Santa Clara River Valley Basin, Santa Paula Subbasin

- Groundwater Basin Number: 4-4.04
- County: Ventura
- Surface Area: 22,800 acres (35.7 square miles)

Basin Boundaries and Hydrology

The northern boundary of the Santa Paula Subbasin is the contact between Pleistocene and younger alluvium and impervious rocks of the Topatopa Mountains. The southern boundary is formed by impervious rocks of Oak Ridge and South Mountain, the Oak Ridge fault, and the Saticoy fault (CSWRB 1956). The eastern edge of the subbasin is marked by a bedrock constriction, with the boundary placed at the position of maximum rising water (CDPW 1933; CSWRB 1956). The western boundary of the subbasin separates it from the Mound and Oxnard subbasins, with the western boundary placed where there is a distinct change in the slope of the water table (CSWRB 1956). Ground surface elevations range from 140 feet above sea level in the west to about 1,000 feet above sea level along the Santa Paula Creek drainage (CSWRB 1956). The Santa Clara River and Santa Paula Creek drain the valley westward toward the Pacific Ocean. Average annual precipitation ranges from 14 to 18 inches.

Hydrogeologic Information

Water Bearing Formations

The primary water-bearing units include upper Pleistocene to Holocene alluvium and lower Pleistocene San Pedro Formation (CSWRB 1956). Groundwater in these sediments is generally unconfined except in the west and northwest portions of the subbasin (CSWRB 1956; Panaro 2000). The estimated average specific yield for these sediments is about 10 percent (CSWRB 1956). The average well yield is about 700 gpm and the average water-bearing thickness of the sediments is about 325 feet (Panaro 2000).

Alluvium. The Pleistocene to Holocene age alluvium consists of silts and clays with lenses of more permeable sand and gravel. The alluvium reaches a maximum thickness of about 200 feet.

San Pedro Formation. The Pleistocene age San Pedro Formation consists dominantly of finer sands and gravels than the overlying alluvium. The San Pedro Formation extends as deep as 4,000 feet (CSWRB 1956; Panaro 2000).

Restrictive Structures

The Oak Ridge and Saticoy faults restrict groundwater movement across the southwestern boundary of the subbasin. The Saticoy fault is considered either an extension or branch of the Oak Ridge fault (CSWRB 1956). Both faults are covered by a thin amount of Holocene age alluvial gravel. The Oak Ridge fault places water-bearing alluvium against older semi-permeable formations in the sub-surface (CSWRB 1956). The Saticoy fault creates a 50 to 100 foot drop in water level between the Santa Paula Basin and the

forebay of the Oxnard Basin (CSWRB 1956). The Santa Clara River syncline is a structure that helps direct flow of groundwater and, where warped and constricted, causes groundwater to rise toward the surface (CSWRB 1956).

Recharge Areas

Recharge to the subbasin is provided by percolation of surface flow in the Santa Clara River, Santa Paula Creek, and other minor tributary streams. Some of the surface flow in the Santa Clara River originates as release from Lake Piru and contains natural runoff of precipitation and imported State Water Project water (UWCD 2000). Subsurface flow from Fillmore Subbasin, percolation of precipitation, and percolation of unused irrigation waters provide recharge as well. Groundwater in Santa Paula Subbasin flows generally toward the southwest. The water table flattens westward, possibly due to an increase in fine material in the San Pedro Formation that causes a decrease in permeability (CSWRB 1956).

Groundwater Level Trends

Hydrographs from the Santa Paula Subbasin show a range of up to 55 feet in water level elevation since 1975. The hydrographs show an annual cyclic rise and fall of water level of about 20 feet with longer-term variations apparently following precipitation cycles. The subbasin was at a low level in 1991 and 1992, then recovered by 1994 and has remained stable since then.

Groundwater Storage

Groundwater Storage Capacity. Calculations of storage capacity vary from 754,000 af (Panaro 2000) to about 800,000 af (CSWRB 1956). The CSWRB estimate uses an average area of 10,000 acres, an average water-bearing thickness of 800 feet and an average specific yield of about 10 percent (CSWRB 1956). The Fox Canyon Groundwater Management Agency (FCGMA; Panaro 2000) uses surface area of about 13,500 acres, an average water-bearing thickness of 365 feet, and an average specific yield of 15 percent. The surface area of the Santa Paula Basin described in this report is larger than that used by either of the two previous studies. The additional area is mostly achieved by incorporation of exposures of the San Pedro Formation and shallow alluvium along the edges of the subbasin. The estimate of about 754,000 af by Panaro (2000) is reasonable.
Groundwater in Storage. In October 1999, the subbasin was an estimated 90 percent full, for about 675,000 af of groundwater in storage (Panaro 2000).

Groundwater Budget (Type A)

For 1997-98, Panaro estimated the applied water recharge to be 10,393 af. Panaro estimated the subsurface inflow to be 2,400 to 11,500 af. The estimated subsurface outflow is 7,200 af/year. Average annual extraction is an estimated 21,612 af.

Groundwater Quality

Characterization. TDS concentrations range from 870 to 3,010 mg/L, with an average of 1,190 mg/L (UWCD 1999a). Electrical conductivity readings range from 1230 to 2860 μmho, with an average of 1784 μmho (based on 14

wells). Data for 13 public supply wells show a TDS content of 470 to 1,800 mg/L, with an average of approximately 1,198 mg/L.

Impairments. Nitrate concentrations can fluctuate significantly.

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	16	3
Radiological	12	1
Nitrates	16	2
Pesticides	9	0
VOCs and SVOCs	9	0
Inorganics – Secondary	16	15

[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:	Average: 700 (Panaro 2000; CSWRB 1956)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
United Water Conservation District	Groundwater levels	21 wells/monthly 35 wells/bimonthly 49 wells/semi-annually (UWCD 1999a)
Ventura County Water Resources Division	Groundwater levels	11 wells/bimonthly (Hoffman 2000)
United Water Conservation District	Miscellaneous water quality	21 wells/monthly 33 wells/bimonthly 50 wells/semi-annually (UWCD 1999a)

Ventura County Water Resources Division	Miscellaneous water quality	Less than 10 wells/annually (Hoffman 2000)
Department of Health Services and cooperators	Title 22 water quality	10

Basin Management

Groundwater management:	The United Water Conservation District has authority to manage groundwater in the subbasin and is a member of the technical advisory committee created following adjudication in 1996. (UWCD 1999ab)
Water agencies	
Public	United Water Conservation District, Fox Canyon Groundwater Management Agency, Ventura County Department of Public Works
Private	Approximately 21 private purveyors (Panaro 2000)

References Cited

California State Water Resources Board (CSWRB). 1956. *Ventura County Investigation*. Bulletin 12. Two Volumes.

Hoffman, L. 2000.Ventura County Water Resources Division: Written Communication to R.R. Davis (DWR), September 27, 2000.

Panaro, D. 2000. Fox Canyon Groundwater Management Agency: Written Communication to R.R. Davis (DWR), March 21, 2000.

United Water Conservation District (UWCD). 1999a. Santa Paula Basin 1998 Annual Report. 28 p.

_____. 1999b. Surface and Groundwater Conditions Report: Water Year 1998. 64 p.

Additional References

Jennings, C.W., and Strand, R.G., 1969, *Geologic Map of California: Los Angeles Sheet*, Olaf P. Jenkins Edition: California Division of Mines and Geology, scale 1:250,000, 1 sheet.

Errata

Changes made to the basin description will be noted here.