San Juan Valley Groundwater Basin

- Groundwater Basin Number: 9-01
- County: Orange
- Surface Area: 16,700 acres (26 square miles)

Basin Boundaries and Hydrology

This groundwater basin underlies the San Juan Valley and several tributary valleys in southern Orange County. The basin is bounded on the west by the Pacific Ocean and otherwise by Tertiary semi-permeable marine deposits. San Juan Creek drains the San Juan Valley and several other creeks drain valleys tributary to the San Juan. Average annual precipitation ranges from 11 to 15 inches.

Hydrogeologic Information

Water Bearing Formations

The primary water-bearing unit within the San Juan Valley Groundwater Basin is Quaternary alluvium (DWR 1972; 1988). This alluvium ranges from a heterogeneous mixture of sand, silt, and gravel in the eastern portion of the basin, to coarse sand near the center, to fine-grained lagoonal sediments in the western portion of the basin (DWR 1972). Thickness of the alluvium averages about 65 feet and may reach more than 125 feet (DWR 1972). Specific yield of the alluvium is estimated to average about 13 percent and range from 3 to 22 percent (DWR 1988). Wells typically yield from 450 to 1,000 gpm (CDM 1987). Sand layers of the Tertiary Santiago Formation may be water bearing within the region and beneath the basin (DWR 1972), and minor amounts of water are extracted from fractured basement rock beneath the basin (DWR 1988).

Restrictive Structures

At the confluence of San Juan Creek and Canada Chiquita, near the middle portion of the basin, the Cristianitos fault forms a barrier to subsurface outflow (DWR 1972; NBS Lowry 1994). Forester, Mission Viejo and Aliso faults are not known to form barriers to groundwater flow, but they are mapped as crossing the basin (DWR 1988).

Recharge Areas

Recharge of the basin is from flow in San Juan Creek, Oso Creek, and Arroyo Trabuco and precipitation to the valley floor. Water from springs flows directly from Hot Spring Canyon into San Juan Creek, adding to recharge (DWR 1972).

Groundwater Level Trends

Groundwater levels in 1987 were similar to water levels in 1952 (DWR 1988). Hydrographs show seasonal cycles with average declines related to drought cycles that recover during more plentiful seasons (DWR 1988). Groundwater flows southwest toward the Pacific Ocean (DWR 1988).

Groundwater Storage

Groundwater Storage Capacity. The total storage capacity has been estimated to be 90,000 af (DWR 1972; 1975; 1988) or 63,220 af (NBS/Lowry (1994).

Groundwater in Storage. Unknown.

Groundwater Budget (Type A)

A study by NBS Lowry (1994) investigated and modeled the groundwater basin for 1979 through 1990. They determined a mean pumpage of 5,621 af/year and a mean subsurface inflow of 2,246 af/year. Average subsurface outflow to the ocean is estimated to be about 450 af/yr (DWR 1972).

Groundwater Quality

Characterization. Groundwater mineral content is variable in this basin (DWR 1972; CDM 1987). Groundwater in the basin typically has calcium bicarbonate or bicarbonate-sulfate character below the upper reaches of the valleys, and calcium-sodium sulfate or sulfate-chloride near the coast (DWR 1988). In general, TDS content in groundwater increases from below 500 mg/L in the upper reaches of the valleys to near 2,000 mg/L near the coast (NBS Lowry 1994). TDS content of water from 3 public supply wells averages 760 mg/L and ranges from 430 mg/L to 1,250 mg/L.

Impairments. Groundwater in the western part of the basin has high TDS content, and water coming from springs in Thermal Canyon has high fluorine content (DWR 1972).

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	0
Nitrates	3	0
Pesticides	3	1
VOCs and SVOCs	3	0
Inorganics – Secondary	3	3

[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: 450-1,000 gal/min (17 wells; CDM 1987)	Average:
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range: 200 - 250 ft (DWR 1967)	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Department of Health Services and cooperators	Title 22 water quality	8/annually

Basin Management

Groundwater management:	The San Juan Basin Authority.
Water agencies	
Public	San Juan Basin Authority, Moulton Niguel Water District, Capistrano Beach County Water District, Capistrano Valley County Water District, Orange County Waterworks District No. 4, Santa Margarita Water District, Santa Ana Mountains Water District, El Toro Water District
Private	

References Cited

San Juan Basin Authority (SJBA). 1971. *Groundwater Storage Program Feasibility Study and Pilot Project Grant Application.* Orange County, California. San Juan Basin Authority. 50 p.

California Department of Water Resources (DWR). 1967. *Ground Water Occurrence and Quality, San Diego Region.* Bulletin 106-2. 233 p.

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Camp Dresser and Mckee, Inc. (CDM). 1987. *Task 10- Groundwater Management Plan*.

NBS/Lowry Engineers and Planners. 1994. *San Juan Basin Groundwater Management and Facility Plan.* Facility Plan.

Additional References

Rogers, Thomas H. 1973. *Geologic Map of California, Santa Ana Sheet*. California Division of Mines and Geology. Olaf P. Jenkins Edition. Scale 1:250,000. 1 sheet.

Moulton Niguel Water District. 2000. *2000 Water Quality Report*. 6 p.

Errata

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