APPENDIX E

GROUNDWATER BASIN DESCRIPTION

DWR CALIFORNIA'S GROUNDWATER BULLETIN 118
TULARE LAKE HYDROLOGIC REGION,
KERN RIVER VALLEY GROUNDWATER BASIN

Kern River Valley Groundwater Basin

- Groundwater Basin Number: 5-25
- County: Kern
- Surface Area: 74,000 acres (124 square miles)

Basin Boundaries and Hydrology

The Kern River Valley basin is in the southern Sierra Nevada at elevations ranging from 2,500 to 4,500 feet. It is irregularly shaped, reflecting the dendritic drainage pattern of the north and south forks of the Kern River, Kelso Creek, and smaller tributary creeks. The Greenhorn Mountains and Kern Canyon Fault form the basin's western boundary, and the Piute and Kiavah Mountains bound the basin to the south and east (Smith 1964). The southern portion of the basin is dominated by Isabella Reservoir, from which the Kern River flows towards the San Joaquin Valley. Average annual precipitation ranges from 6 inches in the eastern portion of the basin to 14 inches in the western portion of the basin.

Hydrogeologic Information

Water Bearing Formations

Groundwater is produced from predominantly Recent alluvium, and to a lesser degree from older (Pleistocene) alluvium in the northern portion of the basin. This alluvium is derived from the granitic and metamorphic bedrock that surrounds the basin on all sides. At the basin's southwest corner, alluvium below the auxiliary Isabella Dam was classified as layers of clayey and silty sands with associated sand and clay layers to a maximum depth of 126 feet (USACE 1964). Similar materials were found approximately one mile south of the dam site during a 1959 investigation by the USACE (1964).

Based on DWR well completion reports, the highest production wells are irrigation and municipal wells drilled near the Isabella Reservoir or near the valley axis where coarse river-laid sediment is abundant. Wells near the reservoir are undoubtedly influenced by this recharge source. Review of the well completion reports also shows 15 to 20 percent of the wells would be considered hard rock wells (generally, those near the basin margins).

Recharge Areas

Groundwater recharge is through direct precipitation and infiltration along valley margins. Recharge also occurs along the north and south forks of the Kern River, and along tributaries such as Kelso and Canebrake Creeks.

Groundwater Budget (Type C)

There are not enough data in the referenced literature to make an estimate of a budget for this basin.

Groundwater Quality

Characterization. The characterization of the groundwater is not known in the referenced literature at this time. TDS values range from 253 to 480 mg/L, with an average value of 378 (based on 11 wells; DHS 2000). EC values range from 420 to 760 µmhos/cm, with an average value of 600 (based on 11 wells; DHS 2000).

Impairments. Iron and manganese levels in wells along the Kern Canyon Fault sometimes exceed the secondary MCLs, and there are occasionally high fluoride concentrations (DHS 2000).

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	73	14
Radiological	78	19
Nitrates	76	5
Pesticides	58	0
VOCs and SVOCs	58	1
Inorganics – Secondary	73	21

[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:10 – 3,650	Average: 350 (25 well completion reports)
Domestic:	Range: 1 – 160	Average: 33 (98 well completion reports)
	Total depths (ft)	
Domestic	Range: 55 - 455	Average: 218 (122 well completion reports)
Municipal/Irrigation	Range: 57 - 580	Average: 243 (33 well completion reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Department of Health Services	Title 22 water quality	92 Varies

Basin Management

Groundwater management:	None
Water agencies	
Public	None
Private	Kern River Valley Water Company (incorporating nine former individual water systems); Erskine Creek Water Company; James Water System; Mountain Mesa Water Company.

References Cited

California Department of Health Services, Drinking Water Field Operations Branch (DHS). 2000. Engineering Report. *Kern Valley Water Company, Kern County, System No. 15-10010, Water Permit No. 03-12-99P-025.* 20 p. + appendices.

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

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

US Army Corps of Engineers (USACE). 1964. *Isabelle Auxilliary Dam-Seepage study.* Sacramento Office Report. 9 p + maps.

Additional References

California Department of Health Services, Drinking Water Field Operations Branch (DHS). 1991. Engineering Report. *South Lake Water Company, System No. 15-039, Kern County, Water Permit No. 03-91-015.* Central Valley Region. 12 p. + appendices.

_____. 1995a. Engineering Report. *Erskine Creek Water Company, Kern County, System No. 15-10009, Water Permit No. 03-12-95P-013.* 18 p. + appendices.

_____. 1995b. Engineering Report. *James Water System, System No. 15-00462, Water Permit No. 03-12-95P-027.* 10 p. + appendices.

_____. 1996. Engineering Report. *Mountain Mesa Water Company, Kern County, System No. 15-10042, Water Permit No. 03-12-96P-005.* 15 p. + appendices.

California Department of Water Resources (DWR). 1951. *Report on Use of Water Within Isabella Reservoir Area on Kern River, Kern County California.* Unnumbered Report.

Errata

Changes made to the basin description will be noted here.