

Groundwater Occurrence and Movement

Groundwater pumped from the CWCB currently provides approximately 36% of the total water supplies used by the overlying population of four million people in 43 cities of southern Los Angeles County.

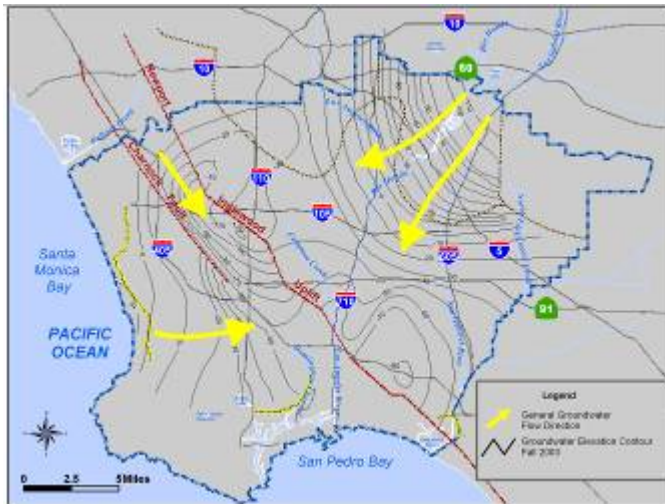


Figure 3—General Groundwater Flow Directions

Groundwater occurs in the pore spaces of the sediments in the basins. Where these sediments are thick and transmissive enough to supply sufficient quantities of water to wells for beneficial use, they are termed "aquifers". The name "aquitard" is given to the less permeable silt and clay layers that separate the aquifers. The major aquifers identified in the CWCB are shown on Figure 2 and include the following, from shallowest to deepest: **A)** the Gaspar and Semiperched aquifers of the Holocene Alluvium Formation; **B)** the Exposition, Artesia, Gage, and Gardena aquifers of the Upper Pleistocene Lakewood Formation; **C)** the Hollydale, Jefferson, Lynwood, and Silverado aquifers of the Lower Pleistocene Upper San Pedro Formation; and **D)** the Sunnyside Aquifer of the Lower Pleistocene Lower San Pedro Formation.

Aquifer depths can reach more than 2,000 feet in the CB and 1,500 feet in the WCB, although production wells generally do not need to be drilled this deep to tap sufficient water. The general direction of groundwater flow is shown on Figure 3. Both the NIU and the Charnock Fault (in the WCB) are partial barriers to groundwater flow, causing differences in water levels on opposite sides of each fault system.

Most of the groundwater in the CWCB remains at an elevation below sea level due to historic over pumping, so the importance of maintaining the seawater barrier wells to keep out the intruding saltwater is critical.

The Groundwater Budget

Based on recent modeling of the CWCB by the U.S. Geological Survey (2003), an average groundwater budget was developed for the 30-year base period between water years 1970/71 and 1999/00 (Table 1). This budget shows the average annual inflows (recharge) and outflows (discharge) to the basins in acre-feet per year. Natural inflows come from the conservation of rainfall or snow melt. Artificial inflows come from imported and recycled water purchased by WRD. The major areas for inflow include the Rio Hondo and San Gabriel River spreading grounds in the Montebello Forebay, the seawater barrier injection wells along the coast, areal recharge from precipitation falling on the basin floor and hillside runoff, groundwater underflow from adjacent basins, and continued seawater intrusion in certain areas. The major outflow is from groundwater extracted from the nearly 550 production wells located throughout both basins.

This average water budget provides a useful picture of the long-term ins and outs of the CWCB, but will change over time as hydrological, cultural factors and water sources evolve. It will be updated in the future as needed.

	CENTRAL BASIN	WEST COAST BASIN	TOTAL
Inflow			
Spreading - Stormflow	48,825	0	48,825
Spreading - Imported	39,305	0	39,305
Spreading - Recycled	34,770	0	34,770
Areal Recharge	32,300	15,600	47,900
Barrier Injection	5,300	29,300	34,600
Net Underflow	44,680	3,800	48,480
Seawater Intrusion	0	7,100	7,100
Total	205,180	55,800	260,980
Outflow			
Pumping	197,500	53,090	250,590
Net (Inflow - Outflow)	7,680	2,710	10,390

Table 1—Average Annual Water Balance 1970/71—1999/00 (afy)

For more information on any of these topics, please contact the Water Replenishment District of Southern California.

Sources of Information for this Technical Bulletin:

Water Replenishment District of Southern California, 2004, "Engineering Survey and Report, 2004".

United States Department of the Interior, U.S. Geological Survey, 2003, "Geohydrology, Geochemistry, and Ground-Water Simulation-Optimization of the Central and West Coast Basins, Los Angeles County, California"; Water Resources Investigations Report 03-4065.

State of California Department of Water Resources, Southern District, 1961, "Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County - Appendix A - Ground Water Geology", Bulletin 104.