 AFY, the basin has a current net groundwater surplus of approximately 148 AFY.

The MWD is expecting the delivery of State Water Project beginning in 1996 (see previous section on Montecito Basin and Table 3) and may participate in a future permanent City of Santa Barbara desalination project. The expected State Water delivery and participation in a Santa Barbara desalination project could result in reduced pumpage, and an increased surplus, in this sub-basin (see Table 1).

Water Quality

This sub-basin is part of Storage Unit #1 of the Carpinteria Basin. Refer to Carpinteria Basin Section (1).

Existing Management Plans/Activities

The conjunctive use facility planned for the injection of Cachuma spillwater is discussed in the section on the Montecito Basin. The wells are located in the center of the Toro Canyon Sub-basin.

4. **Santa Barbara Groundwater Basin**

Description of the Basin

Santa Barbara Basin encompasses about 4,500 acres in or around the City of Santa Barbara. This basin was originally separated into three storage units (I,II,III) by the Mesa and Mission Ridge Faults. Based on the USGS report (Freckleton, 1989), Storage Unit II is now part of the newly designated Foothill Basin (see following section on Foothill Basin).

Structurally, Storage Units I and III are bounded by faults on all sides with the exception of a designated divide with the Montecito Basin located to the east. The two Storage Units are separated by the northwest trending Mesa fault. An offshore fault is thought to seal lower basin aquifers from salt water encroachment, however, the fault may or may not exist based on recent water quality tests.

The primary aquifer in the Santa Barbara Groundwater Basin is the unconsolidated deposits of the Santa Barbara Formation. The Santa Barbara Formation is generally comprised of marine sands, silts and clays. In Storage Unit I the unconsolidated deposits are up to 1,000 feet thick resting unconformable on Tertiary consolidated rocks. Two main producing zones (the upper and lower producing zones) have been identified in City wells. The major sources of recharge are infiltration of precipitation, seepage from streams subsurface inflow from consolidated rocks and infiltration of return flows of water imported to the City.

Land Use

Urban residential, industrial and commercial uses are dominant in Storage Units I and III.

Current Overdraft and Supply/Demand Status

The groundwater basin conditions listed in Table 1 are based on USGS studies (Martin and Berenbrock, 1989; and Freckleton, personal communication, July, 1992). Net groundwater demand and perennial yield of the Santa Barbara basin are estimate to equal approximately 424 AFY and 805 AFY, respectively. These estimates represent a net groundwater surplus of 381 AFY in the basin (Table 1).

The current water supplies for the City are Lake Cachuma, Gibraltar Reservoir, reclamation, desalination and groundwater. Total estimated gross supply for the City, including the Foothill Basin, is estimated to range between approximately 8,900 to 16,500 AFY (Steve Mack, City of Santa Barbara, personal communication, September, 1992). This range of estimated gross supply includes an estimated 1,200 AFY of reclaimed water use within the City basins and the Foothill Basin and a 3,000 AFY allotment of desalinated water from the City of Santa Barbara Desalination Plant. Groundwater accounts for only 7% to 14% of the total supplies (Table 2). In addition to current water supplies the City of Santa Barbara holds an entitlement of 3,000 AFY from the SWP (Table 3). The City of Santa Barbara's various water supplies are part of the City's Long-Term Water Supply Program (LTWSP) and are currently undergoing environmental review.

The total estimated range of gross water demand for the basin is approximately 9,000 to 16,400 AFY. Agricultural uses account for only 1% of the gross demand (Table 2).

Water Quality

Water quality in the City of Santa Barbara Basin has been undergoing extensive study and monitoring by the USGS since the late 1970's. Two extensive reports were prepared: Hutchison (1979) and Martin (1984). The latter has indicated that from July 1978 to January 1980, water levels in the southern part of the basin declined more than 100 feet. These water levels declines resulted from increases in municipal pumping since July, 1978 as part of a testing program designed to determine the usable quantity of groundwater in storage. The pumping has caused water-level declines to altitudes below sea level in the main water-bearing zones. As a result, the groundwater basin would be subject to saltwater intrusion if the study period pumpage were maintained or increased. Other data indicate that saltwater intrusion has degraded the quality of the water yielded from six coastal wells during the study period with four yielding water with chloride concentrations in excess of 1,000 milligrams per liter.

Groundwater not affected by saltwater intrusion in the upper producing zone of Storage Unit I generally has moderate TDS levels ranging from 415 to 950 mg/l. The lower and middle producing zones of Storage Unit I also appeared to have moderate levels of TDS ranging from 405 to 974 mg/l, although several wells had fairly high TDS concentrations (up to 6,450 mg/l). Groundwater samples collected from the lower producing zones of Storage Unit III also had moderate levels of TDS detected, generally ranging between 750 to 815 mg/l.

Other issues in the basin that could potentially lead to significant degradation of groundwater quality include migration of poorer quality water from the deeper Tertiary zone and PCE contamination from near surface sources.

Existing Management Plans/Activities

Management alternatives presented by the USGS (Martin, 1984) for controlling saltwater intrusion in the Santa Barbara area included: (1) decreasing municipal pumping; (2) increasing the quantity of water available for recharge by releasing surplus water from surface reservoirs to Mission Creek; (3) artificially recharging the basin using injection wells; and (4) locating municipal supply wells farther from the coast and spacing them farther apart in order to minimize drawdown. All four alternatives have been implemented by the City (City of Santa Barbara, 1992). In addition the City's Long-Term Water Supply Program (LTWSP) is currently under review.

5. **Foothill Groundwater Basin**

Description of the Basin

The Foothill Basin was the subject of a hydrologic investigation by the USGS, the results of which were recently published (Freckleton, 1989). This study found that the former East Sub-basin of the Goleta Groundwater Basin and Storage Unit # II of the Santa Barbara Basin together represent a separate hydrologic unit designated the Foothill Basin. It encompasses about 2,900 acres within the northern part of the City of Santa Barbara and in the northeastern part of the unincorporated Goleta area.

The Foothill Basin is bounded on the south by the Modoc, Mesa and Mission Ridge Faults and on the north by bedrock exposed on the south flank of the Santa Ynez Mountains. Unconsolidated Pliocene to Pleistocene marine sand, silt and clay characterize the Santa Barbara Formation, the principal aquifer of the basin. This unit is up to 400 feet thick and is under confined conditions where a low permeability zone separates it from the overlying Quaternary alluvium. Recharge to the Foothill Basin occurs as stream seepage, infiltration of precipitation and subsurface inflow from consolidated rocks of the Santa Ynez Mountains.

Land Use

The Foothill Basin area is dominated by residential development. Avocado and lemon orchards are present along the northern edge of the basin.

Current Overdraft and Supply/Demand Status

Freckleton (1989) prepared a detailed computer model of the Foothill Basin and estimated annual recharge to be approximately 905 AFY (see Appendix E in the Revised Draft PEIR). This figure has been adopted by the CWA and P&D as the net perennial yield of the basin (Table 1). Based on an estimated net groundwater demand of 837 AFY, the basin currently has a net groundwater surplus of approximately 68 AFY.

Because gross supply/demand estimates for the basin are not readily available these estimates were included in the City of Santa Barbara Groundwater Basin (Table 2). The land overlying the Foothill Basin is serviced mainly by two municipal water purveyors: the City of Santa Barbara and the Goleta Water District. The City of Santa Barbara pumps from the basin, whereas, the Goleta Water District has minimal use of the basin. The City of Santa Barbara estimates that the city's long-term average draw from the basin will be 400 AFY, but that during drought years the city may pump as much as 2,000 AFY (City of Santa Barbara, 1992). The La Cumbre Mutual Water Company also pumps approximately 300 AFY of groundwater from the Foothill Basin. Because both the City of Santa Barbara and the La Cumbre Mutual Water Company are expecting delivery of State Water beginning in 1996, the existing groundwater surplus in the basin could increase (Table 3).

Water Quality

Sea water intrusion is not a concern in this basin as it is separated by distance and several faults from the ocean. However, overdraft of the basin could reduce underflow (recharge) of groundwater to the City of Santa Barbara Groundwater Basin and increase the potential for further seawater intrusion into Storage Unit I of the City of Santa Barbara Basin. The major threat to groundwater quality in the Foothill Groundwater Basin in the migration of poor quality water from deep zones to the upper producing zones.

Water quality sampling and analysis was done as part of the Freckleton study (1989). The results of the study indicate that groundwater in the basin generally has TDS levels ranging from 610 to 1,100 mg/l (in one well a concentration of 1,500 mg/l was detected).

Existing Management Plans/Activities

The City of Santa Barbara requested that the USGS conduct the Freckleton study (1989) quoted herein. The information in the report will form the basis of any future management plan. Groundwater extraction from the Foothill Groundwater Basin is part of the City's LTWSP. As a part of the LTWSP the city expects to "rest" and recharge the Foothill Basin with supplemental water supplies during non-drought years (City of Santa Barbara, 1992). During drought years it is expected that the Foothill Basin will be an important water supply for the City of Santa Barbara. The City is currently conducting a pilot groundwater injection program in the Foothill Basin.

6. **Goleta Groundwater Basin**

Description of the Basin

The Goleta Groundwater Basin (for the purposes of this report the basin includes the Goleta North-Central and Goleta West Sub-basins) covers about 9,200 acres on a narrow low-lying area between the Pacific Ocean and the base of the Santa Ynez Mountains; the watershed area extends to the crest of this range. There are three formations of water bearing sediments in the basin. They are, in order of decreasing age, the Santa Barbara Formation and the older and younger alluvium. The combined thickness of these unconsolidated sediments reaches a maximum of 2,000 feet.

Underlying these sediments are the consolidated rocks which form the basement unit. This unit is primarily non-water-bearing but does yield water locally, generally through fractures. There are two main aquifers, a shallow horizon in the younger and the older alluvium and a deeper aquifer in the older alluvium and Santa Barbara Formation; these aquifers are for the most part hydrologically separated from each other. The deeper aquifer is under artesian pressure for most of its extent, but the specific area has not been defined. There are 5,000 acres of confined groundwater in the North-Central and West sub-basins, along the southern basin boundary according to Upson (1951).

The basin is composed of a number of faults and folds from a series of deformational events leaving no single dominant structure in the groundwater basin. Most of the water-bearing sediments were deposited in the structural depressions created by the folds and faults. The major overall shape of the basin is a wedge, with a layer of thin sediment lapping up against the consolidated rocks and the thick end terminating against faults on the southern boundary.

A number of major faults cut the area but only two, the Modoc and Goleta faults, cut through the interior of the groundwater basin. These faults and an inferred lithologic barrier were the basis for dividing the basin into three sub-basins; East Sub-basin (1,800 acres); North-Central Sub-basin (5,700 acres); and West Sub-basin (3,500 acres). The boundary between the East and North-Central Sub-basins is the Modoc fault, and an inferred lithologic barrier separates the West and North-Central Sub-basins. The majority of available groundwater is within the North-Central Sub-basin. Recent work by the USGS (Freckleton, 1989) places the East Sub-basin into the newly defined Foothill Basin. Thus the Modoc Fault is the eastern boundary of the Goleta Basin.

Land Use

The Goleta Valley is an unincorporated, principally urbanized area. Historically, agriculture was the dominant land use but has declined significantly in the last 30 years; however, the few areas left grow a variety of crops. These include orchards (lemons and avocados), truck crops (strawberries, vegetables, ornamental plants), and cut flowers.

Current Overdraft and Supply/Demand Status

The status of current overdraft and supply/demand in the Goleta groundwater basin involves: (1) the physical state of the Goleta North-Central and West Sub-basins; (2) the long-term supply situation of the Goleta Water District. These figures are different because the Goleta Water District was able to buy surplus surface water from other purveyors in the past. Hence, Goleta Water District's pumpage from the basin in the last decade was less than it might have been if this extra supply had not been available.

The groundwater basin conditions listed in Table 1 for the Goleta North-Central and West Groundwater Basins are based on studies by Mann (1976); Hoover and Mann (1981) and P&D (Baca, 1991). Net groundwater demand and perennial yield for the Goleta North-Central Basin are estimated to equal approximately 4,603 AFY and 3,420 AFY, respectively. Thus, the North-Central basin is in a state of overdraft by a net margin of 1,183 AFY (Table 1). Net groundwater demand and perennial yield for the Goleta West Basin are estimated to equal approximately 255 AFY and 475 AFY, respectively. Thus, the West Basin currently has a net groundwater surplus of approximately 220 AFY. (Table 1).

Current water supplies available to the Goleta Water District include Lake Cachuma, a stream diversion (McCoy Creek), the reclamation plant under construction and groundwater. The estimated gross supply for the North/Central Basin and West Basin combined is estimated to be approximately 14,072 AFY (Goleta Community EIR, 1992). Groundwater accounts for 29% of the total supplies. The estimated gross demand for the North/Central and West Basins is estimated to range between approximately 14,377 and 17,196 AFY. Agriculture accounts for 22 to 27% of the total gross demand in the basins (Table 2).

Recent events have added other important considerations to the water resource picture in the Goleta area. They include:

1. State Water - The Goleta Water District holds an entitlement of 4,500 AFY to the State Water Project. Delivery is anticipated to begin in 1996 (Table 3).

2. Wright Suit - Under terms of the judgement the District was required to (1) eliminate the overdraft of the basin by 1998, (2) provide immediate service to parcels with "quantified rights," and (3) obtain 500 AFY in new supplies by 1992 to provide augmented service to private overlying owners.

The "quantified rights" parcels have about 350 AFY in right which would include about 150 AFY in net new use. The terms of the Wright judgement thus results in a commitment of about 650 AFY.

3. <u>Desalination</u> - On February 25, 1991 the Board of Directors of the Goleta Water District adopted Ordinance 91-2 mandating that the GWD participate in, or build, a desalination plant. This ordinance specified that the plant should produce at least 3,069 AFY but not more than 4,500 AFY. If Ordinance 91-2 is not repealed by voters in the November 1992 election, the District will likely not build its own plant but would participate in the City of Santa Barbara's desalination program. GWD would obtain a supply of 3,069 AFY from the desalination project (Table 3). Possible changes in the long term supply/demand balance in the Goleta Planning area as related to Ordinances 91-2 and 91-3 (see Appendix F of Revised Draft PEIR).

4. <u>Reclaimed Water</u> - A reclaimed water treatment facility to be operated jointly by the Goleta Water District and the Goleta Sanitary District received necessary permits in 1991. This plant is expected to free up 1,000 AFY of potable water, adding to the GWD supply (see Table 3).

5. <u>Safe Water Supplies Ordinance (Ordinance No 91-01)</u> - The ordinance mandates that Goleta Water District will be forbidden from providing new or additional potable water service connections to any property not previously served by the Goleta Water District until: (1) overdraft in the Goleta Basin has been eliminated; (2) the District is receiving 100% of its deliveries normally allowed by the Cachuma Project; (3) water rationing by the District is eliminated; and (4) the District meets it obligation to make its Annual Storage Commitment to the Drought buffer. The Annual Storage Commitment states that the District shall, after providing to its existing customers, commit 2,000 AF of its water supply to the Goleta Central Basin commencing in the first year of deliveries from the State Water Project.

Overdraft in the North/Central Goleta Basin (Table 1) is not projected to continue as a result of the court judgement in the Wright versus GWD lawsuit and the efforts of the GWD to comply with the judgement.

<u>Water Quality</u>

Impermeable consolidated rocks lie along the seaward side of the Goleta Basin and constitute an essentially continuous surface and subsurface barrier, broken only at the outlet of the Goleta Slough and at the outlet of the smaller Devereux Slough about 3 miles farther west. Both of the sloughs contain brackish water which extends or has extended inland as much as 0.5 to 1 mile and might constitute a source of seawater contamination. However, it is believed that the upper strata of the younger alluvium are sufficiently impermeable to restrain, and probably prevent entirely, the downward percolation of salty water in these sloughs.

Nevertheless, it is conceivable that under a favorable hydraulic gradient, salty water could percolate downward very slowly over a long period of time through the fine-grained deposits. In addition, wells with casings perforated in both shallow and deep zones or wells with a gravel envelope to the land surface could act as conduits by which shallow saline water could migrate into and contaminate deeper zones if the head relationship were favorable.

There is apparently no evidence of salt-water contamination of the groundwater in the central and eastern parts of the basin east of San Pedro Canyon. However, if sea water is moving or does move into the basin as a result of continued maintenance of static water levels below sea level, encroachment ultimately will take place in the eastern part of the basin.

Based on fairly recent (1989) analysis conducted by the Goleta Water District, groundwater in most of the basin show that the TDS, chloride and hardness range from 728 to 1300 mg/l, from 42 to about 319 mg/l and from 402 to 590 mg/l, respectively. In the western part of the Goleta Basin, several wells have yielded high concentrations of dissolved solids.

In addition to ocean water as a source of contamination, two other possible sources exist: saline waters locally native to the lower part of the Santa Barbara formation, and saline waters native to older Tertiary rocks, specifically those associated with petroleum deposits. It has been shown in other areas that connate saline waters may occur in aquifers correlative with the principal water-bearing zones or immediately underlying them.

Existing Management Plans and Activities

The Goleta Water District currently pumps from one bedrock well (the Shulte well). This well was shut down for a couple months at the beginning of 1991, but was reactivated following the rains in March, 1991 (Conway, personal communication, 1991).

When surplus water from Lake Cachuma is available, the Goleta Water District uses this water to recharge to the groundwater basin through injection wells. However, due to the lack of surplus water from Lake Cachuma, this program has not been implemented in over six years (Conway, personal communication, 1991). In an effort to provide supplemental water, the District is building a wastewater reclamation plant, and has also entered into an agreement with the City of Santa Barbara regarding the City's desalination plant. The District also administers an extensive program of voluntary water conservation for all users. The GWD has adopted a Water Supply Management Plan dated October 1, 1991, a Safe Water Supplies Ordinance (Ordinance No. 91-01), and provides an annual report to the court under the Wright Suit settlement.

7. **More Ranch Basin**

Description of the Basin

The More Ranch Basin underlies about 502 acres between the More Ranch Fault and the Pacific Ocean. Interbedded sands and silts of the Santa Barbara Formation comprise the water-bearing units in this basin. They reach a maximum thickness of about 350 feet and are underlain by consolidated rocks of the Sisquoc and Monterey Formations. Variations in water quality and water levels establish that the More Ranch Fault is a hydrologic barrier which separates this small basin from the Goleta Groundwater Basin.

The basin is considered to have two distinct units with only a limited hydrologic connection. The eastern unit encompasses 238 acres located adjacent to the Hope Ranch area. The western unit includes 264 acres in the Austin Road area of More Mesa.

Land Use

Land uses are primarily low-density residential, with some open field agriculture, greenhouses, and other open land.

Current Overdraft and Supply/Demand Status

Safe Yield of the two units is estimated to be 84 AFY (gross), 76 AFY (net). Gross demand is currently estimated to be 24 AFY, all of which is produced by private pumpers. Thus, a surplus of 60 AFY currently is considered to exist.

Water Quality

Water quality in the More Ranch Basin is poor, with total dissolved solids (TDS) ranging from 800 to 2300 mg/l. Basin water is characterized by moderate levels of hydrogen sulfide gas, and high levels of manganese, TDS, and chlorides. Water treatment is required to bring the concentration of these constituents within State of California Drinking Water Standards.

Existing Management Plans and Activities

There are no known groundwater management plans or activities at this time.

8. **Ellwood to Gaviota Coastal Groundwater "Basins"**

Description of the Basin

The Ellwood to Gaviota area covers approximately 105 square miles of the southern coastal part of Santa Barbara County. This area lies between the crest of the Santa Ynez Mountains and the Pacific Ocean. Groundwater occurs in both the consolidated rocks and in the alluvium-filled stream valleys. The consolidated rocks are the most important source. The water contained within these rocks occurs in fracture systems and within the pore spaces of partially cemented sandstone.

The sandstone formations, including the Vaqueros Sandstone, within the consolidated rocks are the primary sources of well water in the area. The Monterey shale which outcrops along the coastline, while in large part only slightly permeable, is reported to yield significant water in localized areas where siliceous beds are highly fractured. The Rincon shale is considered impermeable, and may confine groundwater within the underlying sandstone beds. The alluvium which fills the stream channels draining the study area generally does not attain a thickness greater than 75 to 100 feet. As a source of groundwater, the alluvial deposits yield small to moderate amounts of water to wells.

Land Use

Cultural development within the Ellwood-Gaviota area consists of limited residential development immediately west of Goleta, agricultural production, livestock grazing, and oil extraction, processing, and handling facilities.

Current Supplies/Demand Status

The yield of consolidated rock aquifers (the main source of groundwater in the Ellwood-Gaviota area) are analyzed by either an inventory or pumpage/change-in-storage method. A special inventory method has been developed by P&D and the CWA which takes into account field recharge, stream seepage and subsurface underflow. This method is used on a site specific basis where water level and pumpage records adequate for the other method are not available. The methodology used for the analysis of bedrock aquifers is detailed in the 1992 Groundwater Thresholds Manual. Because these aquifers are assessed one at a time, perennial yield for the entire "basin" area is not presented in Table 1. However, estimates of gross perennial yield are presented in Table 2 for discussion purposes.

Limited data are available for water supplies and uses in the Ellwood-Gaviota area (Table 1 and Table 2). Due to the relatively small magnitude of water needs by the municipal and industrial sector, the water demands for this area developed by the CWA reflect only agricultural water needs. Groundwater accounts for 100% of the water supply in the Ellwood-Gaviota area. The current groundwater pumpage associated with agriculture is estimated to be 3,150 AFY. The gross available supply of groundwater (i.e., gross perennial yield) in this area are estimated to be on the order of 6,000 AFY (Table 2). These estimates would suggest a general surplus of groundwater in the basin. However, by the year 2000, water demands are projected to reach 11,300 AFY in the Ellwood-Gaviota area assuming a substantial increase in agricultural production. It is expected that about 3,500 AFY of this demand would be delivered through the Goleta-west conduit, leaving 7,800 AFY to be met by local or imported sources. The indicated demand is significantly greater than the estimated gross perennial yield (6,000 AFY) within the study area.

Currently, the Morehart Land Company is expecting delivery of 200 AFY from the State Water Project beginning in 1996. The Morehart Land Company owns Naples, California which is located in the eastern portion of the Ellwood-Gaviota Groundwater Basins (Table 3).

Water Quality

The quality of well water is generally very hard and averages near 1,000 mg/l total dissolved solids (TDS). Groundwater in the area is typically low in sodium and high in calcium and magnesium. The concentration of boron is less than 1 mg/l in most samples analyzed by the USGS, except for two wells in the western part of the area. Fluoride concentrations in water samples from about 10 wells are relatively high, ranging from slightly more than 1 mg/l to 8 mg/l.

The base flow of streams in the area is sustained largely by groundwater outflow. Excess irrigation water has a significant impact on stream flow in several of the most intensively cultivated canyons. These streams show a general increase in mineralization along the stream reach from the headwaters to the mouth.

Existing Management Plans and Activities

There are no known groundwater management plans or activities at this time.

9. **Gaviota to Point Conception Coastal Groundwater "Basins"**

Description of the Basin

This area covers approximately 36 square miles south of the crest of the Santa Ynez Mountains between Gaviota Creek and Point Conception. The physiography of this area is similar to that of the Ellwood-Gaviota area, a series of nearly parallel north-south trending stream canyons separated by steeply sloping ridges. The hydrogeologic setting of the Gaviota-Point Conception is very similar to the Ellwood-Gaviota area as described above.

Land Use

The majority of this land area is within the Bixby and Hollister ranches where there is very limited residential development.

Current Overdraft and Supplies/Demand Status

The yield of consolidated rock aquifers (the main source of groundwater in the Gaviota-Point Conception area) are analyzed by either an inventory or pumpage/change-in-storage method. A special inventory method has been developed by P&D and the CWA which takes into account field recharge, stream seepage and subsurface underflow. This method is used on a site specific basis where water level and pumpage records adequate for the other method are not available. The methodology used for the analysis of bedrock aquifers is detailed in the 1992 Groundwater Thresholds Manual. Because these aquifers are assessed one at a time, perennial yield for the entire "basin" area is not presented in Table 1. However, estimates of gross perennial yield are presented in Table 2 for discussion purposes.

Groundwater accounts of 100% of the water supplies in the Gaviota-Point Conception area (Table 2). Due to the lack of data and similarity in hydrogeologic settings, the gross groundwater supply of the Gaviota-Point Conception area was calculated as a ratio of the land surface areas of the Gaviota-Point Conception and the Ellwood-Gaviota regions times that gross groundwater supply of the Ellwood-Gaviota area. Since the Gaviota-Point Conception area is approximately one-third (36 sq. mi.) that of the Ellwood-Gaviota area (105 sq. mi.), the gross groundwater supply of the former is estimated to be 2,000 AFY (Table 2). This figure should be viewed as a tentative approximation of the perennial yield until the acquisition of additional hydrologic data allows for refinement of this value.

Under present (1975) conditions, water needs in the study area have been estimated by the CWA at 1,000 AFY (Table 2). At the present time, no deliveries of State Water are expected in the area (Table 3).

Water Quality

Information regarding the groundwater quality in this area is not readily available. However, because the hydrogeologic setting of the Gaviota-Point Conception is very similar to the Ellwood-Gaviota area, it is likely the water quality is also similar.

Existing Management Plans and Activities

There are no known groundwater management plans or activities at this time.

10.**Santa Ynez River Riparian Groundwater Basin**

Description of the Basin

The riparian basin along the Santa Ynez River form a narrow strip about one-quarter to one and one-half mile wide between Bradbury Dam east of Santa Ynez and a narrow area on the southeastern edge of the Lompoc Plain. This 33-mile, slightly curving alluvial river basin passes through three hydrologic subunits with areas within each subunit as follows: Santa Ynez subunit, about 2,500 acres; the Buellton subunit, 4,400 acres; and the Santa Rita subunit, about 5,200 acres.

The basin depth from Lake Cachuma to the "Narrows" near Lompoc varies from a few tens of feet near Bradbury Dam to about 150 feet at the Narrows. The material underlying these basins is non-water-bearing shale. An exception is in the Buellton subarea, where the river partially overlies and abuts the southern limit of the Buellton Uplands Groundwater Basin. Wells in the river alluvium are usually less than 100 feet deep, 40 to 70 feet being typical.

Land Use

The riparian basin supports urban development (Solvang, Buellton), horse ranches and irrigated truck, field, pasture, deciduous, ornamental, and vineyard crops. The irrigated lands lie on or are contiguous to the alluvial materials of the river basin.

Current Overdraft and Supplies/Demand Status

The riparian basin cannot be assessed for a perennial yield in the manner of the non-riparian basins in Santa Barbara County. Rather than having a fixed maximum yield determined by net natural recharge and imports (if any), the yield is a direct function of their demand. This is because an obligation exists for replenishment through releases from Lake Cachuma to satisfy prior rights, unless Lake Cachuma is spilling. Hydrologically, the riparian basin is not subject to overdraft because a long-term progressive drop in water levels cannot be accomplished. This is because the average annual flow in the river (i.e. potential recharge) is greater than the storage volume of the basin. Shortages during droughts, however, can occur.

There is some municipal and industrial pumpage from the river deposits to Solvang and Buellton urban users and to private homes and farms along the river. The City of Buellton, the City of Solvang and the Santa Ynez Improvement District #1 all draw water from the basin. Also consuming water from the riparian basins are about 4,800 acres of phreatophytes consuming an estimated 6,400 AFY along the river course.

Key indicator wells allow the Bureau of Reclamation to assess the dewatered state of the riparian basin and to release regulated amounts of Lake Cachuma water in a way to maintain a desired maximum working capacity in the basin. The "desired" working capacity has been agreed upon by the Bureau and the Santa Ynez River Water Conservation District to be 10,000 AF below full condition. Maintaining the riparian basin's operational dewatered storage at 10,000 AF or more increases capture of runoff when the Lake Cachuma is not spilling, and thus increases the system yield of Cachuma Project and the riparian basin.

Water Quality

There is a trend of groundwater deterioration along the stretch of the Santa Ynez River from Bradbury Dam to the "Narrows." Degradation begins gradually, groundwater generally staying within the drinking water limits of the California Department of Health. Average range of TDS is from 550 to 950 mg/l; total hardness is from 380 to 650 mg/l. Immediately west of Buellton, groundwater samples show a significant increase in all quality parameters considered. This increase is attributed to the underflow of Nojoqui and Zaca Creeks, and seepage of wastewater effluent from Buellton, Solvang and Santa Ynez. Downstream degradation continues at a slow rate and, on the average, exceeds the California Department of Health's upper limits for both sulfate and TDS.

No evidence exists to suggest a trend of groundwater deterioration over time. The seasonal characteristics of basin recharge and groundwater pumpage for agricultural purposes account for the wide and irregular variance of the quality parameters.

Existing Management Plans and Activities

Aside from the groundwater replenishment through releases from Lake Cachuma, the riparian basin does not currently have artificial recharge projects. However, Stetson Engineers, on behalf of the Santa Ynez River Water Conservation District (SYRWCD), has recently (September, 1992) prepared a draft resource management plan for the entire Santa Ynez River Basin. The City of Buellton, the City of Solvang and the Santa Ynez Improvement District #1, which all draw water from the riparian basin, are part of the SYRWCD.

11. **Buellton Uplands Groundwater Basin**

Description of the Basin

The Buellton Uplands Groundwater Basin encompasses about 16,400 acres in the area just north of the Santa Ynez River near the community of Buellton. The first detailed study of this basin has been completed (Baca, 1991, unpublished P&D report).

The primary aquifers in this basin are the Pliocene Careaga Formation, the Plio-Pleistocene Paso Robles Formation, and the Pleistocene Orcutt Formation. The Careaga is composed primarily of fine grained marine sand. The Paso Robles is composed of varied gravel, sand and clay-rich non-marine deposits. Aeolian sands with occasionally clay layers make up the Orcutt Formation. These unconsolidated units reach a maximum thickness of about 2,500 feet and unconformable overlie non-water bearing rocks of the Sisquoc and Monterey Formations. Recharge to the basin is primarily through rainfall infiltration through sandy surface soils. Little recharge is derived from the Santa Ynez River even though it overlies a portion of the basin. Because of water level gradients, the Buellton Uplands discharges into the riparian basin.

The basin boundaries include outcrops of bedrock to the north, the Santa Ynez River Fault to the south, an narrow connection to the Santa Ynez Upland Basin to the east and a groundwater divide with the Lompoc Uplands to the west. The eastern half of the basin is structurally a south dipping homocline terminated against the Santa Ynez River Fault. The western half is an eastern extension of the Santa Rita Syncline (part of the Lompoc Uplands).

Land Use

The community of Buellton occupies about 1,000 acres near the southeastern corner of the Buellton Uplands Basin and includes residential and commercial land uses. The remainder of the basin is dominated by agriculture including horse ranches and field crops.

Current Overdraft and Supply/Demand Status

The groundwater basin conditions listed in Table 1 are based on a study by Baca (1991). This P&D study is presented in Appendix E of the Revised Draft PEIR. Net groundwater demand and perennial yield Buellton Uplands Basin is estimated to equal approximately 2,133 AFY and 1,300 AFY, respectively. These estimates represent an net overdraft of 833 AFY in the basin (Table 1).

Water supplies in the basin area are derived from groundwater pumped from the Buellton Uplands Groundwater Basin and riparian underflow from the Santa Ynez Riparian Basin. Total estimated gross water supply for the basin is estimated to be approximately 2,666 AFY (this includes an estimated 900 AFY pumped from the riparian basin by the City of Buellton). Groundwater accounts for 100% of the total supplies (Table 2). The total estimated range of gross water demand for the basin is approximately 3,457 to 3,617 AFY. Agricultural uses account for 69% to 72% of the gross demand (Table 2).

The Buellton Uplands Basin currently supplies about ¼ (300 AFY) of the City of Buellton's water demand. The City holds an entitlement to 578 AFY from the State Water Project. Delivery is anticipated to begin in 1996 (Table 3). Based on the current estimation of overdraft (Table 1), the expected delivery could reduce but not eliminate overdraft of the basin.

Water Quality

Groundwater quality data is available for the City of Buellton's #9 well which draws water from the Buellton Uplands Basin. Groundwater in the well has as a TDS concentration of approximately 650 mg/l and has relatively high concentrations of iron and manganese. The water is treated using chlorine and sulfur dioxide at a water treatment facility.

Existing Basin Management Plans and Activities

Stetson Engineering Inc., on the behalf of the SYRWCD, recently (September, 1992) prepared a draft water resources management plan for the Santa Ynez River Basin. The Buellton Upland Groundwater Basin underlies the central eastern portion of the Santa Ynez River Basin. The City of Buellton is part of the SYRWCD.

12. **Santa Ynez Uplands Groundwater Basin**

Description of the Basin

The Santa Ynez Uplands Groundwater Basin covers 130 square miles located between the San Rafael Mountains to the north and the Santa Ynez River to the south. The basin has a long history of deformation, but no one structure controls the storage and movement of groundwater. The unconsolidated water bearing sediments were deposited in the structural lows created by the folds and faults. The wedge-shaped basin was formed by a series of north-west trending synclinal troughs bounded by a complex of reverse faults on the north and north-east. The basin is bounded on the north by Tertiary and older rocks exposed in the San Rafael Mountains and on the south by an uplifted ridge of Tertiary rocks located along the Santa Ynez River at the edge of the Santa Ynez Mountains. The basin is bounded on the west by shale outcrops of the Monterey and Sisquoc Formations in the area east and north of the City of Buellton.

The unconsolidated water-bearing units of Pliocene to Recent age which comprise the basin are, in order of decreasing age, the Careaga Sandstone, the Paso Robles Formation, terrace deposits and alluvium. Their maximum combined thickness is 2,000 feet in the northeast corner of the basin. Underlying these water bearing deposits are older, generally non water-bearing, consolidated bedrock units. All of the basin rocks do yield some water; however, basin production is mainly from the Paso Robles Formation. The Paso Robles has two main saturated horizons; one is a shallow, semi-perched body on the western side of the basin, and the other is the main water horizon located at a greater depth. The Careaga Sand also contains usable confined water, but this is generally not tapped due to its great depth.

Land Use

There are four towns located within the basin: unincorporated Santa Ynez, Los Olivos, and Ballard, plus the City of Solvang. Scattered residential development, including small farms and "ranchettes," prevail outside these towns, with larger farms and ranches beyond the smaller farms. Even though human population is increasing in the area, agriculture is still the dominant land use. Agricultural production covers a wide range, including wine grapes, truck crops, field crops, and cattle grazing. Thoroughbred horse farms also contribute a significant land use. There is a landfill located adjacent to the Uplands Basin in Foxen Canyon.

Current Overdraft and Supplies/Demand Status

The groundwater basin conditions listed in Table 1 are based on recent estimates by the CWA. Net groundwater demand and perennial yield for the Santa Ynez Uplands Basin is estimated to equal approximately 10,998 AFY and 8,970 AFY, respectively. These estimates represent an net overdraft of 2,028 AFY in the basin (Table 1).

Current water supplies for the basin are derived from riparian underflow in the Santa Ynez River, Lake Cachuma, and groundwater from the Santa Ynez Uplands Basin. Total estimated gross water supply for the basin is estimated to range between approximately 14,930 to 15,700 AFY. Groundwater accounts for approximately 73-77% of the total supplies (Table 2). The total estimated range of gross water demand for the basin is approximately 15,052 to 15,514 AFY. Agricultural uses account for 86% to 89% of the gross demand (Table 2).

The Santa Ynez Water Conservation District, Improvement District #1, which draws groundwater from the Santa Ynez Upland Basin, is expecting a delivery of 2,000 AFY from the State Water Project beginning in 1996 (Table 3). A reported 1,500 AF of the expected allotment will be sold to the City of Solvang. Importation of the new SWP supplies may result in reduced overdraft of the basin. Thomas Petersen, manager of Santa Ynez Improvement District #1, reported that the expected delivery of State Water to the area could potentially alleviate overdraft in the Santa Ynez Upland Basin (Petersen, personal communication, September, 1992).

Water Quality

Groundwater quality data in the Santa Ynez Uplands are not available on a consistent enough basis to determine with any degree of certainty the overall conditions of quality trends in the basin. However, based on the concentrations of certain mineral constituents, it appears that the groundwater is of relatively high quality. Total dissolved solids levels range from 350 to 800 mg/l; total hardness 200 to 550 mg/l.

Portions of the Santa Ynez Uplands Basin have severe septic water problems. Problems have occurred in the Los Olivos, Ballard, and Santa Ynez areas due to the interleaving of impermeable clays and silts with saturated sands and gravels within the quaternary terrace deposits. This has lead to numerous instances of septic system failure and the contamination of surface and near surface waters by septic system effluent, and also has led to significant nitrate contamination of the main groundwater body in the southern portion of the basin.

Existing Management Plans and Activities

There are no formal artificial recharge programs within the basin. Evidence to date indicates that there is no recharge to the Santa Ynez Uplands Basin from Lake Cachuma. On behalf of SYRWCD, Stetson Engineering, Inc. recently prepared a water resources management plan (September, 1992) for the Santa Ynez River Basin. A small portion of the Santa Ynez Uplands Basin underlies the eastern portion of the Santa Ynez River Basin. Therefore, a small portion of the Santa Ynez Uplands Basin is covered under this management plan, and falls under the authority of the Santa Ynez Improvement District No. 1.

13. **Lompoc Groundwater Basin**

Description of the Basin

The Lompoc Groundwater Basin of the Santa Ynez River valley is located between the Purisima Hills to the north, the Santa Rita Hills to the west, and the Lompoc Hills to the south. This coastal valley, surrounding the last part of the Santa Ynez River before it empties into the Pacific Ocean, is about twelve miles wide by seven miles long and encompasses 48,600 acres. The Lompoc Basin is divided into three major storage units which are all, to differing degrees, hydrologically connected. These units are: the Plains that surround the river (14,800 acres), the Uplands (29,000 acres which includes the Santa Rita Valley), and the Terrace (4,800 acres).

This area is structurally complex with a long, intricate history of deformation. There is no one structure which formed or controls the groundwater basin. Three storage units have been delineated based on their structural and water level differences; these are the Uplands, the Plains and the Terrace. The Uplands was formed by the east-west trending Santa Rita Syncline; the water bearing sediments overlie the central and northern parts of the syncline. The Santa Rita Valley is hydrologically connected to the Uplands but is its own separate unit contained within the above mentioned syncline. The Plains are also part of the north limb of the Santa Rita Syncline, with the Santa Ynez River cutting a deeper trough through the consolidated rocks. The Terrace is a downfaulted block of Careaga Sand overlain by the Orcutt Sand.

Most of the water bearing sediments were deposited in the structural lows created by the folds, the faults, and the river. There are a number of faults in the area; however, there is no evidence to show that they affect the groundwater movement patterns. There is underflow from the Uplands and Terrace into the Plains.

There are six formations of unconsolidated rocks of Pliocene to Recent age forming the water-bearing basin rocks. In order of decreasing age, these are the Careaga Sand, the Paso Robles Formation, the Orcutt Sand, terrace deposits, younger alluvium and river channel deposits. The basement rocks are all older marine sediments which locally deliver significant quantities of water, often brackish.

Bright et al. (1992) grouped the younger alluvial material and river channel deposits into an upper aquifer zone which was subdivided into three zones: (1) the shallow zone, (2) the middle zone, and (3) the main zone. The shallow zone includes the river channel deposits and the shallow deposits of the upper member of the alluvium. The middle zone and main zone include the base of the upper member of the alluvium and the lower member of the alluvium, respectively. Bright et al. (1992) grouped the Careaga Sand, the Paso Robles Formation, the Orcutt Sand and the terrace deposits into a lower aquifer zone. The main formation utilized for groundwater depends on the area within the groundwater basin: the younger alluvium (upper aquifer) in the Plains; the Careaga Sand and Paso Robles Formation and, locally, the Orcutt Sand (lower aquifer) in the Uplands; the Careaga Sand and Paso Robles Formation (lower aquifer) in the Terrace. The only confined area known is on the Plains where 8,400 acres are capped by clay and silt layers.

Land Use

The City of Lompoc is the major population center, with the smaller unincorporated communities of Vandenberg Village and Mission Hills to the north, as well as Vandenberg Air Force Base. Agriculture is the primary land use in the valley. Truck farming and associated food processing and flower raising (seed and cut flowers) are important aspects of the economy. The oil industry has developed a number of oil fields on the anticlines along the margins of the basin and a large amount of water is used during the oil recovery operations. There are several diatomite mines within the basin; the mining and processing uses a significant amount of groundwater. The City of Lompoc operates a landfill in the basin.

Current Overdraft and Supplies/Demand Status

The groundwater basin conditions listed in Table 1 are based on recent estimates by the CWA (see Appendix E of the Revised Draft PEIR). Net groundwater demand and perennial yield for the Lompoc Groundwater Basin is estimated to equal approximately 23,386 AFY and 21,468 AFY, respectively. These estimates represent an net overdraft of 1,918 AFY in the basin (Table 1).

Current water supplies for the basin are derived entirely from the Lompoc Groundwater Basin (100% groundwater). The total estimated gross groundwater supply for the basin is estimated to be 28,537 AFY (Table 2). The total estimated range of gross water demand for the basin is approximately 32,444 to 34,517 AFY. Agricultural uses account for 67% to 71% of the gross demand (Table 2).

Several water purveyors draw groundwater from the Lompoc Groundwater Basin including the City of Lompoc, Vandenberg Air Force Base (VAFB), Mission Hills Community Service District, and the Vandenberg Village Community Service District. Only VAFB, which also draws groundwater from the San Antonio Groundwater Basin, is expected to receive State Water (Table 3). VAFB is expecting a delivery of 5,500 AFY from the State Water Project beginning in 1996. Thomas Hom, chief engineer at Vandenberg, reported that the Air Force plans to reduce their groundwater pumping from the Lompoc Groundwater Basin by almost 100% (Hom, personal communication, August, 1992). However, VAFB intends to retain the right to pump from the basin in the future. Based on 1990 data reported by Mr. Hom, VAFB pumped approximately 750 AFY from the Lompoc Groundwater Basin. This figure is significantly less than the estimated overdraft and, therefore, the expected delivery to VAFB will probably reduce but not totally alleviate overdraft in the Lompoc Groundwater Basin. Other future supplemental water supplies that may further reduce overdraft in the basin is a water reclamation project planned by the City of Lompoc. The reclamation project is expected to deliver 650 AFY to the City by the year 2000 (Cosby, 1991).

Water Quality

A brief discussion of groundwater quality in the different aquifer zones based on a recent study by Bright et al. (1992) conducted in 1987 and 1988 is presented below. The study was conducted due to increasing groundwater demands in the Lompoc area and historic documentation of the deterioration of water quality in some parts of the groundwater basin.

Lompoc Plain - Upper Aquifer/Shallow Zone Water in the shallow zone, which is under much of the Plain, consists largely of a mixture of water from irrigation return and rainfall infiltration. During 1987-88 the shallow groundwater contained dissolved solids in concentrations that range from about 850 to 8,000 mg/l (Bright et al., 1992) and averages approximately 2,000 mg/l. The lowest dissolved solid concentrations occur in the northwest and eastern portion of the plain and the highest concentration of dissolved solids occurs in the coastal area and western portions of the Plain. The high dissolved solid concentrations have been attributed to seawater intrusion in the costal areas and irrigation return flow in the western plain. The shallow ground water beneath irrigated fields in the plains area is generally characterized by high dissolved solid concentrations, and high sulfite, boron and nitrate. The concentration of many constituents in water from the shallow zone beneath irrigated areas is commonly twice or more the concentration in the main zone.

Lompoc Plain - Upper Aquifer/Middle Zone The middle zone contained groundwater with dissolved solid concentrations ranging from about 650 mg/l to 3,100 mg/l. The distribution of dissolved solids in the middle zone was generally similar to that in the shallow zones during 1987-88. The groundwater in the eastern plain adjacent to the Santa Ynez River contained an average of less than 1,000 mg/l dissolved solids. In the northeast plain, beneath irrigated fields, the groundwater in the middle zone contained average dissolved solids greater than 2,000 mg/l. Unlike the shallow zone, the middle zone did not contain high dissolved solid concentrations in the western portion of the plain. The high concentrations of dissolved solids in the middle zone in the northeastern plain is attributed to downward leakage from the shallow zone.

Lompoc Plain - Upper Aquifer/Main Zone The concentration of dissolved solids ranged from about 720 mg/l to more than 4,500 mg/l. Nitrate-nitrogen concentrations in the main zone generally were less than 1 mg/l. The general pattern of dissolved solids in the main water-bearing zone beneath the plain is somewhat irregular, but generally increases from east to west, and increases from the boundaries of the Lompoc Terrace and the Lompoc Upland toward the Plain. During 1987-88, the lowest concentrations of dissolved solids were found in the eastern portion of the Lompoc plain adjacent to the Santa Ynez River. The highest concentrations are near the boundary of the western plain and the costal area and near the coastline. The poor quality in the main zone in the coastal areas has been attributed to downward leakage of seawater from an overlying estuary. Poor water quality near the boundary of the western plain and the coastal area is probably the result of upward migration from underlying consolidated rocks.

Lompoc Terrace - Lower Aquifer Groundwater in the Lompoc Terrace typically contained about 370 to 670 mg/l of dissolved solids during 1987-1988. The major constituents in water from most wells were chloride, bicarbonate, calcium and sodium. Concentrations of sulfate, in contrast to that in groundwater in the nearby Plain, are relatively low (less than 200 mg/l). There is a general decrease in sulfate in a downgradient direction from south to north across the central part of the Terrace near Lompoc Canyon. A few small seeps and springs discharge water from local shallow, perched zones in the Terrace deposits. This water typically contains about 300 to 500 mg/l of dissolved solids.

Lompoc Upland - Lower Aquifer Groundwater in the Lompoc Upland area generally is of better chemical quality than in the Lompoc Plain area. The concentration of dissolved solids in water from wells in the Upland averaged approximately 500 mg/l during 1987-1988. Perched groundwater of good to excellent chemical quality occurs at shallow depths in much of the Lompoc Upland. Several small springs and seeps discharge along canyon walls.

Existing Management Plans and Activities

The SYRWCD along with the City of Lompoc, Mission Hills Community Service District, Vandenberg Village Community Services District and VAFB have initiated efforts towards the development of a Management Plan, and are continuing to collect and assess data on the basin (Stetson Engineers).

Current management activities include recharge programs and some water reclamation. In accordance with Water Rights Order WR 89-18 water releases are made from the Cachuma Reservoir into the Santa Ynez River for the purposes of providing groundwater recharge to the Lompoc Groundwater Basin. The downstream release program is a very important element of recharge to the basin. In addition, the Santa Ynez River Water Conservation District has appropriation for spreading grounds in the Lompoc Basin which may be utilized in the near future (Keefe, personal communication, 1991). The Mesa Oaks subdivision also has a small storm water runoff recharge basin and the Lompoc Prison is currently recharging reclaimed water. The City of Lompoc, the Lompoc Prison and the Mission Hill Community Service also are currently using reclaimed water for irrigation purposes.

14. **San Antonio Groundwater Basin**

Description of the Basin

The San Antonio Groundwater Basin covers 70,400 acres within its 154 square mile watershed area. Bounded by the Solomon and Casmalia Hills on the north and north-west and the Purisima Hills on the south, the valley's maximum dimensions are 7 miles wide and 30 miles long. At the western end of San Antonio Creek is Barka Slough. This basin has limited hydrologic continuity with the Santa Maria Basin and the Lompoc Basin. There is also a possible connection occurring across the Foxen Canyon Divide to the Santa Ynez Uplands Basin.

Although the area is structurally complex with a series of deformational episodes, two echelon synclines (San Antonio and Los Alamos) are the dominant basin structure. These synclines, which trend east-west, plunge to the east thus terminating the water bearing sediments at the western edge of the basin there by creating Barka Slough, seven miles from the coast. Most of the water bearing sediments were deposited in the structural lows created by the large folds in the consolidated rocks. The bordering hills (Solomon, Casmalia, and Purisima) are surface expressions of the same consolidated rock units in the contiguous anticlines. While there are a number of faults located in the basin, there has been no documentation of any faults which alter groundwater movement.

There are six formations of unconsolidated, water bearing rocks in this basin. They are, starting with the oldest, the Careaga Sand, the Paso Robles Formation, the Orcutt Sand, terrace deposits, alluvium, and dune sand. The basement rock is comprised of relatively consolidated marine rocks which locally yield some water. The unconsolidated sediments range in thickness from zero to 1000 feet, increasing to 3000 feet in the deepest part of the basin. The Paso Robles Formation and Alluvium (primarily along streams) are the main aquifers tapped for water supplies. The Orcutt Sand, while usually above the main water table, locally yields small quantities of water. There is a small confined area around the Vandenberg Air Force Base wells next to Barka Slough.

Land Use

Agriculture and Vandenberg Air Force Base are the two largest users of water from this basin. The largest population concentration is at the town of Los Alamos. Except for the western quarter of the basin, which is owned by the military, most of the valley is devoted to agriculture. Oil development is also present. The foothill area is used primarily for dry farming, vineyards, or grazing, while the flatlands are utilized for irrigated farming. The crops grown include truck crops, wine grapes, sugar beets, beans, corn, alfalfa and ornamentals. There are two landfills located in this basin, a small one maintained by the County in Foxen Canyon and one maintained by the military. The Casmalia toxic waste disposal site is situated in the Casmalia hills just outside this basin.

Current Overdraft and Supplies/Demand Status

The groundwater basin conditions listed in Table 1 are based on estimates by the USGS (1980), and recent revisions by the CWA and P&D (Appendix E, Revised Draft PEIR). Net groundwater demand and perennial yield for the San Antonio Groundwater Basin is estimated to equal approximately 15,431 AFY and 6,500 AFY, respectively. These estimates represent an net overdraft of 8,931 AFY in the basin (Table 1).

Water supplies for the basin are derived entirely from the San Antonio Groundwater Basin (100% groundwater). Total estimated gross groundwater supply for the basin is estimated to be 8,667 AFY (Table 2). The total estimated range of gross water demand for the basin is approximately 20,690 to 21,787 AFY. Agricultural uses account for 79% to 84% of the gross demand (Table 2).

Two water purveyors draw groundwater from the San Antonio Groundwater: VAFB and the Los Alamos Community Service District. Only VAFB is expected to receive State Water (Table 3). As discussed in section 3.2.12, VAFB is expecting a delivery of 5,500 AFY from the State Water Project beginning in 1996. Thomas Hom, chief engineer at Vandenberg, reported that the Air Force plans to reduce their groundwater pumping from the San Antonio Groundwater Basins (personal communication, August, 1992). However, based on the magnitude of the estimated overdraft in the groundwater basin (8,930 AFY), the expected delivery to VAFB will reduce but not totally alleviate overdraft in the basin.

Water Quality

Based on data analysis conducted by CWA, VAFB and USGS, during 1987 through 1990, groundwater in the basin has a dissolved-solids concentrations ranging from 309 to 1030 mg/l. Concentrations tend to exceed the average in wells adjacent to San Antonio Creek in the lower part of the valley, between Los Alamos and the groundwater barrier. Concentrations tend to be below average in wells in the upper part of the valley and along its flanks. This phenomenon probably results from a combination of human and natural causes. Irrigation return water tends to increase dissolved solids concentration through evaporation and leaching of the soil, thereby increasing the salinity of the groundwater. Also, as groundwater moves from the recharge area to the discharge area, soluble minerals are dissolved, thereby increasing the dissolved-solids concentration.

Water from the aquifer west of the groundwater barrier has a high concentration of sodium chloride. Heavy pumping near the barrier or along the edges of the groundwater basin could induce seepage of water of poor quality by upwelling or lateral seepage from consolidated rocks into the principal aquifer.

Degradation of groundwater quality associated with agricultural development is commonly observed. In the San Antonio Creek Valley, degradation could result from both increased mineralization by irrigation return and from the upward and lateral migration of deep groundwater. If the perennial yield of the basin is exceeded, the groundwater circulation pattern eventually may resemble a closed basin, with no outflow. The consequent buildup of dissolved solids would eventually pose a salinity hazard to crops.

Almost all the groundwater in the central agricultural area of the valley is in the specific conductance range for increasing salinity problems. West of the barrier, severe salinity problems exist in all water.

The consolidated rocks outcropping at Barka Slough form a fairly good protective barrier against saltwater intrusion. However, some deterioration could take place through the Slough into the deeper aquifer if the groundwater gradient is reversed. This reversal would result in bringing in salt water, which would adversely affect the slough.

Existing Management Plans and Activities

There currently are no formal artificial recharge programs within the San Antonio Basin. However, a reclamation plant in the basin discharges to ponds which aid in recharging the basin (Vinct, personal communication, 1991). San Antonio Basin has no groundwater management plan at this time.

15. **Santa Maria Groundwater Basin**

Description of the Basin

Starting at the confluence of the Cuyama and Sisquoc Rivers which combine to form the Santa Maria River, the Santa Maria Valley watershed encompasses 260 square miles in both Santa Barbara and San Luis Obispo Counties. The groundwater basin underlies approximately 110,000 acres with approximately 80,000 acres located in Santa Barbara County. There is limited hydrologic continuity with the San Antonio Groundwater Basin to the south.

The valley is the surface expression of the main controlling structure, a large broad syncline. The parts bordering the Solomon-Casmalia Hills and the San Rafael Mountains were formed by the upfolding of the same rock units into anticlines. The water-bearing sediments were deposited in the structural lows created by the syncline in the consolidated basement rocks. These sediments overlie and are enclosed by the basement rock. Cutting through all the basin rocks except for the alluvium are three faults, located between the towns of Sisquoc and Santa Maria, which cause a change in the groundwater gradient. No other faults are known to affect the groundwater movement in the Santa Maria Basin.

There are seven formations of water bearing sediments in the basin. Starting with the oldest, they are the Careaga Sand, the Paso Robles Formation, the Orcutt Formation, terrace deposits, alluvium, river-channel deposits, and the dune sand. These unconsolidated rock units average from 200 to 2,800 feet in thickness. Underlying these units are the consolidated rocks forming the basement unit. This unit is primarily nonwater-bearing but does yield some water locally, generally only through fractures.

All of the basin rocks can yield water, but the major aquifers are located in the Paso Robles Formation and the alluvium. These two units have the characteristics of wide lateral extent, high permeability, consistent recharge and fair water quality, which makes them the most frequently utilized units. The Careaga Sand is not tapped due to its very poor water quality. At the western end of the basin, 30,000 acres are confined by discontinuous semi-permeable clay layers. The actual interface of this confined-unconfined boundary is known only in general terms and has not been mapped. The whole basin behaves as a single aquifer system, except for the confined area which isolates a perched water body.

Land Use

The Santa Maria/Orcutt urban area is the major population center within this basin; there also are a number of smaller towns (Guadalupe, Sisquoc, and Gary). Agriculture predominates in the basin; crops being cultivated cover a wide range including sugar beets, broccoli, alfalfa, wine grapes, strawberries, ornamental crops, and artichokes. Since most agricultural wells are not metered, water use is estimated by knowing the type and acreage of various crops and the types of irrigation used. This value is only a very rough estimate. Oil development is extensive in the north county, particularly in the foothills and mountains where impacts to the groundwater basin are minor or nonexistent. There is one operating landfill within the basin, south of the Santa Maria River east of the City of Santa Maria.

Current Overdraft and Supplies/Demand Status

The groundwater basin conditions listed in Table 1 are based on recent estimates by the CWA (Appendix E, Revised Draft PEIR). Net groundwater demand and perennial yield for the Santa Maria Basin is estimated to equal approximately 100,000 AFY and 80,000 AFY, respectively. These estimates represent an net overdraft of 20,000 AFY (long term average) in the basin (Table 1).

Current water supplies for the Santa Maria basin area are derived entirely from the Santa Maria Groundwater Basin (100% groundwater). The total estimated gross groundwater supply for the basin is estimated to be 119,000 AFY (Table 2). The total estimated range of gross water demand for the basin is approximately 146,808 to 150,034 AFY. Agricultural uses account for 81% to 83% of the gross demand (Table 2).

Several water purveyors draw groundwater from the Santa Maria Groundwater Basin including the City of Santa Maria, Casmalia Community Service District, Southern California Water Company and the City of Guadalupe. With the exception of the Casmalia Community Service District, all the water purveyors are expecting to receive State Water (Table 3). The total expected delivery to the basin area ranges between 16,750 AFY and 19,750 AFY. Based on the estimated overdraft of 20,000 AFY, the delivery of State Water to the basin could alleviate most of the overdraft condition in the basin. However, the water purveyors have committed to offset only their proportionate share of the overdraft.

Water Quality

Within the groundwater basin, water quality declines generally from east to west, and northward from the Solomon-Casmalia Hills. Significant degradation has occurred during the last twenty-five years due to human activities (Ahlroth, CWA, personal communication, 1992). Water quality differs throughout the basin, often reflecting the type of activities in a local area.

Water quality has been most severely impacted in the area of confined groundwater where a shallow perched water body of poor quality has been created due to the irrigation return flow over large areas of land and point sources of waste water. Wastewater discharge from point sources (sugar and oil refineries, wastewater treatment facilities, solid waste landfills, golf courses, stockyards, poultry farms, and feed lots) is also contributing to the degradation of quality, however, the most significant element of groundwater degradation comes from irrigation return flow (non-point sources). Groundwater pumping in the Santa Maria-Orcutt part of the basin has facilitated the mixing of poor quality water from shallow zones with better quality water in the major producing zone of the younger alluvium. In addition, it is thought that some degradation has occurred in the southern portion of the basin due to increased recharge from the Santa Maria river (Ahlroth, personal communication, 1992).

There are no geologic structures to prevent ocean water from migrating into the basin aquifers. The deepest basin rock is the Careaga Sand which outcrops approximately ten miles offshore, thus allowing good access for ocean water entry. At present no seawater intrusion into the aquifers has been documented, however continued mining of the groundwater (pumping above the safe yield) could induce salt water to migrate into the aquifers.

Existing Management Plans and Activities

The major recharge program presently used is Twitchell Reservoir. It is estimated that approximately 20,000 AF (long term average) are effectively recharged to the basin. Water from this reservoir is slowly released into the Santa Maria River to maximize the infiltration through the river gravels into the deeper water bearing units. The only other operation is the Orcutt Recharge Program. This program uses retention basins to capture storm water runoff from impervious surfaces in urban development. A maximum of 2,000 AFY could be cycled into the groundwater aquifers; however, the actual mean annual recharge through this program is unknown. The Santa Maria Basin currently does not have a groundwater management plan (Perry, personal communication, 1991).

16. **Cuyama Groundwater Basin**

Description of the Basin

The Cuyama watershed spans four different counties (Santa Barbara, Ventura, Kern, and San Luis Obispo). The groundwater basin, located between the Caliente Range to the north and the San Rafael Mountains to the south, encompasses 255 square miles. The main valley, trending east-west, has a maximum dimensions of 5 miles wide and 12 miles long.

The Cuyama Valley's controlling structure is a down-faulted block (graben), created by the Morales and Whiterock faults to the north and the South Cuyama and Ozena faults to the south. The water-bearing sediments were deposited within the structural depression formed by this graben. Within this down-faulted block and its overlying sediments there are a number of smaller faults which significantly affect groundwater movement. Two of these faults parallel Graveyard and Turkey Trap Ridges; in the past there had been flowing springs along the surface expressions of these faults.

Another fault is located near the mouth of Santa Barbara Canyon. There also are two large oil fields within the basin. At the eastern end of the main part of the valley, a major synclinal fold underlies the area; its axis trends roughly parallel to the valley's elongation and its northeastern limb terminates against the Morales fault. An anticline of pre-Pliocene age is located near the western boundary area, with the dominant trend of the folds parallel to the San Andreas fault zone.

There are only four formations in the Cuyama Basin which can supply water. In order of decreasing age, they are the Morales Formation, the Cuyama Formation, older and younger alluvium, and terrace deposits. The Paso Robles Formation also is found in the basin but yields no water because of its limited thickness and location above the water table. The basement rocks are basically comprised of marine sediments which are non-water-bearing or contain water that is unsuitable for human uses. The Morales Formation is the main aquifer in the basin, and its permeability varies greatly both laterally and vertically. Most wells here tap as many water bearing horizons as possible, especially in the central part of the basin, taking water from both the alluvium and the Morales Formation. The specific number of water bodies in the basin is unknown; information to date does not allow differentiation of the aquifers or perched water bodies.

Land Use

There are several small towns within the basin: Cuyama, New Cuyama, and Ventucopa in Santa Barbara County, and Ozena in Ventura County. Agriculture dominates land use in the valley and a number of crops are produced: alfalfa, potatoes, corn, sugar beets, grains (hay, wheat, barley), deciduous orchards, citrus, and irrigated pasture. The petroleum industry located on the basin anticlines also uses groundwater for oil recovery and processing/transportation. There are landfills at New Cuyama and Ventucopa.

Current Overdraft and Supplies/Demand Status

The groundwater basin conditions listed in Table 1 are based on estimates by the DWR Land Survey (1985), and recent revisions by the CWA and P&D. Net groundwater demand and perennial yield for the Cuyama Groundwater Basin is estimated to equal approximately 36,525 AFY and 8,000 AFY, respectively. These estimates represent a net overdraft of 28,525 AFY in the basin (Table 1).

Water supplies for the basin are derived entirely from the Cuyama Groundwater Basin (100% groundwater). Total estimated gross groundwater supply for the basin is estimated to be 10,667 AFY (Table 2). The total estimated gross water demand for the basin is approximately 48,882 to 48,982 AFY. Agricultural uses account for 99% of the gross demand (Table 2).

The Cuyama Community Service District in the only water purveyor that draws groundwater from the Cuyama Groundwater Basin. The Cuyama Community Service District is not expected to receive State Water.

Water Quality

The water quality in the Cuyama basin is generally poor. Based on recent (1990) groundwater analysis conducted by the USGS, the TDS levels in the basin ranges up to 1750 mg/l. Wells close to the Caliente Range have extremely high salinity which can probably be attributed to seepage out of the basement marine rocks.

Although its quality is generally poor, groundwater has been used successfully for irrigation of crops. Apparently this is because the sodium content is low and the soils are very permeable; this last factor allows minerals to leach through the root zone. Thus, preventing the buildup of toxic salts in the soil. In the main agricultural region, water degradation is taking place due to the movement of brackish water from north of the Cuyama River into the area of high pumpage and due to the return of irrigation and leaching water carrying dissolved salts back to the water table. Nitrate (NO_3) levels reached 400 mg/l in some shallow wells, which is 9 times the allowable maximum for domestic supplies.

Existing Management Plans and Activities

There currently are no recharge programs within the Cuyama Groundwater Basin. The Cuyama Community Services District does not have a groundwater management plan (Wilson, personal communication, 1991).

Concluding Remarks

As the summaries of each basin have demonstrated, Santa Barbara County, like most of southern California, is made up of a complex patchwork of water districts, private water companies, and various special-purpose districts, designed to develop and improve water service for rural and urban needs. Tables 1 through 3 indicate the County's major water basin supplies and the primary water suppliers within each basin. Of particular interest is the complete reliance of the North County on groundwater; the Cuyama Valley, Santa Maria Valley, San Antonio Valley, and lower Santa Ynez Valley are completely dependent on groundwater, primarily pumped for agricultural uses but with significant M&I components.

These tables also show that, while portions of Santa Barbara County are urbanizing, the dominant water use is still agriculture, accounting for 75 percent of total water use in the County. This statistic underscores the vital importance of the County's groundwater resources in supporting all of the economic activities throughout the County, implying that the management of groundwater resources for long-term sustainability is a necessary pursuit.

C. CONCEPTS OF BASIN MANAGEMENT

The management of a groundwater basin implies a planned program of development, use and protection of subsurface water for defined purposes. In general, the desired goal is to obtain the maximum quantity of water to meet water quality requirements at the lowest cost, without incurring an adverse impact, either economic or environmental. Because a groundwater basin can be visualized as a large natural underground reservoir, it follows that extraction of water by wells at one location influences the quantity and perhaps the quality of water available at other locations within the basin.

Development of water supplies from groundwater typically begins with a few pumping wells scattered over a basin. In time, more wells are drilled and the rate of extraction increases. As wells become more numerous, development of the basin reaches, and may exceed, its natural recharge capability.

Continued development thereafter without a management plan could eventually deplete the groundwater resource, with attendant adverse economic and environmental consequences.

Groundwater management takes many forms in California but, to date, it has been left primarily up to local jurisdictions to carry out such programs. In many areas, such as the San Joaquin Valley, groundwater management means a program of "conjunctive use" where surface water is purchased and imported to recharge and partially replenish overdrafted groundwater basins. In the Santa Clara Valley, groundwater management has meant construction of a series of reservoirs, spreading ponds/fields and injection wells to artificially recharge the aquifer.

For several Southern California basins (including San Fernando, Chino, San Gabriel, Los Angeles and others), groundwater management has been accomplished by a court adjudication process, where legal rights to a certain amount and use of groundwater are firmly established and accurately accounted for by a water master. In these basins, perennial yield is strictly adhered to every year and new users must purchase groundwater rights before they can extract water. In still other basins, such as coastal Orange County, a tax on pumping and a replenishment tax[4] are used to control extractions and provide funds for purchase of imported water and construction of recharge facilities.

In three widely disparate basins (Sierra Valley, Pajaro Valley near Watsonville, Fox Canyon in Ventura County), formal groundwater management districts have been established to accurately ascertain groundwater needs and, if necessary, set limits on use of the resource. While the techniques and procedures vary, each of these basins shares the common idea that effective management is a product of careful study and planning and cooperative efforts between water purveyors, private pumpers and regulators to ensure the long-term viability of the resource.

In 1993, a new law went into effect in California - the Groundwater Management Act (AB 3030, Sections 10750 *et seq.* of the California Water Code) - that facilitates cooperative groundwater basin management. This important new law, as subsequently amended, is recognized and reflected in Part III of this portion of the Conservation Element.

Forecasts of population growth and future water demand in Santa Barbara County suggest that the major groundwater basins must be actively and carefully managed if adequate long-term water supplies are to be maintained for both agricultural and urban uses. The key management objective consists of providing an economical, continuous, and high quality water supply to meet growing demands.

[4] The mechanism used in Orange County is termed the "Basin Equity Assessment." Groundwater producers pay charges for that amount of water produced in excess of some agreed-upon quantity.

PART III
GOALS, POLICIES, AND IMPLEMENTING ACTIONS

The following findings have guided the development of goal and policy statements:

- The County recognizes that groundwater is a limited and vital resource which is renewable only if the quantity of water replenished (either naturally or artificially) equals the quantity withdrawn over time.

- Santa Barbara County relies heavily on groundwater as a source for domestic, commercial, industrial and agricultural uses. This is particularly true in the North County where groundwater is the only available major source of water and supports a major portion of the economy.

- As the background data indicate, seven of the County's major groundwater basins now experience prolonged overdraft conditions (Cuyama, Santa Maria, San Antonio, Lompoc, Santa Ynez Uplands, Buellton Uplands, and Goleta West/North-Central).

- The County recognizes the essential role of long-term water availability in land use planning.

- The County recognizes that new supplemental water sources, such as State Water Project water and augmentation of local supplies, will be available and may serve to replenish groundwater basins or be used in lieu of groundwater.

- The County recognizes that the various water purveyors are responsible for providing adequate service to their customers, consistent with their statutory and contractual mandates. At the same time, within the unincorporated areas, the County has the responsibility to ensure that land use and development can be supported in the long-term by adequate services and resources; this responsibility is implemented through overall land use planning efforts as well as case-by-case development permit actions.

- The County recognizes that it has no authority to regulate or manage the use of groundwater except as provided for in the Groundwater Management Act (Water Code §§ 10750. *et seq.*) and other applicable law. Further, the County does not assume any authority under this section to make a determination of the water rights of any person or entity.

- The County recognizes the preferential value of voluntary cooperative and collaborative efforts, rather than regulatory actions, in achieving the Goals of this document. Such efforts, in order to be effective, should involve and must consider all stakeholders (property owners, public & private groundwater purveyors & users, and other public agencies & private entities with affected interests or relevant expertise). The County intends to act, within its powers and financial abilities, to encourage and assist voluntary cooperative and collaborative efforts which promote the Goals of this document.

The following goals, principles, policies, implementation measures, and development standards represent a consistent and compatible part of the County's Comprehensive Plan, which will provide future guidance for the County's planning, decision-making, and information collection and dissemination.

GOAL 1. To ensure adequate quality and quantity of groundwater for present and future County residents, and to eliminate prolonged overdraft[5] of any groundwater basins.

***PRINCIPLE 1A** - The California Water Code recognizes the existence of rights to reasonable beneficial use of groundwater, and specifically provides that such rights are not diminished by groundwater conservation or the use of alternate supplies to permit groundwater replenishment, subject to specific reporting requirements to the State Water Resources Control Board (see California Water Code, §§ 1005.1. through 1011.5.).*

POLICY 1.1: The County shall encourage and assist all of the County's water purveyors and other groundwater users in the conservation and management, on a perennial yield basis, of all groundwater resources.

ACTION 1.1.1: The County shall encourage and, where feasible, financially assist in continued studies of new or supplemental water sources and the more efficient use of existing sources, for the purpose of avoiding, reducing, or eliminating prolonged overdraft. To ensure that such water is used to reduce overdraft (as opposed to supplying only new uses), the County shall encourage water purveyors to give first priority to offsetting existing demands met by overdrafting groundwater supplies.

ACTION 1.1.2: The County will seek the voluntary cooperation with purveyors during the early planning of any supplemental water sources that the purveyors propose or plan to develop. The County will coordinate with the purveyor, to the extent allowed by the purveyor, to ensure that: (1) environmental constraints are fully incorporated into the location and design of such projects; and (2) mitigations are applied to the fullest extent feasible and consistent with County permit conditioning policies and practices to minimize the magnitude of significant impacts.

***PRINCIPLE 1B** - The County recognizes that agriculture represents the large majority of consumptive groundwater use on a Countywide basis, and that a need exists to promote agricultural practices which maximize the efficiency of agricultural water use and which minimize water loss and excess consumption. The County further recognizes that agriculturists generally are mindful of the need to conserve water*

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5 The term "prolonged overdraft" as used in this Element means net extractions in excess of a basin's perennial yield as averaged over a period of ten or more years. It is recognized that groundwater basin management may involve temporary, planned drawdowns of groundwater levels (i.e., pump age in excess of a basin's perennial yield over one or more years) as part of a conjunctive use or other basin management program, and that these temporary, planned drawdowns of groundwater levels may result in a temporary degradation of groundwater quality. The primary intent is to maintain groundwater use and replenishment in a long-term balance; to avoid to the maximum feasible extent all significant adverse effects, both long-term and permanent, on the County's groundwater resources; and to maintain or improve groundwater quality on a long-term basis.

because of its economic importance, and to maintain water quality in view of its importance to continued agricultural productivity. Nevertheless, in some instances, agricultural practices can be modified such that net agricultural water use and water quality degradation is reduced without economic losses and, sometimes, with economic gains.

POLICY 1.2: The County shall encourage innovative and/or appropriate, voluntary water conservation activities for increasing the efficiency of agricultural water use within the County.

ACTION 1.2.1: The County shall provide support to the Soil Conservation Service, the Resource Conservation District, and other appropriate agencies to continue the Irrigation Management Program and other such water conservation and management efforts.

ACTION 1.2.2: The County shall support the expansion of existing efforts by the U.C. Cooperative Extension/Farm Advisor, in cooperation with the Agricultural Commissioner, Soil Conservation Service, Resource Conservation District, and other appropriate agencies, to develop and update a verifiable comprehensive database on agricultural water use and conservation effectiveness. Such efforts should include incentives for groundwater users to collect and provide more accurate data, as needed to permit the development of more precise determinations of consumptive groundwater use (see Action 4.1.1).

ACTION 1.2.3: The County shall support an evaluation of the advantages and disadvantages of a voluntary agricultural water bank for urban use during a declared drought.

PRINCIPLE 1C *- An important component of reducing prolonged overdraft of groundwater basins is the development of additional water supplies. This can be achieved through increasing the amount of water available for recharge and enhancing the recharge capabilities of each groundwater basin. In addition, the extent to which water purveyors develop and utilize surface water sources may relieve the pumping demands and reliance on groundwater basins.*

POLICY 1.3: The County shall act within its powers and financial abilities to promote and achieve the enhancement of groundwater basin yield.

ACTION 1.3.1: Where feasible and consistent with the County's applicable Comprehensive Plan element(s), the County shall encourage and assist appropriate agencies in ongoing or future projects and programs which increase groundwater recharge and basin yield, as long as such projects and programs can be shown not to degrade groundwater quality. Such activities could include, but would not be limited to, cloud seeding, range management, dams, and spreading basins.

<u>GOAL 2.</u> To improve existing groundwater quality, where feasible, and to preclude further permanent or long-term degradation in groundwater quality.

PRINCIPLE 2A *- Groundwater quality and quantity often are related: excessive overdrafting may result in the mixing of degraded water with other water of acceptable quality, and/or may cause infiltration of poor quality water into the groundwater basins and/or sub-basins; once degradation of groundwater has occurred, it may require large amounts of time and additional groundwater to reverse such degradation.*

POLICY 2.1: Where feasible, in cooperation with local purveyors and other groundwater users, the County shall act to protect groundwater quality where quality is acceptable, improve quality where degraded, and discourage degradation of quality below acceptable levels.

ACTION 2.1.1: In reviewing or preparing basin management plans under the Groundwater Management Act and other applicable law, the County shall consider both the quantity and quality of groundwater in affected basins. Pumpage that causes intrusion of poor quality water, if and where identified, should receive particular attention for improved management.

ACTION 2.1.2: In basins or sub-basins with water quality problems, the County will encourage reduction of salt and other pollutant loading from all sources through cooperative, voluntary efforts and, where feasible, will take direct action in this regard.

PRINCIPLE 2B *- Existing County Health regulations are designed to protect domestic groundwater users, as well as protecting aquifers from problems of septic system use and waste disposal. However, there is little if any protection from agricultural pollutants which may enter various aquifers throughout the County.*

POLICY 2.2: The County shall support the study of adverse groundwater quality effects which may be due to agricultural, domestic, environmental and industrial uses and practices.

ACTION 2.2.1: The County shall cooperate in ongoing and future studies which determine the current and potential extent of agricultural, domestic, environmental and industrial pollutants in various County aquifers, and to ascertain better methods by which agriculturalists can prevent increasing pollutant loads in the future. Such studies should be coordinated with the basin planning and enforcement work done by the RWQCB and SWRCB, and should involve other appropriate agencies and groundwater users.

<u>GOAL 3.</u> To coordinate County land use planning decisions and water resources planning and supply availability.

PRINCIPLE 3A - The California Legislature has declared "that groundwater is a

POLICY 3.1: The County shall support the efforts of the local water purveyors to adopt and implement groundwater management plans pursuant to the Groundwater Management Act and other applicable law.

ACTION 3.1.1: The County shall encourage the preparers of groundwater management plans to consider environmental factors, including but not limited to the potential link between groundwater resources and riparian habitat.

POLICY 3.2: The County shall conduct its land use planning and permitting activities in a manner which promotes and encourages the cooperative management of groundwater resources by local agencies and other affected parties, consistent with the Groundwater Management Act and other applicable law.

ACTION 3.2.1: The County Flood Control & Water Conservation District or the County Water Agency, as feasible and as requested by a local agency or agencies pursuant to the Groundwater Management Act, may assume responsibility in preparing a groundwater management plan pursuant to the Groundwater Management Act and other applicable law.

POLICY 3.3: The County shall use groundwater management plans, as accepted by the Board of Supervisors, in its land use planning and permitting decisions and other relevant activities.

ACTION 3.3.1: The Board of Supervisors, in consultation with the County Planning Commission, shall accept a groundwater management plan which promotes and is consistent with the Goals of this Groundwater Resources Section of the Conservation Element. Such acceptance shall be rescinded where specific facts and circumstances indicate that a plan has been rendered inadequate to promote these Goals.

ACTION 3.3.2: The County shall conserve waters to the extent feasible through exercise of the County's discretionary land use planning and permitting decisions, and shall promote such conservation through related public and private actions.

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[6] Also known as "AB 3030"; Chapter 947, Statutes of 1992 (effective 1/1/93), as may be amended from time to time (e.g., AB 1152 [Chapter 320, Statutes of 1993], approved in August 1993).

***PRINCIPLE 3B** - The County recognizes the water purveyors' responsibilities and obligations to supply the customers within their respective service areas.*

POLICY 3.4: The County's land use planning decisions shall be consistent with the ability of any affected water purveyor(s) to provide adequate services and resources to their existing customers, in coordination with any applicable groundwater management plan.

ACTION 3.4.1: The County, in its planning activities, shall work cooperatively with local water purveyors, the County Water Agency, the County Flood Control and Water Conservation District, State and Federal agencies concerned with water resources, and private groups and individuals with particular interest and expertise related to water resources.

ACTION 3.4.2: Santa Barbara County shall develop its land use plans and policies in a manner which takes into account all groundwater uses (e.g., domestic, agricultural, natural resources and habitats, etc.).

ACTION 3.4.3: In areas without a groundwater management plan accepted by the County, County land use plans and decisions shall account for a prudent "margin of safety" against errors in supply/demand estimates, safe yield and available storage estimates, changes in any other relevant conditions in a basin, and other possible unforeseen circumstances.

ACTION 3.4.4: Santa Barbara County shall encourage and assist local water purveyors in developing adequate water supplies (groundwater, surface water, desalination, etc.) to serve their customers and communities consistent with the applicable general plan(s).

ACTION 3.4.5: The County shall facilitate the efforts of purveyors to serve overlying landowners from the purveyor's system.

POLICY 3.5: In coordination with any applicable groundwater management plan(s), the County shall not allow, through its land use permitting decisions, any basin to become seriously overdrafted on a prolonged basis.

ACTION 3.5.1: Based on input from the County Water Agency and P&D, the Board, in coordination with the responsible water purveyor(s), shall designate any basins within the county as "seriously overdrafted" if the following conditions are present: Prolonged overdraft which results or, in the reasonably foreseeable future (generally within ten years) would result, in measurable, unmitigated adverse environmental or economic impacts, either long-term or permanent. Such impacts include but are not limited to seawater intrusion, other substantial quality degradation, land surface subsidence, substantial effects on riparian or other environmentally sensitive habitats, or unreasonable interference with the beneficial use of a basin's resources. The County's fundamental policy shall be to prevent such overdraft conditions.

ACTION 3.5.2: In seriously overdrafted basins, the County shall not approve discretionary development permits if such development requires new net extractions or increases in net extractions of groundwater, pending development and County acceptance of a basin management plan, consistent with the Groundwater Management Act or other applicable law, which adequately addresses the serious overdraft.

POLICY 3.6: The County shall not make land use decisions which would lead to the substantial overcommitment of any groundwater basin.

POLICY 3.7: New urban development shall maximize the use of effective and appropriate natural and engineered recharge measures within project design, as defined in design guidelines to be prepared by the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD) in cooperation with P&D (*conceptual* examples of such design guidelines are presented in Appendix B).

ACTION 3.7.1: In cooperation with the USGS and local water purveyors, the County should conduct or participate in a study to identify in more detail those areas where natural and enhanced recharge is occurring or may occur in each of the County's major groundwater basins and develop detailed design guidelines for ways to protect recharge areas from further degradation.

DEV. STD. 3.7.1.1: Guidelines should address limitations on new impervious surfaces in areas where such surfaces would reduce groundwater recharge, and should address standards for the incorporation of runoff retention and recharge programs/facilities in areas where they would be effective.

DEV. STD. 3.7.1.2: Runoff retention and recharge facilities shall be properly engineered, as determined by the SBCFCWCD, and shall be located and operated to minimize adverse environmental impacts.

ACTION 3.7.2: The Board of Supervisors, in consultation with the County Planning Commission, shall adopt the design guidelines prepared pursuant to Policy 3.7 and the preceding Action and Development Standards, prior to the implementation of such guidelines.

POLICY 3.8: Water-conserving plumbing, as well as water-conserving landscaping, shall be incorporated into all new development projects, where appropriate, effective, and consistent with applicable law.

ACTION 3.8.1: The County shall continue to encourage and, where feasible, financially participate in water-saving landscape experiments and education programs, such as those conducted by the Water Agency's Regional Water Conservation Program.

ACTION 3.8.2: The County shall continue to develop and refine uniform standards and guidelines for water conservation in new development projects, which shall recognize that different physical characteristics within various areas may require more than a single set of standards and guidelines. All cities within the County shall be encouraged to adopt similar standards and guidelines.

POLICY 3.9: The County shall support and encourage private and public efforts to maximize efficiency in the pre-existing consumptive M&I use of groundwater resources.

ACTION 3.9.1: Where groundwater supplies are in a state of prolonged overdraft and where there exists a County-accepted groundwater management plan which accounts for the crediting of conservation savings against new consumptive uses, the County may allow new development which is consistent with such provisions of the plan.

DEV. STD. 3.9.1.1: In order to be used for the purpose of such offset or credit against new demands, conservation savings must be reasonably permanent in nature, and must be quantitatively verified and monitored by the County or its designee in consultation with any affected water purveyor(s). Examples of savings which would be considered "reasonably permanent" are limited to those associated with the replacement of major water-consuming appliances not easily removable, such as commercial dishwashers; examples of savings which would not be considered "reasonably permanent" include but are not limited to those associated with landscape changes, other irrigation reductions, and easily removable appliances and/or appliance retrofit devices (e.g., flow restrictors, faucet aerators, showerheads, toilet tank displacement devices, etc.).

PRINCIPLE 3C *- The County uses "thresholds of significance" in assessing the environmental effects of a project's groundwater use, with particular regard to groundwater overdraft. Other agencies do not use such thresholds, or use thresholds which differ from those used by the County. Consistency among jurisdictions overlying the same groundwater basin(s) would enhance planning efforts to determine long-term availability of groundwater.*

POLICY 3.10: The County, in consultation with the cities, affected water purveyors, and other interested parties, shall promote the use of consistent "significance thresholds" by all appropriate agencies with regard to groundwater resource impact analysis.

ACTION 3.10.1: The County shall continue to refine and update its "significance thresholds" as new data becomes available and as overdraft conditions persist, as specified in the County's CEQA Guidelines. The County's acceptance of duly prepared and adopted groundwater management plans also may necessitate the adjustment of appropriate groundwater thresholds.

GOAL 4. To maintain accurate and current information on groundwater conditions throughout the County.

POLICY 4.1: The County shall act within its powers and financial abilities to collect, update, refine, and disseminate information on local groundwater conditions.

ACTION 4.1.1: The County Water Agency shall continue to monitor water levels from existing monitoring wells and, in coordination with the U.C. Cooperative Extension/Farm Advisor, shall request, on a voluntary basis, private and public water purveyors and major private groundwater users, including agricultural users, to provide periodic records of groundwater production. Unless deemed unnecessary by the Water Agency's Board of Directors for any year, the Agency shall compile an annual report on the status of pumping amounts, water levels, overdraft conditions, and other relevant data, and shall submit this report to the Board of Supervisors for its acceptance and possible further action. The annual report to the Board shall include a review of the results of all groundwater quality monitoring conducted in the County.

ACTION 4.1.2: The County, in consultation with the cities, other counties, affected water purveyors, and other interested parties, shall promote the use of consistent standards by all appropriate agencies with regard to groundwater resources.

ACTION 4.1.3: The County recognizes the need for more accurate data on all groundwater basins within the County and shall continue to support relevant technical studies, as feasible.

ACTION 4.1.4: The County should identify areas where natural resources and habitats depend upon groundwater, and where such resources and habitats have been adversely affected by groundwater overdraft.

ACTION 4.1.5: The County Water Agency shall continue to act as an information center to share timely communication with other agencies such as the United States Geological Survey (USGS), Department of Water Resources (DWR), State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), other County departments, local districts and cities to ensure that there is maximum gathering and exchange of groundwater information.

ACTION 4.1.6: The service area boundaries of existing and planned private water companies shall be defined. These companies shall be requested to provide this information to P&D and the County Water Agency no later than

12/31/94 or, for subsequently organized companies, within six months of their final formation.

ACTION 4.1.7: The County recommends that all public and private water companies, districts, and agencies, to the extent legally possible, maintain mutual aid agreements with adjacent districts or private water companies in case of water shortages. Any such agreements shall be noted by the County Water Agency in its annual report (see Action 4.1.1). Such agreements would be based on short-term or emergency needs or identified economic benefits to all parties.

ACTION 4.1.8: All water districts and city water departments which have prepared a Water Conservation Plan (under the 1984 Urban Water Management Act) and/or other long-term water planning studies, shall be asked to submit a copy of such plan(s) to the County Water Agency and P&D for review and comment. P&D shall meet with these purveyors to discuss the population/land use projections and their current status.

ACTION 4.1.9: The County Water Agency shall continue to work with local water purveyors and other appropriate entities to promote the efficient use of water by all users through education and incentive programs. Progress on such programs shall be reported by the County Water Agency in its annual report (see Action 4.1.1).

ACTION 4.1.10: The County shall continue to encourage and, where feasible, financially participate in USGS, DWR, SWRCB, and local water purveyors' studies of water quality in basins throughout the County.

ACTION 4.1.11: The County shall continue to encourage and, where feasible, materially assist the seawater intrusion monitoring programs of the USGS, local water purveyors, and other appropriate agencies.

ACTION 4.1.12: The County shall encourage and, where feasible, materially contribute to the refinement and updating of agricultural water use ("duty") factors by the Soil Conservation Service, the U.C. Cooperative Extension/Farm Advisor, or other appropriate entities.

ACTION 4.1.13: The County shall encourage and, where feasible, materially contribute to the refinement of estimates of agricultural water return flows by the State Department of Water Resources, the U.C. Cooperative Extension/Farm Advisor, or other appropriate entities.

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PERSONS AND AGENCIES CONTACTED ***from Program EIR (91-EIR-15)***

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Vandenberg Village Community Services District
Los Alamos Community Services District
City of Santa Maria
California Cities Water Company (Southern California Water Co.)
Cuyama Community Services District
Monterey County Water Conservation District
City of Morro Bay
Fox Canyon Groundwater Management Agency (County of Ventura)
Kern County Water Agency
City of Santa Barbara

Other Agencies
Farm Bureau
Soil Conservation Service
Agricultural Stabilization and Conservation Service
County Agricultural Commissioner
U.C. Cooperative Extension/Farm Advisor
Cachuma and Lompoc Resource Conservation Districts

APPENDIX A

Definitions of Terms

ACRE-FOOT - The quantity of water required to cover one acre to a depth of one foot; equal to 43,560 cubic feet, or approximately 325,851 gallons.

APPLIED WATER DEMAND - The quantity of water that would be delivered for urban or agricultural applications if no conservation measures were in place.

ARTIFICIAL RECHARGE - The addition of water to a ground water reservoir by human activity, such as irrigation or induced infiltration form streams, wells, or recharge basins. See also GROUND WATER RECHARGE, RECHARGE BASIN.

BRACKISH WATER - Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water.

CONJUNCTIVE USE - The operation of a ground water basin in coordination with a surface water storage and conveyance system. The purpose is to recharge to the basin during years of above-average water supply to provide storage that can be withdrawn during drier years when surface water supplies are below normal.

CONSERVATION - As used in this report, urban water conservation includes reductions realized from voluntary, more efficient, water use practices promoted through public education and from State-mandated requirements to install water-conserving fixtures in newly constructed and renovated buildings. Agricultural water conservation, as used in this report, means reducing the amount of water applied in irrigation through measures that increase irrigation efficiency. See NET WATER CONSERVATION.

CRITICAL DRY PERIOD - A series of water-deficient years, usually an historical period, in which a full reservoir storage system at the beginning is drawn down (without any spill) to minimum storage at the end.

CRITICAL DRY YEAR - A dry year in which the full commitments for a dependable water supply cannot be met and deficiencies are imposed on water deliveries.

CWA - Santa Barbara **C**ounty **W**ater **A**gency (or successor agency).

DESALTING - A process that converts sea water or brackish water to fresh water or an otherwise more usable condition through removal of dissolved solids. Also called "desalination."

DWR - California **D**epartment of **W**ater **R**esources (or successor agency).

FIRM YIELD - The maximum annual supply of a given water development that is expected to be available on demand, with the understanding that lower yields will occur in accordance with a predetermined schedule or probability.

GROUND WATER - Water that occurs beneath the land surface and completely fills all pore spaces of the alluvium or rock formation in which it is located.

GROUND WATER BASIN - A ground water reservoir, together with all the overlying land surface and underlying aquifers that contribute water to the reservoir.

GROUND WATER MINING - The withdrawal of water from an aquifer greatly in excess of replenishment; if continued, the underground supply will eventually be exhausted or the water table will drop below economically feasible pumping lifts.

GROUND WATER OVERDRAFT - The condition of a ground water basin in which the amount of water withdrawn by pumping exceeds the amount of water that replenishes the basin over a period of years.

GROUND WATER RECHARGE - Increases in ground water by natural conditions or by human activity. See also ARTIFICIAL RECHARGE.

GROUND WATER STORAGE CAPACITY - The space contained in a given volume of deposits. Under optimum use conditions, the usable ground water storage capacity is the volume of water that can, within specified economic limitations, be alternately extracted and replaced in the reservoir.

GROUND WATER TABLE - The upper surface of the zone of saturation (all pores of subsoil filled with water), except where the surface is formed by an impermeable body.

M&I - Municipal and Industrial (water use); generally urban uses for human activities.

mg/l - Abbreviation for "**m**illi**g**rams per **l**iter," the mass (milligrams) of any substance dissolved in a standard volume (liter) of water. Nearly the same as parts per million (ppm).

NET WATER CONSERVATION - The difference between the amount of applied water conserved and the amount by which this conservation reduces usable return flows.

NET WATER DEMAND - The applied water demand less water saved through conservation efforts (= net applied water = actual water used).

OVERDRAFT - Withdrawal of groundwater in excess of a basin's perennial yield; also see "PROLONGED OVERDRAFT."

P&D - Santa Barbara County **P**lanning and **D**evelopment Department (or successor agency); prior to February 1994, named the Resource Management Department (RMD).

PERCOLATION - The downward movement of water through the soil or alluvium to the ground water table.

PERENNIAL YIELD - "The rate at which water can be withdrawn perennially under specified operating conditions without producing an undesired result" (Todd, 1980). An undesired result is an adverse situation such as: (1) a reduction of the yield of a water source; (2) development of uneconomic pumping lifts; (3) degradation of water quality; (4) interference with prior water rights; or (5) subsidence. Perennial yield is an estimate of the long-term average annual amount of water which can be withdrawn without inducing a long-term progressive drop in water level. The term "safe yield" is sometimes used in place of perennial yield, although the concepts behind the terms are not identical: the older concept of "safe yield" generally implies a fixed quantity equivalent to a basin's average annual natural recharge, while the "perennial yield" of a basin or system can vary over time with different operational factors and management goals.

PROLONGED OVERDRAFT - Net extractions in excess of a basin's perennial yield, averaged over a period of ten or more years. (Also see footnote to Goal 1 in main text.)

ppm - Abbreviation for "parts per million," a measure of a substance's concentration in a solution or other mixture. Nearly the same as milligrams per liter (mg/l).

RECHARGE BASIN - A surface facility, often a large pond, used to increase the infiltration of water into a ground water basin.

RECLAIMED WATER - Urban waste water that becomes suitable for a specific beneficial use as a result of treatment.

RETURN FLOW - The portion of withdrawn water that is not consumed by evapo-transpiration and returns instead to its source or to another body of water.

REUSE - The additional use of once-used water.

RMD - Santa Barbara County **R**esource **M**anagement **D**epartment; reorganized and renamed as the Planning and Development Department (P&D) in February 1994.

RWQCB - California **R**egional **W**ater **Q**uality **C**ontrol **B**oard (or successor agency).

SAFE YIELD (GROUND WATER) - The maximum quantity of water that can be withdrawn from a ground water basin over a long period of time without developing a condition of overdraft. Sometimes referred to as sustained yield.

SALINITY - Generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. Where sea water is the major source of salt, salinity is often used to refer to the concentration of chlorides in the water. See also TDS.

SBCFCWCD - **S**anta **B**arbara **C**ounty **F**lood **C**ontrol and **W**ater **C**onservation **D**istrict (or successor agency).

SERIOUS OVERDRAFT - Prolonged overdraft which results or, in the reasonably foreseeable future (generally within ten years) would result, in measurable, unmitigated adverse environmental or economic impacts, either long-term or permanent. Such impacts include but are not limited to seawater intrusion, other substantial quality degradation, land surface subsidence, substantial effects on riparian or other environmentally sensitive habitats, or unreasonable interference with the beneficial use of a basin's resources. (Also see Policy 3.5 *et seq.* in main text.)

SWP - **S**tate **W**ater **P**roject.

SWRCB - California **S**tate **W**ater **R**esources **C**ontrol **B**oard (or successor agency).

TDS - **T**otal **D**issolved **S**olids, a quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter (mg/l) or in parts per million (ppm). See also Salinity.

USGS - **U**nited **S**tates **G**eological **S**urvey (or successor agency).

WATER RECLAMATION - The treatment of water of impaired quality, including brackish water and sea water, to produce a water suitable for the intended use.

WATER RIGHT - A legally established entitlement to take possession of water in a water supply and to divert that water for beneficial use.

APPENDIX B

Examples of Recharge Design Guidelines

(relates to main text, Policy 3.7 *et seq.*)

APPENDIX C

Index of Detailed Groundwater Basin Maps

The following maps are part of the Groundwater Resources Section of the Conservation Element. All maps use as their base the U.S.G.S. 7.5' Topographic Series at a scale of 1:24,000 (one inch equals two thousand feet), with individual sheets mosaiced together as necessary for full basin coverage. Maps are for sale through the public counter of the Santa Barbara County Planning and Development Department, 123 E. Anapamu St., Santa Barbara.

CONS/GWB-1South Coast Basins (36" by 101")

CONS/GWB-2Santa Ynez Uplands, with eastern Buellton Uplands and Santa Ynez River Basins (42" by 76")

CONS/GWB-3Lompoc, with western Buellton Uplands and Santa Ynez River Basins (36" by 64")

CONS/GWB-4San Antonio Basin (36" by 90")

CONS/GWB-5Santa Maria Basin (42" by 95")

CONS/GWB-6Cuyama Basin (42" by 92")

The Ellwood to Gaviota and Gaviota to Point Conception coastal "basins" are not included in this map series because of their special, diverse nature and the paucity of available source data.