WATER SUPPLY ASSESSMENT

CITY OF GOLETA PROPOSED GENERAL PLAN/ COASTAL LAND USE PLAN

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1.O INTRODUCTION

1.1 NEED FOR A WATER SUPPLY ASSESSMENT

Water Code Section 10910 (b) requires that when a city or county determines an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act (CEQA) pursuant to Section 21080.1 of the Public Resources Code, the city or county shall identify the water supplier that will provide water for the project. The City or County shall then request that the public water supplier prepare a Water Supply Assessment (WSA) for the project which shall evaluate whether the public water supplier's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to other existing and planned future uses in the service area.

In March 2006, the City of Goleta issued a draft General Plan/Coastal Land Use Plan (GP/CP) for public review and comment. A draft Environmental Impact Report (EIR) will be issued for the Draft GP/CP in June or July 2006. The adoption of the GP/CP by the City Council, expected in late 2006, represents a discretionary action subject to CEQA and Water Code Section 10910(b). The Goleta Water District (GWD) is the only public water supplier within the City limits. As such, the City has requested that the GWD prepare a WSA for the Draft GP/CP.

The GP/CP contains a number of state-mandated elements. The Land Use Element establishes a planned land use pattern and policies to govern development within the city. The land use designations and policies, together with the land use plan map, guide the general distribution, location, and extent of future land uses and development. This development will result in increased water demand for residential, commercial, and industrial land uses. No increase in agricultural water demands is anticipated. In response to the City's request, GWD has prepared this WSA, the results of which will be incorporated into the City's Draft EIR for the proposed GP/CP.

1.2 ESTIMATED WATER DEMAND UNDER THE PROPOSED GP/CP

The Land Use Element is one of seven elements mandated by state planning law, at Section 65302 of the California Government Code. The Land Use Element is required to consist of a statement of policies and a land use plan map showing the spatial distribution, location, and extent of lands designated for housing, business, industry, open space, agriculture, and other categories of public and private uses of land. It must state standards for population density and building intensity for each of the land use categories. This element defines Goleta's planned long-range development pattern and physical character, as well as the extent and distribution of future growth in the city. Other elements of the plan further address the relationships between future development and environmental quality, safety hazards, and social and economic concerns.

The key policy in the proposed Land Use Element is LU 1.1 (Land Use Plan Map). Which states **"**The Land Use Plan map in Figure 2-1 is hereby adopted. The Land Use Plan map establishes the future distribution, extent, and geographic locations of the various land uses within Goleta. The standards applicable to each of the various use categories and sites are set forth in Policies LU 2 through LU 9. This policy is accompanied in the Draft GP/CP by a land use map (Figure 2-1) showing future allowable land uses, and the following tables:

Maximum General Plan Housing Build Out			
Land Use	Existing (2005) (units)	Full Build Out (units)	Change (units)
Single family residential units	5,483	5,963	480
Multiple family residential units	6,132	9,382	3,250
Total=	11,615	15,345	3,730

Maximum General Plan Commercial and Industrial Buildout			
Land Use	Existing (2005) (units)	Full Build Out (units)	Change (units)
Commercial square footage	2,575,000	3,279,000	704,000
Industrial square footage	9,544,000	10,921,000	1,377,000
Total=	12,119,000	14,200,000	2,081,000

The proposed Housing Element contains policies and programs to help meet the existing and projected housing needs of all economic segments of the community, with a focus on housing affordable to low- and moderate-income households. The policies in this element would not create additional units above the maximum allowed in the Land Use Element.

The projected water demand associated with the full build out of residential, commercial, and industrial land uses in the proposed Land Use Element are shown in Table 1. The future water use is equally divided amongst five year intervals from 2005-2025 for the sake of analysis. The total projected increase water use associated with the proposed GP/CP is 1,264 acre-feet per year at full build out.

TABLE 1
PROJECTED FUTURE WATER USE (AFY) IN THE CITY OF GOLETA

	Total Current Water Use	Future Water Use*				
		2010	2015	2020	2025	Total Increase
Single family residential	1,508	1,541 *(+33)*	1,574 *(+33)*	1,607 *(+33)*	1,640 *(+33)*	132
Multiple family residential	1,233	1,396 *(+163)*	1,559 *(+163)*	1,723 *(+164)*	1,886 *(+163)*	653
Commercial	592	632 *(+40)*	673 *(+41)*	713 *(+40)*	754 *(+41)*	162
Industrial	2,195	2,274 *(+79)*	2,353 *(+79)*	2,433 *(+80)*	2,512 *(+79)*	317
	5,528					1,264

Total estimated water use is shown for each period. Increases for each 5-year period are shown in italics. Water demand factors are used that are based on historic water use in the GWD: 0.28 AFY per single family unit, 0.20 AFY per multiple family unit, and 0.00023 AFY per square feet for industrial and commercial land uses.

1.3 SCOPE OF THE WSA

Under Water Code Section 10910(c)(1), a city or county about to request a WSA from a public water supplier shall determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted Urban Water Management Plan (UWMP) prepared by the public water supplier. Under Water Code Section 10910 (2), if the projected water demand associated with the proposed project was accounted for in the most recently adopted UWMP, the public water supplier may incorporate the requested information from the urban water management plan in preparing the WSA.

The GWD adopted their most recent UWMP in December 2005. The plan included projections of future water demands from various sources, including development in the City of Goleta. The basis of the City's water demands were the same as those presented in the Land Use Element of the proposed GP/CP (see tables above). Hence, the GWD has determined that it can directly incorporate the information, analyses, and conclusions about future water supply for the proposed GP/CP from its recently adopted UWMP. Most of the information contained in this document was derived from the December 2005 UWMP, which is available at the GWD website (www.goletawater.org)

Under Water Code Section 10920 (4), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

The WSA must also include detailed information about groundwater supplies, including the following: (1) A description of any groundwater basin or basins from which the proposed project will be supplied. (2) For those basins for which a court or the board has adjudicated the rights to pump groundwater, a description of the amount of groundwater the public water system. (3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system. (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system. (5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project.

2.0 DESCRIPTION OF GOLETA WATER DISTRICT

GWD is a County Water District operating pursuant to the provisions of California Water Code, §§ 30,000, et seq. It was formed in 1944 to take advantage of the water supply to be developed by the Federal Cachuma Project on the Santa Ynez River. GWD initially relied on local groundwater until the Cachuma Project began making deliveries in 1955. Since that time, the Cachuma Project has been, and continues to be, GWD's primary water supply source. GWD also delivers water from the State Water Project, recycled water, and groundwater.

GWD is located in the South Coastal portion of Santa Barbara County with its western border adjacent to the El Capitan State Park, its northern border along the foothills of the Santa Ynez mountains and the Los Padres National Forest, the City of Santa Barbara to the east, and the Pacific Ocean to the south. GWD's service area encompasses approximately 29,000 acres, and provides water service to approximately 80,000 customers. GWD's boundaries are shown on Figure 1.

GWD includes the City of Goleta, University of California, and Santa Barbara Airport (City of Santa Barbara property); the remainder of GWD is located in the unincorporated County of Santa Barbara. La Cumbre Mutual Water Company and El Capitan Mutual Water Company are located within GWD's service area; however, these private water companies have their own water supply, water distribution facilities, and customers.

Climatic Factors

The key climatic factors that affect GWD's water supply management are the substantial year to year variation in precipitation and evapotranspiration. Variation in the former affects runoff conditions in the Santa Ynez River watershed, which directly affects GWD's supply from the Cachuma Project. Variation in evapotranspiration can result in years with very high water use from landscaping, outdoor residential uses, and agricultural irrigation. This variation in supply and demand is a key factor that is considered in GWD's water supply management planning.

Facilities

GWD's water distribution system includes over 200 miles of pipelines ranging in size from two inches to 42 inches in diameter. GWD's water supply from the Cachuma Project and the State Water Project is treated through GWD's Corona Del Mar Water Treatment Plant. This plant provides coagulation and flocculation, filtration, and disinfection treatment and has a nominal treatment capacity of 24 million gallons per day. GWD maintains eight reservoirs ranging in individual capacity from 0.3 million gallons to over 6 million gallons, with a total combined capacity of approximately 20.2 million gallons.

Demographic Factors

From 1990 to 2000, the population in the Goleta area has grown an average of 1.3% per year. The Santa Barbara County Association of Governments (SBCAG) projections indicate that the population in the Santa Barbara Unincorporated Census County Division will increase by 0.8 % per year from 2000 to 2030 (2002 Regional Growth Forecast).

The key demographic factors that GWD must consider in current and future water supply management planning are changes in GWD's population due to natural population growth and immigration/emigration, the development and adoption of the City of Goleta's General Plan and its effect on local population and

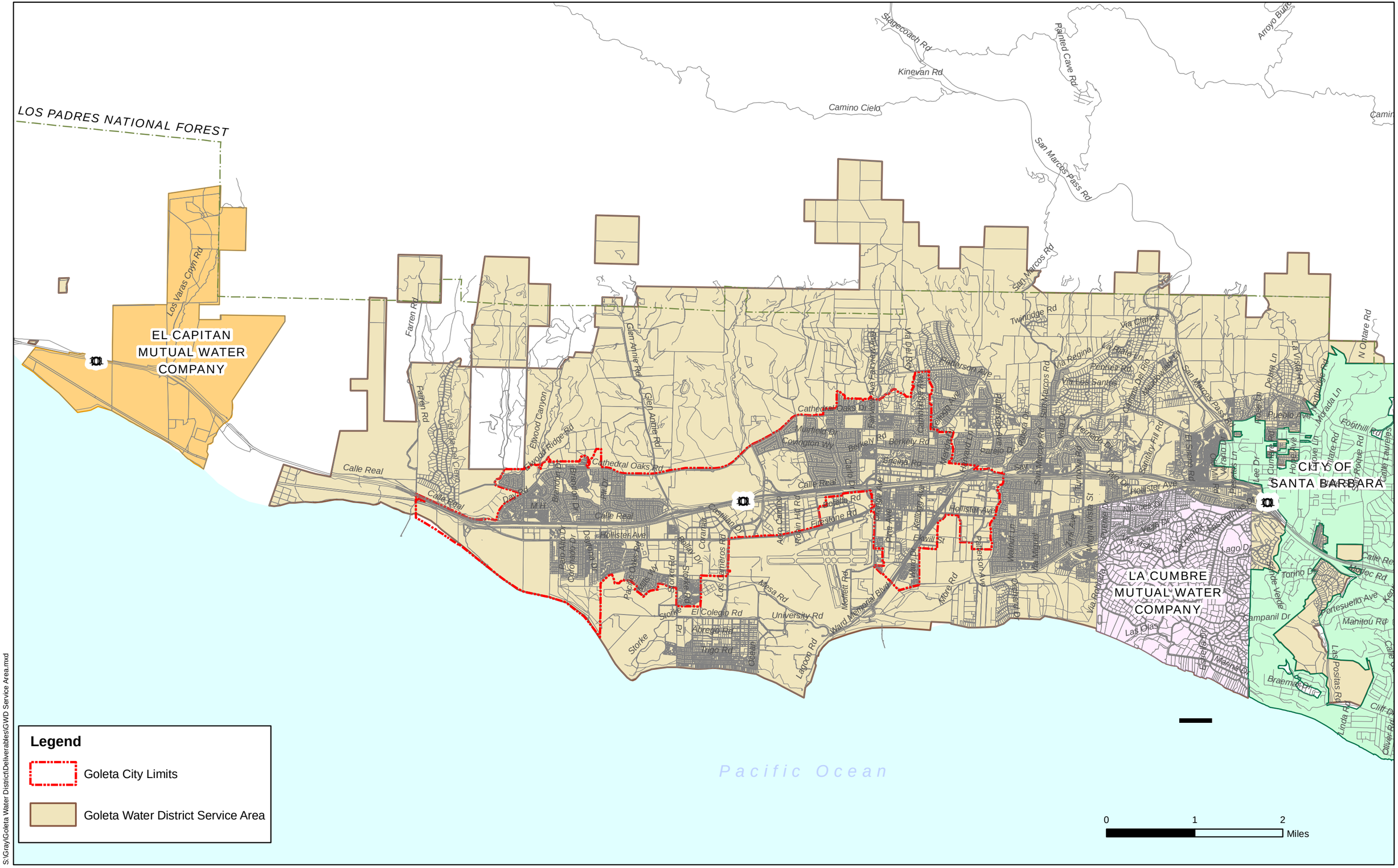


Figure 1. Goleta Water District Service Area

economic growth rates; the development and adoption of the Isla Vista Master Plan; continued growth of the University of California student and faculty populations; possible re-zoning of agricultural and industrial/commercial parcels in the unincorporated area for affordable housing by Santa Barbara County; and recent increase in single family residential development. In addition, changes in agricultural crops, cultivation methods, and irrigation requirements in GWD affects current and future water supply management planning.

3.0 WATER SUPPLY SOURCES

GWD delivers water from the Cachuma Project, the State Water Project, groundwater from the Goleta North/Central Groundwater Basin, and recycled water. Each of the water supply sources are described below.

3.1 CACHUMA PROJECT

The majority of GWD's water supply is from the Cachuma Project which the Federal Government through the Bureau of Reclamation constructed on the Santa Ynez River in the early 1950's. GWD receives approximately 9,322 acre-feet per year (AFY) from the Cachuma Project. The Cachuma Project consists of Bradbury Dam, Tecolote Tunnel, South Coast Conduit, and various water conveyance facilities. The dam impounds water along the Santa Ynez River, approximately 45 miles from its outlet at the ocean. The reservoir had an original capacity of approximately 205,000 acre feet but has been reduced to approximately 190,000 acre feet as a result of siltation. This capacity amount does not include surcharge for the purposes of storage for fish releases (see below).

Water is diverted from Lake Cachuma to the South Coast through the Tecolote Tunnel, which extends approximately 6.4 miles through the Santa Ynez Mountains to the head works of the South Coast Conduit (SCC) at Glen Annie Reservoir. The SCC extends for a distance of approximately 24 miles along the South Coast from Goleta to Carpinteria, and includes four regulating reservoirs. The SCC delivers Cachuma Project raw water to GWD at the Corona del Mar Treatment Plant where it is treated for domestic water use. A turnout at Glen Annie Reservoir supplies raw water that is chlorinated by GWD prior to delivery to agricultural customers in the Goleta West Zone, using the Goleta West Conduit.

Water is provided to the Cachuma Project Member Units for irrigation, domestic, and municipal and industrial water uses. The Member Units include GWD, City of Santa Barbara, Montecito Water District, the Carpinteria Valley Water District, and the Santa Ynez River Water Conservation District Improvement District #1. The project is the principal water supply for Santa Barbara South Coast communities and portions of the Santa Ynez Valley. Since the drought of 1987-1991, the average annual deliveries from the Cachuma Project to the Member Units have been approximately 27,000 acre-feet per year (AFY). The amount of Cachuma Project water delivered to the Member Units varies from year to year, depending on winter runoff, lake storage, water demand, downstream releases for fish, and other water supply sources. The City of Santa Barbara and GWD receive the largest quantity of water from the project.

The current total Cachuma Project operational yield is 25,714 AFY, based on a water shortage of up to 20% during dry years, and taking into account the requirements for downstream releases for fish, described below. GWD's share of this yield is 36.25% or 9,322 AFY.

In 1997, the southern steelhead trout was listed as an endangered species, including the population along the lower Santa Ynez River. A Biological Opinion ("BO") was issued for Cachuma Project operations in September 2000. The BO concludes that operations of the Cachuma Project consistent with the BO would not jeopardize the continued existence of the southern steelhead. The BO includes mandatory terms and conditions that require the Bureau of Reclamation to implement reasonable and prudent measures to minimize take of the southern steelhead. The Cachuma Member Units, including GWD, are implementing the requirements in the BO which include releases from Bradbury Dam to support fish rearing and passage, various scientific studies, and several habitat improvement projects. The Cachuma Project

Member Units surcharge (temporarily raise the water level) Cachuma Lake during spill years to store additional water to be use for releases from the dam for fish.

For several years, a water rights hearing regarding the Cachuma Project has been pending before the State Water Resources Control Board (State Board). The primary evidentiary hearings were held before the State Board in 2003 concerning whether the water rights permit for the Cachuma Project should be modified. A draft EIR was issued in the same year. The State Board is expected to complete a decision regarding the water rights permits and a final EIR in 2006. Historic water right disputes on the Santa Ynez River were resolved through a Settlement Agreement between the Cachuma Member Units and downstream Santa Ynez River water users during the course of the State Board hearings, and there are no water right disputes now pending. The two remaining key issues include the amount of water to be released to provide for this species downstream of the dam, and the need, if any, to provide passage through Cachuma Lake to the upstream watershed.

During spill years, GWD and other Cachuma Project Member Units have the ability to take spill water from the Bureau of Reclamation, as available. GWD has often taken spill water for direct use, for injection into the groundwater basin, or to defer groundwater pumping. GWD does not include spill water in the estimate of the long-term water supply from the Cachuma Project (see Table 8 below) because spill water is not considered a reliable source for long-term water supply planning as it varies with climatic conditions, and its availability is subject to factors such as GWD's ability to inject or use the spill water during the spill year.

3.2 STATE WATER PROJECT

In 1991, the residents in the GWD service area voted to purchase a project allotment of 4,500 AFY from the State Water Project (SWP). The SWP conveyance facilities to the Santa Ynez Valley and Cachuma Lake (where the SWP are conveyed through the Tecolote Tunnel) were completed in 1997 by the Central Coast Water Authority (CCWA). The CCWA is a California Joint Powers Agency formed by its nine public agency members, including GWD. The CCWA was formed to construct the necessary facilities to deliver State Water Project water to its members, and now operates and maintains the facilities. All of the Cachuma Project Member Units are also members of CCWA. SWP water deliveries to Santa Barbara County, including GWD, began in 1997. SWP water is commingled with Cachuma Project water and conveyed through the Tecolote Tunnel to the SCC where it is delivered to the Corona del Mar Water Treatment Plant.

GWD receives SWP water through a Water Supply Agreement with the CCWA. GWD's annual project allotment (also called "Table A Amount") is 4,500 AFY. Table A refers to the table in each SWP contract that lists the maximum amount of water an agency may request each year. GWD also has a drought buffer amount of 450 AFY through CCWA. In 1994, GWD customers voted to purchase an additional 2,500 AFY of SWP allotment to supplement the original allotment and the 450 AFY drought buffer. Hence, GWD's total allotment is 7,450 AFY. Under GWD's agreement with CCWA, GWD's share of the SWP conveyance facilities that deliver SWP water to Cachuma Lake is only 4,500 AFY. The long-term average SWP delivery is about 77 percent due to shortages related to year to year variation in runoff in the Sacramento-San Joaquin Delta. Hence, GWD's 7,450 AFY allotment significantly improves the reliability of the SWP to deliver GWD's planned for 4,500 AFY supply.

3.3 RECYCLED WATER

In 1995, GWD began making deliveries from a newly developed recycled water project developed in cooperation with the Goleta Sanitary District, a separate public agency. The recycled water project has a current treatment and distribution capacity of approximately 1,500 AFY. GWD is currently delivering

approximately 1,000 AFY to the University of California campus, several golf courses, and other irrigation users, most of whom were previously using GWD potable water for irrigation. GWD anticipates that recycled water use will increase, particularly by the University of California, in future years. However, it is unlikely that recycled water production will increase over 1,500 AFY due to limits in the available market and the high cost of increasing treatment capacity.

3.4 GROUNDWATER

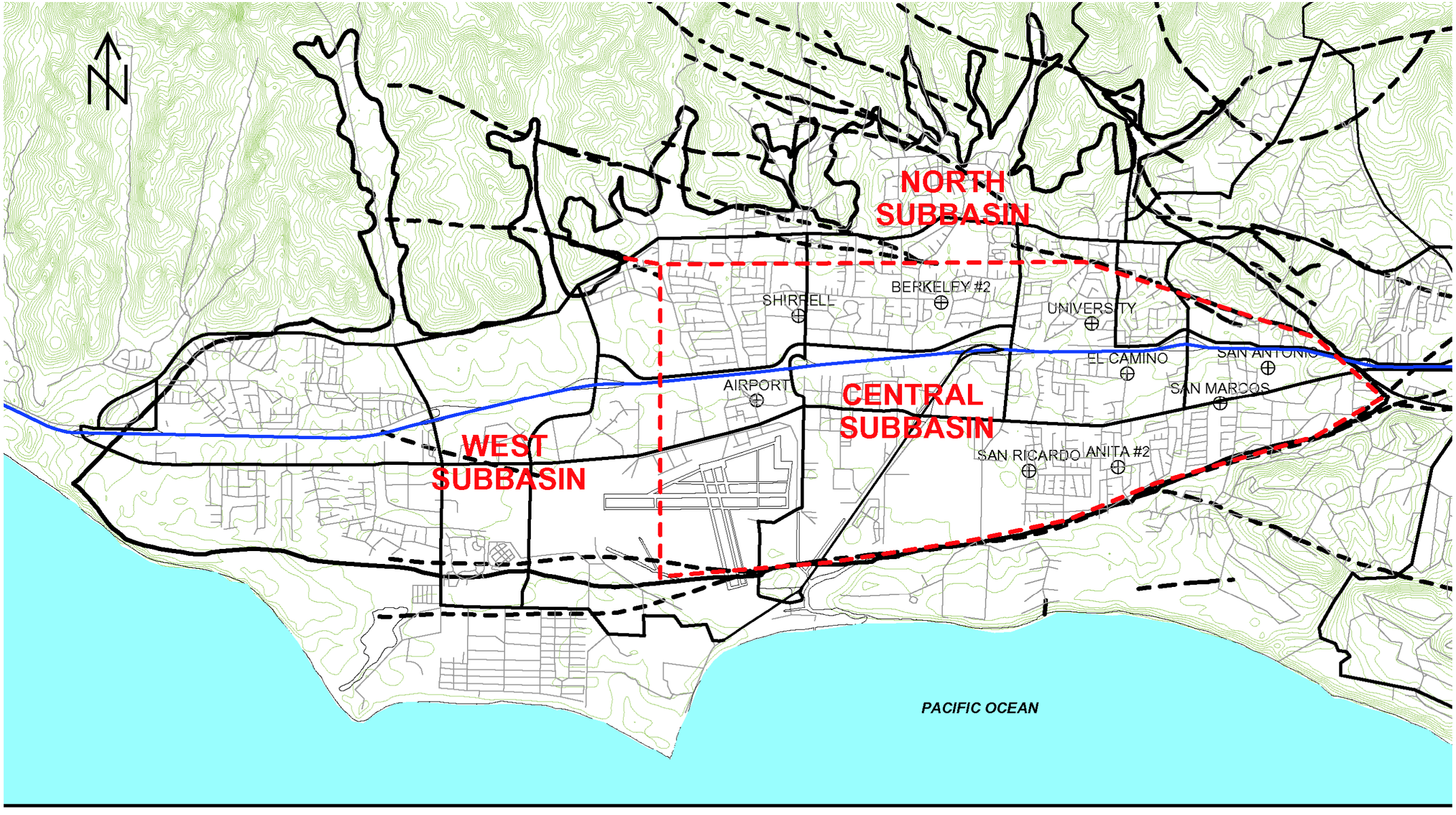
3.4.1 Overview

GWD's right to produce groundwater from the local Goleta North/Central Basin has been adjudicated through a court judgment in 1989 entitled Wright et al v. Goleta Water District . GWD has an adjudicated right to produce 2,350 AFY and any surplus water available. The Wright Judgment also provides GWD with the right to defer producing its annual groundwater entitlement, and considers that water as GWD's stored water for later use during dry years, droughts, and emergencies. The Wright Judgment also provides GWD with the right to inject surface water supplies and claim that as GWD's stored water, in addition to its annual entitlement. When the Cachuma Project spills, GWD may receive "spill water" in addition to its annual entitlement without direct cost, and whenever Cachuma spills GWD uses that water for injection. The spill in 2005 allowed GWD to inject Cachuma Project water. At this time, GWD does not anticipate the need to regularly produce groundwater for at least several years. Emergency and other operational situations could dictate producing groundwater on a short term basis. GWD uses Cachuma Project water at the first priority source, and then State Water Project and recycled water; groundwater is only produced when necessary to meet demand when other sources are insufficient. GWD now has rights to over 35,000 acre feet of stored groundwater in addition to its annual production.

3.4.2 Basin Description

The Goleta Groundwater Basin (GGWB) underlies the Goleta Coastal Plain (Figure 2). The basin is bounded on the north by bedrock of the Santa Ynez Mountains, and to the south by uplifted bedrock along the More Ranch Fault. Tertiary-age bedrock forms the western boundary. The eastern boundary consists of bedrock uplifted along the Modoc Fault. The basin is approximately 8 miles long and 3 miles wide. Basin groundwater rights were adjudicated in Wright Judgment. In the Judgment, the basin is subdivided into two subbasins: the North-Central Subbasin, and the West Subbasin. In much of the technical literature the basin is divided into three subbasins: the North, Central, and West subbasins. Because it retains some technical advantages, nomenclature used in this report follows the later nomenclature of three subbasins.

The GGWB is drained by the Cieneguitas, Atascadero, San Antonio, Maria Ygnacio, San Jose, Las Vegas, San Pedro, Carneros, and Tecolotito creeks. The lower reaches of these creeks are intermittent where they flow across permeable sediments of the North Subbasin. This is an active area of groundwater recharge for the basin. Remaining creek flow runs off into the Pacific Ocean with relatively minor recharge of more fine-grained shallow sediments in the Central and West subbasins.
The majority of useable groundwater in storage in the GGWB is present within the Central Subbasin, which is about 4 miles long and 2 miles wide (Figure 2). The Central Subbasin is separated from the North Subbasin by a fault that appears to form a hydraulic impediment to groundwater flow. The boundary between the North and West subbasins is characterized by significant changes in water quality and hydraulic characteristics that may be related to an overall facies change and/or change in source rock material in underlying sediments.



Source: Dan Wendell, CH2M Hill

Figure 2. Goleta Groundwater Basin

3.4.3 Groundwater Occurrence

Water-bearing deposits of the GGWB consist of young alluvium of Quaternary and Holocene age, terrace deposits, older alluvium, and the Santa Barbara Formation of Pleistocene age (Figure 3). The Santa Barbara Formation is the primary water bearing unit, and is composed of sand, silt, and clay. The hydrostratigraphy of the Basin has been characterized during earlier GWD investigations, which resulted in identification of five principal hydrostratigraphic zones. Evidence of these zones is apparent in geologic and geophysical logs. From youngest to oldest, these zones are as follows (also see Figure 3):

- **Shallow Zone** – The shallow zones consists of unconsolidated alluvium ranging in thickness from 100 to 150 feet, being thickest in the southeast portion of the basin. Groundwater in the shallow zone is locally perched indicating vertical impedance to flow. The shallow zone is typically fine-grained and locally confines underlying units. This unit is not an important source of groundwater to wells.

- **Upper Producing Zone** – The upper producing zone consists of alternating sequences of sands, silts, and sandy clays that attain a maximum thickness of 600 feet in the southern portion of the Central Subbasin. Private wells in the Central Subbasin are primarily screened in this zone.

- **Middle Zone** – The middle zone is an aquitard composed primarily of clay and clayey silt. This unit zone is typically about 200 to 250 feet thick.

- **Lower Producing Zone** – The lower producing zone is characterized by the presence of clean fine sands and silt. In the Central Subbasin it maintains a relatively constant thickness of about 200 feet. The electric log response of this zone is similar to that of the upper producing zone. Private wells tend not be completed in this zone. All major GWD wells are screened in this zone.

- **Deep Zone** – The deep zone, also known as the lower Santa Barbara Formation, is composed primarily of clay. Well logs indicate the zone may extend over 1,000 feet in thickness in the central subbasin. The deep zone is characterized by specific capacities of less than 1 gpm/ft and is not considered a significant source of water to wells.

Bedrock in the basin generally slopes from an elevation of about -200 feet mean sea level (msl) along the northern boundary of the basin to over -2,000 feet msl in the south central portion of the central Subbasin. The bedrock contact with the southern boundary is very abrupt, where it abuts the More Ranch Fault. GWD production wells are typically screened in the upper and lower producing zones and range in depth from 230 to 1,290 feet below ground surface (bgs).

3.4.4 Water Levels

Hydrographs of wells in the Central Subbasin indicate that historically high water level periods were in the mid 1940s and early 1970s, and 2004. Historic low water levels during this period were in 1990. Water levels during this period were below sea level for much of the basin. Groundwater throughout the basin generally flows toward the Central Subbasin from the West and North subbasins due to a water level depression related to relatively high amounts of groundwater pumping. Water levels in the Central Subbasin are still below sea level over much of the area in 2004. The basin is protected from seawater intrusion by the presence of uplifted bedrock along the More Ranch Fault.

B

B'

Shallow Zone

Upper Producing Zone

Middle Zone

Lower Producing Zone

Deep Zone

Elevation (feet msl)

600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000 36,000 38,000 40,000 42,000 44,000

Distance (feet)

State Well ID

Groundwater Elevation

Well Screen

Legend

GP	SP	ML	CL	Sea Shells
GW	SW	MH	CH	BR
GM	SM	FL	OH	
GC	SC	PT	OL	

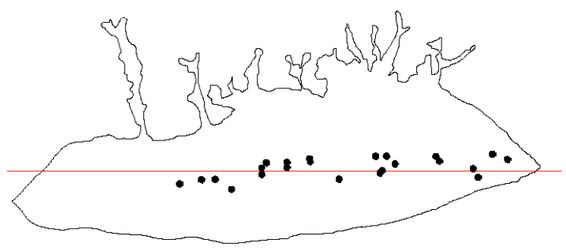


Figure 3. Cross Section of the Goleta Groundwater Basin

3.4.5 Storage

The storage capacity of a groundwater basin is calculated by estimating the total volume of drainable pore space between specified horizons. Drainable pore space ("specific yield") is typically on the order of 10 to 30 percent, with 10 to 20 percent being values that are commonly used. The USGS has calculated that specific yield in the shallow aquifers of the Central Valley of California (a highly studied area) is commonly about 10 percent. This is the same value that the US Geological Survey (USGS) used for unconfined aquifers for calibration of the numerical model of the Santa Barbara Groundwater Basin (USGS, 1986).

Storage capacity estimates are made using estimates of specific yield and the volume of alluvial sediments available for saturation and desaturation. When historical high and low water levels are used these calculations result in what is typically referred to as historical "working storage," "operational storage," or "useable storage." Using this approach, and based on the volumetric difference between 2004 and 1990 water levels and estimates of specific yield of 10 to 20 percent, results in an estimate of about 35,000 to 70,000 acre-feet (AF) between these years (Table 2). These storage values are in general agreement with findings of the Santa Barbara County Technical Advisory Committee (see District Staff Report on Technical Advisory Committee Analysis, Water Supply and Demand in the Goleta Area, May 1989). This committee consisted of technical staff from Santa Barbara County and Goleta area water purveyors and was established to assess water supply and demand issues in the Goleta Valley area. During this work, GWD calculated that there was about 45,000 acre-feet of "working storage" in the Goleta Groundwater Basin in 1987. The County calculated a value of 34,000 acre-feet. The estimated amount of water GWD has stored in the basin since the early 1990s (about 40,000 AF; see Table 3) is in line with the estimate of working storage for this same period (35,000 to 70,000 AFY; see Table 2).

About 30,000 to 60,000 AF of the operational storage is present in the North-Central subbasins. Citing a feasibility study by the Toups Corporation (1974), the Department of Water Resources estimates "useable" groundwater storage of about 40,000 to 60,000 AF between 1941 and 1964.

TABLE 2
USEABLE STORAGE IN THE GOLETA GROUNDWATER BASIN (AF)

Subbasin	Specific Yield (acre-feet)		
	10%	20%	30%
North	5,000	9,000	14,000
Central	24,000	48,000	73,000
West	7,000	15,000	22,000
Total	36,000	72,000	109,000

3.4.6 Groundwater Production

GWD currently has nine major production wells, all of which are located in the Central Subbasin. GWD first began pumping groundwater from the basin in 1963 when it pumped a total of about 250 AF of water from the Gilbert Well, its first well in the basin. GWD groundwater production first exceeded 1,000 AF in 1970 when it pumped about 1,200 AF from the Gilbert and Barquero wells. By 1974, GWD had installed five new wells in the basin and ramped its groundwater production up to 3,700 AF. GWD pumpage peaked in 1985 when it produced slightly more than 6,000 AF of groundwater from the basin. GWD pumping declined sharply in 1991, and has been essentially zero since 1993. Since 1991, GWD has met demand solely through use of surface water from the Cachuma reservoir, State Water Project water since 1997, and recycled water beginning in 1995.

3.4.7 Production Rights

The 1989 settlement of the Wright Judgment resulted in adjudication of production and storage rights for the GGWB. The Wright Judgment entitles GWD to produce 2,350 AFY of groundwater (Table 3). The Wright Judgment also allows GWD to store water in the basin for future use. During years when GWD's surface water supplies are adequate to meet demand, GWD "banks" its entitlement water for future use. GWD has injected surplus Cachuma spill water on numerous occasions. These actions have resulted in GWD banking more than 12,000 AF of water in the basin since 2000 and over 35,000 AF of water stored in total (see Table 3). It is GWD's opinion based on available information on the groundwater basin characteristics that the banked amount can be feasibly produced when needed.

TABLE 3
ACCRUED DISTRICT GROUNDWATER PUMPING RIGHTS
FOR THE GOLETA GROUNDWATER BASIN (THROUGH 2004)

Right	Pumping Right (acre-feet)
Annual Pumpage Right	2,350
Deferred Pumpage (2,350 AFY for 1992-1999)	18,800
Injected Water (Cachuma spills 1992-1999)	6,164
Deferred Pumpage (2,350 AFY for 2000-2004)	11,750
Injected Water (Cachuma spills 2000-2004)	715
Total Accrued Right in 2005=	39,779

3.4.8 District Wells

GWD has nine major production wells, all of which are located in the Central Subbasin. Of these nine wells, three have already been rehabilitated and are operational and three others are currently undergoing rehabilitation. Production capacities of GWD wells has historically ranged from about 200 gallons per minute (gpm) to 750 gpm, with a combined total instantaneous pumping capacity of about 3,260 gpm. GWD has estimated that the six rehabilitated wells will have capacities of about 200 to 900 gpm, with a combined total instantaneous pumping capacity of about 3,480 gpm. In the near future, GWD plans to bring all its primary production wells on line. These have a total capacity of about 4,360 gpm. Assuming each of these wells operates 50 percent of the time, GWD will have a total production capacity of about 3,500 AFY. The total production capacity is about 5,600 AFY if the wells operate 80 percent of the time.

Since the early 1990s, GWD has only operated its wells for periodic injection of Cachuma Lake spill water. However, GWD recently rehabilitated its wells and well facilities and specially retro-fit some of these wells for use as dual-purpose injection-extraction wells (commonly referred to as "Aquifer Storage and Recovery" or "ASR" wells) in order to maximize injection capacity. This will work towards maximizing the conjunctive use potential of the basin and Cachuma Reservoir.

3.5 SUMMARY OF WATER SUPPLY

A summary of the GWDt's water supply sources is provided in Table 4 for the period 2005 – 2030 under normal or average years. GWD does not anticipate any change in these sources over the next 25 years that would substantially reduce the current supply amounts.

TABLE 4
WATER SUPPLY SOURCES AND AMOUNTS AVAILABLE DURING NORMAL YEARS

Water Supply Sources	Estimate of Actual Deliveries Expected in 2005	Long-term Water Supply Amount	Available Water Supply in Future Years (Actual Deliveries May be Less, Esp. in Early Years)				
			2010	2015	2020	2025	2030
Cachuma Project	12,200	9,322	9,322	9,322	9,322	9,322	9,322
State Water Project[(a)]	2,100	4,500	4,500	4,500	4,500	4,500	4,500
Groundwater[(b)]	0	2,350	2,350	2,350	2,350	2,350	2,350
Recycled	1,000	1,500	1,200	1,500	1,500	1,500	1,500
Total=	15,300	17,672	17,372	17,672	17,672	17,672	17,672

These are the District's projected water supplies during normal runoff years. The basis of the water supply projections is described in this section of the report. At this time, the District's supplies for the period 2005-2030 do not include short-term transfers or exchanges, desalination, or increased recycled water.
(a) The District has a total SWP allotment of 7,450 AFY, which includes 450 AFY of CCWA drought buffer. The District's current annual conveyance allowance with CCWA is only 4,500 AFY. The additional allotment increases the reliability of receiving up to 4,500 AFY.
(b) The District has the adjudicated right to produce up to 2,350 AFY as well as any banked groundwater. Hence, more than 2,350 AFY may be available if the District has stored surplus Cachuma Project or SWP water in the groundwater basin.. To date, over 35,000 AF has been stored in the basin.

A summary of recent water production from these supply sources is presented in Table 5. Cachuma Project water deliveries have been higher than GWD's entitlement due to the availability of surplus spill water. SWP water deliveries (which are less than GWD's full allotment of 4.500 AFY) have been sufficient to meet current demand, in combination with the Cachuma Project water production. There has been no need to pump groundwater to meet current water demands.

TABLE 5
WATER PRODUCTION FROM SUPPLY SOURCES DURING THE PAST FIVE YEARS

Calendar Year	State Water Project (AFY)	Cachuma Project (AFY)	Groundwater Production (AFY)	Recycled Water (AFY)	Total (AFY)
2000	2,615	10,108	0	1,001	13,724
2001	2,019	10,504	5	815	13,343
2002	4,678	9,001	3	1,057	14,739
2003	2,425	10,232	0	945	13,602
2004	4,143	9,470	0	1,029	14,642

(a) Data is based on actual production, not deliveries or sales. Unaccounted for losses are not included in the above values.

3.6 WATER SUPPLY RELIABILITY

GWD's water supply is affected by climatic conditions which can result in shortages in supply during periods with low rainfall and runoff. Shortages can occur for different supply sources depending upon the extent and location of the reduced rainfall and runoff. Low rainfall years in northern California can affect the SWP deliveries to GWD. Similarly, low runoff in the Santa Ynez River watershed will reduce supplies from the Cachuma Project. The reliability of GWD's water supply is described in this section by estimating GWD's water supply during normal years, a single critically dry year, and a series of dry years. These conditions are defined below:

- **Normal Years** - For purposes of this assessment, normal years are those years when runoff conditions are considered average or above average, and surface water supplies in both northern California (source of SWP water) and Santa Barbara County (runoff into Cachuma Lake) are sufficient for GWD to receive its regular entitlement from the Cachuma Project of 9,322 AFY and 4,500 AFY from the State Water Project (which is 60% of GWD's allotment). In normal years, GWD would also produce recycled water as necessary, up to its maximum capacity of 1,500 AFY. Finally, groundwater would be produced in an average year only if other supplies were insufficient to meet demand. For this analysis, GWD's full 2,350 AFY groundwater entitlement would be available in a normal year.

- **Critical Dry Year -** The critical dry year is defined as the year with the lowest runoff in the watersheds that affect GWD's surface water supplies. While this condition is considered extreme for water supply planning, is should be noted that a single critical dry year may or may not have any impact on GWD's water supply for that year. In some cases, a very dry year may be a single event in a series of many normal and wet years. Historically, the driest years do not necessarily occur in the middle of a multi-year drought. The following assumptions were used to develop the critical dry year conditions for GWD's water supply.

  The driest year of record in northern California (1977) was used for calculating the SWP water deliveries to GWD, which would be 20% of the District's full entitlement. The critical dry year for the Cachuma Project is 1951 which was the driest year of record on the Santa Ynez River. Based on computer simulation modeling, Cachuma Project deliveries to GWD during this year would have been 74% of GWD's full project allotment. This year also represented the last year of a 6-year drought period (1946 to 1951), and as such, the deliveries from the Cachuma Project were less than deliveries if the critical dry year occurred after a normal or wet year. Normal year groundwater production during the critical dry year would not be reduced, as groundwater supplies would not be immediately affected by a single dry year, and because GWD has sufficient banked groundwater to meet demands in single and multiple dry years. It is assumed that GWD would not reduce production of recycled water in a single dry year.

- **Multiple Dry Years -** Multiple dry years are defined as a sequence of six years with the lowest combined total runoff over the period of record in the watersheds affecting GWD's surface water supplies. For SWP water deliveries, the multiple dry year scenario is defined by the Department of Water Resources as the period 1987-1992 inclusive. Under this six year scenario, SWP water deliveries to GWD would be 23% to 70% of GWD's allotment.

  The multiple dry year scenario for Cachuma Lake was developed by the Santa Barbara County Flood Control & Water Conservation District's Santa Ynez River Hydrology Model. This model uses hydrologic data for the period of 1917 through 1993 to estimate reservoir water levels and system yields to the Cachuma Project Member Units. The worst-case multiple dry year scenario on the Santa Ynez River occurred during the six year period 1946-1951 inclusive. Under these conditions, the

model predicts that GWD would receive 74 to 100% of its Cachuma Project allotment. As is the case for the critical dry year, water to meet demand during the multiple dry year scenarios would be met with banked groundwater from the conjunctive use program, which currently has over 35,000 acre feet of banked groundwater.

The projections of water supplies under normal, single dry year, and multiple dry year conditions are presented in Table 6.

TABLE 6
PROJECTIONS OF AVAILABLE WATER SUPPLIES
IN NORMAL, CRITICAL, AND MULTIPLE DRY YEARS

	Available Supply in AFY (actual production would be less to match demand)							
	Normal Year	Critical Dry Year[(a)]	Multiple Dry Years (a)					
			Year l	Year 2	Year 3	Year 4	Year 5	Year 6
Cachuma Project	9,322	6,898[(a)]	9,322	9,322	9,322	6,898	6,898	6,898
Lake Cachuma Deliveries (% of normal of normal year supply)	--	*74%*	*100%*	*100%*	*100%*	*74%*	*74%*	*74%*
State Water Supply[(b)]	4,500	1,490[(a)]	4,500	1,714	4,183	2,012	1,788	2,161
State Water Deliveries (% of normal year supply)		*20%*	*70%*	*23%*	*70%*	*27%*	*24%*	*29%*
Groundwater (annual legal entitlement) [(c)]	2,350	2,350	2,350	2,350	2,350	2,350	2,350	2,350
Banked Groundwater[(d)]	[stored groundwater if needed]	3,250	3,250	3,250	3,250	3,250	3,250	3,250
Recycled Water (maximum production)	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
TOTAL=	17,672	15,486	20,921	18,135	20,604	16,009	15,784	16,158

(a) Critical dry year defined as driest year during the SWP history (1977), and the driest year from the 6-year drought of record (1946-51) along the Santa Ynez River.
(b) The District's total SWP allotment and CCWA drought buffer supply is 7,450 AFY. Shortages are calculated using this amount. SWP shortages for multiple dry years are based on worst 6-year drought of record 1987-1992 inclusive. Actual deliveries generally cannot exceed 4,500 AFY.
(c) The Court determined the District's average annual entitlement to be 2,350 AFY. Groundwater is only used after Cachuma Project and SWP water are fully utilized. The District's maximum pumping capability will be 5,600 AFY.
(d) The Court determined storage that may be pumped in addition to the District's annual pumping entitlement. Banked groundwater is not considered an annual supply source and is currently not required to meet current annual demands in normal years. It is available in extraordinary circumstances such a drought. Banked groundwater is generated by injected Cachuma Project and/or SWP water, use of SWP water to meet demand in-lieu of pumping, and natural recharge in excess of demand

during wet cycles due to surplus Cachuma Project water to meet demand. The number of years that banked groundwater can be pumped depends on stored amounts. To date, over 35,000 acre-feet has been stored in the Goleta groundwater basin for future uses during dry years.

4.0 PAST, CURRENT AND FUTURE WATER USE BY SECTORS

4.1 HISTORIC AND CURRENT WATER USE

GWD provides water to a variety of municipal, industrial, and agricultural users. Historic annual treated and untreated water deliveries (sales) show variation from year to year due to climatic factors. For example, water deliveries during the drought years of 1989 – 1992 were greatly reduced due to a combination of reduced demands, and mandatory reductions by GWD. Water usage since 1993 has slowly increased to near pre-drought levels due to a combination of increased population and changes in land and use practices by GWD residents.

Recent water deliveries during the period 1999-2004 are presented in Table 7 by water use sector. These data were derived from GWD sales records. They also include unaccounted for losses, which were estimated to be 6 to 8 percent of GWD's total water production based on a recent system audit (JBS Associates, 2005). These losses include unavoidable leakages, meter inaccuracy, unmetered connections, unbilled water use, and record keeping errors. Total average annual water use during the past six years in GWD has been 14,318 AFY.

TABLE 7
RECENT WATER SALES/DELIVERIES (ACRE-FEET PER YEAR), 1999-2004

Water Use Sectors (per Water Code)	1999	2000	2001	2002	2003	2004	Average
Single family residential	4,533	4,690	4,425	4,842	4,597	4,974	4,677
Multiple family residential	2,277	2,302	2,090	2,088	2,066	2,110	2,155
Commercial	1,875	1,927	1,746	1,819	1,734	1,874	1,829
Industrial*	208	214	194	202	193	208	203
Institutional/governmental	536	508	564	571	562	606	558
Landscape	316	348	302	310	275	327	313
Agriculture	2,495	2,348	2,091	2,889	2,444	2,953	2,537
Subtotal=	12,240	12,338	11,413	12,720	11,871	13,053	12,272
Additional Water Uses:							
Recycled water	928	1,003	839	1,083	968	1,051	979
Unaccounted for losses at 8%	1,064	1,073	992	1,106	1,032	1,135	1,067
TOTAL=	14,232	14,414	13,244	14,909	13,871	15,239	14,318

4.2 PROJECTED WATER USE

Predicting future water use is very difficult, particularly over a 20-year period, because there are many factors that influence water demand, including economic conditions, population growth, land use policies and political factors, and water costs. Hence, GWD has used several different methods to project future water use by sector in order to increase the confidence in the projections. The following methods to project future water use by sector for the years 2010, 2015, 2020, 2025, and 2030 were used:

1. Use prior GWD water use projections
2. Apply a regional population growth rate to predict future residential water demand

3. Use recent historic water use growth rates as a predictor of future water demand
4. Develop water use projections using data from land use jurisdictions in the GWD service area – City of Goleta, University of California, Santa Barbara Airport (City of Santa Barbara), and Santa Barbara County (Isla Vista and other unincorporated areas).

The calculations and assumptions for each method are presented in Appendix A of the UWMP. Each method of projecting future water use has inherent limitations and potential errors. To reduce the uncertainty in these predictions, the average estimated total annual water use derived from each method was calculated to provide a final estimate of future water use in GWD from 2010 to 2030, as shown in Table 8. These projections include the future water use associated with the proposed Land Use Element (Table 1) of the City of Goleta's proposed GP/CP. The projections also include the offsetting effects of the GWD's ongoing water conservation programs.

TABLE 8
ESTIMATED FUTURE WATER USE (AFY), 2005-2030

Current (average of 1999-2004)	2010	2015	2020	2025	2030
14,318	14,813	15,368	15,890	16,476	17,010

Source: Table A-18 from Appendix A of the December 2005 UWMP.

5.0 ADEQUACY OF WATER SUPPLY FOR THE PROPOSED GENERAL PLAN

The adequacy of GWD's water service to meet the demands of the proposed GP/CP, as well as all other projected future demands is evaluated below for a normal year, a critically dry year, and a series of dry years . The available water supply during each of these scenarios is compared to the anticipated demand, including those associated with the proposed GP/CP, to identify potential shortages in deliveries.

5.1 NORMAL YEAR SUPPLY AND DEMAND

In a normal year over the period 2005-2030, GWD estimates that it will have sufficient supplies to meet all currently identified water demands, including those associated with the proposed maximum buildout development in the Land Use Element of the proposed GP/CP. GWD's available supply is 17,672 AFY. The normal year demands over the next 25 years will not exceed this amount, as shown in Table 9.

TABLE 9
NORMAL YEAR SUPPLY AND DEMAND (AFY)

	Current	2010	2015	2020	2025	2030
Supply (total available)* [Table 6]	17,672	17,372	17,672	17,672	17,672	17,672
% of Normal Year Supply	100	100	100	100	100	100
Demand [Table 8]	14,318	14,813	15,368	15,890	16,476	17,010
% of Normal Year Demand	100	100	100	100	100	100
Surplus**	3,354	2,559	2,304	1,782	1,196	662
Surplus as % of supply	18%	16%	13%	10%	7%	4%
Surplus as % of demand	23%	19%	15%	11%	7%	4%

* Total available water supplies are shown, but the District will only produce the amount necessary to meet demand.
** The surplus represents the amount of water that the District would not need to produce, which in most instances would be groundwater.

5.2 CRITICALLY DRY SUPPLY AND DEMAND

The critically dry year supply and demand quantities are shown in Table 10. Water supplies in a critically dry year will meet normal year demands until the year 2020. In that year, and years after, GWD will implement demand reduction measures to reduce demands to meet the available supplies in a critically dry year. The maximum demand reduction would be 9% in one year to meet a water supply shortage. If GWD increases its groundwater pumping capacity by the year 2020, the predicted shortages may be avoided by producing groundwater at more than the soon-to-be maximum rate of 5,600 AFY, utilizing GWD's annual legal entitlement and banked groundwater. Hence, GWD estimates that it will have sufficient supplies to meet all currently identified water demands, including those associated with the proposed maximum buildout development in the Land Use Element of the proposed GP/CP with the possibility of only a minor, short-term demand reduction in one year.

TABLE 10
CRITICALLY DRY YEAR SUPPLY AND DEMAND (AFY)

	2010	2015	2020	2025	2030
Available Supply [includes banked groundwater]* [Table 6]	15,486	15,486	15,486	15,486	15,486
% of Normal Year Supply	88	88	88	88	88
Demand** [Table 8]	14,813	15,368	15,486	15,486	15,486
% of Normal Year Demand	100	100	97	94	91
Shortage (Supply Minus Demand)	0	0	0	0	0
Shortage as % of dry year supply	0%	0%	0%	0%	0%
Shortage as % of normal year demand	0%	0%	0%	0%	0%

* Supply includes use of the District's annual groundwater entitlement (2,350 AFY) plus banked groundwater up to the District's 5,600 AFY pumping capacity.
**Assumes that demand will be reduced in 2020, 2025, and 2030 through voluntary demand reduction measures to meet available supplies.

5.3 MULTIPLE DRY YEAR

For this analysis, GWD used the water supply estimates for the six year dry period shown in Table 11. The total annual water supply available to GWD during each of those dry years ranged from 15,784 AF to 20,921 AF. Water from the SWP and Cachuma Project are greatly reduced and highly variable during this period. However, GWD would be able to maximize production in these years by producing groundwater at up to 5,600 AFY.

For the multiple dry year analysis, GWD assumed six year dry periods that would end in 2010, 2015, 2020, 2025, or 2030. The estimated future demand in those years was used based on the demand projections in Table 8. Demand is greater in dry year periods at the later years compared to the earlier years.

The multiple dry year supply and demand estimates are shown in Table 11. GWD estimates that it will have sufficient supplies to meet the annual demands in a 6-year dry period that occurs during the years 2005-2030. GWD does not anticipate any reduction in water deliveries during a six consecutive dry years because GWD can utilize banked groundwater (which is now over 35,000 AF) to make up any shortages in surface supplies. Under a multiple-dry year scenario, GWD estimates that it will have sufficient supplies to meet all currently identified water demands, including those associated with the proposed maximum buildout development in the Land Use Element of the proposed GP/CP.

TABLE 11
MULTIPLE DRY YEAR SUPPLY AND DEMAND

	6 Year Dry Period Ending in Specified Year				
	2010	2015	2020	2025	2030
Average annual supply for 6 year dry period [includes banked groundwater] – AFY [based on Table 6]	17,935	17,935	17,935	17,935	17,935
% of Normal Year Supply	~100	~100	~100	~100	~100
Average annual demand during 6 year dry period – AFY [Table 8]	14,813	15,368	15,890	16,476	17,010
% of Normal Year Demand	100	100	100	100	100
Average annual shortage (Supply Minus Demand) – AFY	0	0	0	0	0
Total groundwater use during 6 year dry period to meet demand and prevent shortages - AF	15,278	18,470	21,466	24,844	28,052
Residual shortage as % of supply	0%	0%	0%	0%	0%
Residual shortage as % of demand	0%	0%	0%	0%	0%

6.0 REFERENCES

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