

Satellites detect dramatic Valley water loss

Tim Sheehan, Fresno Bee, 12-15-09

NASA satellites orbiting 280 miles above Earth are revealing what many in the San Joaquin Valley already know: the region's underground water table is being depleted faster than it's being replenished.

But the amount of water being lost is surprising.

The volume pumped from underground for agriculture, cities and industry is "not sustainable if current trends continue," said Jay Famiglietti, a professor of Earth sciences at University of California at Irvine who worked on the study. And reduced allocations of river water for Valley farmers, he added, will likely increase pumping demands "for the foreseeable future."

Over the past 5 1/2 years, enough water was lost in the San Joaquin and Sacramento river basins to fill Nevada's Lake Mead -- the effect of an extended drought and more pumping of water for agriculture and other human needs.

Scientists from the space agency and UC Irvine presented their findings Monday to the American Geophysical Union in San Francisco.

"Everyone [in the Valley] already knows ground water is being depleted at a rapid clip," Famiglietti said. "But I was surprised at the rate of depletion."

Famiglietti and other scientists said that between October 2003 and March 2009, the overdraft totaled more than 30 cubic kilometers of water. One cubic kilometer is about 264.2 billion gallons -- enough, according to some estimates, to meet the residential water needs of about 7.2 million people for a year.

For years, the U.S. Geological Survey and water agencies have measured sample wells scattered throughout the region. But Famiglietti said the accuracy of NASA's satellites -- which track tiny changes in Earth's gravitational field -- makes the information much more reliable.

"The [depletion] rates we found are bigger than what USGS reported," Famiglietti said. "And when you think of it, it makes sense because of the drought, the reduced water allocations for agriculture and the reduced snowpack. But it's still a surprise."

Famiglietti reported that the San Joaquin River basin, which includes the Tulare Lake Basin, is losing water at the net rate of 3.5 cubic kilometers a year (about what more than 6 million families of four would use in a year) -- most from groundwater pumping. Agriculture typically uses about 80% of groundwater compared to municipal needs, he said.

In the central San Joaquin Valley, every city except Fresno and Clovis relies solely on pumped water for municipal supplies. Fresno and Clovis have small surface-water supplies to augment what they pump from underground.

NASA's twin GRACE (Gravity Recovery and Climate Experiment) satellites were launched in 2002. By measuring minute changes in gravity and mass on Earth, scientists can determine the amount of water under the ground.

The GRACE findings were no surprise to either Valley water officials or conservationists.

"The trend for years has been down, and we all know that," said Randy McFarland, a spokesman for the Friant Water Authority and the Kings River Conservation District.

"We've monitored wells for years, and there are periods when it's down and periods when it's recovered somewhat after rainy years," McFarland said. But, he added, drought has reduced the availability of surface water and forced farmers to pump more in recent years to irrigate crops.

Speck Rosekrans, a senior analyst with the Environmental Defense Fund, said the data from the satellites "just puts a better number on things."

"Groundwater overdraft is a huge problem, and it needs to be addressed," Rosekrans added. "While the NASA analysis doesn't represent new data, it may tell a story in a way that forces the public and water managers to act."

Famiglietti said he hopes the data can help politicians and water managers come up with solutions.

"There's no agenda here," he said. "We're telling people, this is what we found. If it's helpful to you, you're welcome to use it."