Searles Valley Groundwater Basin

- Groundwater Basin Number: 6-52
- County: Inyo, Kern, San Bernardino
- Surface Area: 197,000 acres (308 square miles)

Basin Boundaries and Hydrology

This groundwater basin underlies Searles Valley in portions of San Bernardino, Inyo, and Kern Counties. Elevation of the valley floor above mean sea level ranges from 1,621 feet at Searles (dry) Lake to about 3,300 feet at the southwestern end of the valley. The basin is bounded by nonwater-bearing rocks of the Argus Range and Spanger Hills on the west, the Slate Range on the east, and the Summit Range and Lava Mountains on the south. The northern boundary is formed by the convergence of the Slate and Argus Ranges. The bordering mountains reach elevations of about 6,500 feet in the Argus Range and about 5,500 feet in the Slate Range. Searles Lake covers about 40 square miles in the central part of the valley. Significant evaporite mineral deposits were discovered in 1863 at Searles Lake and have been mined since 1873. Mineral resources derived from the extraction of playa deposits include boron, cesium, lithium, potash, and soda ash (DWR 1964).

Annual average precipitation ranges from about 3 to 6 inches. Runoff from the surrounding mountains drains toward Searles Lake (Jennings and others 1962).

Hydrogeologic Information

Water Bearing Formations

Quaternary alluvium, which forms the major water-bearing material within the basin, includes unconsolidated younger alluvial deposits and underlying unconsolidated to semiconsolidated older alluvial deposits. Maximum thickness of the alluvium is at least 750 feet (DWR 1964).

Restrictive Structures

The Garlock fault, which trends in an east-west direction along the southern perimeter of the basin, may impede the movement of groundwater (DWR 1964).

Recharge and Discharge Areas

Recharge to the basin is derived primarily from the percolation of runoff through alluvial fan deposits located largely in the north part of the basin and from subsurface inflow from Salt Wells and Pilot Knob Valleys. Groundwater in the alluvium moves towards the central part of the basin. Locally, industrial pumping north of Searles Lake has disrupted the natural groundwater gradient causing groundwater to move north towards Valley Wells. Groundwater discharge occurs through evaporation at Searles Lake where water levels are often at or near the surface (DWR 1964, 1969).

Groundwater Level Trends

Hydrographs show that groundwater levels near Valley Wells declined by about 110 feet during 1917 through 1967. This decline was likely the result of intensive pumping of groundwater used in the extraction of evaporate minerals (DWR 1969). At Searles Lake, hydrographs show water levels generally remained about 2 to 6 feet below the surface through 1967, with a decline at one well of about 1 foot during 1915 through 1967. West of the lake at Pioneer Point, groundwater levels declined by about 57 feet during 1948 through 1980. At Trona between 1955 and 1963, groundwater levels declined about 10 feet. Southwest of Searles Lake, water levels at one well declined by about 7 feet during 1979 through 1985, and south of the lake by about 11.5 feet during 1950 through 1981.

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity is estimated at about 2,140,000 af (DWR 1975).

Groundwater in Storage. Unknown.

Groundwater Budget (C)

Groundwater budget information is not available.

Groundwater Quality

Characterization. Springs and wells located along the base of the Argus Range in the northwest part of the basin, typically have water of calcium-sodium bicarbonate or sodium-calcium bicarbonate character. Water of sodium chloride character is found in wells close to Searles Lake. In the southwest part of the basin near Searles Station, groundwater has a calcium-magnesium chloride-bicarbonate character.

Impairments. The groundwater from the springs and wells in the northwest part of the basin generally have water suitable for most beneficial uses, although elevated levels of fluoride and nitrate impair the water for domestic use at two springs. Groundwater from wells in the vicinity of Searles Lake is inferior for essentially all beneficial uses. This assessment is based upon elevated concentrations of fluoride, boron, sodium, chloride, sulfate, and TDS. TDS concentration near Westend on the western shores of Searles Lake was measured at 75,746 mg/L in 1953, whereas TDS content from groundwater beneath Searles Lake has ranged from about 12,000 to 420,000 mg/L. Groundwater from the southwest part of the basin near Searles Station is suitable for both domestic and irrigation purposes (DWR 1964, 1969).

Well Production characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 300 – 1,000	Average: 300 (DWR 1975).
	Total depths (ft)	
Domestic		
Municipal/Irrigation		

Active Monitoring Data

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

Basin Management

Groundwater management:

Water agencies

Public

Private

References Cited

California Department of Water Resources (DWR). 1964. *Ground Water Occurrence and Quality Lahontan Region.* Bulletin No.106-1. 439 p.

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Jennings C. W. , J. L. Burnett, B. W. Troxel. 1962. *Geologic Map of California: Trona Sheet*. Olaf P. Jenkins Edition. California Department of Conservation, Division of Mines and Geology. Scale 1: 250,000.

Errata

Substantive changes made to the basin description will be noted here.