

## **Gilroy-Hollister Valley Groundwater Basin, Hollister Area Subbasin**

- Groundwater Basin Number: 3-3.03
- County: San Benito
- Surface Area: 32,700 acres (51 square miles)

### **Basin Boundaries and Hydrology**

The Gilroy-Hollister Valley Groundwater Basin lies between the Diablo Range on the east and the Gablian Range and the Santa Cruz Mountains to the west. The northern portion is drained toward Monterey Bay by the Pajaro River and its tributaries. The southern portion is drained by the San Benito River and its tributaries.

The Hollister Area subbasin lies within the northeast portion of the Gilroy-Hollister Valley Groundwater Basin and is bounded on the north and east by the Diablo Range. The Calaveras fault is the western boundary and abuts the Bolsa Area subbasin. These subbasin boundaries are primarily derived from geologic and hydrologic conditions. Groundwater occurs in the alluvium of Holocene age, older alluvium. Santa Ana and Pacheco Creeks are the primary streams entering the subbasin from the Diablo Range. Tequisquita Slough drains the subbasin to the northwest into the Bolsa Area subbasin. Precipitation over most of the subbasin averages approximately 13 inches, and increase to about 17 inches in the north.

### **Hydrogeologic Information**

The Gilroy-Hollister basin is comprised of a sedimentary sequence that contains the principal aquifers underlying the Hollister and San Juan Valleys. It consists mainly of clay, silt, sand, and gravel ranging in age from Tertiary to Holocene. The oldest of these deposits lie unconformably on consolidated bedrock of Jurassic, Cretaceous and early Tertiary age (Kilburn 1972).

### ***Water Bearing Formations***

The aquifers in the Hollister Area subbasin consist of clay, silt, sand, and gravel, and poorly consolidated sandstone (Luhdorff and Scalmanini 1991). The unconsolidated or poorly consolidated Tertiary or Quaternary rocks underlying the alluvium have been divided into three units (Kilburn 1972). They are a thick sequence of clay, silt, sand and gravel; they have been grouped into three unnamed units, from oldest to youngest: unit 1, unit 2, and an undifferentiated unit.

**Unit 1 and Unit 2.** Unit 1 crops out and is believed to form the low hills at the north end of Santa Ana Valley and to underlie unit 2. Unit 1 is approximately 1,200 feet thick. The log of well 12S/5E-23A3 indicates the top of the unit to be at a depth of 420 feet at this location (Kilburn 1972). Unit 1 is made up of clay, sand and gravel with individual beds not more than five to ten feet thick. Unit 2 consists of three or four thick sand sequences separated by thinner clay intervals. Units 1 and 2 are not known to occur west of the Calaveras fault.

**Undifferentiated Unit.** Kilburn (1972) describes the undifferentiated unit as including one or more of the following units: alluvium, older alluvium, San Benito Gravels, and alluvial-fan material that may occur in the subsurface along the front of the Diablo Range. This unit is believed to overlap and rest unconformably on an older erosion surface formed on units 1 and 2.

### ***Restrictive Structures***

The Calaveras fault that bounds the subbasin on the west is considered to represent a relatively impermeable barrier to groundwater flow. The fault zone may contain large numbers of crumpled slivers of rock fragments and clay that can form a nearly impervious vertical barrier to groundwater movement (Kilburn 1972).

### ***Recharge Areas***

Most recharge to the subbasin is derived from rainfall and streamflow from creeks entering the basin. Pacheco Pass Water District operates North Fork Dam on Pacheco Creek for the primary purpose of supplying groundwater recharge to the northeast portion of the subbasin (Bonturi 2001).

### ***Groundwater Level Trends***

Groundwater level measurements have been made periodically since 1913. Water levels throughout most of the subbasin show declines from early in the century. From 1945 when annual water-level measurements began, hydrographs show pronounced periodic recovery and decline trends that correlate with volume and time of streamflow (Kilburn 1972). Hydrographs presented in the San Benito County Water District Annual Groundwater Report for the 1999-2000 Water Year (JSA 2000) show a similar trend except after the importation of surface water began in 1987. After this time water levels have generally risen over most of the basin.

### ***Groundwater Storage***

**Groundwater Storage Capacity.** No information is available on the total volume of water in storage in the subbasin. The storage capacity of the larger Gilroy-Hollister Valley Groundwater basin is estimated at 932,000 af. (Bader 1969).

**Groundwater in Storage.** Groundwater storage is discussed in the Groundwater Management Plan for the San Benito County Part of the Gilroy-Hollister Groundwater Basin (JSA 1998) in general terms. However, no specific information is available for the Hollister Area subbasin.

### ***Groundwater Budget (Type A)***

Information in "San Benito County Ground-Water Investigation" (Luhdorff and Scalmanini 1991) describes the groundwater budget of the Hollister Area subbasin. It indicates that based on a groundwater flow model of the basin, total average total recharge is approximately 16,500 af per year. Average discharge was approximately 19,400 af per year during the period from 1951 to 1968. Between 1946 and 1968, groundwater flow patterns were altered by increased pumping near Hollister. Pre-development flow patterns were generally to the northwest, toward San Felipe Lake. By 1968, the direction of groundwater flow had reversed toward a cone of depression near Hollister.

The San Benito County Water District Annual Groundwater Report for the 1999-2000 Water Year (JSA 2000) calculates a change in storage for the subbasin. The Pacheco portion of the subbasin is reported have a decrease change in storage of 240 af, the Hollister West portion is reported to have a decrease change in storage of 2,977, and the Hollister East portion is reported to have an increase change in storage of 2,777af over the period from October 1999 to October 2000. These calculations were done using an area-weighted average storage coefficient for the subbasin.

### **Groundwater Quality**

**Characterization.** No complete characterization of groundwater quality was found in the published data, however incomplete water quality analysis (Kilburn 1972, JSA 1998, JSA 2000 and Badder 1969) indicate the groundwater in the subbasin to be somewhat hard and contains significant concentrations of sulfate and chloride. Data specific to the subbasin indicate electrical conductivity ranges form 565umhos to 2280umhos in samples collected from wells in 1997 (JSA 1998).

**Impairments.** The Groundwater Management Plan for the San Benito County Part of the Gilroy-Hollister Groundwater Basin (JSA 1998) states that groundwater quality in the larger basin is marginally acceptable for potable and irrigation use. The water quality constituents of greatest concern are salinity, nitrate, boron, hardness, and trace elements that occasionally exceed drinking water standards.

### **Water Quality in Public Supply Wells**

<b>Constituent Group<sup>1</sup></b>	<b>Number of wells sampled<sup>2</sup></b>	<b>Number of wells with a concentration above an MCL<sup>3</sup></b>
Inorganics – Primary	24	0
Radiological	10	0
Nitrates	24	3
Pesticides	16	0
VOCs and SOCs	16	0
Inorganics – Secondary	24	9

<sup>1</sup> A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

## Well Production characteristics

Well yields (gal/min)	
Municipal/Irrigation	Average: 400 (Bader 1969)
Total depths (ft)	
Domestic	
Municipal/Irrigation	

## Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
San Benito CWD	Groundwater levels	42 Wells quarterly
San Benito CWD	Miscellaneous water quality	<42 Wells varies
Department of Health Services and cooperators	Title 22 water quality	35 Wells varies

## Basin Management

Groundwater management:	Groundwater Management Plan for the San Benito County Part of the Gilroy-Hollister Groundwater Basin finalized April 1998. Prepared for Aromas WD, City of Hollister, City of San Juan Bautista, San Benito CWD, Sunnyslope CWD, and Tres Pinos CWD.
Water agencies	
Public	San Benito CWD, Pacheco Pass WD, City of Hollister, Sunnyslope CWD, Tres Pinos CWD.
Private	

## References Cited

- Bader J., United States Geological Survey. 1969. Ground-Water Data as of 1967, Central Coastal Subregion, California. Menlo Park. 16 p.
- Bonturi A.J. Pacheco Pass Water District Personal Communication. December 7, 2001.
- Jones & Stokes Associates (JSA). 1998. Groundwater Management Plan for ther San Benito County Part of the Gilroy-Hollister Groundwater Basin.
- Jones & Stokes Associates (JSA). 2000. Annual Groundwater Report for the 1999-2000 Water Year.
- Kilburn C., United States Geological Survey. Water Resources Division. 1972. Ground-water hydrology of the Hollister and San Juan Valleys, San Benito County, California : 1913-68. Menlo Park: U. S. Geological Survey. iv,44 p.
- Luhdorff & Scalmanini. 1991. San Benito County Ground-Water Investigation.

## Additional References

California Department of Water Resources San Joaquin District. 1964. Waste Water Disposal Investigation, Hollister Gas Field, San Benito County, Code 4103-044. 13 p.

\_\_\_\_\_. 1971. Nitrates in ground waters of the central coast area : memorandum report. Fresno, Calif.: The District. ii, 16 , [1] folded leaf of plates p.

\_\_\_\_\_. 1977. Artificial recharge of ground water in the San Joaquin-central coastal area : district report. Fresno: The District. vii, 64 p.

Farrar C.D., San Benito County Water Conservation and Flood Control District, United States Geological Survey. 1981. Ground-water-level monitoring network, Hollister and San Juan Valleys, San Benito County, California. Menlo Park, Calif.: U.S. Geological Survey. 9 p.

Kaple G.W. 1979. Digital model of the Hollister Valley ground-water basin, San Benito County, California. Menlo Park: United States Geological Survey Water Resources Division. iv, 17 p.

## Errata

Changes made to the basin description will be noted here.