

GROUNDWATER REPLENISHMENT AT THE MONTEBELLO FOREBAY SPREADING GROUNDS

By: Ted Johnson, Chief Hydrogeologist
Email: tjohnson@wrd.org

Groundwater has been pumped out of the Central and West Coast Basins (CWCB) for over 100 years, providing residents and businesses with a reliable, high quality and relatively inexpensive source of water. Of all the water that is currently used in the basins, groundwater provides nearly 40% of the total supply. The remaining 60% is imported water from Northern California, the Colorado River and recycled water from local municipal wastewater treatment plants.

But will the groundwater supply last forever? Is it an infinite resource? Because more groundwater is pumped out than is naturally replenished, the answer is 'No'. Agencies such as WRD must provide artificial replenishment to supplement natural replenishment and keep the groundwater basins balanced to avoid overdraft (more water taken out than going in). Severe overdraft occurred in the first half of the 20th century resulting in falling water levels, loss of supply from storage, wells going dry, and seawater intrusion. These problems need to be avoided in the future.

One way of replenishing the groundwater basins is through spreading grounds. These "leaky lakes" must be constructed in geologically suitable areas where surface water can soak down into the subsurface and recharge the aquifers in a groundwater basin (**Figure 1**). For a spreading grounds project to work, the soil beneath it to the

water table must be highly permeable sand or gravel so the infiltrating surface water can move downward without blockage. If less permeable silt or clay layers exist, they can act as a barrier and prevent the water from reaching the water table and aquifers.

Groundwater recharge consists of many components such as infiltration of surface water (rain, rivers, lakes, irrigation water); underflow from adjacent basins; injection wells; and others. Groundwater discharge occurs from pumping wells; underflow to adjacent basins; losses to springs, rivers, or lakes; or others. The overall water balance for the CWCB was presented in Technical Bulletin #1. The focus of this current Technical Bulletin is on the Montebello Forebay Spreading Grounds (MFSG), which is the principle groundwater recharge area for the entire CWCB. These spreading grounds account for nearly half of the total groundwater replenishment in the CWCB. Therefore, they are critically important and must be protected, maintained and preserved as recharge facilities to ensure sufficient groundwater supplies in the future.

The MFSG consists of two facilities in the northeast portion of the Central Basin (**Figure 2**), the Rio Hondo Coastal Spreading Grounds (RHSG) and San Gabriel Coastal Spreading Grounds (SGSG). They are located downstream of the Whittier Narrows Dam adjacent to the Rio Hondo and San Gabriel river

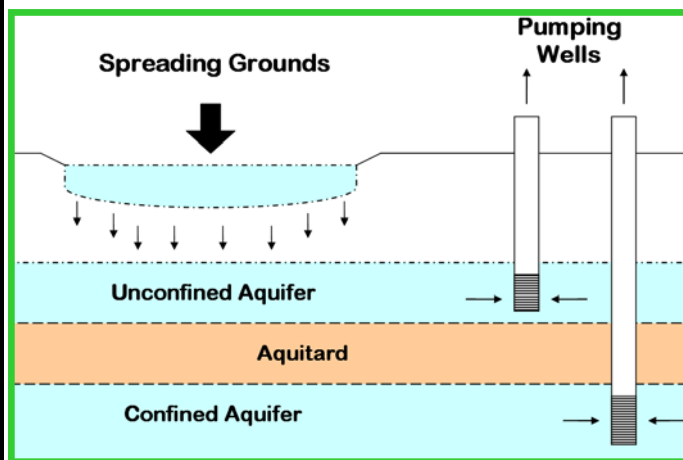


Figure 1—Typical Spreading Grounds (Recharge Facility)



Figure 2—MFSG in the Northeast Portion of Central Basin

channels, respectively. The RHSG consists of off-channel spreading grounds, while the SGSG consists of both off-channel grounds and the river channel itself. The Los Angeles County Flood Control District (LACFCD) owns and operates the MFSG for storm water conservation and flood control. Since the late 1930s, they have been recharging the groundwater basins with storm water runoff. But because storm water amounts are insufficient for the total replenishment needs of the CWCB, imported water was added in the 1950s and recycled water in the 1960s to supplement this natural source. **Table 1** lists additional information

	RHSG	SGSG
First Used	1937/38	1938/39 grounds; 1954/55 river channel
Size (acres)	570	128 grounds; 308 river channel
# of Sub-Basins	20	3 grounds; 7 river channel
Percolation Rate (cubic feet per second)	400	75 grounds; 75 river channel
Water Storage (acre feet)	3,694	550 grounds; 913 river channel

Table 1— Spreading Grounds Information (see Reference #1)

on the MFSG groundwater recharge facilities.

LACFCD has an extensive program of maintaining and grooming the spreading grounds to maximize groundwater recharge. During major storm events, the County works around the clock to ensure that as much runoff as possible is captured by diverting the flows to the various sub-basins instead of allowing the water to be lost to the ocean (**Figure 3**). During the times when the spreading grounds are not filled with storm water, WRD purchases imported and recycled water for artificial replenishment.

Since 1962/63, over 5.6 million acre feet (af) of water has been recharged at the spreading grounds, including 2.23 million af (40%) of storm water, 1.45 million af (26%) of recycled water, and 1.92 million af (34%) of imported water (see Reference #2).

Over time, recycled water amounts increased while imported water amounts decreased as the safety and reliability of the recycled water was proven through intensive sampling, monitoring, and research efforts. Currently, about 40% of the replenishment water is storm water, 40% is recycled water, and 20% is imported water.

But the Metropolitan Water District of Southern California (MWD) classifies the replenishment water it sells as interruptible water, and can shut it off any time for any reason. The most recent interruption started in May 2007 and continues today, and could continue through all of 2008 or longer depending on the severity of the current drought. If WRD cannot buy this water for replenishing the CWCB, then overdraft will occur and water levels will fall.

Fortunately, prior to the interruption, groundwater levels in the CWCB were in good condition and therefore can be drawn down for a period of time much like drawing down water levels in a reservoir. But the water levels will eventually have to be made up and there is no guarantee that imported water will be available. With this in mind, WRD's Water Independence Network (WIN) was developed with the goal of making the CWCB self-sustaining basins. Eliminating the basins' dependence on imported water for replenishment purposes can be achieved by using more storm and recycled water. Ultimately, implementation of the suite of WIN



Figure 3 - Rio Hondo Spreading Grounds are full after a storm event

Reference Information used for this Technical Bulletin:

1. Los Angeles County Department of Public Works Web Site accessed 3/13/08: <http://www.ladpw.org/wrd/spreadingground/information/>
2. Water Replenishment District of Southern California, 2008, Regional Groundwater Monitoring Report for Water Year 2006/2007, Table 2.1