Santa Clara River Valley Groundwater Basin, Santa Clara River Valley East Subbasin

- Groundwater Basin Number: 4-4.07
- County: Los Angeles
- Surface Area: 66,200 acres (103 square miles)

Basin Boundaries and Hydrology

The Santa Clara River Valley East Subbasin is bordered on the north by the Piru Mountains, on the west by impervious rocks of the Modelo and Saugus Formations and a constriction in the alluvium (DPW 1933), on the south by the Santa Susana Mountains, and on the south and east by the Gabriel Mountains. The surface is drained by the Santa Clara River, Bouquet Creek, and Castaic Creek. Average annual precipitation ranges from 14 to 16 inches.

Hydrogeologic Information

Water Bearing Formations

Groundwater is found in alluvium, terrace deposits, and Saugus Formation. Groundwater in the subbasin is generally unconfined in the alluvium, but may be confined, semi-confined, or unconfined in the Saugus Formation (Slade 2002).

Alluvium. Holocene age alluvium consists of unconsolidated, poorly bedded, poorly sorted to sorted sand, gravel, silt, and clay with cobbles and boulders. These deposits are thickest below the channel of the Santa Clara River and thin laterally away from the channel, and east and west of the community of Acton (Slade 1990; DWR 1993). The maximum reported thickness is 240 feet and specific yield is estimated to range from about 9 to 19 percent (Slade 2002).

Terrace Deposits. Pleistocene age terrace deposits consist of crudely stratified, poorly consolidated, weakly cemented, gravel, sand and silt (Slade 2002). They can be found on the low-lying flanks of the foothills and upper reaches of the Santa Clara River tributaries. Terrace deposits attain a maximum thickness of 200 feet near Saugus, Agua Dulce, and Acton (Slade 1990; DWR 1993). These deposits generally lie above the water table and likely have limited ability to supply groundwater to wells (Slade 2002).

Saugus Formation. The late Pliocene to early Pleistocene age Saugus Formation consists of as much as about 8,500 feet of poorly consolidated, weakly indurated, poorly sorted, sandstone, siltstone, and conglomerate. The lower portion of the Saugus Formation is termed the Sunshine Ranch Member, which consists of as much as 3,500 feet of sand and silt deposited in a brackish marine to terrestrial environment (Slade 2002). Groundwater is not widely produced from this member for municipal and irrigation uses because well yield is typically low, about 100 gpm and the groundwater can be brackish (Slade 2002). The upper member of the Saugus Formation contains lenses of conglomerate and sandstone interbedded with sandy-mudstone deposited in a terrestrial environment (Slade 2002). Wells in the upper member have typically have higher yields, reaching more than 3,000

gpm, and better water quality than the Sunshine Ranch Member (Slade 2002). The maximum depth to the base of fresh water is about 1,500 feet northeast of the San Gabriel fault, 5,500 feet between the San Gabriel and Holser faults, and about 5,000 feet southwest of the Holser fault (Slade 2002). Specific yield is estimated to range from about 5 to 8 percent (Slade 2002).

Restrictive Structures

The San Gabriel and Holser faults cross through the subbasin and displace the Saugus Formation, but not the Quaternary age alluvial deposits. Displacement on the San Gabriel fault produced uplift and subsequent erosion of much of the upper member of the Saugus Formation north of the fault. The Saugus Formation is also displaced upward on the south side of the Holser fault, though groundwater in the Saugus Formation does not appear to be affected by this fault (Slade 2002). Groundwater moving through the alluvium is not affected by these faults (Upper Santa Clara Valley Water Committee 2002; Slade 2002).

Recharge Areas

The alluvial aquifer is recharged chiefly by infiltration of runoff waters in the Santa Clara River and its tributaties (DWR 1968; Upper Santa Clara Valley Water Committee 2002), with additional natural recharge from percolation of rainfall to the valley floor and subsurface inflow (Slade 2002). Additional recharge is from percolation of excess irrigation water applied to urban landscaping and of reclaimed water discharged into the Santa Clara River channel (Slade 2002). Recharge to the Saugus Formation is from infiltration of rainfall on the exposed formation and percolation of water from the alluvial aquifer (Slade 2002).
Discharge is through pumping for municipal and irrigation uses and consumption by phreatophytes and outflow to the Santa Clara River in the western part of the subbasin (Slade 2002).

Groundwater Level Trends

Groundwater levels in the alluvium has been relatively stable during about 1970 through 2000 (Upper Santa Clara Valley Water Committee 2000). During this period, depth to groundwater varied from about 13 to 37 feet in the western, 10 to 50 feet in the central, and 15 to 100 feet in the eastern parts of the subbasin (Slade 2002). Water levels tend to follow long term precipitation patterns by dropping during periods of low rainfall and recovering during periods of high rainfall. Groundwater levels in the Saugus Formation have been essentially constant during 1970 through 2000 (Upper Santa Clara Valley Water Committee 2002). Groundwater flow in the subbasin is southward and westward and follows the course of the Santa Clara River (Slade 2002).

Groundwater Storage

Groundwater Storage Capacity. The groundwater storage capacity of the alluvial aquifer is about 240,000 af and the Saugus Formation aquifer is at least 1,650,000 af (Slade 2002).

Groundwater in Storage. Groundwater in storage in the alluvial aquifer during the historical high in 1945 is estimated to have been about 201,000 af and during Spring 2000 was about 161,000 af (Slade 2002). Groundwater in storage in the Saugus Formation during Spring 2000 is estimated to be about 1,650,000 af (Slade 2002).

Groundwater Budget (Type A)

Recent study has determined a normal year operational yield of 30,000 to 40,000 af/yr for the alluvial aquifer and 7,500 to 15,000 af/yr for the Saugus Formation (Upper Santa Clara Valley Water Committee 2002; Slade 2002). Pumping from the alluvial aquifer has ranged from 20,000 to 44,000 af/yr, with an average of about 35,000 af/yr for 1990 through 2000 (Slade 2002). During 1991 through 2000, annual pumping from the Saugus Formation ranged from 3,850 to 15,000 af and averaged about 8,500 af/yr. About 92 percent of the Saugus pumping is used for municipal purposes (Upper Santa Clara Valley Water Committee 2002; Slade 2002). During 2001, 25,322 af of groundwater was used for municipal and industrial purposes, 16,091 for agricultural and other uses; 37,300 af was produced from the alluvial aquifer and 4,100 af was from the Saugus Formation (Upper Santa Clara Valley Water Committee 2002).

Groundwater Quality

Characterization. Groundwater in the alluvial aquifer varies from calcium bicarbonate character in the east to calcium sulfate character in the western part of the subbasin (Slade 2002). Nitrate content decreases to the west and TDS content increases from about 550 to 600 mg/L in the east to about 1,000 mg/L in the west (Slade 2002). Groundwater in the Saugus Formation aquifer is of calcium bicarbonate character in the southeast, calcium sulfate in the central, and sodium bicarbonate in the western parts of the subbasin (Slade 2002). TDS content in the Saugus Formation aquifer ranges from about 500 to 900 mg/L (Slade 2002). Water sampled from 59 public supply wells show an average TDS content of 695 mg/L in the subbasin and a range from 300 to 1,662 mg/L.

Impairments. Nitrate content has exceeded 45 mg/L in some parts of the subbasin with a well in the central part of the subbasin reaching 68 mg/L (DWR 1968; 1977). TDS content may also be elevated, particularly in the western part of the subbasin to become unsuitable for domestic use (DWR 1968; 1979). Trichloroethylene and ammonium perchlorate have been detected in four wells in the eastern part of the subbasin (Slade 2002).

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	67	4
Radiological	56	2
Nitrates	74	2
Pesticides	66	4

VOCs and SVOCs	66	0
Inorganics – Secondary	67	7

[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 Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 100 – 4,000 gal/min (Saugus Formation; Slade 2002)	Average:
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range: to 200 feet (alluvial aquifer; Slade 2002) to 2,000 ft (Saugus Formation; Slade 2002)	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Department of Health Services and cooperators	Title 22 water quality	62

Basin Management

Groundwater management:	An Urban Water Management Plan was adopted in December 2000 and implemented in 2001 (Upper Santa Clara Valley Water Committee 2002)
Water agencies	
Public	Los Angeles County Water Works District Number 36, Castaic Lake Water Agency, Newhall County Water District
Private	Valencia Water Company

References Cited

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Additional References

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Errata

Updated groundwater management information and added hotlinks to applicable websites. (1/20/06)