Sweetwater Valley Groundwater Basin

- Groundwater Basin Number: 9-17
- County: San Diego
- Surface Area: 5,910 acres (9.3 square miles)

Basin Boundaries and Hydrology

The Sweetwater Valley Groundwater Basin underlies an alluvial valley that empties into the San Diego Bay. The basin is bounded on the east by impermeable Santiago Peak volcanic rocks. The north and south boundaries are Pliocene to Pleistocene semi-permeable terrestrial deposits, which constitute the valley walls. The western boundary is the San Diego Bay.

Hydrogeologic Description

Water Bearing Formations

Alluvium. The most permeable water-bearing deposit in the basin is Quaternary alluvium, which consists of unconsolidated stream deposits of sandy silt, sand, and cobbles. This unit is the principal source of groundwater in the basin with an estimated average thickness of 80 (SDCWA 1997) to 100 feet (USACOE 1982) with specific yields ranging from 10 to 12 percent (DWR 1986). Groundwater in these deposits is unconfined, and wells produce an average yield of about 300 gpm (SDCWA 1997).

San Diego Formation. Groundwater is also produced from the Pliocene age San Diego Formation that is slightly to moderately consolidated and characterized by a wide range of textures. Sediments range from clay to gravel, and include well-sorted medium to coarse sand, silty sand and clayey sand (Huntley and others 1996). Huntley and others (1996) estimate that the San Diego Formation reaches 800 feet thick based on borehole data, but the San Diego County Water Authority (1997) estimates that the average thickness is about 700 feet and that maximum thickness may exceed 2,000 feet. Production well yields in the National City well field are about 1500 gpm (Huntley and others 1996) and the average well yield is about 500 gpm (SDCWA 1997). Groundwater in the San Diego Formation is confined, with a mean storage coefficient of about 0.001 (SDCWA 1997).

Restrictive Structures.

The La Nacion fault zone trends north and northwest and crosses the eastern part of the basin. Impermeable basement rocks are higher east of the fault zone with thicker, water-bearing deposits to the west of the fault (Huntley and others 1996). Apparently, however, the fault zone does not create a barrier to groundwater movement (DWR 1986).

Recharge Areas.

Recharge is derived from the runoff of seasonal precipitation in the upper reaches of the Sweetwater River Valley, discharge from the Sweetwater Reservoir, and underflow from the reservoir. Subsurface flow may also contribute recharge (DWR 1986).

Groundwater Level Trends

Groundwater level data showed that the groundwater surface in the early 1980s was relatively stable, and higher than in the years preceding 1959. This is attributed to decreased groundwater pumping due to the importation of Colorado River water (USACOE 1982). A study by the Sweetwater Authority indicates that water levels in production wells near National City have remained stable since about 1957 (Garrod 2001). Groundwater flow follows surface flow of the Sweetwater River (DWR 1986).

Groundwater Storage

Groundwater Storage Capacity. San Diego County Water Authority (1997) estimates a groundwater storage capacity of 13,000 af in Quaternary alluvium and about 960,000 af in the San Diego Formation. These values suggest a total storage capacity of about 973,000 af for this basin.

Groundwater in Storage. DWR (1986) estimated that between 17,000 and 20,000 af of groundwater was in storage.

Groundwater Budget (Type A)

The San Diego County Water Authority (1997) estimates annual groundwater production at 900 af/yr from Quaternary alluvium and about 2,000 af/yr from the San Diego Formation.

Groundwater Quality

Characterization. Generally, the groundwater in the alluvium is of a sodium-calcium chloride character, with a TDS concentration ranging from 300 to more than 50,000 ppm. In the San Diego Formation, the water is of a sodium chloride character and the TDS content ranges from 600 to 1,600 mg/L (USACOE 1982). Data from 9 public supply wells shows TDS concentration ranging from 1,249 to 3,320 mg/L, with an average of approximately 2,114 mg/L.

Impairments. TDS, chloride and sodium content of the groundwater generally exceed the recommended limits for drinking (DWR 1986). Groundwater tested in 1953 and 1963 was similar to that tested in the 1980s (DWR 1986).

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	9	0
Radiological	9	3
Nitrates	9	0
Pesticides	9	0
VOCs and SVOCs	9	0
Inorganics – Secondary	9	9

[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: 300 gal/min from alluvium; 500 gal/min from San Diego Formation
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Sweetwater Authority	Groundwater levels	7 wells San Diego Formation
Sweetwater Authority	Miscellaneous water quality	7 wells San Diego Formation
Department of Health Services and cooperators	Title 22 water quality	9/annually

Basin Management

Groundwater management:	The Governing Board of the Sweetwater Authority has adopted an interim groundwater management plan while an AB 3030 plan is being developed (Reynolds 2001).
Water agencies	
Public	Sweetwater Authority, National City, South Bay Irrigation District, San Diego County Water Authority
Private	

References Cited

Boyle Engineering Corp. 1993. *Lower Sweetwater River Basin Groundwater Studies:* Unpublished report for Sweetwater Authority.

California Department of Water Resources (DWR). 1986. *San Diego Region Ground Water Resources Studies, Phase III.* Memorandum Report. 213 p.

Elliot, W.J. 1970. *Gravity Survey and Regional Geology of the San Diego Embayment, Southwest San Diego County, California:* Pacific Slope Geology of Northern Baja California and Adjacent California, Pacific Section AAPG, SEPM, And SEG. pp. 10-22.

Garrod, Michael. 2001. Sweetwater Authority, Deputy Chief, Engineering, Phone communication with Timothy Ross, DWR, Southern District. 13 November, 2001.

Huntley, David, Biehler, Shawn, and Marshall, C. Monte. 1996. *Distribution and Hydrogeologic Properties of the San Diego Formation, Southwestern San Diego County.* San Diego Formation Task Force Report of Investigation. Volume I. 65 p.

Reynolds, Richard A. 2001. Sweetwater Authority, Authority Manager Emeritus. Phone communication with Timothy Ross, DWR, Southern District. 14 November, 2001.

San Diego County Water Authority (SDCWA). 1997. *Groundwater Report, June 1997.* San Diego, California.

United States Army Corps of Engineers, Los Angeles District (USACOE). 1982. *Sweetwater River Flood Control Channel, State Highway Route 54, Interstate Highway Route 5, Recreation Facilities and Conservation of Marshlands.* Sweetwater River Final Environmental Impact Statement. 110 p.

Additional References

California Department of Water Resources (DWR). 1967. *Ground Water Occurrence and Quality: San Diego Region.* Bulletin No. 106-2. 235 p.

Errata

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