Tehachapi Valley East Groundwater Basin

- Groundwater Basin Number: 6-45
- County: Kern
- Surface Area: 24,000 acres (37 square miles)

Basin Boundaries and Hydrology

This irregularly shaped northeast-southwest trending basin is bounded on the north by the Sierra Nevada and on the south and east by the Tehachapi Mountains. An alluvial high (surface drainage divide) forms the western boundary of this basin and the adjacent Tehachapi Valley West basin. Runoff waters west of this divide flow to Tehachapi Creek northwest to the San Joaquin Valley. Surface drainage to the east of this divide either ponds in Proctor Dry lake or flows eastward down Cache Creek toward Freemont Valley. Water ponds in Proctor Dry Lake due to a slight surface drainage divide between the lake and Cache Creek. Average annual precipitation ranges from 10 to 14 inches.

Hydrogeologic Information

Paleozoic sediments, pre-Tertiary granitic rocks, and Tertiary sediments of the Sierra Nevada occur to the north; Paleozoic sediments and pre-Tertiary granitic rocks of the Tehachapi Mountains are the predominant rock types to the south. An alluvial high occurs to the west between the settlement of Monolith and City of Tehachapi (Smith 1964).

Water Bearing Formations

The Quaternary alluvium comprises the upper portion of the valley fill that extends to a depth of at least 750 feet. Near Proctor Dry Lake, an intermittent type of playa, the Quaternary alluvium extends to a depth of about 200 feet (DWR 1964). Specific yield of the alluvium is estimated at 7 percent except for the northern, eastern, and southern edges of the basin (represented by high portions of alluvial fans) where a value of 10 percent has been estimated (Michael 1962).

Under natural conditions, groundwater flow was probably split near the drainage divide between Tehachapi Valley East and West basins and moves toward the east and west, respectively. Although there is still some groundwater outflow both east and west, most water leaves the basin only as streamflow during storm events (Michael 1962). Heavy pumping in areas south of Tehachapi and Monolith has altered the movement of groundwater due to the creation of a large pumping depression.

Wells on the eastern edge of Proctor Dry Lake once produced artesian flows but these wells have not flowed since 1947. These artesian flows were caused in part by an upper confined aquifer that has since been drained. In 1961, the groundwater table was about 60 feet below Proctor Dry Lake (DWR 1964).

Restrictive Structures

A southeast trending fault crosses the central basin west of Proctor Dry Lake. Depth to basement offsets of up to 400 feet exist, however, the fault does not

appear to affect groundwater flow based on the observation of similar groundwater elevations on either side of the fault (Michael 1962).

Recharge Areas

The importation of State water to supplement groundwater supplies starting in 1973 has had a significant affect on reducing basin overdraft. While initially treated and used as municipal supply, most imported water is now used conjunctively in groundwater recharge programs**.** The principal sources of natural water supply in the basin are the percolation of streamflow originating in the watershed, and to a lesser extent, the deep percolation of direct rainfall. The areas of Whiterock, Sand, and Cache Creeks are the main recharge areas of the basin and are capable of a moderate recharge rate. Usable groundwater supplies are derived from the recent and underlying older alluvial deposits (DWR 1964).

Groundwater Level Trends

Since the start of basin adjudication in the early 1970's, groundwater levels have increased to those present during the late 1940's when the valley's groundwater overdraft problem became apparent. From 1951 to 1961, hydrographs show that the groundwater level of this basin dropped on average 25 feet, resulting in a decrease in the amount of groundwater stored of 35,000 af (based on a basin area of 18,000 acres and a specific yield of 7 percent; TCCWD 2000). Hydrographs from 1961 to 1978 show that the groundwater level continued to drop another 33 feet on average, resulting in a loss of 41,500 af of groundwater from the basin (based on the basin area and specific yield stated above; TCCWD 2000). From 1978 to 1999, hydrographs show that groundwater levels rose an average of 55 feet and restored 70,000 af of groundwater to the basin (based on the basin area and specific yield stated above; TCCWD 2000).

Groundwater Storage

Groundwater Storage Capacity. The total storage capacity of this basin is calculated as 150,000 af, based on a basin volume of 2,160,000 af and a specific yield of 7 percent (Michael 1962).

Groundwater in Storage. The amount of groundwater in storage has not been determined.

Groundwater Budget (Type C)

There are not enough data to estimate a budget for this basin, although some data have been recorded. The natural recharge in the basin is estimated at 3,000 af. This value is based on safe yield values determined by the Court which approximate the estimated combined annual recharge of 10,000 af for Cummings, Brite, and Tehachapi Valleys (Michael 1962). Brite and Tehachapi Valleys receive about 60 percent of this recharge or 6,000 af. The Tehachapi Valley East basin occupies about 60 percent of the combined Brite/Tehachapi Valley watershed and would be assigned 60 percent of the recharge or 3,600 af. However, less rainfall in this portion of the watershed suggests a 50 percent split would be more appropriate, or 3,000 af, as stated above. There is no subsurface outflow, but some flow is pulled into the groundwater pumping depression in the Tehachapi Valley West basin.

Groundwater Quality

Characterization. The water from this basin has not been characterized. TDS values range from 298 to 405 mg/L with an average value of 361 (based on 3 wells). EC values range from 480 to 1250 µmhos/cm, with an average value of 865 (based on 2 wells).

Impairments. There are no known impairments in the references used.

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	7	1
Radiological	2	0
Nitrates	10	0
Pesticides	7	0
VOCs and SVOCs	8	0
Inorganics – Secondary	7	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		Average: 150 (1 well completion reports)
Domestic:	Range: 2 – 150	Average: 31 (29 well completion reports)
	Total depths (ft)	
Domestic	Range: 102 - 440	Average: 285 (33 well completion reports)
Municipal/Irrigation		Average: 750 (1 well completion report)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
TCCWD	Groundwater levels	31 Semi-annually
Department of Health Services and cooperators	Title 22 water quality	9 Varies

Basin Management

Groundwater management:	Tehachapi Valley East is an adjudicated basin; the Tehachapi-Cummings County Water District (TCCWD) is Watermaster.
Water agencies	
Public	TCCWD
Private	None

References Cited

California Department of Water Resources (DWR). 1964. *Groundwater Occurrence and Quality—Lahontan Region*. Bulletin 106-1. June 1964. 439 p.

California Department of Water Resources (DWR), San Joaquin District. Well completion report files.

Michael, Eugene D. and Donald L. McCann. 1962. *Geology Groundwater Survey—Tehachapi Soil Conservation District, Kern County, California*. Consultant Report. Michael-McCann Associates. 88p.

Smith, A.R. (compiler). 1964. Bakersfield Sheet of *Geologic Map of California*. California Division of Mines and Geology (CDMG). Scale 1:250,000.

Tehachapi-Cummings County Water District (TCCWD). June 2000. Twenty-Sixth Annual Watermaster Report for Tehachapi Basin. 48p.

Errata

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