Olympic Valley Groundwater Basin

Groundwater Basin Number: 6-108
County: Placer
Surface Area: 700 acres (1 square mile)

Basin Boundaries and Hydrology

The Olympic Valley groundwater basin is located about 150 miles east of San Francisco and 90 miles southwest of the Sacramento Valley. The basin lies on the eastern slope of the Sierra Nevada. The mouth of the basin drains into the Truckee River approximately 6 miles northwest of Tahoe City and 10 miles south of Truckee along California State Highway 89. It extends about 5 miles (2.5 miles) west from the Truckee River to the crest of the Sierra Nevada at Granite Chief (base of the Squaw Valley ski slopes at Squaw Creek). The Olympic Valley groundwater basin extends about 3 miles north from Squaw Peak. Squaw Creek is the major stream in the basin and flows from west to east into the Truckee River. The general groundwater gradient parallels the streams, flowing in an easterly direction. Elevations within the basin range from about 9,006 ft at Granite Chief (6,400 ft at the northwest margin of the basin) to about 6,060 ft at the Truckee River. Annual precipitation totals at the fire station on the valley floor from 1990 to 2000 range from about 25 to 80 inches (SVPSD 2001). Average annual precipitation in Olympic Valley groundwater basin ranges from 39 to 67 (54) inches, increasing from east to west.

Hydrogeologic Information

Water Bearing Formations (Kleinfelder 2000)

Unless referenced otherwise, the following section is a brief summary of Kleinfelder's "Technical Memorandum of Squaw Valley Background Data" dated February 15, 2000.

The primary source of groundwater in the Olympic Valley groundwater basin is from the Quaternary unconsolidated glacial, alluvial and lake deposits on the lower slopes and floor of the valley. These deposits range in thickness from less than five feet at the margins of the valley to depths possibly as great as 180 feet along its axis (Gasch & Associates 1973). A complex unconfined and semi-confined aquifer system of varying lateral extent occurs within these depths. This system may be divided into "upper" and "lower" aquifers based on the presence of clay interbeds that act as the semi-confining layer at the base of the "upper" aquifer. Both are subject to seasonal fluctuations of static water levels due to the recharge cycle dominated by snowmelt and by varying precipitation cycles within the valley.

The "upper" aquifer is generally shallow, with the base usually located between 10 and 25 ft below ground surface. Recharge occurs as infiltration of precipitation and snowmelt. Squaw Creek stream gauge data indicates groundwater discharge, making the creek a gaining stream (Kleinfelder 1987).

The "lower" aquifer consists of water bearing deposits below the semi-confining clays. These relatively impermeable clays vary in thickness, depth and lateral extent. Recharge occurs as snowmelt infiltration at the contact of valley deposits and hard rock valley walls and as downward migration of "upper" aquifer groundwater.

Groundwater also occurs as fracture flow within the andesitic and granitic bedrock of Olympic Valley groundwater basin. Although the primary hydraulic conductivity is low relative to the unconsolidated deposits, secondary hydraulic conductivity in fracture zones, open joints and along bedding plane weaknesses in the bedrock can produce significant quantities of groundwater.

Glacial deposits. Glacial sediments are typically composed of rock ranging from fine silt to large boulders that have been sorted and stratified by the action of water flowing from the glacier (Freeze and Cherry 1979). Permeability of these deposits can be moderate to high. Glacial sediments consisting of moraine deposits also occur within the basin and mark the extent of glacial advance. These deposits are generally unsorted, have high clay content, and are produced by the grinding glacial action. They typically have moderate permeability.

Alluvial deposits. Recent fluvial deposits consisting of decomposed granite, andesite and glacial sediments that have been reworked by stream water typically are restricted to stream margins within the basin. These deposits are generally very permeable. (Thodal, 1997).

Lake deposits. These deposits are widespread and discontinuous, and are a result of fluctuating lake levels. Deposits containing well-sorted beach sand have relatively high permeability, but those with high silt and clay content have lower permeability (Thodal 1997). It is these semi-confining clays that separate the "upper" and "lower" aquifers in the Olympic Valley groundwater basin.

Recharge Areas

Groundwater recharge in the basin is primarily from infiltration of precipitation into faults and fractures in bedrock, into the soil and decomposed granite that overlies much of the bedrock, and into unconsolidated deposits. Groundwater is recharged over the entire extent of the flow path, except where the land surface is impermeable. Stream flow also recharges ground water when the water-table altitude is lower than the water-surface altitude of the stream (Thodal 1997).

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 150 - 600	Average: 330
	Total depths (ft)	
Domestic		
Municipal/Irrigation	Range: 61 - 280	Average: 116

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
SVPSD	Groundwater levels	Unknown
SVPSD	Miscellaneous water quality	Unknown
Department of Health Services and cooperators	Title 22 water quality	2 wells

Basin Management

Groundwater management:	Non identified
Water agencies	
Public	Squaw Valley Public Services District Lahontan Regional Water Quality Control Board, Placer County Department of Environmental Health.
Private	Squaw Valley Mutual Water Company, Squaw Valley Ski Corporation, Sierra Club Local Chapter, The Resort at Squaw Creek, Squaw Valley Lodge, Olympic Village Inn, Plumb Jacks.

References Cited

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Thodal, Carl E. 1997. Hydrogeology of Lake Tahoe Basin, California and Nevada, and Results of a Ground-Water Quality Monitoring Network, Water Years 1990-1992. Water-Resources Investigations Report 97-4072. USGS. 53 p.

Additional References

Burnett, J.L. 1971. "Geology of the Lake Tahoe Basin." *California Geology* 24(7): 119-127.

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Crippen, J.R., and B.R. Pavelka. 1970. The Lake Tahoe Basin, California-Nevada. U.S. Geological Survey Water-Supply Paper 1972. 56p.

United States Geological Survey (USGS). 1997. Stream and Ground-Water Monitoring Program, Lake Tahoe Basin, Nevada and California. Fact Sheet FS-100-97. 6 p.

Errata

6/12/06 Added Squaw Valley Public Services District to list of public water agencies under Basin Management Section.