# Elsinore Groundwater Basin

- Groundwater Basin Number: 8-4
- County: Riverside
- Surface Area: 25,700 acres (40.2 square miles)

## Basin Boundaries and Hydrology

The Elsinore Groundwater Basin underlies the Elsinore Valley in western Riverside County. The basin is bounded on the southwest by the Santa Ana and Elsinore Mountains along the Willard fault, a splay of the active Elsinore fault zone. The basin adjoins the Temecula Valley Groundwater Basin on the southeast at a low surface drainage divide. The basin is bounded on the northwest by the Temescal Subbasin of the Upper Santa Ana River Valley Groundwater Basin at a constriction in Temescal Wash. The basin is bounded on the northeast by nonwater-bearing rocks of the Peninsular Ranges along the Glen Ivy fault. Average annual precipitation ranges from 12 to 14 inches. Lake Elsinore lies in a closed basin formed between strands of the active Elsinore fault zone.

## Hydrogeologic Information

### *Water Bearing Formations*

The Elsinore Groundwater Basin contains alluvial fan, floodplain, and lucustrine deposits, which are underlain by alluvium of the Pauba Formation (DWR 1981). The maximum thickness of sedimentary deposits reaches 2,300 feet beneath Lake Elsinore (DWR 1981). Specific yield for the basin ranges from about 6 to 16 percent and averages about 7.6 percent (SWRB 1956).

**Alluvial Fan, Floodplain, and Lacustrine Deposits.** These deposits are Late Pleistocene to Holocene in age and form the surficial materials of the basin. Alluvial fan deposits of gravel, sand, silt, and clay are found near the western and northeastern edges of the basin emanating from the adjacent crystalline mountains. The interior of the valley contains floodplain deposits that reach a thickness of about 200 feet and contain stringers of sand and gravel in finer silt and clay. In the zone of inundation of Lake Elsinore, fine-grained lacustrine deposits of sand, silt, and clay reach 800 feet in thickness (DWR 1981). The lake deposits have a specific yield of about 6 percent, whereas the floodplain deposits range from 9 to 12 percent (DWR 1981).

**Pauba Formation.** The Pleistocene age Pauba Formation is a composed of alluvial sandstone and fanglomerate members (Morton and others 1999) that reach a maximum thickness of about 2,200 feet beneath lake Elsinore (DWR 1981). This is the principal water-bearing unit of the basin, with the most productive wells extracting from alluvial sand and gravel bodies that occur as stringers within less pervious silt- and clay–rich deposits. In general, sediments are coarser near the margins of the basin and become finer toward Lake Elsinore. Specific yield for the Pauba Formation averages about 9 percent (DWR 1981).

### *Restrictive Structures*

Groundwater movement in the basin is strongly influenced by faults cutting the alluvial and lacustrine sediments in Elsinore Groundwater Basin. Differences in groundwater elevation are found across the Wildomar, Willard, and Glen Ivy faults, indicating that they are barriers to groundwater flow (DWR 1953, SWRB 1956; DWR 1981). As many as 8 separate fault bounded blocks are interpreted in the basin and there appears to be little groundwater movement across these bounding faults (DWR 1981).

### *Recharge Areas*

The principal recharge of the basin is from infiltration of stream flow through alluvial fan deposits near the edges of the basin and through gravel deposits along the course of the San Jacinto River. Other contributing sources include infiltration from unlined channels overlying the basin, underflow from saturated alluvium and fractures within the surrounding bedrock mountains and hills, and spreading of water in recharge basins (WE 2000).

### *Groundwater Level Trends*

Groundwater levels within Elsinore Groundwater Basin declined more than 100 feet between 1927 and 1950 (DWR 1953). A hydrograph from one well shows that water level declined about 110 feet in the southern part of the basin from 1967 through 1985. However, a hydrograph from a well in the northern part of the basin shows a rise in water level of about 65 feet from 1963 through 1980. Under natural conditions, groundwater should flow generally toward Lake Elsinore; however, because faults cutting the sediments impede groundwater movement, groundwater flow is dominantly contained within fault blocks in the basin.

### *Groundwater Storage*

**Groundwater Storage Capacity.** Total storage capacity is estimated to be about 27,000 af (SWRB 1956, DWR 1975), 1,840,000 af (DWR 1981), and 1,400,000 af (EVMWD 2001).

**Groundwater in Storage.** Groundwater in storage in 1964 and 1975 was estimated to be about 1,000,000 af (DWR 1981). About 245,000 af of available dry storage in 1999 (EVMWD 2001) suggests that about 1,155,000 af of groundwater in storage was available.

### *Groundwater Budget (Type C)*

Mean subsurface inflow is estimated to be about 800 af/yr (SWRB 1956). Total extraction for 1978 is estimated to have been 8,081 af (DWR 1981).

### *Groundwater Quality*

**Characterization.** Groundwater northeast of Lake Elsinore is calcium sulfate character, whereas groundwater southeast of the lake is calcium bicarbonate (SWRB 1956). Groundwater in the central part of the basin has sodium sulfate-bicarbonate character (DWR 1981). Springs and wells near the town of Elsinore yield water of sodium sulfate character (DWR 1981). The range of TDS content for 17 public wells is 290 to 680 mg/L and the average TDS content is 460 mg/L.

**Impairments.** Fluoride content exceeding recommended levels has been found in groundwater near the town of Elsinore (DWR 1953; SWRB 1967).

## 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 | 18 | 1 |
| Radiological | 20 | 0 |
| Nitrates | 18 | 0 |
| Pesticides | 20 | 0 |
| VOCs and SVOCs | 20 | 1 |
| Inorganics – Secondary | 18 | 4 |

[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 5,400 gal/min (DWR 1978) | Average: |
| | **Total depths (ft)** | |
| Domestic | Range: | Average: |
| Municipal/Irrigation | Range: to 2,306 ft (DWR 1978) | Average: |

## Active Monitoring Data

| Agency | Parameter | Number of wells /measurement frequency |
|---|---|---|
| US Geological Survey | Groundwater levels | 1 |
| US Geological Survey | Miscellaneous water quality | 1 |
| Department of Health Services and cooperators | Title 22 water quality | 18 |

## Basin Management

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| Groundwater management: | Elsinore Valley Municipal Water District has proposed a groundwater management plan. |
| Water agencies | |
| Public | Elsinore Valley Municipal Water District |
| Private | |

## References Cited

California Department of Water Resources (DWR). 1953. *Elsinore Basin Investigation.* Bulletin No. 9.

_____, Southern District. 1978. A Preliminary Evaluation of *Ground Water Conditions in the Vicinity of Lake Elsinore. Southern* District Technical Information Record 1080-A-1 34 p.

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California State Water Resources Board (SWRB). 1956. *Santa Ana River Investigation:* State Water Resources Board Bulletin No. 15. 207 p. [nb: later published in 1959 as DWR Bulletin No. 15).

Eastern Valley Municipal Water District (EVMWD). 2001. Elsinore Valley Pilot Recharge Demonstration Project Grant Application.

Morton, D.M., Hauser, R.M., and Ruppert, K.R. 1999. *Preliminary digital geologic map of the Santa Ana 30'x60' quadrangle, southern California, version 1.0.* U.S. Geological Survey Open-File Report 99-172 15p., scale 1:100,000, 2 sheets.

Wildermuth Environmental (WE). 2000. *TIN/TDS Study Phase 2A.*

## Errata

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