Middle Amargosa Valley Groundwater Basin

- Groundwater Basin Number: 6-20
- County: Inyo, San Bernardino
- Surface Area: 390,000 acres (609 square miles)

Basin Boundaries and Hydrology

The Middle Amargosa Valley Groundwater Basin underlies Chicago Valley and part of Greenwater and Amargosa Valleys within southeastern Inyo County and northeastern San Bernardino County. Elevation of the valley floor ranges from about 1,300 feet near Tecopa in the southern portion of the vallley to about 2,300 feet at the California-Nevada state line. The basin is bounded by consolidated rocks of the Resting Springs and Nopah Ranges on the east, the Dumont Hills on the south, and the Greenwater Range and Ibex, Black, and Funeral Mountains on the west. Although the basin extends north into Nevada, the California-Nevada state line is the northern boundary. The bordering mountains range in elevation from about 4,500 to 6,000 feet, with Pyramid Peak in the southern Funeral Mountains attaining a maximum elevation at 6,725 feet (DWR 1964).

Average annual precipitation ranges from about 3 to 6 inches. Surface runoff from infrequent rainstorms or flash floods generally drains to the channel of the Amargosa River, and flows southward through the valley (Jennings 1958; Jennings and others 1962).

Hydrogeologic Information

Water Bearing Formations

Quaternary alluvium forms the major water-bearing unit within the basin. Included in this unit are the unconsolidated younger alluvial deposits and the underlying unconsolidated to poorly consolidated older alluvial deposits. Maximum thickness of the alluvium is at least 900 feet (DWR 1964).

Restrictive Structures

The Death Valley-Furnace Creek fault zone, which roughly parallels the northwest trend of the basin, may facilitate the movement of groundwater to the northwest, whereas locally, the fault may act as a barrier to the movement of groundwater to the southwest. Eagle Mountain in the central part of the basin, is a barrier to the southerly flow of groundwater, causing springs and shallow groundwater to occur north of the mountain (DWR 1964; Hunt and others 1966).

Recharge and Discharge Areas

Recharge to the basin is derived primarily from subsurface inflow from basins to the north and east in Nevada. Additional replenishment is derived by the percolation of surface runoff through alluvial fan deposits at the base of bordering mountains. Groundwater in the younger and underlying older alluvium moves toward the south, roughly following the course of the Amargosa River. Confined groundwater conditions are found in the southern part of the basin near Tecopa and Shoshone, and in the area of shallow

groundwater north of Eagle Mountain. Confined condition may also occur at the north end of the basin near the California-Nevada stateline. Groundwater discharges from the basin into Death Valley Groundwater Basin south of Tecopa at the southern end of the basin (DWR 1964; Hunt and others 1966).

Groundwater Level Trends

Hydrographs show that groundwater levels remained largely unchanged or declined slightly over the period of record, which intermittently spans from 1956 through 2001. In Chicago Valley, water levels declined in one well by about 0.2 foot from 1956 through 1964. Depth to water remained between 19 and 22 feet below the surface. Groundwater levels near Death Valley Junction in the central part of the basin, declined by about 1.8 feet from 1979 through 1984, but remained within about 3 to 7 feet of the surface. Hydrographs for wells east of Death Valley Junction, near the California–Nevada stateline, show water levels declined by 0.9 foot from 1984 through 1993. Depth to water fluctuated between 97.0 and 97.9 feet over this period. Approximately 3 mile north of Death Valley Junction, water levels declined in one well by about 1.4 feet during 1987 through 1999, with water levels remaining within 37.2 and 38.6 feet of the surface.

North of Eagle Mountain, where shallow groundwater occurs, water levels rose between 0.3 foot and 3.0 feet from 1983 through 1993. Depth to water in wells remained between about 5 to 10 feet below the surface. Approximately 2 miles north of the zone of shallow groundwater, water levels rose by about 2.9 feet at one well under artesian head, and by about 3.3 feet at another well during 1983 through 1993. West of the zone of shallow groundwater, water levels declined by 1.1 feet from 1983 to 1992. In the north part of the basin near Franklin Well, confined groundwater conditions may be indicated by the decline in water levels in one well by 6.2 feet from 1986 through 2001, and a gain in water levels in a nearby well by 5.2 feet from 1986 through 1999.

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity is estimated at about 6.8 million acre-feet (DWR 1975).

Groundwater in Storage. Unknown.

Groundwater Budget (C)

Groundwater budget information is not available.

Groundwater Quality

Characterization. In the southern part of the basin near Tecopa, the character of the groundwater is generally sodium bicarbonate-sulfate. Near Death Valley Junction in the northcentral part of the basin, the character of the groundwater is sodium bicarbonate, while at the north end of the basin the character is largely sodium bicarbonate-sulfate. In Chicago Valley, in the southeast and southcentral parts of the basin, groundwater is typically calcium bicarbonate or calcium-magnesium bicarbonate in character.

Impairments. In general, the groundwater in the Middle Amagosa Basin is rated inferior to marginal for domestic and irrigation uses primarily because

of elevated levels of fluoride and boron, with the exception of groundwater in Chicago Valley. Multiple analyses from 22 wells show that 16 had fluoride levels consistently at or above 0.9 mg/L and ranged as high as 7.6 mg/L. The average concentration of fluoride in wells was 1.9 mg/L. Boron was found at or above 1.0 mg/L in 10 of 22 wells with a maximum concentration of 9.2 mg/L reported at Tecopa Hot Springs located in the southern part of the basin. The average concentration of boron in wells was 1.9 mg/L. TDS content ranges from about 550 to 2,475 mg/L, excluding the Chicago Valley where TDS ranges from about 290 to 475 mg/L. Analyses indicate that groundwater in the Chicago Valley is probably of good quality and suitable for most beneficial uses (DWR 1964; Bader 1969).

Well Production Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 2,500–3,000	Average: 2,500 (DWR 1975)
	Total depths (ft)	
Domestic		
Municipal/Irrigation		

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
US Geological Survey	Groundwater levels	2
	Miscellaneous water quality	
Department of Health Services and cooperators	Title 22 water quality:	4

Basin Management

Groundwater management:

Water agencies

Public

Private

References Cited

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

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Hunt, C.B. , T.W. Robinson, W.A. Bowles, and A.L. Washburn. 1966. *Hydrologic Basin Death Valley California.* U.S. Geological Survey Professional Paper 494 – B. 137 p.

Jennings, C.W. 1958. *Geologic Map of California: Death Valley Sheet.* Olaf P. Jenkins Edition. California Department of Conservation, Division of Mines and Geology. Scale 1: 250,000.

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.

Additional References

Slate, Janet L. ed. 1999. *Proceedings of Conference on Status of Geologic Research and Mapping, Death Valley National Park.* U. S. Geological Survey Open-File Report 99-153. 179 p.

Errata

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