

Lower Russian River Valley Groundwater Basin

- Groundwater Basin Number: 1-60
- County: Sonoma
- Surface Area: 6,600 acres (10 square miles)

Basin Boundaries and Hydrology

The Lower Russian River Valley Groundwater Basin is a narrow, meandering river canyon located in the Mendocino Range within west-central Sonoma County. The valley begins approximately 2.5 miles east of Mirabell Heights and extends west and southwest for approximately 23 (river) miles until it exits into the Pacific Ocean near Jenner. The canyon ranges in width from about 0.1 to 0.5 miles and has an average width of about 0.25 miles. The valley is defined by the areal extent of alluvial and river-channel deposits that are bounded by bedrock of the Franciscan Complex.

Mark West Creek discharges into the upper reaches of the lower Russian River Valley near Mirabell Heights. Other significant tributaries to the lower Russian River include: Green Valley near Rio Dell; Fife Creek and Pocket Canyon near Guerneville; Dutch Bill Creek near Monte Rio; Austin Creek near St. Joseph Camp; and Willow and Sheephouse Creeks east of the river mouth near Jenner. Precipitation along the Lower Russian River Valley varies from approximately 32 inches near the river mouth to about 44 inches at Rio Nido.

Hydrogeologic Information

Water Bearing Formations

The principal water-bearing units in the lower Russian River Valley are the alluvium and river-channel deposits. The Franciscan Complex that underlies the lower Russian River Valley is considered essentially non water-bearing and therefore, does not yield significant quantities of water to wells. Information on water-bearing formations and groundwater conditions was obtained from Cardwell (1965).

Alluvium and River-Channel Deposits. The Alluvium and River-Channel Deposits are Holocene in age and consist largely of sand and gravel with minor amounts of silt and clay. The alluvium in tributary valleys and in abandoned meanders, such as Armstrong Valley north of Guerneville, contains a higher proportion of silt and clay. The thickness of these deposits varies from a thin veneer along the valley margins to greater than 100 feet near the axis of the valley. The maximum thickness of the alluvium in the main bedrock channel has not been determined because no wells have been drilled deeper than 136 feet. The maximum depth of fill at the mouth of the Russian River probably exceeds 300 feet, as evidenced by the thickness of alluvium in valleys in the vicinity of and north of San Francisco Bay. Several wells within this valley are reported to yield 500 gpm or more. The yields from wells in Armstrong Valley are as much as 200 gpm. Groundwater in this valley is unconfined and is hydraulically connected with the Russian River. Near the river mouth; however, and in the larger tributary

valleys, deposits that contain large amounts of silt and clay may confine groundwater locally. The average specific yield is probably 15 to 20 percent.

Groundwater Level Trends

Hydrographs from two wells along the Russian River Valley near Guerneville (40 year record) and Monte Rio (approx. 15 year record) show that except for typical seasonal variations, overall water levels are stable (DWR 1975; DWR unpublished data)

Groundwater Storage

Groundwater Storage Capacity. Cardwell (1965) estimated the groundwater storage capacity of the alluvial materials to be approximately 55,000 af. This estimate assumed an average maximum depth of alluvial materials of 150 to 200 feet and a specific yield of 15 percent. An estimated groundwater storage capacity of 22,000 af was determined by DWR (1965) for the lower Russian River alluvium below Rio Dell assuming a 40 foot saturated thickness (depths of 10 to 50 feet) and a specific yield of 15 percent.

Groundwater in Storage. No published values have been identified.

Groundwater Budget (Type C)

There are not enough data available to provide a groundwater budget for this basin.

Groundwater Quality

Characterization. Cardwell (1965) reported that groundwater in the Lower Russian River Valley is of the calcium magnesium bicarbonate type and is generally of good quality, except for that in the lower part of the tidal reach of the river. TDS in groundwater ranges from 120 to 210 mg/L.

Impairments. Brackish water is found in wells near the river from the river mouth to below Duncan Mills, a distance of about 5 to 6 miles. Sodium and chloride levels are generally low, except in the area of tidewater encroachment below Duncan Mills. During a period of extremely low streamflow, saline water might extend 10 miles upstream, from the river mouth to Monte Rio.

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	29	1
Radiological	19	2
Nitrates	29	0
Pesticides	19	0
VOCs and SVOCs	18	0
Inorganics – Secondary	29	14

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)

Alluvial wells can yield 500 gpm or more. Specific capacities range from about 1 to 20 gpm/ft. (Cardwell 1965)

Total depths (ft)

Domestic	Range: 21 to 425	Average: 127 (Based on 59 well completion reports)
Municipal/Irrigation	Range: 39 to 202	Average: 102 (Based on 14 well completion reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	One well / semiannually
	Miscellaneous water quality	None known
Department of Health Services and cooperators	Title 22 water quality	32 wells as required in Title 22, Calif. Code of Regulations

Basin Management

Groundwater management:	No groundwater management plans were identified.
Water agencies	
Public	Sonoma County Water Agency, Forestville W.D., Russian River County W.D.
Private	

References Cited

California Department of Water Resources (DWR). 1965. Water Resources and Future Water Requirements – North Coastal Hydrographic Area, Volume 1: Southern Portion (Preliminary Edition) – Bulletin No. 142-1. April.

_____. 1975. Evaluation of Ground Water Resources: Sonoma County. Volume 1: Geologic and Hydrologic Data. Bulletin 118-4, December.

Cardwell, G.T. 1965. Geology and Ground Water in Russian River Valley Areas and in Round, Laytonville and Little Lake Valleys, Sonoma and Mendocino Counties, California. USGS Water Supply Paper 1548.

Errata

Changes made to the basin description will be noted here.