Introduction

Water is a resource vital to Santa Barbara County. The availability, quality and cost of water in this area have greatly influenced the economy and the community. Like other areas with limited local water supplies, we must manage our resources carefully and supplement local supplies with water from other regions. Our water sources are diverse and the facilities and programs established to manage those supplies are complex.

It is a major undertaking to plan for and manage our water resources. Managing water resources involves complicated scientific, technological, economic and political decisions. Water supplies are carefully studied, treated, protected and distributed in their journey from source to user. However, most water users know very little about the process of delivering this precious resource to their home or business.

The purpose of this report is to provide a brief overview of the water supplies available within Santa Barbara County, and how those supplies are used and managed within the county. For those who want more information on this dynamic subject, our source publications are listed in the References section of this report.

Properly informed, we can each more effectively participate in the complicated process of managing and protecting our water resources for our own use, the environment and future users.

Setting

Santa Barbara County is located approximately 100 miles northwest of Los Angeles and 300 miles south of San Francisco. Over 409,000 people live in Santa Barbara County. The mild climate, picturesque coastline, scenic mountains, and numerous parks and beaches make the county a popular tourist and recreational area.

East Beach, where Sycamore Creek meets the Pacific in Santa Barbara

Climate

Santa Barbara County has a Mediterranean climate with several microclimatic regions. Summers are warm and dry; the winters are cool and often wet. The county has a unique physical orientation, with a series of east-west transverse mountain ranges. This produces a profound orographic effect when a storm approaches the county from the Pacific Ocean. Most precipitation occurs between November and March with the exception of some far inland mountain areas receiving sporadic late summer thundershowers. Moist air from the Pacific Ocean moderates temperatures in the coastal areas; somewhat lower winter minimums and higher summer maximums prevail in the inland valleys.

Santa Barbara County's weather is mainly controlled by the Pacific high-pressure system. In the dry season, from about May through September, the Pacific high usually occupies the area northeast of Hawaii. During the winter months it is weaker and positioned further south. For the most part, Santa Barbara County receives relatively gentle but steady rainfall during storm events. At times the persistence of the Pacific high at a latitude farther north than normal keeps the Pacific storm track farther to the north. This "blocking high" results in either no precipitation for part or all of California, or, at most, only light amounts. This climatological scenario is the reason for most of California's droughts, including those occurring in the 1976-1977 and 1986-1991 seasons.

Rainfall is variable and streamflow is highly variable. The county is divided into six major watersheds each varying in their dominant geography and by types and quality of water supply. Streamflow is directly from rainfall with no significant snowmelt and little base flow from headwaters. Most streams are dry in the summer.

Drought

Historical records show that local drought periods of several years or more are cyclical, recurring about every forty years. Tree ring studies covering time periods of several centuries reveal apparent droughts lasting as long as 16 years or more. The most recent drought occurred from 1986 until 1991 and included some of the driest years on record. Evidence from tree ring analysis indicates that severe droughts occurred as far back as 1544. Droughts in Santa Barbara County have lasted an average of five years, with a maximum of 9 years.

Currently, the impacts of drought on our community result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. In order to lessen the impacts of droughts, local water purveyors have developed water management plans that provide long-term options for augmenting water supplies in preparation for future droughts.

Rainfall Highlights

Annual precipitation varies from 7" - 9" near Cuyama to a maximum of about 36" at the uppermost elevations of the San Rafael Mountains.

Most rainfall in a year:

1997-1998 ..... 46.75" ..... Santa Barbara
1941-1942 ..... 30.76" ..... Santa Maria

Wettest Month:

February 1998 ..... 21.36" ..... Santa Barbara

Biggest Storm Event:

January 1969 ..... Highest flow in Santa Ynez River in 2,900 years — 89,000 cfs (about 40 million gallons per minute) flowed into Lake Cachuma

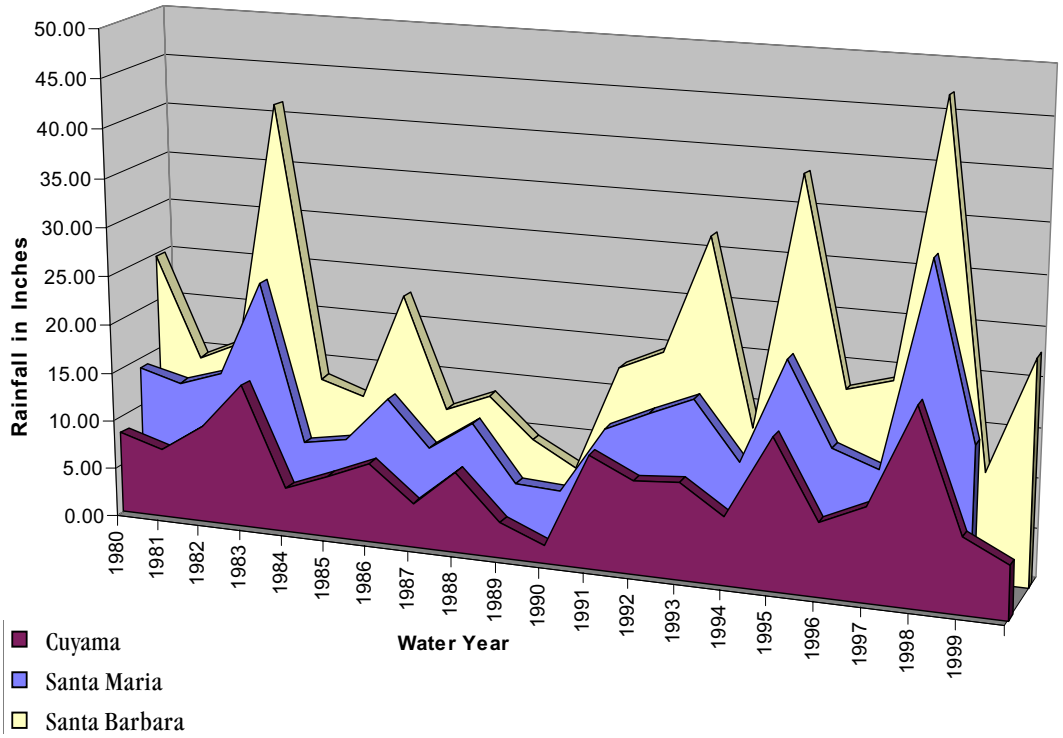
Santa Barbara County is subject to some of the highest short-duration rainfall intensities in California:

- In 1995, 1.6" of rain fell in a 30 minute period near San Marcos Pass
- In 1993, 1.25" of rain fell during a 15 minute period at the Buellton Fire Station
- In 1969, 16" of rain fell in a 24 hour period at Juncal Dam

Driest year:

1877 ..... 4.49" ..... Santa Barbara

Rainfall Comparison



Santa Barbara County

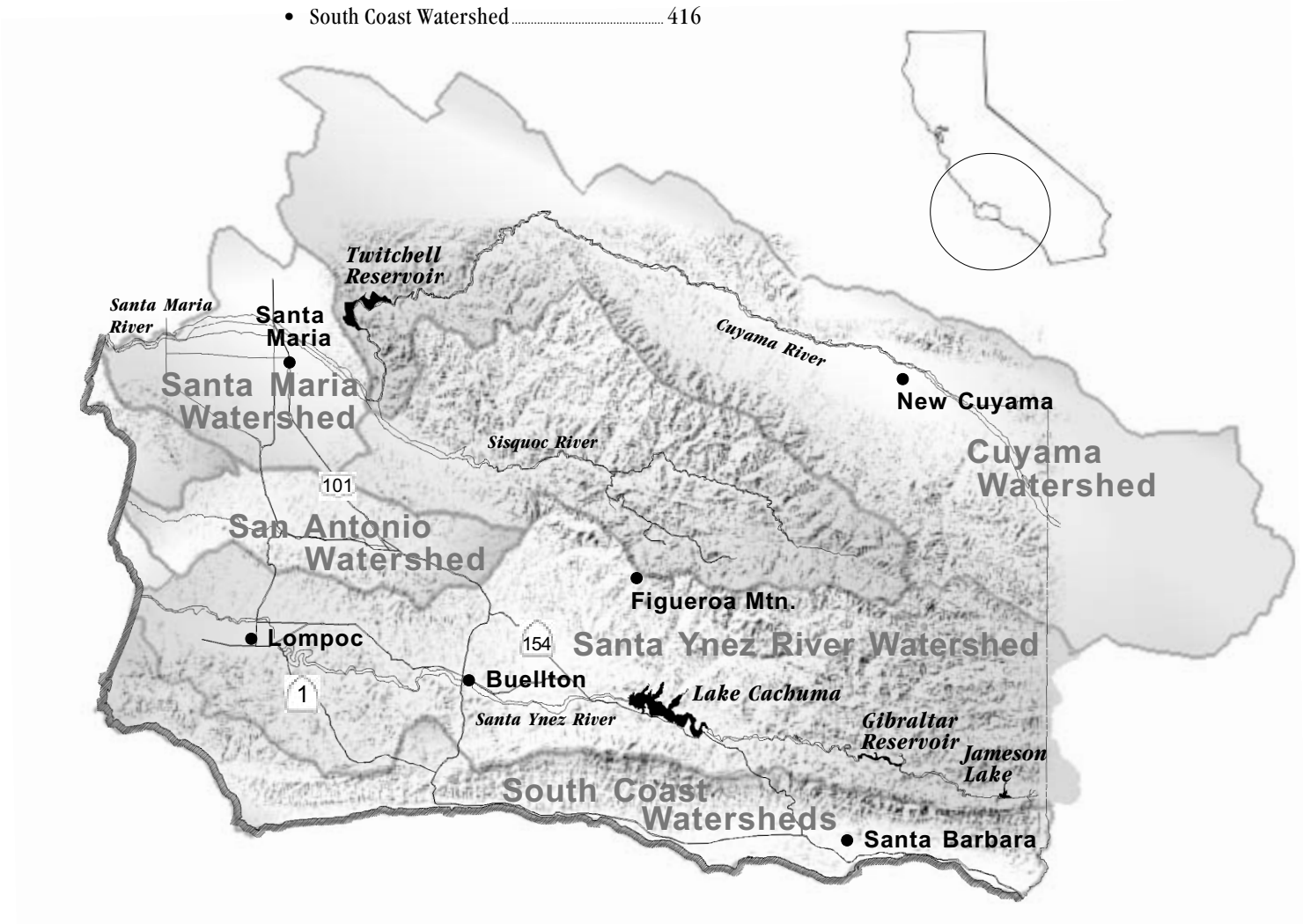
The county occupies 2,745 square miles, one-third of which is located in the Los Padres National Forest.

The five principal drainage areas of the county are:

Watershed	Square Miles
• Santa Maria Watershed *Including Cuyama and Sisquoc Watersheds*	1,845
• Cuyama Watershed	1,140
• San Antonio Watershed	165
• Santa Ynez River Watershed	900
• South Coast Watershed	416

Annual Average Rainfall:

City of Santa Barbara	18”	(1868-1999)
City of Santa Maria	14”	(1907-1999)
Figueroa Mountain	23”	(1961-2000)
New Cuyama	9”	(1955-1998)



Terrain

Like most of Southern and Central California, Santa Barbara County is very mountainous. The steep Santa Ynez Mountains bound the coastal communities of Goleta, Santa Barbara and Carpinteria on the north; farther north the San Rafael Mountains rise to the highest elevations in the county; and the Sierra Madre Mountains occupy the northeast portion of the county. About 65% of Santa Barbara County's 2,745 square miles are hilly or mountainous. Most of the remaining 35% of the land is taken up by a few valleys and plains.

Water Resource System

The county's residents obtain their potable water from several sources: storm runoff collected in reservoir systems, groundwater withdrawal, and the State Water Project. The county's potable water supply is delivered to the public through a variety of water purveyors: incorporated cities, community service districts, water districts, public utility companies, conservation districts and others.

There are four major reservoirs located in the County of Santa Barbara. Two reservoirs, Cachuma and Twitchell, are owned by the federal government, administered by the Santa Barbara County Water Agency, and operated by local water districts. The third, Gibraltar Reservoir, is owned and operated by the City of Santa Barbara. The fourth, Jameson Reservoir, is owned and operated by the Montecito Water District. Water from Cachuma, Gibraltar and Jameson is delivered to the South Coast through three tunnels built into the Santa Ynez Mountains.

Groundwater is another source of potable water for county residents. Since groundwater fluctuations are cyclical and sensitive to overdraft, groundwater withdrawal is closely monitored. In the South County, water purveyors use groundwater as a secondary source of potable water. However, the North County is nearly 100% supported by groundwater and/or shallow, riparian basin water, both of which are recharged by surface flows. The Santa Ynez River Water Conservation District Improvement District #1 (considered as part of the North County for purposes of this report) does receive water from the Cachuma Project.

The State Water Project (SWP) has served as another source of potable water since 1997. Water is delivered to Santa Barbara County from the Lake Oroville Reservoir located in Plumas County through a series of aqueducts, reservoir systems, and open river transport. Since SWP water is used primarily as a supplemental supply for urban users, its portion of the county's total water supply is likely to vary each year. At maximum rates of delivery, the SWP could supply up to one-third of the region's municipal and industrial demands.

Flood flows, February 1998

For More Information

Population/Employment:

Santa Barbara County Association of Governments:
http://www.sbcag.org/

Rainfall:

Santa Barbara County Water Agency:
http://www.publicworkssb.org/water/

History

Santa Barbara County has a rich water development history, dating back to the Mission founders in the earliest settlements of what is now the city of Santa Barbara. Residents of Santa Barbara County recognized its limited and seasonal water supply as a crucial factor for the region's continued growth and development even before the incorporation of local cities.

South Coast

The Mission in Santa Barbara was the area's first major European population center and supported surrounding ranching and fruit-growing efforts. When water supplies became limited due to higher concentrations of people in the area, plans were made to construct the South Coast's first large dam and reservoir which was completed in 1807. A rock and masonry dam approximately 20 feet high, 80 feet long, and 12 feet wide was constructed 1.5 miles above the Mission. The dam still stands today in the Santa Barbara Botanic Garden, along with remnant portions of an aqueduct that conveyed water to a reservoir north of the Mission, which held approximately 500,000 gallons of water (1.5 acre-feet). After incorporation as a city in 1850, Santa Barbara's population expanded and the City continued to experience the pressures of limited water supplies. A report written in 1889 by the City Engineer concluded that the only feasible long-term source of water for Santa Barbara would have to come from the Santa Ynez River. He recommended land purchases for two possible dam and reservoir sites on the Santa Ynez River, but the City's initial bond proposal was defeated.

The South Coast's first water supply and distribution system was developed at the Santa Barbara Mission

Droughts in 1894 and from 1898 through 1900 re-emphasized the report's conclusions. While the Cold Spring Tunnel (constructed in 1896) initially provided approximately 290 acre-feet of water per year, its yield steadily decreased to about 100 acre-feet per year and attention again turned to potential dam and reservoir sites on the Santa Ynez River. A 1905 report by the USGS recommended the construction of a tunnel (the Mission Tunnel) from the Santa Ynez River to the coast side of the mountains, in conjunction with building a dam and reservoir at the Gibraltar site on the river (Santa Barbara County Water Agency, 1949).

The main obstacle to this plan was that the tunnel would have to pass through lands held by the Santa Barbara Water Company, a private firm which had bought extensive tracts of land on the headwaters of the Santa Ynez River that encompassed all practicable reservoir sites. The City negotiated a contract with the Santa Barbara Water Company to allow construction of the tunnel in exchange for maintenance of flows in Mission Creek. The 3.7 mile-long Mission Tunnel was completed in 1912, the same year that the City purchased the holdings of the Santa Barbara Water Company.

The presence of major reservoirs in Santa Barbara County began in 1920 with the completion of Gibraltar Dam and Reservoir on the Santa Ynez River. Gibraltar Reservoir is located north of Santa Barbara on the northern side of the Santa Ynez Mountains. Continuing pressure due to increasing population in Santa Barbara County (mainly on the South Coast) and problems associated with rapid siltation of res-

ervoirs, which led to diminished storage capacities, required the development of additional water supplies. Descriptions of the development of the county's four major reservoirs are presented in subsequent sections of this report.

North County

For the purposes of this report, the North County is defined as the region encompassing the area from the San Luis Obispo County line south through the Santa Maria, Lompoc and Santa Ynez Valleys.

Santa Maria Valley

Up until the importation of State Water Project water in 1997, the northern portion of the county has been largely dependent on groundwater. Development of groundwater resources was accelerated in the early 1900s as a result of advances in drilling and pumping technologies. Agricultural development increased dramatically after World War II due to advances in refrigerated transport technology that allowed crops grown in the Santa Maria Valley to be transported by train in refrigerated rail cars for sale in distant locations.

Prior to the construction of the Vaquero Dam and Reservoir (now called Twitchell Reservoir), large portions of the Santa Maria Groundwater Basin were subject to periodic flooding, as documented in the Lippincott report (1931) to the Santa Maria Valley Water Conservation District (SMVWCD). In an effort to provide relief from flooding disasters, the SMVWCD, the Santa Barbara County Water Agency (SBCWA) and the U.S. Bureau of Reclamation (USBR) evaluated a number of potential dam sites on the Santa Maria River in the 1940s and 1950s. In the 1950s the USBR constructed the Vaquero Dam for water conservation and flood control. The project was intended to provide water for beneficial uses within the District that rely on the groundwater supplies underlying the Santa Maria Valley, and to protect urbanized and agricultural areas from flood damage.

Construction in progress on Mission Tunnel, completed in 1912

During the past 25 years some of the urban areas in the North County have been expanding rapidly as the population has been increasing. This urbanization has displaced some agricultural lands. At the same time, improvements in agricultural technology have allowed increases in crop yield and intensification of agricultural development on an acre-by-acre basis. In some cases, water demand per acre has increased to allow for double and triple cropping and for higher water-using (and income-producing) crops to be grown, such as strawberries. Irrigation technologies have also improved, reducing the amount of water used by some crops. These improvements include drip irrigation, seedling propagation in controlled greenhouse environments, laser leveling of fields, and use of tailwater recovery systems in furrow-irrigated fields.

In some parts of the Santa Maria Groundwater Basin, the water quality is not high enough to support urban development. Due to declining water quality and modest overdraft in the Santa Maria Groundwater Basin, urban water purveyors moved to develop their entitlement to imported State Water Project (SWP) water. The SWP benefits all basin users through improved water quality and will eventually improve water quality in the basin. In addition, the SWP will offset a portion of the groundwater overdraft, through reduced pumping and improved quality return flows. Today, most of the water supply for the City of Santa Maria comes from the State Water Project.

Santa Ynez and Lompoc Valleys

As discussed above, agricultural development increased significantly after World War II. Water supplies in the Santa Ynez and Lompoc Valleys were obtained from groundwater and from the Santa Ynez River.

In order to augment water supplies by capturing flood flows on the Santa Ynez River, the USBR, together with water users and purveyors on the South Coast and the Santa Ynez River Basin area, evaluated potential dam sites on the river in the 1940s and 1950s. By 1956 site selection for and construction of the Bradbury Dam and Lake Cachuma were complete. The project included construction of a transmission tunnel (Tecolote Tunnel) through the Santa Ynez Mountains, and a distribution system along the South Coast.

The Cachuma Project provides a water supply for both urban and agricultural users, 90% of whom are on the South Coast. The diversion of water from the Santa Ynez River Valley to the South Coast has created a number of issues regarding these water supplies.

In the years since the Cachuma Project was completed there have been legal challenges by various downstream users. These challenges allege that construction of the Bradbury Dam has resulted in reduced water availability and declining water quality in the lower reaches of the Santa Ynez River and in the Lompoc Groundwater Basin. One result of this, and a greater understanding of the Cachuma Project's effects on riparian groundwater users downstream, is that the State Water Resources Control Board (SWRCB) has issued several orders that govern water rights releases from Lake Cachuma. In addition, Cachuma Member Units (five water purveyors that contract for water from the reservoir) have voluntarily established an allocation of water to maintain fish downstream from the Dam. The SWRCB will consider the existing orders and the "fish account" during its re-evaluation of the Cachuma Project permit, which is scheduled for late in the year 2000.

Construction of the South Coast Conduit Channel which runs from Tecolote Tunnel to Carpinteria

State Water Project

The concept of a statewide water development project was raised in 1919, when Colonel Robert B. Marshall published a plan for transferring water from the Sacramento River system to the San Joaquin Valley and through the Tehachapi Mountains to Southern California. His proposal led to the first State Water Plan, published in 1931, which identified facilities and means of accomplishing the north-to-south water transfer. Although the plan was approved by the voters, the bonds to fund the project could not be sold as the state was in the midst of the Great Depression. In 1937, the federal government took over the funding and began constructing the Central Valley Project (CVP). Today, the CVP is operated and maintained by the U.S. Bureau of Reclamation and delivers about 7 million acre-feet of water through its system.

During and following World War II, California's population nearly doubled and agriculture became big business so more water was needed beyond that provided by the CVP. Therefore, the Legislature asked the State Water Resources Board to update and expand the prewar water studies. In response to this request, the Division of Water Resources (precursor to the Department of Water Resources) of the Public Works Department produced Bulletin 1 (1951), Bulletin 2 (1955) and Bulletin 3

(1957), which included data on water resources, forecasts of future demand, and plans for the infrastructure needed to transfer water from areas of surplus in the north to the water-deficient areas to the south.

Concurrently, other specialists completed the first proposal for a "Feather River Project" (eventually named the State Water Project) in 1951 to meet the state's immediate water needs. The proposed project was authorized by the State Legislature in 1951. In 1955, a second report on the Feather River Project was completed and included the addition of another reservoir in the system.

That same year, Northern and Central California experienced one of the greatest floods on record, which caused more than $200 million in property damage and took 64 lives. In response to this disaster, the Legislature appropriated $25.2 million to the Department of Water Resources (officially created in July 1956) to construct the State Water Project for flood control and water supply purposes. Work began in May 1957 in the Oroville area to make way for the dam and reservoir. In 1959 the California Water Resources Development Bond Act, known as the Burns-Porter Act, was passed authorizing the issuance of $1.75 billion in general obligation bonds to finance the SWP and any additional facilities needed to augment water supplies to meet local needs. Federal funding was provided for flood control and federal-state joint-use facilities. In November 1960, voters approved the bond act.

The initial facilities of the State Water Project, completed in 1973, included 18 reservoirs, 17 pumping plants, 8 hydroelectric power plants, and 550 miles of aqueduct. Additional facilities have been added to the system since that time including the Coastal Branch that serves Santa Barbara County. For more information refer to the State Water Project section of this report

For More Information

Historical photographs available on compact disk from Goleta Water District. Call 964-6761.

California Department of Water Resources, 1999. *California State Water Project Atlas.*

Santa Barbara County Water Agency. 1949. *A Water History and the Cachuma Project.*

U.S. Bureau of Reclamation. 1951. *Santa Maria Project, South Pacific Basin, California.*

City of Santa Barbara:
http://www.ci.santa-barbara.ca.us/departments/public_works/water_resources/

Goleta Water District:
http://www.goletawater.com/

Montecito Water District:
http://www.montecitowater.com/

Vandenberg Village Community Services District
http://www.impulse.net/~vvcsd