San Joaquin Valley Groundwater Basin
Tracy Subbasin

- Groundwater Basin Number: 5-22.15
- County: San Joaquin, Contra Costa, Alameda
- Surface Area: 345,000 acres (539 square miles)

Basin Boundaries and Hydrology

The San Joaquin Valley comprises the southernmost portion of the Great Valley Geomorphic Province of California. The Great Valley is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The Tracy Subbasin is defined by the areal extent of unconsolidated to semiconsolidated sedimentary deposits that are bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin-Stanislaus County line on the south. The Tracy Subbasin is located adjacent to the Eastern San Joaquin Subbasin on the east and the Delta-Mendota Subbasin on the south. All of the above mentioned subbasins are located within the larger San Joaquin Valley Groundwater Basin. The Tracy Subbasin also lies to the south of the Sacramento Valley Groundwater Basin, Solano Subbasin.

The Tracy Subbasin is drained by the San Joaquin River and one of its major westside tributaries; Corral Hollow Creek. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay. Annual precipitation within the subbasin ranges from about 11 inches in the south to about 16 inches in the north.

Hydrogeologic Information

Water Bearing Formations

The Tracy Subbasin is comprised of continental deposits of Late Tertiary to Quaternary age. These deposits include the Tulare Formation, Older Alluvium, Flood Basin Deposits, and Younger Alluvium. The cumulative thickness of these deposits increases from a few hundred feet near the Coast Range foothills on the west to about 3,000 feet along the eastern margin of the basin. Information regarding the water bearing units and groundwater conditions was taken from (Hotchkiss and Balding 1971), (Bertoldi et al. 1991), and (Davis G.H. et al. 1964).

Tulare Formation. The Tulare is exposed in the Coast Range foothills along the western margin of the basin and dips eastward toward the axis of the valley. It consists of semi-consolidated, poorly sorted, discontinuous deposits of clay, silt, and gravel. The Corcoran clay occurs near the top of the Tulare Formation and confines the underlying fresh water deposits. The eastern limit of the Corcoran clay is near the eastern boundary of the basin. The Tulare formation is moderately permeable, with most of the larger agricultural, municipal and industrial extractions coming from below the Corcoran clay. Wells completed in this zone produce up to 3,000 gallons per minute. Small domestic wells often obtain their supply from above the Corcoran clay. However, groundwater above the Corcoran clay is often of poor quality. The total thickness of the Tulare Formation is about 1,400 feet.

Specific yield values for water bearing deposits in the San Joaquin Valley and Delta area range from about 7 to 10 percent.

Older Alluvium. Older alluvium consists of loosely to moderately compacted sand, silt and gravel deposited in alluvial fans during the Pliocene and Pleistocene. The older alluvium is widely exposed between the Coast Range foothills and the Delta. The thickness of the older alluvium is about 150 feet. It is moderately to locally highly permeable.

Flood Basin Deposits. Flood basin deposits occur in the Delta portion of the subbasin, in the northern two-thirds of the basin. They are the distal equivalents of the Tulare Formation and older and younger alluvial units and consist primarily of silts and clays. Occasional interbeds of gravel occur along the present waterways. Because of their fine-grained nature, the flood basin deposits have low permeability and generally yield low quantities of water to wells. Occasional zones of fresh water are found in the basin deposits, but they generally contain poor quality groundwater. The maximum thickness of the unit is about 1,400 feet.

Younger Alluvium. Younger alluvium includes those deposits that are accumulating or would be accumulating under natural conditions. It includes sediments deposited in the channels of active streams as well as overbank deposits and terraces of those streams. They are present along the channel of Corral Hollow Creek and consist of unconsolidated silt, fine- to medium-grained sand, and gravel. Sand and gravel zones in the younger alluvium are highly permeable and, where saturated, yield significant quantities of water to wells. The thickness of the younger alluvium in the Tracy Subbasin is less than 100 feet.

Groundwater Level Trends

Review of hydrographs for the Tracy Subbasin indicate that except for seasonal variation resulting from recharge and pumping, the majority of water levels in wells have remained relatively stable over at least the last 10 years (DWR unpublished data; San Joaquin County Flood Control unpublished data).

Groundwater Storage

Groundwater Storage Capacity. There are no published groundwater storage values for the entire basin; however, (Hotchkiss and Balding 1971), estimated the groundwater storage capacity for the Tracy-Patterson Storage Unit at 4,040,000 af. This storage unit includes the southern portion of the currently defined Tracy Subbasin from approximately one-mile north of Tracy to the San Joaquin-Stanislaus County line. Since the Tracy Subbasin comprises roughly one third of the Tracy-Patterson Storage Unit, it can be inferred that the approximate storage capacity of the southern portion of the Tracy Subbasin is on the order of 1,300,00 af.

Groundwater in Storage. There are no published data available on the amount of groundwater in storage for this subbasin.

Groundwater Budget (Type C)

There is insufficient published data available to provide a groundwater budget for this subbasin.

Groundwater Quality

Characterization. In general, the northern part of the subbasin is characterized by a sodium water type and the southern part of the subbasin is characterized by calcium-sodium type water (Sorenson 1981). The northern part of the subbasin is also characterized by a wide range of anionic water types including: bicarbonate; chloride; and mixed bicarbonate-chloride types. Major anions in the southern part of the subbasin include sulfate-chloride and bicarbonate-chloride. Dissolved solids concentrations in well water sampled in San Joaquin and Contra Costa Counties ranged from 50 to 3,520 mg/L, with a mean of 463 and medium of 269 (Sorenson 1981). The highest TDS values were found in the central and western portion of the USGS study area which, in general, corresponds with the limits of the Tracy Subbasin. Based on analyses of 36 water supply wells in the subbasin, TDS ranges from 210 to 7,800 mg/L and averages about 1,190 mg/L.

Impairments. Areas of poor water quality exist throughout the subbasin. Areas of elevated chloride occur in several areas including: along the western side of the subbasin; in the vicinity of the City of Tracy; and along the San Joaquin River. Areas of elevated nitrate occur in the northwestern part of the subbasin and in the vicinity of the City of Tracy. Areas of elevated boron occur over a large portion of the subbasin from south of Tracy and extending to the northwest side of the subbasin.

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	34	4
Radiological	39	2
Nitrates	36	2
Pesticides	36	2
VOCs and SVOCs	37	0
Inorganics – Secondary	34	18

[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: 500 – 3,000 gpm with specific capacities of 10 to 100 gpm/ft (Davis G.H. et al. 1964)	
	Total depths (ft)	
Domestic	Range: 44 – 665	Average: 188 (Based on 888 well completion reports)
Municipal/Irrigation	Range: 60 – 1,020	Average: 352 (Based on 70 well completion reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	3 semiannually
San Joaquin County Flood Control [and cooperators]	Groundwater levels	15 semiannually
DWR	Miscellaneous water quality	6 biennially
Department of Health Services and cooperators	Title 22 water quality	183 annually

Basin Management

Groundwater management:	San Luis and Delta-Mendota Water Authority North adopted an AB 3030 plan on December 5, 1997. The Water Authority is composed of the following agencies/companies: Banta-Carbona I.D.; City of Tracy, Del Puerto W.D.; Patterson W.D.; Plain View W.D.; San Joaquin County FC&WCD; West Side I.D.; and West Stanislaus I.D.
Water agencies	
Public/Private	Naglee Burk I.D., North Delta W.A., City of Tracy, Contra Costa W.D., Diablo W.D., East Contra Costa I.D., Alameda CFC&WCD, Banta-Carbona I.D., Byron Bethany I.D., Central Delta W.A., City of Antioch WSA, City of Brentwood WSA, Pescadero R.D. No. 2058, Plain View W.D., Reclamation District No. 2039. South Delta W.A., Stockton-East W.D., The West Side I.D., West Stanislaus I.D.

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Errata

Updated groundwater management information and added hotlinks to applicable websites. (1/20/06)