Upper Santa Ana Valley Groundwater Basin, Chino Subbasin

- Groundwater Basin Number: 8-2.01
- County: San Bernardino
- Surface Area: 154,000 acres (240 square miles)

Basin Boundaries and Hydrology

The Chino Subbasin is bounded on the east by the Rialto-Colton fault; on the southeast by the contact with impermeable rocks forming the Jurupa Mountains and low divides connecting the exposures. On the south the subbasin is bounded by contact with impermeable rocks of the Puente Hills and by the Chino fault; on the northwest by the San Jose fault; and on the north by impermeable rocks of the San Gabriel Mountains and by the Cucamonga fault (Koehler 1983). San Antonio Creek and Cucamonga Creek drain the surface of the subbasin southward to join Santa Ana River. Annual mean precipitation ranges from 13 to 29 inches across the surface of the subbasin and averages about 17 inches.

Hydrogeologic Information

Water Bearing Formations

The water-bearing units in the Chino Subbasin includes Holocene and Upper Pleistocene alluvium.

Holocene Alluvium. This unit consists mainly of alluvial-fan deposits, with maximum thickness of 150 feet that are coarsest in and near the mouths of the canyons, and are finer away from canyon mouths in the southern part of the subbasin.

Pleistocene Alluvium. This unit is exposed mainly in the northern part of the subbasin and supplies most of the water to wells in the subbasin. The Pleistocene alluvium is about 600 to 700 feet thick throughout most of the subbasin. The alluvium contains interfingering finer, alluvial-fan deposits and coarser, fluvial deposits. Most of the wells producing water from the eastern half of Chino Subbasin draw from the coarse portion of the Pleistocene alluvium (LCAA 1981). The combined effects of sorting and weathering give the Pleistocene alluvium in the central part of the subbasin the lowest clay content and the highest well yields with 500 to 1,000 gallons per minute. In the southern part of the area, where the sediments tend to contain more clay, wells generally yield between 100 and 500 gpm (DWR 1970).

Restrictive Structures

The Chino Subbasin is bounded by three major fault systems. Many of the faults within the subbasin form ground water barriers marked by discontinuities in ground water elevations. The Rialto-Colton fault forms the eastern boundary of the Chino Basin. Although it has no surface expression, it forms a major barrier to ground water movement. The San Jose fault forms the northwest boundary of the Chino Basin. It displaces the base of fresh water from 250 feet to 400 feet (LCAA 1981). The Cucamonga

fault zone forms part of the northern boundary of the Chino Basin. Displacement on this fault amounts to about 1,000 feet on the west end to 4,000 feet at its east end. Low scarps in Holocene and Pleistocene alluvium near the mouths of Cucamonga, Day, and Etiwanda Canyons indicate its recent geologic activity. Rising water at the base of Guard Station Hill indicates it forms a ground water barrier (LCAA 1981).

Recharge Areas

Ground water recharge to the subbasin occurs by direct infiltration or precipitation on the subbasin floor, by infiltration of surface flow, and by underflow of ground water from adjacent basins. The five recharge facilities in the subbasin are Deer Creek, Day Creek, East Etiwanda, San Sevaine, and Victoria (Koehler 1983).

Groundwater Level Trends

Groundwater levels declined about 80 feet from historical high marks in the 1920s by 1980. By 2000, water levels had recovered about 20 feet.

Groundwater Storage

Groundwater Storage Capacity. Total storage within the subbasin is 18,300,000 af (DWR 1971).

Groundwater in Storage. Water in storage in 1982 was estimated to be 8,600,000 af (CDMI 1983). Water in storage in the Fall of 1997 is estimated to have been 5,3000,000 af, and in the Fall of 2000 to have been 5,325,000 af (Malone 2002).

Groundwater Budget (Type A)

The Chino Subbasin was adjudicated in 1978 and is pumping within the subbasin is managed and reported by the Chino Basin Watermaster. Total groundwater production in the Chino Subbasin is estimated at 145,735 af during the 1997-1998 water year, 162,267 af for 1998-1999 (CBW 2000), 178,820 for 1999-2000, and 161,475 for 2000-2001 (Malone 2002).

Groundwater Quality

Characterization. Water is predominantly calcium-sodium bicarbonate throughout the subbasin. Total dissolved solids in the subbasin ranges from 200 mg/l to 600 mg/L (Koehler 1983) and has an average of 484 mg/L (WE 2000). According the Department of Health Services, the TDS concentration from Title 22 wells ranges from 149 mg/l to 1,710 mg/l and has an average of 359 mg/l.

Impairments. The most serious problems continue to be high concentrations of dissolved solids and nitrate-nitrogen.

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	153	17
Radiological	149	5
Nitrates	164	73
Pesticides	153	6
VOCs and SVOCs	151	10
Inorganics – Secondary	153	31

[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: to 1,500 gal/min	Average: 1,000 gal/min
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
USGS and cooperators	Groundwater levels	12
USGS and cooperators	Miscellaneous water quality	8
Department of Health Services	Title 22 water quality	187

Basin Management

Groundwater management:	The Chino Groundwater Basin was adjudicated in 1978. The Chino Basin Watermaster is responsible for the management of this subbasin and they have prepared an Optimum Basin Management Program-Draft phase 1 report.
Water agencies	
Public	Chino Basin Municipal Water District.
Private	

References Cited

Camp Dresser and Mckee Inc. (CDMI). 1983. *Chino Basin Groundwater Storage Program Final Report.* A consultant report prepared for California Department of Water Resources and The Metropolitan Water District of Southern California.

Chino Basin Watermaster (CBW). 2000. Twenty Second Annual Report of the Chino Basin Watermaster Fiscal Year 1998-1999.

California Department of Water Resources (DWR). 1934. South Coastal Basin Investigation. *Geology and Ground Water Storage Capacity of Valley Fill.* Bulletin No. 45.

_____ 1971. Meeting Water Demands in the Chino-Riverside Area. Bulletin No. 104-3.

_____ 1986. San Bernardino-San Gorgonio. Water Resources Management Investigation Water Basins of the Coastal Plain of Los Angeles County. Bulletin No. 104.

Koehler, J. H. 1983. *Artificial Recharge in the Northern Part of Chino Ground-Water Basin, Upper Santa Ana Valley, California.* United States Geological Survey (USGS). Water Resources Investigations Report 832-4122.

LeRoy Crandall and Associates (LCAA). 1981. Report of Hydrogeologic Findings Phase I Geology and Hydrogeology Tasks Feasibility Study of the Chino Ground Water Basin Storage Program.

Malone, Andrew E. 2002. Wildermuth Environmental Inc. Electronic Mail to Marta Espinoza, Department of Water Resources. 9 May, 2002.

Wildermuth Environmental, Inc. (WE). 2000. TIN/TDS Study Phase 2A – Technical Draft Memorandum.

Errata

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