Long Valley Groundwater Basin

- Groundwater Basin Number: 6-104
- County: Lassen, Sierra, CA, Washoe, NV
- Surface Area: 46,840 acres (73 square miles)

Basin Boundaries and Hydrology

The Long Valley Groundwater Basin is an elongated north-south trending basin located at the western edge of the Basin and Range Geomorphic Province. The basin is bounded by Peavine Peak to the south, Mesozoic granitic rocks of the Diamond Mountains to the west, Peterson Mountains to the east, and Honey Lake Valley Basin to the north. Peterson Mountain consists mainly of Cretaceous to Jurassic granitic rocks with exposures of metavolcanic rocks near Cold Springs Valley.

Two east-dipping normal faults are inferred to lie along the western and central parts of the valley. The two major faults include the Diamond Mountain Fault and a central unnamed fault that extends from Peavine Peak through Reno Junction. The valley is generally an asymmetric half-graben development. Valley sequences are tilted westward. Schweickert (1989) notes that the half-graben structure is likely to be characterized by numerous buried normal faults and large bedrock slivers at depth. Sedimentation patterns are expected to be complex.

South of Highway 70, bedrock is shallow (150 to 300-feet in depth) between the Diamond Mountains and central the Long Valley fault. Pleistocene nonmarine sedimentary rocks constitutes valley fill in this region. These older valley fill underlie terraces along the west side of the valley.

East of the central fault the valley is underlain by a thick, west-dipping Pliocene nonmarine sequence referred to as the Hallelujah Formation. This sequence thins to a few hundred feet near the vicinity of Bordertown and forms a north-trending anticline between Cold Springs Valley and the southern-most part of Long Valley.

Long Valley Creek, an adjudicated stream, flows north through the basin and discharges into the Honey Lake Groundwater Basin. The creek is a main source of recharge to the Honey Lake basin. There is some restriction to groundwater flow between the two basins due to shallow bedrock at the north end of the valley.

Long Valley is also hydrologically connected to Cold Spring Valley in the south. The USGS has reported that Cold Spring Valley receives an estimated 200- to 500-acre-feet annually as underflow from Long Valley (DWR 1989). A groundwater divide is present near the community of Bordertown. South of this divide groundwater moves southeast into Cold Springs Valley. North of this divide groundwater moves toward Long Valley Creek.

Annual precipitation ranges from 13- to 17-inches increasing to 25 inches in the surrounding uplands.

Hydrogeologic Information

Water-Bearing Formations

Long Valley is underlain by fluvial Quaternary sediments and Tertiary fluvial-lacustrine sediments. The Quaternary sediments consist primarily of alluvium with limited areal extents and thickness and are not a significant source of groundwater for the basin. The Tertiary sediments are the primary water-bearing formation in the valley and are referred to as the Hallelujah Formation. The following summary of water-bearing formations is from DWR (1989) unless otherwise noted.

Quaternary Sedimentary Deposits. The Quaternary alluvial deposits consist of unconsolidated clay, silt, sand, and gravel deposited by Long Valley Creek and its tributaries. These deposits are limited in thickness and areal extent and provide some recharge to the older sedimentary and lake deposits. Few wells are completed in this unit.

Tertiary Hallelujah Formation. The Hallelujah Formation consists of a lower member composed of sandstone with interbedded boulder breccias and conglomerates, a middle member consisting of siltstone and shale, and an upper member consisting of sandstone and minor siltstone (Schweickert 1989). Mergner (1978) reports that the formation may range in thickness from 3,000 to 8,000-feet.

The sediments are composed of fluviatile and lacustrine sedimentary debris derived locally from the granite and rhyolite tuff exposed in the valley. It was deposited as interlayered, lensing bodies of arkosic pebbly sand, gray silty sand, mica-rich sandy silt, silty mud, and clay ranging in depth up to 3,450 feet.

The lower part of the formation is marked by beds of sandy pebble and cobble conglomerate. These deposits supply most of the groundwater to wells at the southern end of the valley. There is limited production data available on wells drilled into this unit.

Restrictive Structures.

Groundwater outflow from the basin into Honey Lake Valley Groundwater basin is restricted by bedrock found at 35 feet below the stream channel of Long Valley Creek near the Highway 395, Bridge #7-23.

Groundwater Level Trends

Water levels in the majority of monitoring wells in the basin have held steady or have risen slightly during the period of 1987 through 1999.

Groundwater Storage

WRD (1989) estimates storage for the Upper Long Valley, the southern portion of the basin south of Hallelujah Junction, to range between 180,000 and 300,000 acre-feet based on an acreage of 12,300 acres, a depth interval of 100-feet, and specific yield ranging from 0.15 to 0.25.

Groundwater Budget (Type B)

Estimates of groundwater extraction are based on a survey conducted by the California Department of Water Resources during 1997. The survey included land use and sources of water. Estimates of groundwater extraction for agricultural and municipal/industrial uses are 74 and 28 acre-feet respectively. Deep percolation from agricultural applied water is estimated to be 140 acre-feet.

Groundwater Quality

Characterization. Groundwater is of the calcium-sodium bicarbonate type (Schmidt 1980) with total dissolved solids ranging from 127- to 570-mg/L, averaging 302 mg/L (DWR unpublished data).

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	NKD	
	Total depths (ft)	
Domestic	Range: 56 – 442	Average: 143 (32 Well Completion Reports)
Municipal/Irrigation	200 (1 Well Completion Report)	

Active Monitoring Data

Agency	**Parameter**	**Number of wells /measurement frequency**
DWR	Groundwater levels	31 wells semi-annually
DWR	Miscellaneous Water Quality	4 wells bi-yearly

Basin Management

Groundwater management:	Long Valley Groundwater Management District Long Valley Creek Adjudication, Decree No. 12999 Nevada State Engineer Designated the Nevada portion of Upper Long Valley in 1982.*
Water agencies	
Public	None
Private	None

* By this action only preferred uses, including quasi-municipal uses, will be considered for further permitting of groundwater in the Nevada portion of the basin and total net consumptive use of all application shall be held to the estimated perennial yield of that portion of the valley. Perennial yield is estimated to be 1283 acre-feet annually. (WRD 1989)

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Errata

Changes made to the basin description will be noted here.