Scotts Valley Basin

- Groundwater Basin Number: 5-14
- County: Lake
- Surface Area: 7,320 acres (11 square miles)

Basin Boundaries and Hydrology

The Scotts Valley Basin lies adjacent to the west side of Clear Lake and extends northwesterly along Scotts Creek north to Hidden Lake. The valley is bordered to the east by the shoreline of Clear Lake and bounded on the west and the north by the Jurassic-Cretaceous Franciscan complex of metamorphic and sedimentary rocks which constitute the basement rock in the basin (Jennings 1969). The basin shares a boundary with the Big Valley Basin to the south and may be hydrologically contiguous. Annual precipitation in the basin ranges from 31- to 35-inches, increasing the northwest.

Hydrogeologic Information

Water-Bearing Formations

The aquifer system in Scotts Valley Basin is composed primarily of Quaternary alluvial and terrace deposits, and Plio-Pleistocene to Pleistocene lake and floodplain deposits. Plio-pleistocene Cache Formation sediments overlie bedrock.

Quaternary Alluvium. The channel deposits of Scotts Creek and the uppermost valley deposits in the southern portion of basin are composed of Quaternary alluvium. The active channel of Scotts Creek is underlain by uncemented gravel and sand, with silt and clay lenses. Sands and gravels within the alluvium have moderate to high permeability while the silt and clay lenses have a relatively low permeability. In the southern part of the valley, gravels and clays are interbedded at shallower depths representing portions of former stream channels. Wells extract variable amounts of water from these zones. Wells installed in sand and gravel lenses yield an average of about 230 gpm (DWR 1957). Surficial lake deposits of sandy and silty clay are located in the northern portion of the basin. Underlying these deposits is a fairly continuous gravel stratum in which water is under artesian pressure. Groundwater is confined in the northern portion of the valley and is essentially unconfined in the southern portion. The confined aquifer is 3- to 10-feet thick and underlies approximately 2.4 square miles of valley floor at depths ranging between 85- to 105-feet. The unconfined aquifer underlying the southern valley floor varies in thickness from 40- to 70-feet (Ott Water Engineers 1987).

Quaternary Lake and Floodplain Deposits. The northern part of Scotts Valley is underlain by lake deposits of sandy and silty clay ranging in thickness from 60- to 90-feet (DWR 1957). Permeability in the fine grained lake deposits is low with specific yields ranging from about 3- to 5-percent.

Quaternary Terrace Deposits. Terrace deposits lie directly on bedrock or on older lake and floodplain deposits. These deposits are a continuation of

terrace deposits as seen in the Western Upland aquifer system of Big Valley Basin to the south. They consist of poorly consolidated clay, silt, and sand, with some gravel lenses. Thickness of the deposits ranges from 50- to 100-feet (SMFE 1967). These deposits generally have low permeability due to high clay content. Available well records indicate reddish brown clays with little potential for significant water yield (ESA 1978).

Plio-Pleistocene Cache Formation. Pre-terrace sediments that exist in Scotts Valley area are identified as the Cache Formation based on the stratigraphic position and the lithologic similarity to known beds of that formation. The Cache Formation is largely made up of lake deposits; however, some stream deposits and volcanic ash lenses are likely included (DWR 1957). The Cache Formation is identified from water well driller reports as a blue clay layer containing some gravel lenses that is several hundred feet thick. Permeability of the Cache Formation is generally low due to its high clay content; however, yields of groundwater extracted from gravel or ash lenses within the Cache Formation may be appreciable (DWR 1957).

Recharge Areas

Recharge to the confined aquifer takes place in the forebay or unconfined zone in the southern portion of the valley. Percolation from Scotts Creek is the principal source of recharge with minor amounts from precipitation and applied irrigation water.

Groundwater Level Trends

Evaluation of the groundwater level data shows an average seasonal fluctuation ranging from 5- to 10-feet for normal and dry years for wells located in the vicinity of Scotts Creek and Clear Lake. For wells located closer to the Coastal Range the average seasonal fluctuation is approximately 20- to 40-feet for normal and dry years.

Long-term comparison of spring-spring groundwater levels indicates a slight decline in groundwater levels of up to 10-feet associated with the 1976-77 and 1987-94 droughts, followed by a recovery in levels to pre-drought conditions of early 1970's and 1980's. Overall there does not appear to be any increasing or decreasing trend in the groundwater levels.

Data indicates that lowering of groundwater levels accompanied by subsidence has occurred in Scotts Valley. Gravel has been extracted to average depths of 4- to 6-feet and up to 10- to 15-feet within Scotts Creek channel. This extraction has apparently resulted in the lowering of the stream channel and adjacent unconfined groundwater levels by about 3- to 4-feet in the southern portion of the valley (Ott Water Engineers 1987).

Groundwater Storage

The average specific yield for the depth interval of 0- to 100-feet is estimated to be 8 percent based on review and analysis of well logs (DWR 1957). The storage capacity for the basin is estimated to be 5,900 acre-feet based on the above depth interval and estimate of specific yield (DWR 1957). DWR (1960) estimates the useable storage capacity to be 4,500 acre-feet.

Groundwater Budget (Type B)

Estimates of groundwater extraction for Scotts Valley Basin are based on surveys conducted during the year 1995. The survey included land use and sources of water. Groundwater extraction for agricultural use is estimated to be 4,200 acre-feet. Groundwater extraction for municipal/industrial uses is estimated to be 520 acre-feet. Deep percolation of applied water is estimated to be 1,000 acre-feet.

Groundwater Quality

Characterization. Calcium-magnesium bicarbonate is the predominant groundwater type in the basin (SWRCD 1978). Total dissolved solids range between 140- to 175-mg/L, averaging 158 mg/L (DWR unpublished data).

Impairments. Iron, manganese, and boron concentrations exceed EPA maximum acceptable concentrations for continuous irrigation for selected wells (SWRCB 1978).

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	7	1
Radiological	6	0
Nitrates	9	1
Pesticides	4	0
VOCs and SVOCs	5	0
Inorganics – Secondary	7	1

[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: 6 – 1200	Average: 171 (11 Well Completion Reports)
	Total depths (ft)	
Domestic	Range: 5 – 408	Average: 125 (497 Well Completion Reports)
Municipal/Irrigation	Range: 28 – 600	Average: 127 (132 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	3 wells measured semi-annually
Lake County	Groundwater levels	6 wells measured semi-annually
DWR	Miscellaneous water quality	1 well biennially
Department of Health Services	Title 22 water quality	9

Basin Management

Groundwater management:	Lake County adopted a groundwater management ordinance in 1999.
Water agencies	
Public	County of Lake, City of Lakeport WSA, Scotts Valley WCD
Private	

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Errata

Changes made to the basin description will be noted here.