Salinas Valley Groundwater Basin, Langley Area Subbasin

- Groundwater Subbasin Number: 3-4.09
- County: Monterey
- Surface Area: 15,400 acres (24 square miles)

Basin Boundaries and Hydrology

The Salinas Valley – Langley Area Subbasin is in reality a series of low hills bounded to the east by the geologic contact of Tertiary sediments with granitic bedrock and to the north by a drainage divide in the Carneros Hills. North of this divide is the Elkhorn Slough (and Pajaro Valley Groundwater subbasin) and to the south are the Moro Cojo Slough and lower Salinas River valley. The western and southern boundaries approximately coincide with the slope break at the base of the Carneros Hills, generally marked by the 200-foot elevation contour interval. The west and south boundaries are shared with the Salinas Valley – 180/400-Foot Aquifer and the –Eastside Aquifer Subbasins, respectively.

The southern boundary also generally coincides with the northern boundary of the Salinas Valley drainage subbasin. The western portion of the subbasin is drained by west flowing creeks in Langley, Vijerra, Berta, and Pesante Canyons, all of which intersect a south flowing creek in San Miguel Canyon. The eastern subbasin is drained by south flowing creeks, which enter the southwest flowing Gabilan Creek. Average annual precipitation is approximately 15 to 17 inches, increasing northward.

Hydrogeologic Information

Water Bearing Formations

From oldest to the youngest, the water-bearing units of the subbasin are the Pliocene Purisima Formation, the Plio-Pleistocene Paso Robles Formation, the Pleistocene Aromas Red Sands, Quaternary terrace deposits, Holocene alluvium, and Holocene sand dunes (DWR 1977). Outcrops of the Aromas Red Sands compose most of the subbasin. Exposures of Quaternary terrace deposits and Holocene alluvium along Gabilan Creek form a small portion of the southeast subbasin. The Paso Robles Formation interfingers with the upper portion of the Purisima Formation and the lower portion of the Aromas Red Sands. Because of their depth (>500 feet), units below the upper Aromas Red Sands are generally not used for groundwater supply.

A granitic bedrock ridge outcrops at the eastern subbasin margin and plunges northwestward beneath the sedimentary units listed in the above paragraph. All units below the upper Aromas Red Sands pinch out eastward against this ridge. The Aromas Red Sands, Purisima Formation and Paso Robles Formation thicken westward from the bedrock ridge.

The Aromas Red Sands Formation is composed of friable, quartzose, well-sorted brown to red sands that are generally medium-grained and weakly cemented with iron oxide. The formation consists of upper aeolian and lower fluvial sand units that are separated by confining layers of interbedded clays and silty clay (MW 1993). The Aromas sands are considered the primary water-bearing unit of the subbasin. The lower portion of the Aromas Red Sands interfingers with the upper portion of the Paso Robles Formation and together form the 400-Foot Aquifer to the west in the Salinas Valley – 180/400-Foot Aquifer Groundwater Subbasin.

Seawater intrusion occurring in the Salinas Valley Groundwater Basin, 180/400-Foot Aquifer Subbasin to the west does not appear to have progressed in the Langley Area Subbasin.

The northeast corner of the subbasin underlain by the granitic bedrock ridge was placed under a moratorium on land subdivisions in 1980 due to groundwater supply limitations (Fugro 1995).

Restrictive Structures

Except for the confining layers between the upper and lower Aromas Red Sands, no other groundwater flow restrictions are thought to exist in the subbasin.

Recharge Areas

Groundwater recharge is solely from deep percolation of precipitation in the hills and small drainages of the subbasin. Historically, groundwater drained from the granitic ridge and moved westward under Elkhorn Slough and Tembladero Slough where it recharges the fluvial deposits of the 180-Foot Aquifer near Castroville (Johnson 1983). However, during 1994 a groundwater depression existed at the center of the subbasin beneath the Prunedale area with groundwater flowing into this depression from surrounding areas (Fugro 1995). A map representing 1995 water levels in this report shows no depression and westward flow again.

Groundwater Level Trends

Between 1960 and 1979, there was an average increase in groundwater levels of approximately 6 feet. (Johnson 1983).

Groundwater Storage

The total storage capacity of this subbasin has not been determined, but as of 1980, it is estimated that approximately 356,000 af of groundwater is stored in this subbasin. This estimate is based on data in Johnson (1983) and was adjusted so that the subareas match subbasin boundaries in this report as near as possible.

Groundwater Budget (Type B)

There are not enough data in the referenced literature to provide an estimate of the subbasin's groundwater budget, but some values are published for 1980. These values were scaled from data in Johnson (1983) and were adjusted so that the subareas in Johnson (1983) match the subbasin boundaries described in this report as near as possible. Natural recharge for 1980 is approximately 4,000 af. Annual urban and agricultural extractions were estimated to be 380 af and 500 af, respectively. Subsurface outflow is approximately 2,000 af.

Groundwater Quality

Characterization. The characterization of the groundwater in this subbasin has not been determined. TDS value range from 52 to 107 mg/L (DWR 1967). The Department of Health Services, which monitors Title 22 water quality standards, reports TDS values in two public supply wells ranging from 332 to 348 mg/L, with an average value of 340 mg/L (DHS 2001).

Impairments. Groundwater beneath the Granitic Ridge portion of the subbasin has been affected by elevated nitrate levels in shallow aquifers. Two of the 11 wells with chemical data exceeded the drinking water standard (Fugro 1995).

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	6	0
Radiological	4	0
Nitrates	2	0
Pesticides	11	0
VOCs and SOCs	11	0
Inorganics – Secondary	6	0

[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 Production characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 15 - 1,571	Average: 449 (12 Well Completion Reports)
Total depths (ft)		
Domestic	Range: 79 - 684	Average: 367 (79 Well Completion Reports)
Municipal/Irrigation	Range: 175 - 760	Average: 486 (15 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
	Groundwater levels	NKD
	Misc. water quality	NKD
Department of Health Services (incl. Cooperators)	Title 22 water quality	52 Varies

Basin Management

Groundwater management:	MCWRA requires annual extraction reports form all agricultural and municipal well operators. MCWRA has also researched, developed and/or constructed projects to reduce seawater intrusion, manage nitrate contamination in the groundwater, provide adequate water supplies to meet current and future needs, and to hydrologically balance the groundwater subbasin in the Salinas Valley.
Water agencies	
Public	Monterey County Water Resources Agency
Private	Over 120 DHS-permitted water systems including Prunedale MWC, Moro Cojo MWA, Linda Vista MWC, Holly Hills MWC, and Assisi MWC.

References Cited

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Johnson, MJ. 1983. *Groundwater in North Monterey County, California*. US Geological Survey Water Resources Investigations 83-4023. 32p.

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Additional References

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Errata

Changes made to the basin description will be noted here.