2

2 Region Description

The IRWMP encompasses all of Santa Barbara County (Figure 2-1). The county is an appropriate region for integrated planning for a number of reasons:

- Different subregions within the county share water supplies and infrastructure, and water is managed as an interconnected system within the county boundaries (refer to Section 3).
- Water and wastewater management entities must address issues and challenges that are specific to the region and that would benefit from an integrated management approach (refer to Sections 2 and 3).
- From an institutional perspective, many of the Cooperating Partners have a long history of working together to resolve water issues, and a framework already exists for addressing key issues related to water resource management (refer to Section 3). The IRWMP builds on this framework, expanding existing programs and identifying further opportunities for integration.
- The county is largely geographically separate from neighboring counties. Santa Barbara County abuts Kern County only along its sparsely populated northeast corner. The portions of the Rincon Creek watershed shared by Ventura County and the Cuyama River watershed shared by Ventura and San Luis Obispo counties have very low population densities, are subordinate in size, and have no shared water infrastructure. The Santa Maria Groundwater Basin, shared with San Luis Obispo County, is the subject of nearly complete adjudication (refer to Section 3); the court has imposed a mandatory management structure, and thus, any integrated management must accommodate the court's directives.

2.1 Overview

Santa Barbara County is located approximately 100 miles northwest of Los Angeles and 300 miles south of San Francisco. The county occupies approximately 2,739 square miles. Bordered on the west and south by the Pacific Ocean, the county has 110 miles of coastline. Four of the Channel Islands—Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara—are in Santa Barbara County. These islands are not addressed in this IRWMP, because they are largely owned and managed by the federal government as a national park and marine sanctuary. The county has a population of approximately 421,656 (State of California, 2007a), which is projected to increase to 562,700 by 2030 and to 605,600 by 2040 (SBCWA, 2003). The county is highly diverse in terms of climate, topography, economic activities, recreational opportunities, and social/economic structure. Additionally, there are five major ecological zones and numerous subareas ranging from arid high desert regions in the interior; mountains and foothills; and coastal plains.

About 65 percent of the terrain of Santa Barbara County is hilly or mountainous, and most of the remaining 35 percent is composed of valleys and plains. The steep Santa Ynez Mountains bound the coastal plain 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. Approximately one-third of the land area within the county is located within the Los Padres National Forest, which includes two wilderness areas, the San Rafael Wilderness and the Dick Smith Wilderness. The national forest includes portions of watersheds that provide an important water source for coastal populations, as well as important habitat for several threatened, endangered, proposed, candidate, and sensitive species.

Most of the county population lives in the coastal valleys and in the cities of Santa Barbara and Santa Maria. Other population centers on the South Coast include the cities of Goleta and Carpinteria, along with unincorporated areas such as Isla Vista, Hope Ranch, Mission Canyon, Montecito, and Summerland. The cities of Solvang and Buellton, the unincorporated communities of Los Olivos, Ballard, and Santa Ynez, and the Chumash Indian Santa Ynez Reservation are located in the Santa Ynez Valley, north of the Santa Ynez Mountains. The City of Lompoc, the unincorporated communities of Vandenberg Village and Mission Hills, Vandenberg Air Force Base, and the Lompoc Federal Correctional Complex are in the Lompoc Valley, where the Santa Ynez River flows out to the sea. Los Alamos is the only community in the San Antonio watershed. The cities of Santa Maria and Guadalupe, and the unincorporated towns of Orcutt, Casmalia, Betteravia, Garey, and Sisquoc are located in the northern portion of the county. The City of Santa Maria is the largest city in Santa Barbara County. Northeast of the San Rafael mountains is the dry and sparsely populated Cuyama Valley, where the community of Cuyama is located.

Major land use categories are shown in Figure 2-2, along with a breakdown of land ownership and the amount of land dedicated to generalized land uses. The federal government is the largest land owner in the county; the United States Forest Service and Air Force have jurisdiction over nearly 46 percent of the land area. Los Padres National Forest and Vandenberg Air Force Base comprise approximately 748,000 acres combined. The national forest provides a scenic backdrop to many communities within both north and south Santa Barbara County and is managed for multiple purposes, including recreation, oil development, and grazing. Vandenberg Air Force Base is headquarters for the 30th Space Wing, which manages Department of Defense space and missile testing and places satellites into polar orbit from the West Coast.

The state of California owns approximately 1 percent of county lands, or 18,000 acres. Most of this land comprises the University of California at Santa Barbara (UCSB), near the City of Goleta; the Sedgwick Reserve, which is operated by the University as part of its Natural Reserve System and located east of Los Olivos in the Santa Ynez Valley; La Purisima Mission State Park, located near Lompoc; and several state parks located along the coast, within the city of Santa Barbara, and in the Santa Ynez Mountains. Less than 1 percent of the county is owned by the county or other local agencies, and the remainder is privately owned.

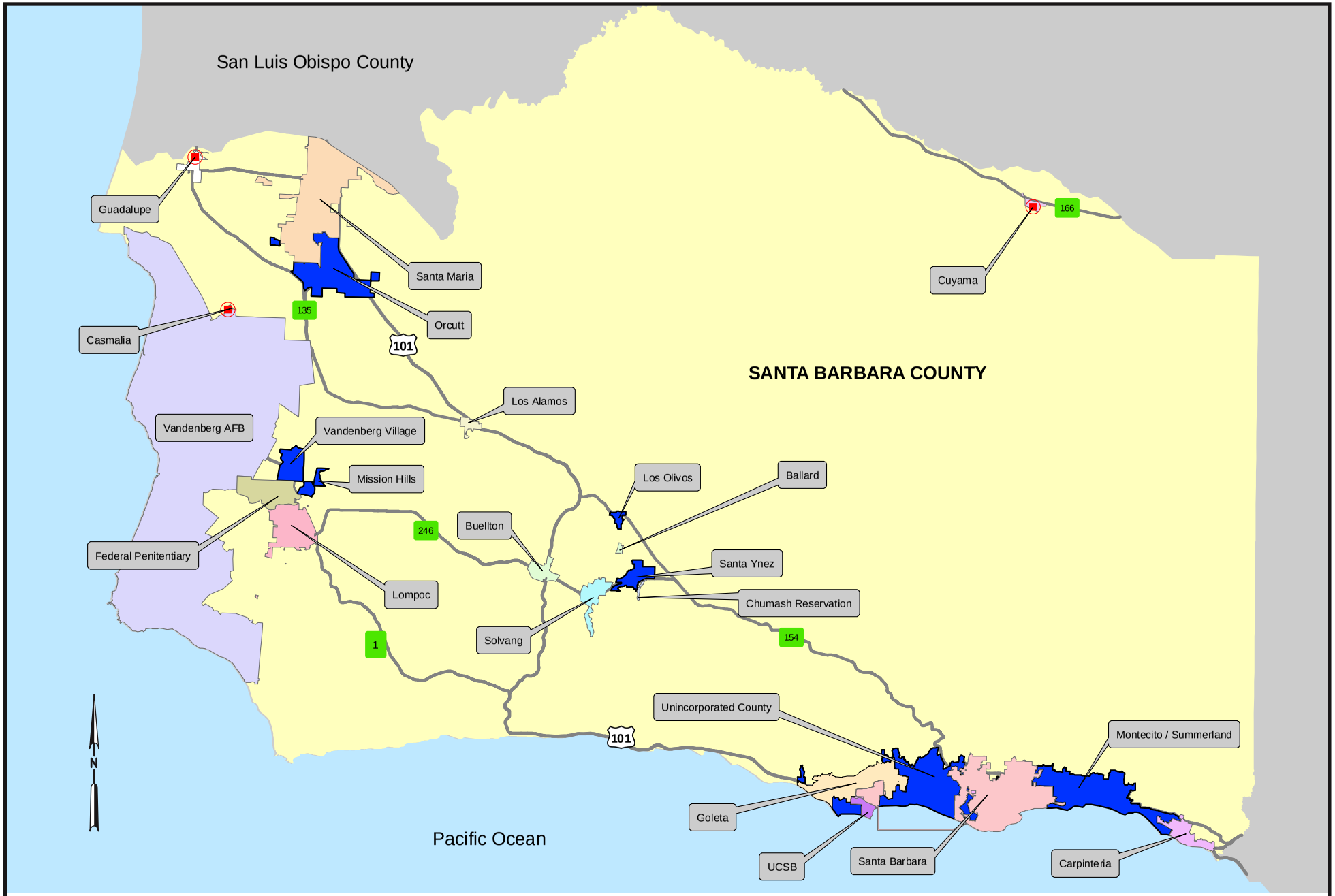

FIGURE 2-1
IRWMP REGIONAL MAP
SANTA BARBARA IRWMP

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Thirty-four percent of the county (555,000 acres) is in agricultural preserves, and an additional 13 percent (206,000 acres) is zoned for 100-acre or greater lot size, or is in other agriculturally zoned land. Less than 3 percent of the county is within incorporated cities, 2 percent is within unincorporated urban areas, and less than 1 percent is zoned for hillside estate lots of 40 acres or more.

2.2 Climate

Santa Barbara County has a Mediterranean climate with several microclimatic regions. Summers are warm and dry; the winters are cool and often wet. Annual precipitation typically ranges from 7 to 9 inches near Cuyama to a maximum of about 36 inches at the uppermost elevations of the San Rafael Mountains. Average rainfall throughout the county is approximately 15 to 18 inches per year. The county topography has a unique physical orientation compared to the rest of California with a series of east-west transverse mountain ranges. This topography causes an orographic effect when a storm approaches from the Pacific Ocean. Storms from the south can cause heavy precipitation on south-facing slopes, while storms from the north or west can concentrate precipitation on west or north-facing slopes. Annual average rainfall at the highest elevation is twice that of the lowest elevation. Most precipitation occurs between November and March with the exception of some far inland mountain areas that may receive sporadic late summer thundershowers. Moist air from the Pacific Ocean moderates temperatures in the coastal areas; lower winter minimums and higher summer maximums prevail in the inland valleys.

Santa Barbara County weather is mainly controlled by the Pacific high pressure system. In the dry season, from about May through September, the Pacific high pressure system usually occupies the area northeast of Hawaii. During the winter months, it is weaker and positioned further south. At times, the persistence of the Pacific high pressure system 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 of rainfall. This climatological scenario is the reason for most of California’s droughts, including those occurring in 1976 to 1977 and 1986 to 1991.

2.3 Economic Conditions and Trends in the Region

Santa Barbara County is economically diverse with pronounced differences between the north and the south. Agricultural activities and oil development traditionally have been the dominant economic forces north of the Santa Ynez Mountains; although in recent years, tourism has increased, oil leases have been decommissioned, and more white-collar workers have been moving in to the area because of the high housing prices in the south. Agriculture continues to be the county’s major producing industry, despite reductions in the amount of farmland.

The South Coast’s economy is largely based on tourism, software or other high-tech pursuits, and education-related activities; although the area continues to support oil development offshore, and agricultural activities continue to occur in the Goleta and Carpinteria valleys, particularly in the foothills. The South Coast has experienced slow economic growth in recent years, while the North County has undergone considerable

economic growth. This is due in large part to the extremely high cost of housing in the South Coast, where the median price of a single family home exceeds $1 million. As a result, the North County is undergoing significant population growth, which in turn, is driving construction and service industry growth in the area. Economists predict that the North County region will be the main driving force in the economy for the foreseeable future because of relatively affordable housing, available work force, and a perceived business-friendly environment (UCSB, 2006).

2.4 Santa Barbara's Social and Cultural Makeup

Santa Barbara County is socially and culturally diverse. The county is predominantly composed of White / Caucasians (approximately 56 percent) and Hispanics (approximately 34 percent), with Asians and African Americans comprising most of the remaining population (State of California, 2007c). The county includes three Disadvantaged Communities (DAC)—Cuyama, the City of Guadalupe, and Casmalia—all of which are located in North County[1]. All three communities are fairly isolated from other populated areas within the county, especially Cuyama and Casmalia. These communities face financial hardships and serious health risks related to the condition of their respective water supply systems and potential threats to the quality of their drinking water, as described in greater detail in Section 6.

Due in part to the high cost of housing, the population in the South County is becoming increasingly stratified. The number of middle class residents is decreasing, leaving a concentration of younger and poorer residents, as well as older and wealthier retirees. School enrollments have been declining in the South County because working families can not afford housing and choose to move to less expensive areas. The North County, on the other hand, is experiencing an influx of younger families because housing is more affordable. North County school enrollments are on the rise (UCSB, 2006).

Santa Barbara residents appreciate its mild climate, scenic beauty, beaches, mountains, recreational resources, and cultural opportunities. Those qualities that make the county a desirable destination for tourists also make it an appealing place to live. The county is home to a long-standing environmental movement, stemming in part from the large oil spill that affected 35 miles of coastline in 1969. Environmental activists are, however, sometimes at odds with other interests regarding the most appropriate way to manage Santa Barbara County resources.

2.5 Major Watersheds and Rivers

The county contains four principal watersheds (Table 2-1): Santa Maria, which includes the Cuyama and Sisquoc watersheds; San Antonio Creek; Santa Ynez; and South Coast, which is composed of approximately 50 short, steep watersheds (Figures 2-3 and 2-4). The headwaters of the principal watersheds are generally undeveloped, and the middle and

[1]DACs were identified by reviewing median household income (MHI) data from the 2000 US Census for all zip codes within Santa Barbara County and identifying those that were 80 percent or less of the statewide MHI based on the 2000 Census ($37,994). MHIs are as follows: Guadalupe, $30,864; Casmalia, $37,574; and New Cuyama, $36,500. In comparison, the MHI for all Santa Barbara County zip codes is $49,027.

lower sections are often developed with urban or agricultural uses. The four major rivers draining these watersheds are the Santa Maria, Sisquoc, Cuyama, and Santa Ynez. Rainfall is variable, and streamflow is flashy. Streamflow is generated directly from rainfall with little base flow contribution from headwaters. Most rivers and the lower reaches of streams are dry in the summer.

TABLE 2-1
Santa Barbara County Watersheds

Watershed	Square Miles
Santa Maria (including Cuyama and Sisquoc watersheds)	1,845
San Antonio Creek	165
Santa Ynez River	900
South Coast (composed of numerous smaller watersheds)	416

2.5.1 Santa Maria Watershed

The Santa Maria Watershed (Figure 2-5) is drained by the Santa Maria River, which is formed by the confluence of the Cuyama and Sisquoc rivers at Fugler Point, 20 miles inland from the coast. Elevations range from sea level to 6,828 feet at Big Pine Mountain, which is at the headwaters of the Sisquoc River. The Santa Maria River Valley covers the 260-square-mile watershed area downstream of the Cuyama-Sisquoc River confluence. Much of the valley consists of a broad alluvial area known as the Santa Maria Plain. The Cuyama River drains a 1,140-square-mile watershed area that includes southeastern San Luis Obispo County, northeastern Santa Barbara County, and relatively small portions of Ventura and Kern counties. Major tributaries to the Cuyama River are Huasna River and Alamos Creek. Most of the river and its tributaries have intermittent flows, although some reaches of the river have surface water most of the year. Some of the major tributaries also have perennial flows in some reaches. Since 1959, flow in the Cuyama River has been regulated by Twitchell Reservoir, which retards a portion of intercepted storm flow for later release. The Sisquoc River receives runoff from a watershed area of approximately 470 square miles. The watershed of the Sisquoc River is defined by the northwestward-trending Sierra Madre Mountains on the north and the westward trending San Rafael Mountains on the south. Most of the Sisquoc River drainage lies within the boundaries of the Los Padres National Forest. The Sisquoc River is designated as a Wild and Scenic River. Except for wilderness areas in the National Forest, all of the land is used for some form of agriculture. Other industries of significance include oil and gravel mining, recreation, light manufacturing, and research and development mostly related to the aerospace business (CARCD, 2002).

2.5.2 San Antonio Creek Watershed

The drainage system of the San Antonio Creek Watershed starts at a point approximately 10 miles east of Los Alamos. It traverses generally to the west through Los Alamos and Vandenberg Air Force Base to the ocean. The basin is rather confined, averaging about 8 miles in width. The lower reaches throughout Vandenberg Air Force Base have a perennial

flow, in part because of irrigation tailwater, but primarily because of a geologic rift at Barca Slough, which causes an upwelling. The principal crops grown are vegetables in the flat areas, and winegrapes in the transitional uplands. All are irrigated from groundwater resources (CARCD, 2002).

2.5.3 Santa Ynez River Basin

The Santa Ynez River originates in the San Rafael Mountains in the Los Padres National Forest near the eastern border of the county. A small portion of the Santa Ynez River watershed lies in Ventura County. The river flows westerly about 90 miles to the ocean, passing through Jameson Lake, Gibraltar Reservoir, and Lake Cachuma. The Santa Ynez River basin is the largest drainage system that is wholly located in Santa Barbara County. The 621,577 acres that it drains is about 40 percent of the mainland part of the county. It is the primary source of water for about two-thirds of the Santa Barbara County residents, including the heavily populated south coastal region around Santa Barbara. Three dams have been constructed on the river to store and divert water to the South County. These are described in detail in Sections 3 and 4. None of the reservoirs on the Santa Ynez River has a prescriptive requirement for a flood control storage area. All of the water diversions from the dams are by tunnels cut through the Santa Ynez Mountains to terminal reservoirs near urban areas.

Approximately 260,000 acres in the watershed are public land, 215,000 of which is within the Las Padres National Forest. The remaining public lands are, for the most part, on Vandenberg Air Force Base. In the Santa Ynez Valley there is an extensive thoroughbred racehorse industry. Crops grown in this area include wine grapes and irrigated forage crops for the horses. Most of the relatively flat lands between Buellton and Lompoc are used for growing a variety of irrigated crops including flowers, vegetables, wine grapes, beans, and walnuts. Most of the irrigated land is located in Lompoc Valley west of Lompoc. That area is similar to Santa Maria Valley in that the marine influences allow year round crop production. All irrigation water is pumped from underground resources. Almost all of the upland areas are used as range to raise beef cattle. Other important industries are oil production, diatomaceous earth mining, and human resources support for Vandenberg Air Force Base (CARCD, 2002).

2.5.4 South Coast Watersheds

The south coastal region generally includes all of the southerly drainages from Point Concepcion to the Ventura County line. Its approximately 50 watersheds range from 162 acres to 30,572 acres, with an average size of 3,209 acres. This area is heavily influenced by the ocean because of the southerly aspect, and the ocean current which is usually about 10 degrees higher than the current north of Point Concepcion during the winter months. This south to north current is from South American waters as opposed to the north to south Humboldt Current north of Point Concepcion. The currents merge near the point and then trend seaward. The topography is precipitous, rising abruptly from sea level to about 4,300 feet. Annual rainfall varies from about 16 inches on the coast to about 30 inches at the summits. Virtually all the subtropical fruit (principally avocados) and about 75 percent of the nursery and hot-house products of the county are raised in the South Coast, most of which are in the vicinity of the urban complex between Goleta and Carpinteria. Irrigation water is provided from a variety of sources, including pumped groundwater; diversions from Cachuma, Gibraltar, and Juncal Dams; and to a lesser degree from on-farm surface entrapments. The southeastern part is heavily urbanized, and includes the contiguous communities of Goleta, Santa Barbara, Montecito, Summerland, and Carpinteria. Other than agriculture, important industries include tourism, electronic products manufacturing, city and county government, and University of California, Santa Barbara (CARCD, 2002).

2.6 Groundwater Basins

Santa Barbara County groundwater basins are shown in Figure 2-6; their sizes and land uses served are summarized in Table 2-2.

TABLE 2-2
Santa Barbara County Groundwater Basins

Basin	Size (Acres)	Land Use Summary
North County Groundwater Basins		
Santa Maria	110,000 with 80,000 within Santa Barbara County	Two cities; extensive unincorporated urban area (Santa Barbara County); extensive irrigated agriculture; petroleum
San Antonio Creek	70,400	One town; extensive agriculture; some petroleum; Vandenberg Air Force Base
Cuyama	441,600 with 81,280 within Santa Barbara County	Extensive agriculture; some petroleum; very low population density
Santa Ynez River Groundwater Basins		
Santa Ynez Uplands	83,200	Three towns, one city and other medium-density residential; varied high-value agriculture
Buellton Uplands	16,400	Agriculture; one city
Lompoc[a]	48,600	One city, 2 areas of unincorporated urban development; Vandenberg Air Force Base; varied agriculture; petroleum; Federal Penitentiary Complex
Santa Ynez River Riparian Basins	12,000 (3 subunits)	Two cities; 7,300 acres of irrigated cropland
South Coast Groundwater Basins		
Carpinteria	6,700	One city; unincorporated urban development; orchards, irrigated crops, and greenhouses
Montecito	4,300	Primarily low-density residential use; unincorporated
Santa Barbara	4,500	Primarily residential, industrial and commercial
Foothill	3,000	Primarily residential and commercial
Goleta North/Central	5,700	Primarily residential, industrial, and commercial
Goleta West	3,500	Primarily residential, industrial, and commercial
More Ranch	502	Primarily open space; limited residential/agriculture
Ellwood to Gaviota Coastal Basins	67,200	Agriculture, primarily orchards and grazing; limited municipal/industrial
Gaviota to Pt. Conception Coastal Basins	23,040	Agriculture, primarily grazing

Sources: Santa Barbara County, 2000; Santa Barbara County, 2003

[a]Consists of three hydrologically connected subbasins: Lompoc Plain, Lompoc Terrace, and Lompoc Upland

The following conclusions regarding groundwater basins are taken from the 2005 Santa Barbara County Groundwater Report (Santa Barbara County, 2006). References to overdraft pertain to safe yield and not perennial yield. Safe yield is defined in the 2005 report as the maximum amount of water which can be withdrawn from a basin (or aquifer) on an average annual basis without inducing a long-term progressive drop in water level. Perennial yield is defined as the amount of water that can be withdrawn from a basin (or aquifer) on an average annual basis without inducing economic or water quality consequences.

The 2005 Santa Barbara County Groundwater Report (Santa Barbara County, 2006) summarizes the status of groundwater basins as follows:

- The Cuyama Groundwater Basin is in a state of overdraft of approximately 28,525 acre-feet per year (AFY) based on a 1992 study. Water levels have fallen significantly, but no regional economic or water quality problem has yet been documented.
- In the recent litigation, *Santa Maria Valley Water Conservation District versus the City of Santa Maria et al.,* the court ruled that, based on a preponderance of evidence, the Santa Maria Groundwater Basin is not currently in a state of overdraft. Management of this groundwater basin will be subject to the adjudication, which is expected to be completed in 2007. (Refer to Section 3 for additional discussion).
- The San Antonio Groundwater Basin is in a state of overdraft of approximately 9,540 AFY based on a 2003 study. Water levels have fallen significantly, but no regional economic or groundwater quality problem has yet materialized.
- The Lompoc Plain Groundwater Basin is in equilibrium under the State Water Resources Control Board (SWRCB) Decision WR 89-18 and management by the Santa Ynez River Water Conservation District, because natural recharge is augmented with periodic water releases that are made from Cachuma Reservoir to maintain groundwater levels in the basin.
- The Lompoc Uplands Groundwater Basin has apparently reached equilibrium since, over time, water levels have been lowered to approach the elevation of the Lompoc Plain and Santa Ynez River, which now regulate the water levels in the Uplands Basin.
- The Santa Rita subarea of the Lompoc Basin is in a state of overdraft of approximately 800 AFY based on a 2001 study. However, water levels in some parts of this area have declined significantly in the past few years, and thus, in the future some economic effects may be realized as the balance between energy costs and commodity prices fluctuate.
- The Buellton Uplands Basin is in a state of surplus of approximately 800 AFY based on a 1995 study.
- The condition of the Santa Ynez Uplands Groundwater Basin has varied over time, and a 2001 study reported the basin as being in a state of overdraft of approximately 2,028 AFY at that time. The decline in water levels in this basin appears to have bottomed out in the 1987 to 1991 drought, however, and the basin may currently be in equilibrium. Under current extraction practices, part of the basin is used conjunctively

with local and imported surface water supplies. No regional economic or water quality impacts associated with pumping have materialized.

- The South Coast Basins are in equilibrium through management by local water districts and the Wright Suit Settlement[2]. The City of Santa Barbara practices conjunctive use of groundwater resources in the Foothill Basin and Storage Unit No. 1 of the Santa Barbara Groundwater Basin. Relatively minor amounts of pumping occur during average and wet years. More pumping is used during droughts to replace supplies lost to diminished surface water. Between pumping by the City and various private pumpers, the basins are in long term balance.

2.7 Ecological Processes and Environmental Resources

Santa Barbara County is located at a point of transition between the Southern California and Northern California ecozones and is characterized by rare plant assemblages. The county has a range of climatic zones, ranging from Mediterranean climate (South Coast) to Alpine (Big Pine Mountain) to high desert (Cuyama area), resulting in considerable ecological diversity. Over 1,400 plant and animal species are found in the county. Of these, 54 are federally or state-listed threatened or endangered species (22 plant and 32 animal species), and another 60 species are considered rare or of special concern (including proposed endangered, threatened, candidate, and sensitive species).

2.7.1 Aquatic Sensitive Species

The listed species found in Santa Barbara County include five aquatic/stream dependent species (tidewater goby [*Eucycloglobius newberryi*], tiger salamander [*Ambystoma californiense*], red-legged frog [*Rana aurora draytonii*], arroyo toad [*Bufo californicus*], and southern California steelhead trout [*Oncorhynchus mykiss*]). The county's watersheds provide critical habitat for the anadromous steelhead trout, which are found primarily in the Santa Ynez River and its tributaries and the South Coast creeks, including Mission Creek. Steelhead populations have declined due to human activity impacts, such as loss of native vegetation, influx of aggressive exotic species, increased creek/stream scouring, streamflow and groundwater diversion, increases in impervious surfaces and runoff, and degraded water quality because of thermal pollution and potential nutrient, sediment, and other polluted runoff from urban development. Dams, culverts, concrete channels, low-flow crossings, or other structures have created fish passage barriers to important upstream habitat. The southwestern pond turtle (*Clemmys marmorata pallida*), a California Species of Special Concern, also is found in the county.

[2] The 1989 Wright Suit Settlement served to adjudicate the water resources of Goleta North/Central Basin and assigned quantities of the basin's safe yield to various parties, including the Goleta Water District and the La Cumbre Mutual Water Company. The judgment also ordered the Goleta Water District to bring the North/Central Basin into a state of hydrologic balance by 1998. The district has achieved compliance with this order through the importation of State Water Project water and the development of other supplemental supplies. These supplemental supplies have offset the court mandated reduction in pumpage from the basin. Given that the basin has been adjudicated and pumpage is controlled by the court, overdraft is not foreseeable in the North-Central Basin.

2.7.2 Freshwater Habitats

Zaca Lake, located in the San Rafael Mountains north of Lake Cachuma, is the only natural lake in Santa Barbara County. It is less than 1 mile in circumference and tends to become anaerobic seasonally; therefore, the waters do not support a large or diversified biota.

Lake Los Carneros is located on the grounds of Stow House in Goleta and is not a natural body of water; it does, however, support a large and stable ecological community. It is surrounded by typical aquatic vegetation and supports diverse bird species.

Lake Cachuma is the largest reservoir in the county. It attracts numerous migratory birds and has a rookery of great blue herons. The endangered southern bald eagle (*Haliaeetus leucocephalus*) may be observed at the lake. The lake supports large populations of large mouth and small mouth bass, crappie, bluegill, redear, sunfish, channel catfish, and rainbow trout.

The county's four major rivers (Santa Ynez, Santa Maria, Cuyama, and Sisquoc) and its many creeks and streams are characterized by riparian vegetation along their banks. This habitat can also occur along arroyos, barrancas, and other types of drainages throughout the county. Riparian vegetation supports a great diversity of aquatic and terrestrial wildlife species. Streams and pools provide habitat for aquatic and semiaquatic species such as Pacific chorus frog, western toad, Pacific treefrog, and the introduced bullfrog. Common reptiles include the ensatina, western fence lizard, common kingsnake, gopher snake, and common garter snake. Riparian vegetation is also used by small mammals for cover, movement corridors, and foraging. Small populations of the southwestern willow flycatcher (*Empidonax trailii extimus*), least Bell's vireo (*Vireo bellii pusillus*), federally and state-listed species, are present in the riparian areas along the Santa Ynez River, portions of which are designated as critical habitat for these species.

A number of invasive weeds are present in the county's riparian areas, including arundo, tamarisk, Pampas grass, myoporum, cape ivy, and castor bean. Such weeds are detrimental to habitat and water conservation, and they increase the risk of flooding and erosion in riparian systems. South Coast creeks discharge to the Santa Barbara Channel, and impaired creek water quality affects the water quality of the ocean in the vicinity of public beaches. Common to all urban south coastal watersheds, the natural function of local creeks has been affected over time by human activities and land alteration, which ultimately has altered natural hydrologic and geomorphologic processes, degraded water quality, and diminished native biological communities.

2.7.3 Sloughs/Coastal Salt Marshes

Several salt marshes occur in the county and provide habitat for a number of estuarine invertebrates and fish, migratory birds, and rare and endangered animal species, such as Belding's Savannah sparrow (*Passerculus sanwichensis beldingi*), California brown pelican (*Pelicanus occidentalis californicus*), western snowy plover (*Charadrius alexandrinas*), light-footed clapper rail (*Rallus longirostris levipes*), and tidewater goby; and plant species such as salt marsh bird's beak (*Cordylanthus maritimus*).

Carpinteria Salt Marsh

Carpinteria Salt Marsh is a 230-acre estuary adjacent to the City of Carpinteria and is owned by the City of Carpinteria, the University of California (as part of its Natural Reserve System), and the Land Trust for Santa Barbara County. The marsh was one of the original California Critical Coastal Areas identified in 1995 as an impaired estuary. It is also a 303(d) listed waterbody (for nutrients, organic enrichment, low dissolved oxygen, and priority organics). Nurseries, greenhouses, orchards, row crops, and residential areas may contribute to nutrients in the watershed. Sedimentation is likely coming from construction, storm drains, and agriculture. The marsh and its tributaries (Santa Monica Creek, Franklin Creek, and Arroyo Paredon) contain levels of nitrates that exceed Basin Plan objectives for municipal and domestic supply. Flood control, sediment management, and ecosystem enhancement measures recently have been implemented.

Goleta Slough

Goleta Slough is located near UCSB and includes portions of the Santa Barbara Airport, which is under the jurisdiction of the City of Santa Barbara. Large volumes of sediment and debris contained in runoff from the mountains have entered the Goleta Slough ecosystem and profoundly affected the ecosystem by raising ground surface elevations and affecting patterns of flooding and the development of wetland versus upland habitats. High inputs of sediment and debris, funneled into relatively narrow areas as a result of creek channelization and development of the Goleta Valley, have diminished the capacity of creek channels to convey floodwaters through developed areas, which require regular maintenance by the Santa Barbara County Flood Control District. Goleta Slough is a 303(d) impaired water body for pathogens, and priority organics and is considered a Critical Coastal Area (CCA). The slough is managed by the Santa Barbara Airport and the Goleta Slough Management Committee, which is composed of a variety of federal, state, and local agencies, organizations, and individuals, through the Goleta Slough Ecosystem Management Plan. The importance of the slough is recognized and reflected in its designation as an Environmentally Sensitive Habitat in the Local Coastal Plans of both the City and County of Santa Barbara.

Greater Devereux Slough

The Greater Devereux Slough ecosystem is located on the West Campus of UCSB, and a large portion of the area is a designated Environmentally Sensitive Habitat. The upland drainage areas, commonly referred to as Santa Barbara Shores and Ellwood, are important because they are home to one of the largest monarch butterfly overwintering sites on the West Coast. As a part of the University of California's Natural Reserve System, the area is reserved for habitat and wildlife preservation, public education, and academic research. The slough is not listed on the 303(d) list, but sediment loading is reducing the total size of the slough. Continued residential development in the watershed may increase contamination of runoff entering the slough, and exotic plant species are displacing native plants and altering the habitats. The Santa Barbara Audubon Society began a new habitat restoration project on the north shore of Devereux Slough in September 2002 intended to restore a 1.42-acre portion of Devereux Slough seasonal wetland and upland margin, improve foraging habitat for the state-listed Belding's Savannah sparrow and two species of marsh-dependent butterflies, pygmy blue and wandering skipper.

Surf/Ocean Beach Park

The Surf area, including Ocean Beach Park, is located about 13 miles west of Lompoc at the mouth of the Santa Ynez River. The area contains a salt marsh, a small freshwater marsh, and dune habitat. Access to certain parts of the beach is restricted at times because the western snowy plover nests there. Like the other marshes, this area is a stopover for birds using the Pacific Flyway, and it contains habitat suitable for a number of sensitive species, including Belding's Savannah sparrow and the black rail. Endangered plant species, such as salt marsh bird's beak also may be found here. The Santa Ynez River Lagoon also is found here and generally forms when flows decrease after the winter runoff period when the mouth of the river fills with sand deposited by both the river and by the strong longitudinal drift of sand from north to south along the shoreline. Low summer flows generally are unable to keep the outlet open, although inflow from the Lompoc treatment facility and wave action can breach this barrier (COMB and USBR, 2004). The lagoon represents a unique habitat characterized by saltwater/freshwater mixing.

2.7.4 Coastal Dunes

This community occurs in several places along the coast, including on the southwestern edge of the University of California, Santa Barbara, campus (Devereux Dunes), at Vandenberg Air Force Base, north of Point Sal, between Point Sal and Purisima Point, south of Purisima point, and around Surf. Of particular note is the Guadalupe-Nipomo Dunes Complex, located near the mouth of the Santa Maria River. The Dunes Complex is a National Natural Landmark comprising 18 miles and more than 22,000 acres of one of the largest coastal dune ecosystems on earth. The Dunes Complex is located in a transition zone between Northern and Southern California plant and animal communities, resulting in a high degree of habitat diversity, a large number native plants and animals, and susceptibility to disturbing delicate ecosystem balances. With more than 1,000 known species of birds, plants and animals and some of the highest dunes on the West Coast, it is a place of rare beauty and significance. Established in 2000 and encompassing 2,533 acres, the Guadalupe-Nipomo National Wildlife Refuge is located in the heart of the Dune Complex. The habitat includes coastal dune scrub, dune swales, wetlands, fore and active dune areas and coastal strand. Sensitive species found in the refuge include the western snowy plover, California red-legged frog, California least tern and over 16 species of rare plants. The Oso Flaco Lake Natural Area, a California State Park, also is located within the Dune Complex.

2.7.5 Areas of Special Biological Significance

The SWRCB designates Areas of Special Biological Significance (ASBS) throughout the State of California, defined as "a nonterrestrial marine or estuarine area designated to protect marine species or biological communities from an undesirable alteration in natural water quality, including, but not limited to, areas of special biological significance that have been designated by the SWRCB through its water quality control planning process (PRC Section 36700[f]). In these areas, non-point source pollution is to be controlled as much as possible, and point source and thermal discharges are generally not permitted. The only ASBS within Santa Barbara County is the Channel Islands National Marine Sanctuary, which is managed by the National Park Service out to 6 miles from shore.

2.7.6 Marine Protected Areas

California Assembly Bill (AB 993) the Marine Life Protection Act was passed into law on October 10, 1999. A ‘‘marine protected area’’ is a named, discrete geographic marine or estuarine area seaward of the high tide line or the mouth of a coastal river, including any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna that has been designated by law, administrative action, or voter initiative to protect or conserve marine life and habitat. Marine protected areas include marine life reserves and other areas that allow for specified commercial and recreational activities, including fishing for certain species but not others, fishing with certain practices but not others, and kelp harvesting, provided that these activities are consistent with the objectives of the area and the goals and guidelines of the law. Marine protected areas are primarily intended to protect or conserve marine life and habitat, and are therefore a subset of marine managed areas, which are broader groups of named, discrete geographic areas along the coast that protect, conserve, or otherwise manage a variety of resources and uses, including living marine resources, cultural and historical resources, and recreational opportunities. A number of marine protected areas are present within Santa Barbara County, primarily at the Channel Islands, although the Goleta Slough has this designation, as do the Refugio State Marine Conservation Area and Vandenberg State Marine Reserve.

2.8 Water Quality

Water quality is a concern because of its potential effect on human health, enterprise, aquatic organisms, and ecosystem conditions. Quality is determined by factors such as native condition of groundwater and surface water, sources of contamination (natural and human induced), and extent of seawater intrusion.

2.8.1 Critical Coastal Areas (CCA)

The CCA Program is part of the state's Nonpoint Source Pollution Plan and a nonregulatory planning tool to coordinate the efforts of multiple agencies and stakeholders, and direct resources to CCAs. The program’s goal is to ensure that effective nonpoint source pollution management measures are implemented to protect or restore coastal water quality in CCAs. CCAs in Santa Barbara County include the Santa Ynez River, Goleta Slough, and Carpinteria Marsh. Criteria for identifying CCAs reflect the dual goals of improving degraded water quality and providing extra protection from non-point source pollution to marine areas with recognized high resource value. The CCA program relies on existing designations of degraded water quality (i.e., the Clean Water Act 303(d) list of impaired and threatened water bodies), and marine or estuarine areas with high resource value (i.e., California Marine Managed Areas, including State Water Quality Protection Areas, and equivalent areas specified in the San Francisco Bay Plan).

2.8.2 Section 303(d) Impaired Water Bodies

Water quality is assessed by comparing measured levels of contaminants to standards that have been established for each beneficial use. The state of California has established “beneficial uses” for all surface water bodies within its jurisdiction. Water quality standards have been established for each beneficial use. The standards are the basis for identifying which water bodies are “impaired,” or restricted in their beneficial uses. These impaired

water bodies are formally identified under Section 303(d) of the Clean Water Act, which requires states, territories, and authorized tribes to develop a list of water quality limited segments. The list of these water bodies and their pollutants of concern is the basis for setting priorities for the improvement of water quality. The county contains a number of water bodies that are listed as impaired under Section 303(d). The current list, shown in Appendix A, was approved by the SWRCB on October 25, 2006 (Resolution No. 2006 – 0079); the water segments and their impairments are listed in Table 2-3. Sources of pollution include both urban and agricultural uses, as well as natural sources. The waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that priority rankings be established for the development of action plans, called Total Maximum Daily Loads (TMDLs), to improve the water quality for waters on the list.

2.8.3 Groundwater Quality

The importation of State Water Project water, with lower salt content than the local sources, provides for higher quality "return flows," and thus, helps the basin water quality. In the Santa Maria basin, in addition to improvements provided by the recharge operations of Twitchell Reservoir and state water importation, the Laguna County Sanitation District helps improve water quality in the basin by utilizing a reverse osmosis process to remove and a deep injection well to dispose of approximately 8,000 pounds per day of salts, which would otherwise accumulate in the basin system. In the Santa Ynez River watershed, under the Cachuma Project Settlement Agreement, State Water Project water is mixed with water rights releases from Bradbury Dam to lower the salt content of flows downstream. Since 1997, discharge of State Water Project water has tended to lower the total dissolved solids (TDS) of groundwater in the vicinity of these sources.

Increases in TDS have been recorded in many basins in the county. Efforts to increase recharge and improve irrigation efficiency have been implemented to address this problem.

Several areas in the county (Santa Barbara and near Santa Maria) have experienced signs of seawater intrusion. As of yet, these initial signs of intrusion do not pose a threat to drinking water supplies.

The county contains a number of non-sewered, fairly densely populated areas that remain on septic tanks, requiring integrated action by the Local Agency Formation Commission, cities, and special districts to provide for extensions of sewer systems to serve these areas or other measures to address potential groundwater contamination. State maximum contaminant levels (MCLs) for nitrates already have been exceeded in some areas, and methyl tertiary butyl ether (MTBE) and chlorinated solvents pose problems for some wells. Additionally, the recently constructed Chumash wastewater treatment plant in the Santa Ynez Valley is a new source of wastewater discharge into Sanja de Cota Creek, which is a tributary to the Santa Ynez River. As would occur with any wastewater treatment plant upstream of potable water wells, there is a potential risk of contamination of the potable wells in the Santa Ynez River alluvium. Because of the federal nexus, the U.S. Environmental Protection Agency has regulatory jurisdiction over this discharge. A water quality control plan is being developed to determine potential sources of contamination, designate beneficial uses, and assign water quality objectives.

The following describes groundwater quality in the major basins (Santa Barbara County, 2000; Santa Barbara County, 2005).

Carpinteria Groundwater Basin

Water quality has been monitored sporadically over most of the 20th century. Since the initial U.S. Geological Survey (USGS) study, TDS concentrations within the basin have increased, with recent concentrations ranging from 436 to 980 milligrams per liter (mg/L). Groundwater analyses conducted in 1985 revealed nitrate levels below the state MCL of 45 mg/L for public water systems.

Montecito Groundwater Basin

Water quality in the basin is generally suitable for agricultural and domestic use. Some wells near fault zones or coastal areas yield groundwater with elevated levels of TDS and other constituents. Studies indicate that seawater intrusion is not a significant problem in the basin. It is thought that deeper aquifers of the basin are protected from seawater intrusion by an impermeable offshore fault. However, some encroachment of seawater might occur in shallower aquifers during periods of heavy pumping such as during the early 1960s.

Santa Barbara Groundwater Basin

TDS concentrations within the two basins range from about 400 mg/L to about 1,000 mg/L. Isolated wells have exhibited much higher TDS concentrations. Seawater intrusion occurred in some areas of the south basin (Storage Unit No. 1) where heavy pumping from municipal wells caused groundwater levels to drop as much as 100 feet in the late 1970s. More recently, samples taken from coastal wells have confirmed the presence of seawater intrusion with chloride concentrations greater than 1,000 mg/L. Groundwater pumping within the Santa Barbara Groundwater Basin has been drastically reduced since 1991. Effective pumping practices, together with groundwater injection programs, have restored the previously existing gradient thereby reversing the trend of seawater intrusion.

Foothill Groundwater Basin

TDS concentrations range from 610 to 1,000 mg/L in seven wells sampled in the basin. Chloride concentrations in this basin are relatively low (44 to 130 mg/L) in the seven wells. An eighth well was sampled in the USGS study from which poor quality water (TDS 1,900 mg/L, chloride 360 mg/L) was recovered. This well, however, is known to produce water from bedrock aquifers below the sediments that comprise the Foothill Basin.

Goleta Groundwater Basin

The USGS compiled water quality data for these basins in the early 1940s. Groundwater analyses completed at that time indicated that chloride concentrations throughout most of the North-Central and West basins were less than the Department of Health Services secondary standard of 250 mg/L. TDS ranged from about 170 mg/L to 1,400 mg/L in the North-Central Basin, and was approximately 800 mg/L in the West Subbasin. More recent studies yielded similar TDS ranges as the USGS study with the exception of high concentrations in some wells of the West Basin. The recent study yielded no evidence of seawater intrusion. In addition, seawater intrusion is not likely to have occurred at any time due to the rock formations and the More Ranch Fault along the coast that act as barriers to groundwater migration. Near-surface low permeability sediments cause the southern portion of the North-Central and West basins to be under confined conditions and provide a barrier to contamination from potential surface sources of water quality degradation such as agricultural return flow or infiltration of brackish water in the overlying Goleta Slough. High TDS perched water is present in shallow aquifers above the confining layers. This water is not in general use. Water quality in the North-Central Basin is sufficient for many agricultural uses but might require treatment for domestic uses. Water in the West Basin requires treatment for domestic use and can be used for irrigation of a limited variety of crops. The Goleta Water District has extracted water from a bedrock well on a test basis. The well pumped water from the fractures in consolidated bedrock in the foothills north of the basin and was of very poor quality. The District has no plans to utilize water from this source.

Santa Ynez Uplands

Water quality within the basin is generally adequate for most agricultural and domestic purposes. Studies completed in 1970 indicate TDS concentrations ranging from 400 to 700 mg/L. Although recent water quality data are limited, samples analyzed by the USGS in 1992 exhibited a TDS concentration of 507 mg/L.

Buellton Uplands Groundwater Basin

Current water quality data for the basin is limited. However, data from late 1950s and early 1960s indicate TDS concentrations between 300 and 700 mg/L for several wells within the basin.

Lompoc Groundwater Basin

Water quality in the shallow zone of the Lompoc Plain tends to be poorest near the coast and in heavily irrigated areas of the subbasin. TDS concentrations of up to 8,000 mg/L near the coast were measured in the late 1980s. The poor quality water in this area is attributed to upwelling of poor quality connate waters, reduction in fresh water recharge from the Santa Ynez River beginning in the early 1960s, agricultural return flows, and downward leakage of seawater from an overlying estuary in the western portion of the basin. The presence of elevated boron and nitrates (constituents common in seawater and agricultural return flow, respectively) supports this conclusion. In the middle zone, water samples taken from below agricultural areas of the northeastern plain contained TDS concentrations averaging over 2,000 mg/L. However, some middle zone groundwater from the western

plain exhibited TDS levels below 700 mg/L. Areas of recharge, adjacent to the Santa Ynez River, contained TDS concentrations of less than 1,000 mg/L in the eastern plain. It is believed that leakage from the shallow zone is responsible for elevated TDS levels in the middle zone in the northeastern plain. Groundwater from the main zone exhibited TDS concentrations as high as 4,500 mg/L near the coast. It is thought that contamination of the main zone (mainly near the coast) is due to percolation of seawater through estuary lands and upward migration of poor quality connate waters from the underlying rock. Groundwater of the Lompoc Terrace and Lompoc Upland Subbasin is generally of better quality than that of the Lompoc Plain, averaging less than 700 mg/L TDS. Some of the natural seepage from these subbasins is of excellent quality. Groundwater users and public agencies within the basin are working to clarify and resolve water quality concerns.

San Antonio Groundwater Basin

Water quality studies conducted by the USGS in the late 1970s indicated an average TDS concentration within the basin of 710 mg/L, with concentrations generally increasing westward. The cause of the westward water quality degradation is thought to be the accumulation of lower quality water from agricultural return flow and the dissolution of soluble minerals. The highest TDS concentration (3,780 mg/L) was found in the extreme western end; the lowest concentration (263 mg/L) was found at the extreme eastern end. Analyses compiled for samples taken between 1958 and 1978 indicate that groundwater quality remained fairly stable during that period. Analyses of water sampled in 1993 for several wells show only slight increases in TDS since the previous study. There is evidence that poor quality connate waters exist within fracture zones of the bedrock and that this water might be induced into overlying strata through excessive pumping. There is no evidence of seawater intrusion in the basin, nor is the basin considered susceptible to seawater intrusion due to the consolidated rock that separates the basin from the ocean.

Santa Maria Valley Groundwater Basin

Water quality data indicates that TDS concentrations generally increase from east to west, with the most significant degradation occurring in the western part of the basin. TDS concentrations for shallower wells also tend to increase southward, away from the recharge area of the Santa Maria River. TDS concentrations east of Guadalupe have increased to over 3,000 mg/L in 1975 from less than 1,000 mg/L in the 1930s. In addition, TDS levels have increased significantly in Orcutt wells since the 1930s, but have remained relatively stable since 1987. The importation and domestic use of State Water Project water now results in better quality discharge water from the treatment facilities. A recent study conducted by the SWRCB indicates that the basin is subject to nitrate contamination, particularly in the vicinity of the City of Santa Maria and in Guadalupe. The study shows that nitrate concentrations have increased from less than 30 mg/L in the 1950s to over 100 mg/L in the 1990s in some parts of the basin. Coastal monitoring wells are measured biannually for any indication of seawater intrusion, although there has been no evidence that it has occurred. The concern of seawater intrusion is based on evidence that the Careaga Sand crops out on the ocean floor several miles west and there are no known barriers to prevent intrusion. Although it is likely that the seawater-freshwater interface has migrated toward land during the 20th century, the slope of groundwater has remained positive toward the ocean in the western-most part of the basin.

The Central Coast Regional Water Quality Control Board (RWQCB) has begun initial reports on bacteria and nitrates in the Santa Maria River Basin. Based on these reports, they have served notice of the intention to initiate a process to establish TMDLs for these two pollutants of concern. Part of the TMDL process focuses on identification of pollution sources.

Cuyama Groundwater Basin

Agricultural water use began in 1938 and has since progressively increased. The constant cycling and evaporation of irrigation water has resulted in decreasing water quality. Groundwater within the basin makes up 100 percent of the water supply for Cuyama Valley agriculture, petroleum operations, businesses and homes. Agriculture accounts for over 95 percent of the water use within the valley.

2.8.4 Surface Water Quality

Urban Water Quality

Various entities in the IRWMP planning region are focusing their efforts on poor surface water quality in creeks, rivers, and oceans due to polluted storm water and urban runoff discharges. Runoff pollutants can include pesticides, fertilizers, green waste, animal waste, human waste, petroleum hydrocarbons (gasoline, motor oil), trash, and other constituents.

Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of waste from a point source to a receiving water body. Phase II of the NPDES program, enacted in 1999, requires preparation of Storm Water Management Plans (SWMP) to manage discharge of urban runoff to receiving waters (refer to Section 3 for a discussion of regional SWMPs. These plans summarize the management plans and strategies to maintain compliance in all applicable discharge and effluent prohibitions, including control measures such as public education and outreach on storm water impacts, public involvement / participation, illicit discharge detection and elimination, construction site storm water runoff control, post-construction storm water management in new development or redevelopment, and pollution prevention / "good housekeeping."

There are a number of potential urban storm water constituents of concern that the NPDES Phase II Storm Water Management Program aims to control on a national level and that are found in low levels in many areas throughout the county. (Water bodies that are sufficiently polluted to warrant clean up are listed in Table 2-3). These urban pollutants may include sediment, nutrients, bacteria and viruses, oil and grease, metals, organic compounds, pesticides, and gross pollutants such as trash. Storm water and incidental urban runoff are two of the primary carriers of pollutants that enter the county storm drain systems and creeks. Non-storm urban runoff from commercial and residential areas, streets and parking lots, city and commercial facilities, and building construction sites, among others, can all contribute as non-point sources of water pollution.

2.8.5 Ocean Water Quality

Ocean water quality is of concern in Santa Barbara County, as it is in many places along the California coast. Scientific evidence has linked storm water runoff with high levels of indicator bacteria in creeks and ocean water. Exposure to indicator bacteria correlates with

an increased health risk to humans, requiring beach warnings. Sources of these indicator bacteria may include human and domestic and wild animal excrement, decomposing plant matter, and septic and sanitary sewer overflow. Investigations of the City of Santa Barbara sewer system, for example, have indicated that local sewer pipe leaks likely occur in some areas of the city, contributing untreated wastewater to the shallow groundwater zone that can eventually make its way to creeks and to the beaches. In addition, damaged and broken sewer lines may also allow inflow of percolating rainwater into the city sewer system, overwhelming the capacity of the Estero treatment plant to effectively treat sewage during large storm events and resulting in discharge of only partially treated wastewater (City of Santa Barbara Creeks Restoration / Water Quality Improvement Division, 2005).

Table 2-4 summarizes the exceedance percentages (the number of samples exceeding one or more standards / total number of samples taken from the site) for the beaches monitored by the Santa Barbara County Environmental Health Services Department from 1998 to 2006.

2.8.6 Agricultural Water Quality

Agricultural sources may contribute to water quality impairments through irrigation return flow, flows from tile drains, and storm water runoff. These discharges can affect water quality by transporting pollutants including pesticides, sediment, nutrients, salts (including selenium and boron), pathogens, and heavy metals from cultivated fields into surface waters. Some surface water bodies are classified as impaired, at least in part, because of pollutants from agricultural sources.

To control and assess the effects of these discharges, the Central Coast RWQCB has adopted a comprehensive conditional waiver, using proactive solutions to control agricultural discharges, including an extensive public outreach and education approach, resulting in the enrollment of 400,000 acres in the program (State of California, 2007b). All farmers are expected to complete 15 hours of farm water quality education within 3 years of adoption of the waiver, develop farm water quality management plans that address, at a minimum, irrigation management, nutrient management, pesticide management and erosion control, and begin implementing management practices identified in their plans. Those who have completed the above requirements by the deadline qualify for a waiver with reduced reporting requirements.

2.8.7 Drinking Water Quality

Imported water from the State Water Project is of high quality, ranging from 222 to 510 mg / L TDS. In parts of the North County, State Water Project water is blended with other lower quality water, which results in a higher overall quality of the water distributed to customers. For the South Coast water purveyors, State Water Project water is conveyed through Lake Cachuma, where it mixes with local surface water. The water is then directed to local water treatment plants, after which it is distributed to customers. According to the U.S. Geological Survey figures for 1998 (Agajanian et al., 1998) the TDS for the rivers in Santa Barbara County range from 518 mg / L to 1,130 mg / L. Water treatment facilities are discussed in Section 4, and specific drinking water quality issues, including those facing DACs are addressed in Section 8.

TABLE 2-4
Percentage Exceedances for Indicator Bacteria (1998 to 2006)*

Beaches	Exceedance Percentage								
	1998	1999	2000	2001	2002	2003	2004	2005	2006
Arroyo Burro	44	33	36	27	21	17	13	26	46
Butterfly Beach	-	-	11	10	7	12	4	6	12
Carpinteria City Beach	7	10	4	13	9	4	2	10	8
Carpinteria State Beach	36	37	13	31	9	6	4	18	16
East Beach at Mission Creek	55	27	19	39	28	15	25	38	40
East Beach at Sycamore Creek	24	20	20	17	25	13	10	12	16
El Capitan State Beach	15	5	11	9	7	6	2	8	8
Gaviota State Beach	17	13	31	30	4	12	10	4	14
Goleta Beach	13	11	19	27	12	13	6	18	10
Guadalupe Dunes State Beach	3	2	4	12	12	2	4	2	4
Hammond's Beach	15	18	23	20	12	10	6	14	10
Haskell's Beach	-	-	-	21	4	13	6	16	16
Hope Ranch Beach	37	18	30	16	8	10	6	8	18
Jalama Beach	42	36	31	22	6	10	6	22	12
Leadbetter Beach	25	11	16	28	11	12	6	14	16
Ocean/Surf Beach	27	25	11	12	4	2	6	8	4
Refugio State Beach	28	24	32	25	22	6	4	18	18
Rincon at Bates Beach	54	27	17	7	2	2	0	6	4
Sands at Coal Oil Point	12	6	7	12	4	4	4	4	2
Summerland Beach	-	-	-	-	-	-	-	-	9
Average Percentage	30	22	21	23	12	9	6	14	14

Source: County of Santa Barbara Public Health Department, 2007.

*Based on AB 411 year-round sampling data.

2.9 Water Demand

Current agricultural and urban demands are discussed below, as are projected demands.

2.9.1 Agricultural Demand

Agricultural development increased dramatically after World War II due to advances in refrigerated-transport technology, which allowed crops grown in the county to be transported by train in refrigerated rail cars for sale in distant locations. Agricultural water use now accounts for approximately 75 percent of all water demand in the county;

calculating an exact amount would require accounting for the fact that some of the water used for agricultural returns as groundwater recharge. Most agricultural water supplies are obtained from private groundwater wells, although some water purveyors provide agricultural water, as well. Table 2-5 summarizes the amount of water currently provided to agricultural users by source. In recent years, 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, such as strawberries, to be grown. 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.

TABLE 2-5
Estimated Agricultural Water Demand

Source	Demand (AFY)
Carpinteria Valley Water District	1,840[a]
Goleta Water District	2537[b]
La Cumbre Mutual Water Company	103[c]
Montecito Water District	550[d]
Santa Ynez River Water Conservation District Improvement District No. 1	2,404[e]
Private Wells, Cuyama Valley	15,300[c]
Private Wells, San Antonio Valley	17,020[c]
Private Wells, Santa Maria Valley	117,852[c]
Private Wells, Santa Ynez Valley	59,980[c]
TOTAL	**218,115**

Sources:
[a]Carpinteria Valley Water District, 2005b, Table 12
[b]Goleta Water District, 2005a, Table 16
[c]Santa Barbara County Water Agency, 2000
[d]Montecito Water District, 2005, Table 5D
[e]Santa Ynez River Water Conservation District **Improvement District No. 1, 2006**

2.9.2 Urban Demand

Urban water use accounts for approximately 25 percent of all water demand in Santa Barbara County. Current supplies provided by each water purveyor are shown in Table 2-6.

Per capita water use is shown in Table 2-7. Variances in water usage are due in part to the amount of industry and subregional climate, as well as variation in lot sizes and soil types.

TABLE 2-6
Urban Water Use Summary for Santa Barbara County

Water Purveyor	Typical Demand (AFY)
Carpinteria Valley Water District	2,122[a]
City of Buellton	806[b]
City of Guadalupe	574[b]
City of Lompoc	5,212[c]
City of Santa Barbara	12,960[d]
City of Santa Maria	13,243[e]
City of Solvang	1,277[b]
Cuyama Community Services District	166[b]
Golden State Water Company (Orcutt)	7,394[b]
Goleta Water District	11,781[f]
La Cumbre Mutual Water Company	1,258[b]
Los Alamos Community Services District	238[b]
Mission Hills Community Services District	540[b]
Montecito Water District	5,655[g]
Santa Ynez River Water Conservation District Improvement District No. 1	2,405[h]
Vandenberg Air Force Base	4,500[b]
Vandenberg Village Community Services District	1,311[f]
TOTAL	**71,239**

Sources:
[a]Carpinteria Valley Water District, 2005b, Table 12
[b]Santa Barbara County Water Agency, 2000
[c]City of Lompoc, 2005, Table 15
[d]City of Santa Barbara, 2005, Figure 7
[e]City of Santa Maria, 2005, Table 4-2
[f]Goleta Water District, 2005a, Table 16
[g]Montecito Water District, 2005, Table 5D
[h]Santa Ynez River Water Conservation District Improvement District No. 1, 2006, Table 6; service area includes the Santa Ynez Reservation
[i]Santa Barbara County Water Agency, 2007

TABLE 2-7
Municipal and Industrial Water Use: Per Capita in 2006

Agency	Per-Capita Water Use (Gallons/Person/ Day)
City of Buellton	281
Carpinteria Valley Water District	102
Casmalia Community Services District	52
Cuyama Community Services District	183
Golden State Water Company	178[a]
Goleta Water District	108
City of Guadalupe	116
La Cumbre Mutual Water District	295
City of Lompoc	104
Los Alamos Community Services District	195
Mission Hills Community Services District	189
Montecito Water District	345
City of Santa Barbara	121
City of Santa Maria	123
Santa Ynez River Water Conservation District Improvement District No. 1	273
City of Solvang	227
Vandenberg Village Community Services District	202

Source: Santa Barbara County Water Agency, unpublished data

[a]Source: Santa Barbara County Water Agency, 2007

2.9.3 Projected Water Demand and Supply

By 2040, the Santa Barbara County population is expected to increase by almost 52 percent over 2000 levels (from about 399,000 to 606,000) (Santa Barbara County, 2003). Total water demand for this same 40-year period is projected to increase by only 9 percent, from 314,000 AFY to 345,000 AFY (Santa Barbara County, 2003). Agricultural water demand, which accounts for about 75 percent of total demand, is expected to remain nearly the same. At present, with careful and strategic planning, water supplies are sufficient to meet demand countywide during normal water years, but water purveyors will need to develop an additional 10,800 AFY by 2030; this number is projected to increase to 12,400 AFY by 2040, or they will have to rely on mining groundwater in certain areas in order to meet future demand (Santa Barbara County, 2003).

Only one of the five Designated Analysis Units (DAU) in Santa Barbara County (as defined by State of California Department of Water Resources [DWR]), DAU 75 South Coast, has a

water supply that meets the current demand in normal rainfall years. The other basins have existing shortfalls in water supply that will increase in the future (Santa Barbara County, 2003).

- DAU 71 Santa Maria—The current 4,200 AFY water supply shortfall will increase to 7,700 AFY by 2040, although water conservation efforts are expected to continue.
- DAU 73 San Antonio—The current 3,900 AFY shortfall will decrease slightly to 3,800 AFY by 2040, primarily due to limited population growth and increased conservation.
- DAU 74 Santa Ynez—Although this DAU has a slight overall current water supply deficit of only 300 AFY, the water supply shortfall is expected to reach 1,600 AFY by 2040.
- DAU 75 South Coast—The DAU as a whole has sufficient water supplies through the year 2040 on a normal year basis. However, periodic severe droughts reduce supplies by as much as 25 percent, requiring water purveyors to reserve available water supply during normal years for later drought use to partially offset shortages.
- DAU 76 Cuyama Valley—This DAU is already experiencing a water supply shortfall of about 7,900 AFY of its total average water demand of 20,700 AFY. This water shortfall is expected to decline slightly to about 6,600 AFY in 2040; however, significant new water supplies will be required to balance average annual water supply and demand.

2.10 Natural Hazards Requiring Emergency Planning

Water resources planning in Santa Barbara County must consider the potential for service disruptions due to natural hazards such as earthquakes, fires, and floods, which can damage water and wastewater infrastructure. Additionally, the area experiences periodic droughts, which requires planning for periodic shortages.

2.10.1 Severe Storms and Flooding

Santa Barbara County experiences periods of high intensity rainfall, which cause flooding and landslides. For example, widespread problems resulted from the December 2004 / January 2005 storms including facilities damage, road and railroad closures, mudslides, flooding, power outages, fallen trees, and beach erosion. Some areas, such as the eastern end of Santa Maria, experience chronic flooding in modest storm events because existing floodwater conveyances are not adequate to meet the increased runoff due to both agricultural and urban growth. The Cuyama Valley agricultural area in the proximity of the Cuyama River is another region that is highly susceptible to flooding because the river banks are low (less than 4 feet) and highly erodable, so the natural ability to contain the river is limited. In the city of Santa Barbara, Mission Creek and Sycamore Creek are prone to flooding when significant rainfall occurs. Periodic flooding also occurs on the Santa Ynez River, particularly in the City of Lompoc and on agricultural fields west of Lompoc, associated with the limited ability to maintain channel capacity because of sensitive habitat considerations.

2.10.2 Earthquakes

The county, like the rest of California, is seismically active and has experienced multiple large-scale (magnitude 6.0 or greater) earthquakes over the last two centuries. The December 21, 1812, earthquake was estimated to be magnitude 7.2 (Harp, 1980). Much of Santa Barbara was damaged by the magnitude 6.3 earthquake of June 29, 1925. Another strong earthquake of magnitude 6.0, which also caused damage in Santa Barbara, occurred June 30, 1941. The county contains numerous active and potentially active faults and is also susceptible to ground shaking from regional faults, such as the San Andreas Fault, which is located approximately 7 miles from the northeast corner of the county. Earthquakes present the potential to damage water storage facilities and levees, cause landslides, and disrupt water supply and treatment capabilities in the region for weeks or possibly months.

2.10.3 Fire

During the summer and early fall, much of Santa Barbara County is at risk from wildfires stemming from a combination of dry, windy conditions and woodlands, brushlands, chaparral, and grasslands that burn readily. The county contains a number of high fire hazard areas, particularly in undeveloped and mountainous locations, although fires may occur in urban areas, as well. Fires pose a number of challenges to water resources planners, because adequate water must be supplied at correct pressure to meet fire department requirements, particularly during major incidents, and portions of the county have deficient fire flows. Fires also can result in erosion and runoff from burned areas, which can affect surface water quality and increase sedimentation of local creeks, and reservoirs.

2.10.4 Drought

Historical records show that local drought periods of several years or more are cyclical. 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 5 years with a maximum of 9 years. Local water purveyors implement water conservation programs to extend local surface water and conserve groundwater. They also import supplemental water supplies to cope with drought.