Cummings Valley Groundwater Basin

- Groundwater Basin Number: 5-27
- County: Kern
- Surface Area: 10,000 acres (16 square miles)

Basin Boundaries and Hydrology

Cummings Valley Groundwater Basin is bounded on the north by the Sierra Nevada and on the south by the Tehachapi Mountains, with low-lying ridges connecting the two ranges on its east and west sides. The basin is drained by Chanac Creek, which exits the Cummings Valley to the southwest. A small ephemeral creek enters from Brite Valley to the northeast. Average precipitation values range from 10 to 14 inches.

Hydrogeologic Information

Pre-Tertiary granitic rocks and Paleozoic sediments of the Sierra Nevada occur to the north and east; pre-Tertiary granitic rocks of the Tehachapi Mountains are the predominant rock types to the west and south (Smith 1964). These rocks form a basement over which Quaternary alluvium has been deposited.

Water Bearing Formations

Alluvium in the Cummings Valley is represented by alluvial fan and floodplain material deposited by Cummings Creek to the south, Chanac Creek to the east, and intermittent streams to the north. The alluvium is derived predominantly from granitic rock and a smaller metamorphic rock source along the basin's east margin. The depth to basement increases from approximately 50 feet in the southern valley to 450 feet at the northeastern boundary of the valley floor (Michael 1962).

Typical of alluvial settings, coarser material (gravels and cobbles) exists in the upper fans at the valley margins and finer grained materials (clay and sandy clay) near the valley center. Review of selected well completion reports on file in DWR's San Joaquin District, show moderately thick clay-rich layers commonly interbedded with sands and gravels. Stetson (1969) states these relatively impervious clay and sandy clay deposits create confined to semi-confined conditions in the deeper aquifer, but that the upper and lower aquifers remain hydraulically connected.

Restrictive Structures (optional)

Abrupt changes in depth to bedrock along the northeastern basin boundary are caused by the presence of a normal fault (Michael 1962). An inferred northeast-trending fault crosses the western portion of the basin and offsets basement depths by up to 250 feet (Michael 1962) and appears to control the northern limit of the basin. The fault does not appear to affect groundwater flow based on the observation of similar groundwater elevations on either side of the fault.

Recharge Areas

Groundwater recharge in the basin is dependent upon the percolation of precipitation from the tributary watershed (Stetson 1969, Richter 1950). The rather thick clay layers at the valley center inhibit or greatly reduce the deep percolation of irrigation water, rainfall, or stream recharge on the valley floor; therefore, the majority of recharge occurs within the alluvial fan and foothill areas at the basin margins (Michael 1962). Due to narrow gaps in bedrock highs at the drainage inlet and outlet to Cummings Basin, and to lowered water levels due to pumping, very little subsurface inflow or outflow occurs (Stetson 1969, Michael 1962).

Three groundwater recharge sites supplied with State Water Project water are operated by the Tehachapi-Cummings County Water District on the higher alluvial fan areas at the east, west, and south sides of the basin.

The Cummings basin was adjudicated in 1972 and the court established a safe yield value of 4,090 af annually (TCCWD 2000). Since the start of basin adjudication in the early 1970s, groundwater levels have increased to those present during the late 1940s when the valley's groundwater overdraft problem became apparent. The importation of SWP water to supplement groundwater supplies starting in 1973 has also had a significant affect on reducing basin overdraft. While initially treated and used as a municipal supply, most imported water is now used conjunctively in groundwater recharge programs.

Groundwater Level Trends

Based on hydrographs from TCCWD (2000), groundwater levels declined steadily (up to 100 feet) from approximately 1950 to the mid- to late 1970s when the results of basin management through adjudication became apparent. After adjudication, water levels increased and now stand near those present during 1950.

Groundwater Storage

Groundwater Storage Capacity. No published information was found for total groundwater storage in the basin. However, available data allow an estimate to be calculated. Based on an average specific yield of 7 percent (Michael 1962), the above-listed basin area, and an average basin depth of 200 feet, a total storage estimate of approximately 140,000 af is obtained.

Groundwater in Storage. Available storage for 1996 was calculated based on the above specific yield and basin depth, and an average unconfined groundwater depth of 60 feet below grade (TCCWD 2000). The difference in the average water depth and well depth represents approximately 140 feet of saturated aquifer, which results in an estimated available storage of approximately 98,000 af for 1996.

Groundwater Budget (Type A)

A published groundwater budget is not available for the basin. However, a significant number of budget components exist in various reports.

Basin inflows include estimates of natural recharge between 2,465 af (Michael 1962) and 3,210 af (Stetson 1969). Artificial recharge and applied water recharge of the basin are 41 af and 448 af, respectively (TCCWD 2000). Subsurface inflow is not significant (Stetson 1969). Outflows include annual urban extraction and annual agricultural extraction from the basin at 110 af and 475 af, respectively (TCCWD 2000). Other extractions equal 1,355 af (TCCWD 2000). Subsurface outflow is not significant (Stetson 1969).

Groundwater Quality

Characterization. . Groundwater in the basin is predominately of the calcium-bicarbonate type (Stetson 1969). The average EC of groundwater is 530 μmhos/cm with a range of 470-640 based on data from seven wells. The average TDS is 344 mg/L.

Impairments. No groundwater quality impairments are suggested by the references obtained.

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	15	2
Radiological	11	1
Nitrates	15	0
Pesticides	15	1
VOCs and SVOCs	14	0
Inorganics – Secondary	15	5

[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: 100 (1 well completion reports)
Domestic:	Range: 12-150	Average: 56 (24 well completion reports)
	Total depths (ft)	
Domestic	Range: 64 – 540	Average: 295 (35 well completion reports)
Municipal/Irrigation	Range: 265 – 520	Average: 402 (4 well completion reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
TCCWD	Groundwater levels	51 Semi-annually
Department of Health Services, including Cooperators	Title 22 water quality	15 Varies

Basin Management

Groundwater management:	Tehachapi Valley West is an adjudicated basin; the Tehachapi-Cummings County Water District is Watermaster. Water rights are overlying, not prescriptive.
Water agencies	
Public	TCCWD
Private	Stallion Springs Community Services District, Bear Valley Community Services District

References Cited

California Department of Water Resources, 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. 88 p.

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

Stetson, Thomas M. 1969. *Hydrologic Investigation of Cummings Valley, Kern County, California*. Consultant Report, Thomas M. Stetson, Civil and Consulting Engineers. 73 p.

Tehachapi-Cummings County Water District (TCCWD). June 2000. Twenty-Fifth Annual Watermaster Report for Cummings Basin. 12 p.

Errata

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