Chuckwalla Valley Groundwater Basin

- Groundwater Basin Number: 7-5
- County: Riverside, Imperial
- Surface Area: 605,000 acres (940 square miles)

Basin Boundaries and Hydrology

This basin underlies the Palen and Chuckwalla Valleys dominantly in eastern Riverside County. The basin is bounded by consolidated rocks of the Chuckwalla, Little Chuckwalla, and Mule Mountains on the south, of the Eagle Mountains on the west, and of the Mule and McCoy Mountains on the east. Rocks of the Coxcomb, Granite, Palen, and Little Maria Mountains bound the valley on the north and extend ridges into the valley. The smaller intervening valleys are contiguous with and tributary to the main part of Chuckwalla Valley (DWR 1963). There are no perennial streams in Chuckwalla Valley. Palen, Ford, and several smaller dry lakes are found in topographic low-points. Average annual precipitation in the basin ranges to 4 inches.

Hydrogeologic Information

Water Bearing Formations

Water-bearing units include Pliocene to Quaternary age continental deposits divided into Quaternary alluvium, the Pinto Formation, and the Bouse Formation. The maximum thickness of these deposits is about 1,200 feet and the average specific yield of the upper 500 feet of unconsolidated sediments is estimated to be 10 percent (DWR 1979).

Alluvium. Holocene-age alluvial fan, river, and lake sediments contain clasts derived from the surrounding mountains (Crandall 1981). Pleistocene-age alluvium consists of fine to coarse sand interbedded with gravel, silt, and clay. The Quaternary alluvium likely comprises the most important aquifer in the area (DWR 1963).

Pinto Formation. The Pleistocene-age Pinto Formation consists of coarse fanglomerate containing boulders and lacustrine clay with some interbedded basalt. The fanglomerate would likely yield water freely to wells, but the basalt would likely yield only small amounts of water (DWR 1963).

Bouse Formation. The Pliocene-age Bouse Formation and an older fanglomerate are composed of coarse alluvial and fanglomerate deposits and have been mapped along the edges of the Chuckwalla Valley. These unconsolidated to semi-consolidated sediments are reported to yield several hundred gallons per minute of water to wells perforated in the coarse grained sections of these deposits (Wilson and Owen-Joyce 1994).

Restrictive Structures

Faults are likely in some parts of the basin; however, no barriers are known to inhibit groundwater flow (DWR 1963; 1979).

Recharge Areas

The basin is recharged by subsurface inflow from the Pinto Valley and Cadiz Valley Groundwtaer Basins, and by percolation of runoff from the surrounding mountains and of precipitation to the valley floor (DWR 1979).

Groundwater Level Trends

Data show stable groundwater levels in the basin (DWR 1963). Contours for the basin indicate that the groundwater moves from the north and west toward the gap between the Mule and the McCoy Mountains at the southeastern end of the valley (DWR 1979).

Groundwater Storage

Groundwater Storage Capacity. The total storage capacity is estimated to be about 9,100,000 af (DWR 1975); however, the recoverable storage is estimated to be 15 million af (DWR 1979).

Groundwater in Storage. The upper 100 feet of saturated sediments are estimated to have 900,000 af of groundwater in storage (DWR 1975).

Groundwater Budget (Type C)

Extractions totaled about 11 af in 1952 (DWR 1975) and about 9,100 af in 1966 (U.S. Bureau of Reclamation 1972).

Groundwater Quality

Characterization. Groundwater to the south and west of Palen Lake is typically sodium chloride to sodium sulfate-chloride in character. TDS content across the basin ranges from 274 to 12,300 mg/L (DWR 1979). The best water quality is found in the western portion of the basin, where TDS content ranges from 275 to 730 mg/L (DWR 1979). An analysis of water from one public supply well shows a TDS content of 424 mg/L.

Impairments. Sulfate, chloride, fluoride, and TDS concentrations are high for domestic use (DWR 1975). High of boron and TDS concentrations, and high sodium percentage impair groundwater for irrigation use (DWR 1975). In the valley north of Palen Lake, TDS content ranges from 2,960 to 4,370 mg/L.

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	1	1
Radiological	1	0
Nitrates	1	0
Pesticides	1	0
VOCs and SVOCs	1	0
Inorganics – Secondary	1	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	Range: to 3,900 gal/min	Average: 1,800 gal/min (DWR 1975)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range: 1,200 ft (DWR 1979)	Average:

Active Monitoring Data

Agency	**Parameter**	**Number of wells /measurement frequency**
USGS	Groundwater levels	12
	Miscellaneous water quality	
Department of Health Services and cooperators	Title 22 water quality	10

Basin Management

Groundwater management:

Water agencies

Public

Private

References Cited

California Department of Public Works. 1954. *Ground Water Occurrence and Quality, Colorado River Basin Region.* Water Quality Investigations Report No. 4.

California Department of Water Resources. 1963. *Data on Water Wells and Springs in the Chuckwalla Valley Area, Riverside County, California.* Bulletin No. 91-7.

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Wilson, R.P., and Owen-Joyce, S.J. 1994. *Method to identify wells that yield water that will be replaced by Colorado River water in Arizona, California, Nevada, and Utah.* U.S. Geological Survey, Water Resources Investigation Report 94-4005. 36 p.

Additional References

Geoscience Support Services, Inc., 1995. *Interim Report Evaluation of Water Resources in Bristol, Cadiz, and Fenner Basins.* Prepared for Cadiz Land Company, Inc. for submission to Mojave Water Agency. 103 p.

LeRoy Crandall and Associates. 1979. *Report of Phase I Investigation, Feasibility of Storing Colorado River Water in Desert Groundwater Basins.*

Metzger, D.G. and others. 1973. *Geohydrology of the Parker-Blythe-Ciboloa Area, Arizona and California.* U.S. Geological Survey Professional Paper 486-G. 130 p.

Errata

Changes made to the basin description will be noted here.