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USGS scientists find new Mojave Desert water-storage options

Possible new groundwater recharge areas to serve growing desert population

Scientists at the U.S. Geological Survey (USGS), working with the City of Victorville and the Mojave Water Agency (MWA), have recharged water through 400 feet of dry earth in California's Mojave Desert to groundwater basins previously thought unavailable for municipal water storage.

The new findings, published in the scientific journal *Ground Water* (<http://www.ngwa.org/publication/gw/index.aspx>), could enable water managers in the fast-growing Victor Valley to replenish groundwater in areas where geology and the depth of the water basin have made recharge difficult. The water table in some of those areas has dropped up to 60 feet from historic levels due to heavy municipal use.

These new findings will help ensure the long-term dependability of water access in the region, USGS scientist John Izbicki said.

Victorville Councilman Bob Hunter, who has strongly advocated recharge projects, was elated with the findings.

"Recharging our basins is critical to our future. We have to think beyond traditional answers and take advantage of scientific strategies to provide the needed water for our growing region," Hunter said.

"With California's water crisis, projects like this will enable us to meet the many diverse water demands in our area," said Kirby Brill, MWA general manager. "This project is but another example of how working together we can address the region's water needs."

Water agencies can replenish underground storage by several methods, including the use of recharge ponds that allow water to infiltrate into the groundwater basin, or aquifer. These recharge ponds are usually located close to rivers where coarse sands, scoured by stream flow, and shallow aquifers allow water to reach the basin quickly.

But with population in the Victor Valley growing from about 90,000 in 1980 to 420,000 in 2005, desert communities have grown far from traditional sources of supply, pumping deep aquifers for their water. Because of the rapid growth, those areas are tapping groundwater faster than it can be replenished naturally.

Izbicki, the chief scientist on the study, theorized that desert basins could be replenished if recharge ponds were placed near dry washes, where occasional runoff created favorable geologic conditions.

The Victor Valley and Baldy Mesa water districts, recently merged into the Victorville Water District -- a subsidiary of the City of Victorville -- built a one-acre recharge pond in the Oro Grande Wash, a tributary of the Mojave River that parallels Interstate 15 between Cajon Pass and Victorville. Scientists from the USGS drilled a 460-foot hole next to the pond and installed instruments to monitor water movement and quality. At first, the water took three years to move from the test pond to the water table. But once the ground was wet, water took only one year to travel downward from the pond to the aquifer.

A one-year recharge rate would allow water agencies to recharge the aquifer while providing for municipal uses.

“The study site was carefully planned and monitored,” Izbicki said. “We had a very good idea that this would work. With instruments exactly placed, we were able to determine within days when the water actually reached the aquifer.”

The City of Victorville and the Mojave Water Agency are using the findings to help design a full-scale multi-use project to recharge the depleted aquifer and store water for future use in the Victorville area. During three years of the study, about 1,000 acre-feet of water was infiltrated into the test pond. Local water agencies are designing a large-scale project that will percolate as much as 8,000 acre-feet of water annually.

Reggie Lamson, director of the water district for the City of Victorville, said that phase one of the project is already in the design stage. The agencies will first build a water metering facility located adjacent to the California Aqueduct to accurately monitor and control the amount of drawn water. Next, a 42-inch pipeline will be built to bring water to the planned Oro Grande Wash Percolation Facility.

There, water will fill ponds that will percolate hundreds of feet for “banking” deep in the earth.

“This is another tool in our toolbox to stabilize water supply in the area,” Lamson said.

Izbicki said it is uncertain how the recharge area will respond to a large-scale project. But if successful, that amount of recharge over 20 years would increase water levels in almost all of the wells in the Victorville area west of the Mojave River, reversing more than 50 years of water-level declines.

“Artificial recharge also was successful at another pond along Oro Grande Wash about three and a half miles farther downstream where the depth to water was 225 feet,” Izbicki said.

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