Gilroy-Hollister Groundwater Basin, Llagas Subbasin

- Groundwater Basin Number: 3-3.01
- County: Santa Clara
- Surface Area: 56,000 acres (87 square miles)

Revision Summary: The spelling in the description was corrected to Pájaro River. The boundary conditions have been corrected to reflect that the Diablo Range is on the east and the Santa Cruz Mountains are on the west.

Basin Boundaries and Hydrology

The Llagas subbasin occupies a northwest trending structural depression. The Diablo Range bounds it on the east and the Santa Cruz Mountains form the basin boundary on the west. The subbasin extends from the groundwater divide at Cochran Road near the town of Morgan Hill in the north to the Pájaro River in the south (SCVWD 2001b). The dominant geohydrologic feature is an inland valley that is drained to the south by tributaries of the Pájaro River, including Uvas and Llagas creeks. Annual precipitation for the Llagas subbasin ranges from less than 16 inches in the south to more than 24 inches in the north.

Hydrogeologic Information

Water Bearing Formations

The water bearing formations of the Llagas subbasin include Pliocene to Holocene age continental deposits of unconsolidated to semi-consolidated gravel, sand, silt and clay (DWR 1981). These include the Santa Clara Formation and the valley fill materials (alluvial and alluvial fan deposits) which constitute the principal water producing formations (DWR 1981).

The Santa Clara Formation. The Santa Clara Formation is of Plio-Pleistocene age. This formation underlies much of the valley and unconformably overlies older non-water bearing sediments (DWR 1981). It consists of fairly well consolidated clay, silt, and sand with lenses of gravel. These sediments are generally of fluviatile origin with an estimated maximum thickness of 1800 feet (DWR 1981). It is difficult to distinguish the Santa Clara Formation from overlying alluvial material based on limited well log data. The lower portions of deeper wells within the subbasin likely intersect the Santa Clara Formation. A number of these wells supply water of excellent quality for irrigation and municipal purposes (DWR 1981).

The Alluvial Fans. Alluvial fan deposits of Holocene age occur at the margin of the valley basin. They are composed of a heterogeneous mixture of unconsolidated to semi-consolidated clay, silt, sand, and gravel usually locally partially confined (DWR 1981). The alluvial fan deposits range in thickness from 3 feet to 125 feet and overlie the Santa Clara Formation and other older non water bearing deposits (DWR 1981). Well yields are generally good and water quality is usually suitable for most uses (DWR 1981).

Older Alluvium. The older alluvium is of Plio-Pleistocene age and is distributed in the central portion of the valley from the northern boundary of the subbasin south to Gilroy. It consists of unconsolidated clay, silt, and sand formed as floodplain deposits. It characteristically is identified by a dense clayey subsoil that acts as an aquitard to vertical movement of water and limits recharge potential (DWR 1981). It provides adequate yields to wells up to 100 feet in depth and water obtained from this formation is generally suitable for most uses (DWR 1981).

Younger Alluvium. The younger alluvium is of Holocene age and occurs in the flat lying areas from Gilroy south to the basin's southern boundary. It is composed of clay, silt, and sand with lenses of sandy gravel (DWR 1981). Similarly to the older alluvium, the younger alluvium has been formed principally as a flood plain deposit but it does not have a well-defined clay subsoil. The younger alluvium has a maximum thickness of about 100 feet and generally overlies the older alluvium and alluvial fan deposits (DWR 1981). Groundwater in the younger alluvium is generally unconfined. Wells yield sufficient quantities of water of generally acceptable quality for domestic purposes (DWR 1981).

Recharge Areas

Recharge to the Llagas subbasin occurs from a variety of sources: natural recharge from streams, principally Uvas and Llagas Creeks; percolation of precipitation and surplus irrigation waters; seepage along canals; subsurface inflow; and artificial recharge. The amount of water recharged to the groundwater basin varies widely from year to year, dependant on the amount of precipitation (DWR 1981). A number of artificial recharge facilities enhance natural recharge to the Llagas subbasin including the Madrone Channel, Main Ave Percolation Ponds, and a number of percolation ponds along Uvas and Llagas Creeks (DWR 1981).

Groundwater Level Trends

Groundwater elevation in the Llagas Subbasin Index Well (10S03E13D003) would indicate that groundwater levels have remained fairly stable over the period of record with the exception of static water level drops and subsequent recovery associated with the 1976-1977 and 1987-1992 drought periods. The period of record covers the period from January 3, 1969 to April 2, 2001 (www.scvwd.dst.ca/gwuse/gwmimap.htm 2001c). While groundwater elevations in the index well is not indicative of elevations in all wells within the subbasin it is suggestive of relative changes in groundwater levels within the subbasin (SCVWD 2001b).

Groundwater Storage

Groundwater Storage Capacity. Operational storage capacity of the Llagas subbasin is estimated to be 150,000 acre-feet (SCVWD 2001a).

Groundwater in Storage. No published reports were found addressing the quantity of groundwater in storage.

Groundwater Budget (Type B)

Natural groundwater recharge based on the long-term average for the Llagas subbasin is estimated to be 44,300 acre-feet per year (SCVWD 2001a). Total facility recharge (Artificial Recharge) countywide is estimated to be 157,200 acre-feet (SCVWD 2001a). Although no published basin budget was found for the Llagas subbasin, enough components exist that would allow for the preparation of a detailed groundwater budget.

Groundwater Quality

Characterization. Although generally hard (DWR 1981), monitoring results indicate that groundwater is good for most for most beneficial uses (SCVWD 2001b). This assessment is based on a comparison of water monitoring results with water quality objectives established by the Regional Water Quality Control Board (SCVWD 2001a).

Impairments. The Santa Clara Valley Water District created a Nitrate Management Program in October 1991 to investigate and remediate increasing nitrate concentrations in the Llagas subbasin (SCVWD 2001a). The results of a study completed in February 1996, suggest that nitrate concentrations are increasing over time and that elevated concentrations of nitrate still exist in the Llagas subbasin (SCVWD 2001a). Since 1997 more than 600 wells in south Santa Clara County including the Llagas and Coyote subbasins have been tested for nitrate. More than half exceed the federal safe drinking standard for nitrate (SCVWD 2001a). These nitrate concentrations in excess of federal standards were found only in private wells, all public wells within the county meet drinking water standards (SCVWD 2001a).

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	65	3
Radiological	35	0
Nitrates	72	13
Pesticides	51	5
VOCs and SOCs	51	0
Inorganics – Secondary	65	11

[1] 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).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] 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	Range: 285 – 2,422	Average: 1,488 (Elia, Bob. 2001)
Total depths (ft)		
Domestic	Range: 54 - 690	Average: 256 (Wellma)
Municipal/Irrigation	Range: 302 - 920	Average: 589 (Elia, Bob. 2001)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
SCVWD including cooperators (County-wide)	Groundwater levels	168 Wells monthly, 108 Wells quarterly
SCVWD	Miscellaneous water quality	60 Wells (County-wide)
SCVWD	Nitrate	51 wells quarterly
Department of Health Services and cooperators	Title 22 water quality	95 Wells

Basin Management

Groundwater management:	Santa Clara Valley WD adopted a groundwater management plan in 2001 under authority granted in Water Code App. 60.
Water agencies	
Public	Santa Clara Valley WD, City of Morgan Hill, City of Gilroy
Private	

References Cited

California Department of Water Resources (DWR). Evaluation of groundwater Resources South San Francisco Bay Volume IV South Santa Clara County Area: Bulletin 118-1, May 1981.

Elia, Bob (City of Gilroy, Operation Supervisor Water Division). Personal Communication, October 18, 2001

Santa Clara Valley Water District (SCVWD). 2001a. Urban Water Management Plan: April 2001.

_____. 2001b. Santa Clara Valley Water District Groundwater Management Plan: July 2001.

_____. 2001c. www.scvwd.dst.ca/gwuse/gwmimap.htm: October 10, 2001

Errata

Changes made to the basin description will be noted here.