

## **Langford Valley Groundwater Basin, Langford Well Lake Subbasin**

- Groundwater Basin Number: 6-36.01
- County: San Bernardino
- Surface Area: 19,300 acres (30.2 square miles)

### **Basin Boundaries and Hydrology**

Langford Well Lake Subbasin underlies the main portion of Langford Well Valley in central San Bernardino County. Surface elevation above mean sea level ranges from 2,160 at Langford Well (dry) Lake to about 2,500 feet. The subbasin is bounded by nonwater-bearing rocks of the Alvord Mountains on the south and by a series of low bedrock buttes bordering on the north and northwest. A low-lying drainage divide extending north from the Alvord Mountains defines the eastern boundary, and a series of low hills defines the western boundary. The Alvord Mountains rise in elevation to about 3,500 feet. The subbasin lies within the Fort Irwin National Training Center (DWR 1964; USGS 1986).

Average annual precipitation ranges from about 4 to 6 inches. Runoff from the surrounding highlands drains towards Langford Well (dry) Lake, which overlies the eastern part of the subbasin (Jennings and others 1962; USGS 1986).

### **Hydrogeologic Information**

#### ***Water Bearing Formations***

Quaternary alluvium, which forms the major water-bearing formation within the subbasin, includes unconsolidated younger alluvial deposits and underlying unconsolidated to semi-consolidated older alluvial deposits. Maximum thickness of the alluvium is estimated to be about 1,000 feet (Mendez and Christensen 1997). Groundwater beneath Langford Well Lake is confined below at least 420 feet.

#### ***Recharge and Discharge Areas***

Recharge of the subbasin is chiefly from the percolation of occasional runoff through alluvial fan deposits at the base of the Alvord Mountains, and from limited subsurface inflow from the Fort Irwin Subbasin to the north. Groundwater in the alluvium historically moved toward Langford Well Lake; however, since about 1990, the flow of groundwater has been modified and redirected towards a pumping depression southwest of the Langford Well Lake (DWR 1964; Mendez and Christensen 1997).

#### ***Groundwater Level Trends***

The record of groundwater levels intermittently spans a period from 1954 through 2002. In the northeast part of the subbasin, water levels remained largely unchanged between 1993 and 2002, with the average depth to water about 30 feet. Southwest of Langford Well Lake, a pumping depression has developed around wells used to supply Fort Irwin National Training Center since about 1990 (Mendez and Christensen 1997). Hydrographs suggest that

water levels declined in this part of the subbasin by about 18 feet at one well during 1988 through 2000 and declined at another well by about 11 feet from 1993 through January 2002. Depth to water at the latter location in 2002 was about 106 feet below the surface. Confinement of the groundwater is indicated in wells located near Langford Well Lake by differences in water levels in a nested monitoring well located there. From 1995 through 2002, water levels rose by 53 feet in the deepest well with a depth of 780 feet, by 23.8 feet in the moderately deep well with a depth of 420 feet, and by 2.9 feet in the shallowest well with a depth of 210 feet. In the southernmost part of the subbasin, records show that water levels declined by about 8 feet from 1987 through 2002, with the depth to water ranging between 240 and 248 feet below the surface.

### **Groundwater Storage**

**Groundwater Storage Capacity.** Total storage capacity for the Langford Valley Groundwater Basin is estimated at about 760,000 af (DWR 1975). An estimate of the total storage capacity of the Langford Well Lake Subbasin is not available.

**Groundwater in Storage.** Unknown.

### **Groundwater Budget (C)**

Groundwater budget information is not available.

### **Groundwater Quality**

**Characterization.** The character of the groundwater is sodium sulfate-bicarbonate or sodium bicarbonate-sulfate.

**Impairments.** The quality of the groundwater is rated inferior for both domestic and irrigational uses because of elevated levels of fluoride, boron, iron, and sodium. Groundwater used for domestic consumption must either be blended with water from other sources or treated to meet drinking water standards. Fluoride content in wells range from 1.8 to 13.0 mg/L, with an average concentration of 9.2 mg/L. Boron concentration ranges from 0.02 mg/L to 2.0 mg/L, with an average content of 1.01 mg/L. TDS content ranges from 448 to 634 mg/L, with an average concentration of about 510 mg/L.

### **Water Quality in Public Supply Wells**

Constituent Group <sup>1</sup>	Number of wells sampled <sup>2</sup>	Number of wells with a concentration above an MCL <sup>3</sup>
Inorganics – Primary	3	3
Radiological	3	1
Nitrates	3	0
Pesticides	3	0
VOCs and SVOCs	3	0
Inorganics – Secondary	3	2

<sup>1</sup> 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).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> 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 Production Characteristics

Well yields (gal/min)		
Municipal/Irrigation	Range: 410–1,700	Average: 410 (DWR 1975)
Total depths (ft)		
Domestic		
Municipal/Irrigation		

## Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
US Geological Survey	Groundwater levels	11
US Geological Survey	Miscellaneous water quality	7
Department of Health Services and cooperators	Title 22 water quality	3

## Basin Management

Groundwater management:

Water agencies

Public

Fort Irwin National Training Center

Private

## References Cited

- California Department of Water Resources (DWR). 1964. *Ground Water Occurrence and Quality Lahontan Region*. Bulletin No.106-1. 439 p.
- \_\_\_\_\_. 1975. *California's Ground Water*. Bulletin No. 118. 135 p.
- Jennings C. W. , J. L. Burnett, B. W. Troxel. 1962. *Geologic Map of California: Trona Sheet*. Olaf P. Jenkins Edition. California Department of Conservation, Division of Mines and Geology. Scale 1: 250,000.
- Mendez G.O. and Christensen, A.H. 1997. *Regional Water Table (1996) and Water-Level Changes in the Mojave River, the Morongo, and the Fort Irwin Ground-Water Basins, San Bernardino County, California*. U.S. Geological Survey Water-Resources Investigations Report 97-4160. 34p.
- U. S. Geological Survey. 1986. *Langford Well, California*. 7.5' Quadrangle. Provisional Edition. Scale 1: 24,000.

## Errata

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