

Groundwater -- resource remains vast but difficult to define fully

Kate Campbell, Ag Alert, 10-13-15

It's a vital California resource, but groundwater isn't easily understood—and during the state's four-year drought, as groundwater pumping has increased in response to reduced surface supplies, it has been the subject of sometimes-alarming, but not necessarily accurate, public statements about the health of the resource.

The drought has focused attention on groundwater and newly adopted laws aim to ensure the resource is sustainably managed. But water experts say gaps remain in scientific understanding of subsurface water supplies.

There's general agreement by water experts that during an average year, the resource provides about 30 percent of the water needed for farms, families and the state's economy. During dry spells, that proportion increases to more than 60 percent.

Certain areas of the state have no groundwater and others rely on it completely. Some groundwater lies near the surface; other sources are thousands of feet deep.

There are declining groundwater levels and areas where land has subsided as water has been withdrawn.

But Tim Quinn, executive director of the Association of California Water Agencies, dismisses the notion that the state might be running out of groundwater.

"We have hundreds of millions of acre-feet of groundwater under our feet in California," Quinn said.

Past estimates of just how much water is stored underground ranged from 850 million acre-feet to 1.3 billion acre-feet. By comparison, the six main reservoirs in the federal Central Valley Project can hold a combined 11.8 million acre-feet.

"The system is not broken just because a lot of groundwater is being pumped right now," Quinn said. "Instead, we're in the middle of a horrific natural disaster and, to survive these immediate circumstances, farmers and cities have turned to groundwater."

Over the long term, Quinn said groundwater needs to be protected, "to ensure it's available when dry years come again."

Given the severity of the current drought, the U.S. Geological Survey said it found many Central Valley wells are at or below historic water levels. Subsidence in some areas of the San Joaquin Valley has resulted in land surface declines during the past couple of years.

"The groundwater storage capacity of an individual basin or within the entire state is one of the questions most frequently asked by private citizens, water resource planners and politicians alike," authors of the State Water Plan wrote in an update to the plan.

Answering the question isn't easy, because information is complex and there's still much that's unknown about groundwater resources, said hydrogeologist Todd Kincaid of Reno-based GeoHydros, a consulting firm specializing in geological and hydrological modeling.

He said technology used for modeling relies on data from multiple sources—sometimes old paper reports, spreadsheets and maps, as well as the latest satellite images and geophysical exploration technology adapted from oil and gas exploration.

Once data are pulled together, Kincaid and his team use computer analysis to create three-dimensional models designed to "see" underground structures and understand subterranean water movement. Some basins are well understood, he said, whereas information for others is incomplete or nonexistent.

Although determining total underground storage capacity is still evolving, hydrologists agree with estimates that conclude capacity stands in the hundreds of millions of acre-feet, at least, though not all of that groundwater would be usable.

It's generally agreed the largest groundwater reservoirs are found in the Central Valley—spanning more than 400 miles underground through the Sacramento and San Joaquin valleys. The majority of the supply arrives as runoff that seeps into the aquifers. Depending on surface hydrology and soil types, some aquifers recharge faster than others.

Following passage last year of new laws known as the Sustainable Groundwater Management Act, or SGMA, the state has ranked groundwater basins to identify those most compromised or heavily used, to allow for targeted funding and more rigorous management, said Jack Rice, California Farm Bureau Federation associate counsel, noting 21 basins and sub-basins have been identified as "significantly overdrafted."

"Population and growth, the number of wells, irrigated acreage, groundwater use in total and percent of total supply are part of the categories that are used to rank basins experiencing problems," Rice said.

The state Department of Water Resources will release a final list of critically overdrafted basins in coming days. Those basins will need to have groundwater sustainability plans in place by Jan. 31, 2020, two years earlier than other high- and medium-priority basins.

"It's extremely important for farmers and ranchers who rely on groundwater to get involved with implementation of SGMA," said Danny Merkley, CFBF water resources director. "Part of that involvement will require some understanding of groundwater as a natural resource."

Although SGMA will focus on stabilizing and managing groundwater, Merkley said, "the real solution to water supply stability is to build more surface water storage. With adequate surface water supplies, the need to go to groundwater can be greatly reduced."