Coastal Plain of Los Angeles County Groundwater Basin, West Coast Subbasin

- Groundwater Basin Number: 4-11.03
- County: Los Angeles
- Surface Area: 91,300 acres (142 square miles)

Basin Boundaries and Hydrology

The West Coast Subbasin of the Coastal Plain of Los Angeles Basin is adjudicated and commonly referred to as the "West Coast Basin." It is bounded on the north by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River. On the east it is bounded by the Newport-Inglewood fault zone, and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills (DWR 1999). The surface of the subbasin is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which then flow into San Pedro Bay. Average precipitation throughout the subbasin is 12 to 14 inches.

Hydrogeologic Information

Water Bearing Formations

The water-bearing deposits include the unconsolidated and semi-consolidated marine and alluvial sediments of Holocene, Pleistocene, and Pliocene ages. Discharge of groundwater from the subbasin occurs primarily by pumping extractions (DWR 1961).

The principal aquifers present in the subbasin are below.

Aquifers/ Aquiclude	EPOCH	Formation	Lithology	Maximum Thickness (feet)	Yield (gpm)
Semiperched	Holocene	Alluvium	Sand, silt, clay	60	
Bellflower			Silty clay, clay	80	
Gaspur			Coarse sand, gravel	120	
Bellflower			Silty clay, clay	200	
Gardena			Sand, gravel	160	100-1300
Gage	Pleistocene	Lakewood Formation	Fine to coarse-grained sand and gravel	160	
Lynwood	Lower Pleistocene	San Pedro Formation	Sand, gravel with small amount of clay	200	500-600
Silverado			Coarse sand and gravel	500	
unnamed			Coarse sand and gravel/silt and clay	500 to 700	

The Semiperched aquifer of both Holocene and Pleistocene age is unconfined. The water in underlying aquifers is confined throughout most of the Basin, though the Gage and Gardena aquifers are unconfined where water levels have dropped below the Bellflower aquiclude (DWR 1961). These aquifers merge in places with adjacent aquifers, particularly near Redondo Beach (DWR 1961).

The Silverado aquifer, underlying most of the West Coast Basin, is the most productive aquifer in the Basin. It yields 80-90 percent of the groundwater extracted annually (DWR 1999). Specific yield values range from 1 percent to 26 percent (DWR 1961), with a subbasin average of 13 percent (DWR 1961).

Restrictive Structures

Folding and associated faulting have formed the dominant northwest-trending structural features in West Coast Basin. The major structural feature in the area is the Newport-Inglewood fault zone, which forms the eastern boundary of the subbasin and is a partial barrier to groundwater movement in the area. This zone is marked by thinning, folding and offsetting of the aquifers. Southeast of Signal Hill, the Cherry Hill and Reservoir Hill faults of this zone act as barriers to groundwater movement in all aquifers (DWR 1961). The Avalon-Compton fault acts as a barrier below the Lynwood aquifer. The Rosecrans and Dominguez anticlines appear to act as partial barriers to groundwater movement (DWR 1961).

Recharge Areas

Natural replenishment of the Basin's groundwater supply is largely limited to underflow from the Central Basin through and over the Newport-Inglewood fault zone. Water spread in the Central Basin percolates into aquifers there, and eventually some crosses the Newport-Inglewood fault to supplement the groundwater supply in the West Coast Basin. Seawater intrusion occurs in some aquifers that are exposed to the ocean offshore. Injection wells in the West Coast Basin Barrier create a north-south trending mound of fresh water from the LA International Airport south to the Palos Verdes Hills. Injection wells also form a protective mound at the Dominguez Gap Barrier near Wilmington (DWR 1999). Minor replenishment to the West Coast Basin occurs from infiltration of surface inflow from both the Los Angles and San Gabriel Rivers into the uppermost aquifers. Other minor sources of recharge by infiltration from the surface include return irrigation water from fields and lawns, industrial waters, and other applied surface waters.

Groundwater Level Trends

Water levels have risen about thirty feet from levels measured before adjudication of the subbasin in 1961(DWR 1999). In 1999, water levels were higher in the El Segundo and Dominguez gap areas from water levels of 1998 (DWR 1999). The general regional groundwater flow pattern is southward and westward from the Central Coastal Plain toward the ocean.

Groundwater Storage

Groundwater Storage Capacity. The storage capacity of the primary water producing aquifer, the Silverado aquifer, is estimated to be 6,500,000 af (DWR 1961).

Groundwater Budget (Type A)

A complete budget could not be constructed due to the lack of available data. However, some inflows and outflows for the subbasin were determined for water year 1998, and should give an idea of the subbasin activity. Recharge to the subbasin by means of artificial recharge was determined to be 95,638 af (DWR 1999). The subbasin received about 19,665 af of recharge from injection into wells forming the Dominguez Gap Barrier (DWR 1999). Subsurface inflow, arriving primarily from the Central Basin, accounts for 68,473 af (DPW 1952) of recharge to the subbasin. Extractions from the subbasin are predominately for urban use, with a small amount dedicated to agriculture. Urban use accounted for 51,673 af (DWR 1999), while agriculture was 89 af (DWR 1999).

Groundwater Quality

Characterization. The character of water in the Gaspur zone of the subbasin is variable. Seawater intrusion has produced deterioration of water quality over time. Early tests indicated that the water was sodium bicarbonate in character. It is questionable whether this is representative of the entire zone, because the higher quality water residing outside the subbasin is calcium bicarbonate in nature (DPW 1952).

The Gardena water-bearing zone exhibits a calcium-sodium bicarbonate character and is of good quality. In the Silverado zone, the character of water varies considerably. In the coastal region of this zone, the water is calcium chloride in character, and then transitions into sodium bicarbonate moving inland. The Pico formation is sodium bicarbonate in nature and is of good quality (DPW 1952). Data from 45 public supply wells shows an average TDS content of 720 mg/L and a range of 170 to 5,510 mg/L.

Impairments. Seawater intrusion occurs in the Silverado zone along the Santa Monica Bay and in the Gaspur zone in the San Pedro Bay. Two seawater barrier projects are currently in operation. The West Coast Basin Barrier Project, which runs from the Los Angeles Airport to the Palos Verde Hills, and the Dominguez Gap Barrier Project which covers the area of the West Coast Basin bordering the San Pedro Bay. Injection wells along these barriers create a groundwater ridge, which inhibits the inland flow of salt water into the subbasin to protect and maintain groundwater elevations (DWR 1999).

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	45	0
Radiological	45	1
Nitrates	46	0
Pesticides	46	0
VOCs and SVOCs	44	0
Inorganics – Secondary	45	30

[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	To 1,300 gal/min
	Total depths (ft)
Domestic	
Municipal/Irrigation	

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
USGS	Groundwater levels	67
USGS	Miscellaneous water quality	58
DWR	Groundwater levels	71
Department of Health Services and cooperators	Title 22 water quality	45

Basin Management

Groundwater management:	In 1961 the West Coast Basin was adjudicated, and the Department of Water Resources was retained as Watermaster. Each month individual pumpers report their extractions to the Watermaster, which allows the Watermaster to regulate water rights in the subbasin. (DWR 1999)
Water agencies	
Public	City of El Segundo, City of Inglewood, City of Lomita, City of Long Beach, City of Los Angeles, City of Signal Hill, City of Torrance
Private	California-American Water Co., California Water Service Co., Dominguez Water Corp., Los Angeles Waterworks Dist. 29, Southern California Water Company. (DWR 1999)

References Cited

California Department of Public Works (DPW). 1952. *West Coast Basin Reference-Report of Referee.* 130 p.

California Department of Water Resources (DWR). 1961. *Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County.* Bulletin No. 104.

____, Southern District. 1999. *Watermaster Service in the West Coast Basin, Los Angeles County, July 1, 1998 – June 30, 1999.* 84 p.

Water Replenishment District of Southern California, 2000, *Engineering Survey and Report*

Additional References

California Department of Water Resources (DWR). 1958. *Sea-Water Intrusion in California.* Bulletin No. 63. 91 p.

____. 1975. *Sea-Water Intrusion in California.* Bulletin No. 63-5. 394 p.

Errata

Changes made to the basin description will be noted here.