Santa Maria Valley Groundwater Basin

- Groundwater Basin Number: 9-11
- County: San Diego
- Surface Area: 12,300 acres (19.2 square miles)

Basin Boundaries and Hydrology

This groundwater basin underlies Santa Maria Valley in central San Diego County. The basin is bounded by impermeable crystalline rocks (Rogers 1965; DWR 1967). Average annual precipitation ranges from 11 to 21 inches. The valley is drained westward by Santa Maria Creek to the Pacific Ocean.

Hydrogeologic Information

Water Bearing Formations

The principal water bearing deposits are residuum and two ages of alluvium (DWR 1967; 1991). Well yield was reported as ranging to 250 gpm and averaging about 50 gpm (DWR 1959; 1975), and later as ranging to 500 gpm and having a mean well yield of about 36 gpm (DWR 1991).

Alluvium. Holocene age alluvium is composed of gravel, sand, silt and clay (DWR 1967). These deposits are generally thin and unsaturated (DWR 1971). Pleistocene age alluvium underlies the Holocene alluvium and consists of gravel, sand, and silt (DWR 1967). It is generally unconsolidated, but locally is partially cemented and weathered (DWR 1967). The combined alluvial deposits in the basin are reported to range from 4 to 100 feet thick and have a specific yield of about 16 percent (DWR 1991). The one well reported to pump from alluvium has the largest yield for the basin at 500 gpm (DWR 1991).

Residuum. Residuum is bedrock that has weathered in place. This material is found throughout San Diego County and generally considered Quaternary in age, though it is found locally underlying Tertiary sediments in this county (DWR 1967). In this basin, residuum is exposed along the flanks of the basin and underlies the Quaternary deposits. Thickness of residuum varies greatly over short lateral distances from about 5 to 224 feet and has a mean thickness of about 52 feet (DWR 1991). Specific yield averages about 8 to 10 percent and well yield in this material is generally low, but this is the most extensive water source in the basin (DWR 1967; 1991). Well yield ranges from 2 to 75 gpm, with an average of about 21 gpm (DWR 1991).

Restrictive Structures

The Temescal fault crosses this basin (DWR 1967) and apparently forms a partial barrier to groundwater flow (DWR 1991). Other faults are mapped as crossing the basin, but it is unknown whether they have an effect on groundwater flow (DWR 1991).

Recharge Areas

Recharge of the basin is through percolation of precipitation to the valley floor, runoff, and flow in Santa Maria Creek. Because about 50 percent of the population is not on municipal sewerage (DWR 1991), some recharge likely comes from septic systems.

Groundwater Level Trends

A hydrograph for one well located near the middle of the basin shows water levels generally rising from 1957 through 1989. The range in water levels over this time is about 25 feet, and the seasonal change in water level is typically about 10 feet (DWR 1991). Water level contour maps suggest that a sharp pumping depression about 30 feet deep had developed under northern Ramona by 1989 (DWR 1991). Groundwater flow is generally toward the middle of the valley, then westward following the course of Santa Maria Creek (DWR 1991).

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity for this basin is estimated to be 77,000 af (DWR 1975). Storage capacity for the alluvium is estimated at about 3,360 af and for the residuum is about 32,400 af (DWR 1991).

Groundwater in Storage. Unknown.

Groundwater Budget (Type A)

Information is not available to construct a budget; however, some data are available. Annual groundwater extractions by the Ramona Metropolitan Water District during 1971 through 1990 ranged to about 915 af (DWR 1991). Private wells are estimated to pump at least 236 af/yr (DWR 1991). An estimated 315 af of groundwater was used for irrigation in 1989 (DWR 1991).

Groundwater Quality

Characterization. Groundwater is predominately sodium chloride in character; however, water of sodium sulfate and sodium bicarbonate character is found in the northern part of the basin (DWR 1967). The most prevalent combinations of major cations are sodium-magnesium-calcium, sodium-calcium-magnesium, and sodium, and the most common major anion combinations are bicarbonate-chloride, chloride-bicarbonate, and chloride (DWR 1991). Analyses of groundwater from this basin made in the 1960s indicate that TDS content can range from 164 to 1,287 mg/L and average about 456 mg/L (DWR 1967). This groundwater was rated as generally suitable for domestic and irrigation uses (DWR 1967). DWR (1991) shows the range and mean of TDS, chloride, sulfate, and nitrate concentrations roughly by decade for the 1950s, 1960s, 1970s, and 1980s. The 1989 data show a range in TDS content from 324 to 1,680 mg/L, with a mean of 803 mg/L. More recent analyses suggest that the water has an average TDS content of about 1,000 mg/L (McIntosh 2000). Water from two public supply wells has TDS concentrations of 590 and 750 mg/L.

Impairments. Sulfate, nitrate, and TDS concentrations are high for domestic use (DWR 1975) and locally high chloride content produced water rated as marginal for irrigation (DWR 1967). High nitrate concentrations are more common in the central and eastern parts of the basin (DWR 1991).

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	3	0
Radiological	3	3
Nitrates	3	0
Pesticides	3	0
VOCs and SVOCs	2	0
Inorganics – Secondary	3	0

[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: to 250 gal/min	Average: 50 gal/min to 500 gal/min (DWR 1975) Average: 36 gal/min (DWR 1991)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range: to 800 ft	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Ramona MWD	Groundwater levels	3/daily to monthly
Department of Health Services and cooperators	Title 22 water quality	2

Basin Management

Groundwater management:

Water agencies

Public	San Diego County Water Authority, Ramona Municipal Water District
Private	

References Cited

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Additional References

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Errata

Substantive changes made to the basin description will be noted here.