Bristol Valley Groundwater Basin

- Groundwater Basin Number: 7-8
- County: San Bernardino
- Surface Area: 498,000 acres (778 square miles)

Basin Boundaries and Hydrology

This basin underlies Bristol Valley in eastern San Bernardino County. The basin is bounded by nonwater-bearing rocks of the Bullion Mountains on the west, of the Bristol, Marble, Granite, and Old Dad Mountains on the north, of the Marble, Ship, and Calumet Mountains on the east, and of the Calumet, Sheep Hole, and Coxcomb Mountains on the south. Short segments of surface and groundwater divides also compose parts of the northern, eastern, and southern boundaries. One short segment of the eastern boundary is placed in Fenner Gap, which lies between the Marble and Ship Mountains and separates the Bristol Valley Groundwater Basin from the Fenner Valley Groundwater Basin. The Lava Hills and Lead Mountain form emergent consolidated rock within the basin, and young lava flows emanating from Amboy Crater overlie alluvial and lake deposits within the basin (Bishop 1963). Surface waters of this internally drained basin converge toward Bristol (dry) Lake. Average annual precipitation ranges to 6 inches.

Hydrogeologic Information

Water Bearing Formations

In this part of the Mojave Desert, both an upper and a lower alluvial aquifer have been identified. The upper aquifer consists of Quaternary age sands and gravels from 200 to 800 feet thick (DWR 1967; MWD 1999; 2000). The lower aquifer consists of middle to late Tertiary age alluvial deposits that contain a higher proportion of fine material and are generally less permeable than those of the upper aquifer (MWD 2000). The thickness of the lower alluvial aquifer may reach 6,000 feet near Bristol Lake. These aquifers are separated in places by discontinuous layers of silt and clay; however, both aquifers are presumably unconfined (MWD 1999). One well near Fenner Gap yields 3,000 gpm, and others yield 1,000 to 2,000 gpm, from the upper aquifer (MWD 1999).

Restrictive Structures

Late Tertiary and Quaternary faults are common throughout this basin; however, it is unknown whether or not these faults impede groundwater flow.

Recharge Areas

Natural recharge is dominantly from percolation of surface runoff through stream beds and washes. A conjunctive use project is proposed that would recharge the basin with Colorado River water at Fenner Gap during wet years and extract it down gradient during drought years (MWD 1999; 2000).

Groundwater Level Trends

Although monitoring data are scarce, groundwater levels were stable during 1983 through 1998 (MWD 1999). The groundwater level remains near the surface at Bristol Lake, where trenches are excavated below the water table

to facilitate concentration of brines. Near Fenner Gap, monitoring of agricultural wells suggests that there has been no significant decline in groundwater levels (MWD 1999). Groundwater flows from the edges of the basin towards Bristol Lake where groundwater is close to the surface (DWR 1967; MWD 1999).

Groundwater Storage

Groundwater Storage Capacity. The total storage capacity for this basin is estimated at 7,000,000 af (DWR 1975).

Groundwater in Storage. Unknown.

Groundwater Budget (Type A)

Natural recharge is estimated at about 2,100 af/yr (DWR 1975). Extractions in 1952 totaled about 11 af (DPW 1954; 1975). The annual extraction is estimated at about 5,020 af (MWD 1999).

Groundwater Quality

Characterization. Groundwater in the basin is sodium bicarbonate or sodium chloride in character (DWR 1967). TDS content ranges from 286 to 298,000 mg/L (DWR 1967). Evaporation has produced super-saline water beneath the dry lake, with TDS content as much as 298,000 mg/L (DWR 1967). Around the eastern edge of the basin, near Fenner Gap, the water has a TDS concentration of about 300 to 400 mg/L (MWD 1999; 2000). Elsewhere in the basin, TDS content typically exceeds 500 mg/L (DWR 1967).

Impairments. Water in some wells has fluoride content that exceeds the recommended level. TDS content is extremely high in some wells near Bristol Lake (DWR 1967).

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: to 3,000 gal/min (MWD 1999)	Average: 125 gal/min (DWR 1975)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

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

Basin Management

Groundwater management:

Water agencies

Public

Private

References Cited

Bishop, C. C. 1963. Geologic Map of California Needles Sheet. Olaf P. Jenkins Edition. California Division of Mines and Geology. Scale 1:250,000.

California Department of Public Works (DPW). 1954. *Ground Water Occurrence and Quality, Colorado River Basin Region.* Water Quality Investigations Report No. 4. 59 p.

California Department of Water Resources (DWR). 1967. *Water Wells and Springs in Bristol, Broadwell, Cadiz, Danby and Lavic Valleys and Vicinity, San Bernardino and Riverside Counties, California.* Bulletin No. 91-14.

Metropolitan Water District of Southern California (MWD). 1999. *Cadiz Groundwater Storage and Dry-Year Supply Program: Draft Environmental Impact Report, Draft Environmental Impact Statement, SCH. No 99021039.* MWD Report No. 1157.

____. 2000. Supplement to the Cadiz Groundwater Storage and Dry-Year Supply Program: Draft Environmental Impact Report, Draft Environmental Impact Statement, SCH. No 99021039. MWD Report No. 1169.

Additional References

Geoscience Support Services, Inc. 2001. *Fourth Annual Monitoring Report, January 2000-December 2000.* Cadiz Valley Agricultural Development. Prepared for Cadiz, Inc.

Errata

Changes made to the basin description will be noted here.