Borrego Valley Groundwater Basin

- Groundwater Basin Number: 7-24
- County: San Diego and Imperial
- Surface Area: 150,000 acres (240 square miles)

Basin Boundaries and Hydrology

This basin underlies Borrego and Lower Borrego Valleys in the eastern Imperial and western San Diego Counties. The basin is bounded by the Santa Rosa Mountains on the north, the San Ysidro Mountains on the west, Coyote Creek and Superstition Mountain faults on the northeast, and the Fish Creek and Coyote Mountains on the southwest. The southeastern boundary is a surface drainage divide from the Coyote Mountains northeast to Superstition Mountain. Coyote Creek and San Felipe Creek drain the valley southwestward. Borrego Sink, overlying the northern portion of the basin, is a major collection point for runoff in Borrego Valley (DWR 1984). Average annual precipitation is about 5 inches.

Hydrogeologic Information

Water Bearing Formations

The groundwater basin is an alluvium-filled valley underlain by crystalline bedrock. The valley fill consists of three aquifers: upper, middle, and lower (DWR 1984).

The upper aquifer is comprised of Holocene to Pleistocene age alluvial, fan, playa and eolian deposits. The unit ranges to 1,000 feet thick at the north end of the basin. Specific yields for these deposits range from 15 to 25 percent (DWR 1984). This aquifer is the principal source of groundwater in Borrego Valley and well yields are as much as 2,000 gal/min (Mitten and others 1988).

The middle and lower aquifers are Pleistocene age continental deposits, including moderately consolidated sand, gravel, and boulders. Thickness ranges to 700 feet in the middle aquifer and is thickest near the center of the valley, but thins towards the southeast (Mitten and others 1988). The lower aquifer reaches 1,800 feet thick in the south–central part of the valley (DWR 1984). Specific yield ranges from 5 to 10 percent in the middle aquifer and 1 to 5 percent in the lower aquifer (DWR 1984).

Restrictive Structures

The northwest trending Coyote Creek and Superstition Mountain faults form the northeast boundary of the basin. Water level differences of 100 feet on opposite sides of the Coyote Creek fault indicate the fault is a barrier to groundwater flow (Moyle 1974; 1982).

Recharge Areas

Groundwater recharge to the basin is by percolation of runoff in Coyote Creek and several smaller intermittent streams emanating from mountains north and west of the valley (CDPW 1954).

Groundwater Levels Trends

Groundwater levels declined during 1953 through 1980 but the rate of decline decreased during 1965 through 1980. Measurements taken during 1980 throughout the basin show that groundwater levels ranged from 18 to 305 feet below ground surface (Moyle 1982). Wells in Borrego Valley near Borrego Springs declined as much as 38 feet during 1983 through 1999 (Borrego Water District 2000). Groundwater generally flows southeastward through the basin.

Groundwater Storage

Groundwater Storage Capacity. The storage capacity based on stable water levels before groundwater development began in the basin is estimated to be about 5,500,000 af (Moyle 1982).

Groundwater in Storage. The amount of water in storage prior to 1945 is estimated to be about 5.5 million af (Moyle 1982**)**. The net depletion of groundwater from 1945 to 1980 is estimated to be about 330,000 af (Moyle 1982), implying that groundwater in storage for 1980 was about 5,170,000 af.

Groundwater Budget (Type A)

Annual recharge to the basin is estimated to be about 8,300 af/yr and average subsurface outflow at 3,600 af/yr (DWR 1984). Net extractions during 1998 were estimated at 15,161 af and (Borrego Water District 2000).

Groundwater Quality

Characterization. Based on data from selected wells, the statistically dominant water quality for the basin is sodium sulfate in character (Moyle 1982). TDS concentration ranges from 300 to 2,440 mg/L (Moyle 1982); water from one public supply well has a TDS content of 330 mg/L.

Impairments. High TDS content is found in some wells throughout the basin with concentrations fluctuating seasonally (Moyle 1982). Concentrations of nitrate in water ranged to 300 mg/L (Moyle 1982). The main sources of high nitrate concentration are septic systems, waste water treatment plants, irrigation return water, and decomposition of vegetation. However, because some high nitrate concentrations in groundwater were reported before irrigated agriculture and concentration of septic tanks began, some sources of nitrate may be natural. Nitrate concentrations are generally higher in the upper aquifer than the lower aquifers (DWR 1984).
Water samples from some wells have had sodium, sulfate, chloride, iron, or boron concentrations that exceeded the MCL (Moyle 1982).

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	11	1
Radiological	9	0
Nitrates	12	0

Pesticides	6	0
VOCs and SVOCs	6	0
Inorganics – Secondary	11	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:	Average:
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
San Diego County/Borrego Water District	Groundwater levels	10/3 months
San Diego County Health Dept.	Miscellaneous water quality	10/3 months
Department of Health Services and cooperators	Title 22 water quality	25

Basin Management

Groundwater management:	Borrego Water District is in the process of drafting an AB 3030 groundwater management plan.
Water agencies	
Public	Borrego Water District
Private	

References Cited

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Additional References

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Errata

Changes made to the basin description will be noted here.