Description of the Santa Ynez River Watershed

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1.0 The Santa Ynez River System supports the County of Santa Barbara's South Coast and Santa Ynez Valley

The Santa Ynez River flows westerly approximately 90 miles to the Pacific Ocean, draining a nearly 900 square mile watershed in southern Santa Barbara County. The watershed is bounded on the south by the Santa Ynez Mountains, on the north and east by the Santa Rosa Mountains and on the west by the Pacific Ocean. Between 1920 and 1952, three reservoirs were constructed on the River to capture and store River water. The three reservoirs currently have a combined storage capacity of about 200,000 AF. Two of the reservoirs are owned and operated by local entities while the third and largest of these, Cachuma Reservoir, was constructed by the Federal Bureau of Reclamation. None of the reservoirs are operated on a safe yield basis and therefore reservoir water users rely on other water sources to meet demands at times when the reservoirs cannot deliver their normal draft. Currently, the combined draft on the three reservoirs is about 32,700 AFY. .

Cachuma Reservoir is the major water supply source for southern Santa Barbara County. About one-third of the demand within the watershed is fulfilled by Cachuma Reservoir while the remaining two-thirds is met from groundwater extraction and the importation of State Water Project water from the Sacramento-San Joaquin Delta . The Reservoir is the primary source of water to the southern coastal area of Santa Barbara County known as the South Coast area. The Reservoir supplies about 45% of the total demand of that area.

Within the watershed, Cachuma Reservoir water is supplied to the Santa Ynez River Water Conservation District, Improvement District #1 (ID#1) in the Santa Ynez River Valley. ID#1, in turn, provides water to the communities of Santa Ynez, Los Olivos, Ballard, and the City of Solvang. The remaining demands within the Santa Ynez River Basin including those of the cities of Buelton, Solvang and Lompoc and the community of Santa Ynez are fulfilled through surface (subsurface flow of the River) and groundwater extractions, contracted SWP deliveries and Cachuma Project water delivered through an exchange with SWP water to the ID#1 service area. The approximate population within the Santa Ynez watershed in 2000 was about 80,000.

The South Coast area is situated south of the Santa Ynez Mountains and includes the cities of Carpinteria, Goleta and Santa Barbara and the communities of Montecito and Summerland. The population of the South Coast area was about 200,000 in 2000. The area is served by four water suppliers: the City of Santa Barbara provides water to its residents, the Goleta Water District serves the City of Goleta; the Montecito Water District provides water to the communities of Montecito and Summerland and the Carpinteria Valley Water District is the water provider for the City of Carpinteria. Water demands of the South Coast area are met by diversions from the Santa Ynez River, local ground waters and imported water from the State Water Project.

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Water is conveyed from each of three reservoirs on the River to the South Coast by means of separate tunnels through the Santa Ynez Mountains. Infiltration of groundwater to these tunnels provides additional water to the South Coast.

Cloud seeding has been conducted within the County of Santa Barbara for many years to increase the total amount of rain available for runoff to the reservoirs and infiltration to groundwater basins. The Santa Barbara County Water Agency estimates that cloud seeding increases the long-term average yield of Cachuma Reservoir by about 10%.

2.0 Three reservoirs have been constructed on the Santa Ynez River

Three water supply reservoirs are located on the upper Santa Ynez River: Jameson, Gibraltar, and Cachuma. All of the reservoirs are used for water supply and were not designed for flood control purposes. In recent years (including the 1998 El Nino), however, Cachuma Reservoir operations have included modified winter storm operations at the discretion of the USBR to reduce downstream flooding in the lower Santa Ynez River. The characteristics of each reservoir are described briefly in the following sections.

2.1 Jameson Reservoir is the furthest upstream reservoir

Jameson Reservoir was formed by the construction of Juncal Dam in 1930. Juncal Dam is a concrete arch located about 88 river miles from the Pacific Ocean. The watershed area above Juncal is about 14 square miles. However, Alder creek, a tributary to the Santa Ynez River located south of Jameson Lake and flowing into the river at a point downstream from Juncal Dam, is at certain times diverted to Jameson Reservoir via an aqueduct. The 160 foot high dam was not constructed to provide for the passage of fish through the dam.

In 1994, the storage capacity of the reservoir was 5,235 acre feet, reduced from the original capacity of 7,228 acre feet by siltation. Based on a bathymetric survey in 1998, the reservoir capacity was unchanged at about 5,285 AF (at spillway level elevation of about 2224 ft.). The water surface area of the full reservoir (at spillway elevation) as surveyed in 1994 is 128 acres. The reservoir is owned and operated by Montecito Water District and diversions to the South Coast are made through the 2.14 mile long Doulton Tunnel. In addition, a portion of the water from Fox Creek, a downstream tributary to the Santa Ynez River, is diverted into the tunnel.

Currently, the safe yield of the reservoir is about 1,150 AFY, but the reservoir is operated in an over draft mode. Thus, the long-term yield of the reservoir with a draft of 2,000 AFY is estimated to average about 1,800 AFY. Tunnel infiltration plus Fox Creek diversions provide an additional average supply of about 500 AFY.

2.2 Gibraltar Dam and Reservoir is situated betwe en Jameson and Cachuma

Gibraltar Dam and Reservoir were constructed by the City of Santa Barbara in 1920 and are located about seventy-three river miles from the Pacific Ocean. . No structures exist that would allow for the passage of fish through the180 ft high concrete arch dam. Water diverted is conveyed to a release outlet and into the north portal of the Mission Tunnel. The outlet works for downstream release allows metered releases into the Santa Ynez River.

The total watershed area above Gibraltar Dam is approximately 216 square miles; the most eastern fourteen square miles of which are located above Juncal Dam. Thus, the total watershed area between Juncal to Gibraltar is about 202 square miles.

Siltation has been a continual problem at Gibraltar Reservoir due to the significant size and steep terrain of its watershed compared to reservoir capacity. The siltation problem has been aggravated by occasional occurrence of wild fires in the watershed. Siltation reduced the original reservoir capacity of 14,500 acre feet to 7,600 acre feet by the year 1947. The reinforced concrete arch dam was raised 23 feet in 1948, increasing the storage capacity to 14,777 acre feet. In the 1980's the storage capacity of the reservoir was reported to be about 8,500 acre feet. In 1995, the reservoir capacity was 7,634 acre feet with a corresponding surface area, when full, of 248 acres. Based on a bathymetric survey in September 2001, the reservoir capacity was 7,060 acre-feet at spillway level (elevation 1399.82).

Diversions from Gibraltar Reservoir to the City of Santa Barbara are made through the 3.7 mile long Mission Tunnel. In addition, some water from Devils Canyon Creek, a downstream tributary to the Santa Ynez River, is diverted into the tunnel. Currently, the safe yield of the reservoir is about 2,000 AFY. However, the reservoir is operated in an overdraft mode. The long-term average yield of the reservoir with a draft of 5,000 AFY is estimated to be about 4,600 AFY. Tunnel infiltration plus diversions from Devils Canyon Creek produce an average additional supply of about 1,100 acre-feet of water per year

2.3 Cachuma Reservoir is the largest of the three Santa Ynez River reservoirs

Cachuma Reservoir, completed 1953, is the largest of the three reservoirs on the Santa Ynez River. The reservoir is formed by Bradbury Dam located 48.7 river miles from the Pacific Ocean. The dam is a 205 foot high earth-fill structure. The normal full operating level of the reservoir is 750 ft., MSL (with the gates fully closed). Following execution of the 1994 Fish Memorandum of Understanding (MOU), the reservoir has been surcharged to 750.75 feet to partially offset impacts to project yield from downstream releases for fish. The storage capacity of Cachuma Reservoir at 750.0 ft, when constructed, was 204,874 acre feet with a surface area of 3,090 acres. Based on the

1990 silt survey, the capacity of the reservoir was reduced to 190,409 acre feet with a corresponding surface area of 3,043 acres. Based on the 2000 bathymetric survey, the capacity of the reservoir at 750.0 ft. has been reduced to 188,035 acre-feet. The watershed area above Bradbury Dam is approximately 417 square miles, 216 square miles of which are above Gibraltar Dam.

The safe yield of Cachuma was determined in the 1960s to be 27,800 AFY. However, due to siltation, revisions in project hydrology and downstream release obligations, the safe yield was reduced to approximately 25,500 AFY. Currently, the reservoir is drafted at a rate of about 25,700 AFY to meet existing demands among the water districts that hold contract rights to receive Cachuma water. The U.S Bureau of Reclamation (USBR) operates the reservoir to deliver water to the Project Member Units. Project operations also include the storage and release of water for downstream water rights as required by Orders WR 73-37 and 89-18 of the State Water Resources Control Board (SWRCB) . The Upper Santa Ynez River Operations Agreement (sometimes referred to as the Gibraltar Pass Through Agreement), and SWRCB Order Nos. WR 73-37 and WR 89-18 specifically provide for downstream releases from Cachuma Reservoir.

Downstream releases to the Santa Ynez River and pipeline diversions to the ID#l service area are accomplished through outlet works. Minor lake diversions are made directly to the County park at the reservoir. Diversions to the South Coast are conveyed through the 6.4 mile long Tecolote Tunnel completed in 1956. Water infiltration into the tunnel is considered part of the Cachuma Project yield and averages about 2,000 AFY. When lake levels falls near elevation 650 ft., MSL, as they did during the 1986-1991 drought, diversions to the South Coast are continued by pumping from the lake through a floating conduit into the intake tower. Currently, the Cachuma Project average yield (sum of all the lake diversions plus Tecolote Tunnel infiltration water), with an annual draft of 25,714 AF, is about 25,500 AFY. The minimum pool for this yield is 12,000 acre feet.

Since 1993, releases have been made from Cachuma Lake for fish studies and maintenance of habitat, pursuant to the Fish Memorandum of Understanding and 2000 Biological Opinion and Lower Santa Ynez River Fish Management Plan. Releases for fish rearing habitat are made primarily through the Hilton Creek supplemental watering system designed to deliver water to three release points: two along Hilton Creek and one in the stilling basin below the dam. The total capacity of this system will be 10 cfs upon installation of a pump station. The system is currently operating by gravity, and as such, its capacity is limited by the reservoir level.

Beginning in 1997, the Central Coast Water Authority (CCWA) began to deliver State Water Project (SWP) water to Cachuma Reservoir for the SWP contractors on the South Coast. The treated SWP water is dechloraminated at the Santa Ynez Pumping Facility and then pumped via the Santa Ynez pipeline through the existing Bradbury Dam outlet works into Lake Cachuma. The water is then delivered through Tecolote Tunnel to the contractors on the South Coast. When deliveries of SWP water to Cachuma Lake coincide with downstream releases through the outlet works at Bradbury Dam, commingled water is released to the Santa Ynez River. The Santa Ynez Pumping Facility is designed to deliver about 22 cfs through the outlet works at Bradbury Dam. Based upon an SWP water supply reliability report recently issued by the California Department of Water Resources, SWP water availability, on a long term basis, is assumed by the Cachuma Member Units to be 75% of their contract amounts.

Deliveries to ID#1, a Cachuma Member Unit, are accomplished through an exchange with a portion of the South Coast's entitlement of SWP water. As a result, ID#1 receives no Cachuma water directly; however, its contract for Cachuma water provides the basis for the exchange of an equivalent amount of SWP water from the South Coast Member Units.

2.4 Summary of surface water resources

The table below shows the current expected water yields from the three reservoirs. The yields are based on historic hydrologic conditions and on specific reservoir draft levels. It should be noted that all of the reservoirs are drafted at a greater rate than that which is sustainable in critical dry periods. Thus, deficiencies in surface supplies during these periods must be obtained from groundwater sources or the State Water Project.

Reservoir	Draft AFY	Yield Avg AFY	Tunnel Yield AFY	Total Yield AFY
Jameson	2,000	1,800	500	2,300
Gibraltar	5,000	4,600	1,100	5,700
Cachuma	25,700	23,500	2,000	25,500
Total	32,700	29,900	3,600	33,500

3.0 The River system provides water to two groundwater systems

While not a part of the Santa Ynez River system, the Santa Ynez, Buellton and Lompoc Uplands provide extracted groundwater to met demands in their respective areas within the watershed.

Two groundwater systems are associated with the Santa Ynez River. These are divided at the Lompoc Narrows. The groundwater system east of the Narrows is considered as the subsurface flow of the Santa Ynez River. The system to the west is known as the Below Narrows Groundwater Basin and is defined as a percolating groundwater system.

3.1 The Above Narrows Alluvial Groundwater Basin extends from Bradbury Dam to the Narrows

The Above Narrows Alluvial Groundwater Basin (ANAGB) extends along the Santa Ynez River from Bradbury Dam to the Narrows east of Lompoc. Coarse grained, unconsolidated sand and gravel river channel and younger alluvium deposits comprise a groundwater basin approximately 35 miles long and of variable width from 0.2 to 1.5 miles. The estimated depth of the above Narrows alluvial groundwater basin varies widely with a range from about 150 feet near the Lompoc Narrows, thinning eastward to about fifty feet near San Lucas Bridge below Bradbury Dam. Most of the basin is underlain by relatively non-water bearing shale. This groundwater system has been defined as the underflow of the River.

The ANAGB is divided into four sub areas based on geographic characteristics. The Santa Ynez sub area extends from Bradbury Dam to Alisal Bridge in Solvang, a distance of about 11 river miles. The Buellton sub area extends west from Alisal Bridge for a distance of about 7.4 river miles to a point on a major river bend, about three miles west of the City of Buellton. The Santa Rita sub area extends from the west end of the Buellton sub area to the Lompoc Narrows. The Santa Rita sub area is divided into east and west reaches. The Santa Rita East reach extends downstream 14.6 river miles from the Buellton sub area along the Santa Ynez River to a point located upstream from the confluence with Salsipuedes Creek. The Santa Rita West reach extends from this point downstream to the Lompoc Narrows.

Water budget parameters for the alluvial groundwater basins are percolation from the River, drainage to the River, underflow, bank infiltration, depletions by riparian vegetation, agricultural consumptive use, municipal and industrial consumptive use, mountain front recharge and return flows.

The alluvial basins are replenished through percolation of surface water and subsurface flow from geologic units surrounding the aquifer. Depletions occur through extractions by riparian vegetation (phreatophytes) and by wells within the alluvial basin as well as subsurface discharge at the Narrows. Underflow in the alluvial basin is assumed to move parallel to the Santa Ynez River. It moves from east to west and from one sub area to another and flows through the Lompoc Narrows to the Lompoc basin. There is virtually no underflow into the eastern most end of the alluvial basin due to the construction of Bradbury Dam (which extends approximately 70 feet into bedrock below the stream bed and cuts off underflow beneath the dam.)

3.2 The Below Narrows Groundwater Basin is recharged by the River

The Santa Ynez River flows into the Lompoc Plain west of the Narrows. In the Lompoc Plain, the river flows in a northwest direction for about three miles and then turns west for ten miles before it empties into the Pacific Ocean. Most of the river percolation in the Lompoc Plain occurs in the forebay area extending from Robinson Bridge at the Narrows to Floradale Bridge, north of the City of Lompoc, a distance of about 6 miles. West of the City of Lompoc, percolation to the lower part of the younger alluvium (which comprises the main aquifer) is limited due to the near surface fine grained silt and clay deposits.

4.0 Conclusions

The Santa Ynez surface reservoir system is highly regulated and is subject to diminishing yields as a result of siltation. At the same time, the surface reservoir system is the principal water supply for a large and growing population of nearly 300,000 people in Santa Barbara County. While additional sources of water such as the SWP may be available to help meet water supply needs, these sources are, themselves, unpredictable since they are subject to both regulatory and climatic limitations. Moreover, as others will testify, demand within the Cachuma Project service area has hardened over time with the institution of conservation measures that are among the most progressive in the State. As a consequence, the imposition of additional regulatory requirements on the Cachuma Project is likely to impact consumptive beneficial uses significantly.