Central Valley sinks as parched farms wring water from aquifers

Debra Kahn, Environment & Energy Publishing, 1-3-14

FIREBAUGH -- A large swath of Central Valley is sinking as farms pump groundwater in the face of searing drought, sparking a scramble for solutions as forecasts show no end to dry conditions.

So says the U.S. Geological Survey, whose research shows land near the San Joaquin River sank by nearly a foot per year from 2008 to 2010, one of the most dramatic rates ever measured in the San Joaquin Valley.

Using satellite imagery, scientists identified a sinking bowl that sprawls more than 1,200 square miles and includes five towns, part of the San Joaquin River and a network of canals used for irrigation and flood control. USGS had studied the area a half-century or so ago.

"We'd largely stopped measuring subsidence about 30 years ago because it wasn't a problem anymore," hydrologist Michelle Sneed said. "We were really surprised about the large size of the area and the high rate of subsidence measured as part of the recent study."

The most recent subsidence has buckled concrete liners in the Delta-Mendota Canal, which distributes water from the Sacramento-San Joaquin Delta. The Central California Irrigation District has spent $5 million in recent years on shoring up leaks in a canal that has lost nearly half its capacity.

"It's directly a mitigation for subsidence," said district General Manager Chris White, who emphasized that the problem didn't start in his district. "We have subsidence because of pumping going on around us."

The Bureau of Reclamation, which commissioned the study in preparation for up to $800 million in restoration work on the San Joaquin River, isn't sure yet how the sinking will affect its plans.

Before beginning construction, Reclamation wanted to ensure the stability of the river and surrounding land. The agency has to restore river channels, build fish passages and help other agencies reintroduce chinook salmon under a 2006 settlement with environmental groups over water diversions.

Initial measurements confounded the agency. "We originally thought we got some bad readings and such, but no, the readings were correct," said Rick Woodley, resources manager for Reclamation's mid-Pacific region. "That was when we identified that maybe we've got more of a problem here, and this report is validating that."

The USGS findings have complicated Reclamation's efforts, although it's still too early to say how they might affect the timeline for river restoration, Woodley said.

"I don't know that there's any construction projects that are on hold," he said. "There are some that were in the queue, fixes on the Sacramento dam and some diversion structures in that area, a fish screen that was programmed to go in."

The sinking points to an important issue for California: unregulated groundwater withdrawals.

Water experts say California lives up to its "Wild West" reputation in groundwater management with a patchwork of more than 2,500 water service providers that may or may not have authority over a resource that supplies roughly 35 percent of agricultural and urban water usage.

"We may have the least [groundwater regulation] of any state," said Felicia Marcus, head of the State Water Resources Control Board. "It's probably a tie with Texas at the state level."

Marcus said the state is looking to local water managers to oversee groundwater withdrawals. "We do have many basins that are well-managed at the regional level, which is the ideal place to be doing it because it is neighbors managing their collective resource," she said.

But aquifers aren't always aligned with water districts above them. "Regulating groundwater isn't something a district can just do unless it has authority over the given groundwater basin," she said. "Some districts may have organized around a groundwater basin; others have not. The mix of surface and groundwater varies widely agency to agency. It's very complicated and very local."

In San Luis Obispo County, the Paso Robles Basin has dropped so much in recent years that the county passed an emergency ban last summer on new or increased pumping. County officials are now considering forming a new agency to regulate groundwater use.

And the state water board stepped into Monterey County with an order to end pumping from the Carmel River by 2017. Among the responses being weighed are construction of a desalination plant and reinjecting treated wastewater into depleted aquifers.

"There are compelling stories everywhere," Marcus said, adding that some problems confound local regulatory action.

"At the state level, we can now only take action after a basin is seriously overdrafted and water quality is thereby affected unless there is a connection to surface water," she said. "By the time our current authorities let us go in, in many cases, it's kind of late."

'Easier said than done'

The construction of huge state-funded and federally funded canals in the mid-20th century had managed to halt subsidences by bringing water from rivers to farmers and cities. But recent drought and regulatory cutbacks in water deliveries to protect endangered fish have forced farmers to turn back to large-scale groundwater pumping.

Groundwater conditions vary according to topography -- there are 515 groundwater basins in the state -- and local regulatory structures, making it a regional problem.

"There's plenty that you can do to manage around subsidence, but it requires some really specific local knowledge about supplies," the Central California Irrigation District's White said. "It's so site-specific, what the problem might be, that a state agency just has so many different types of areas to deal with; it's better dealt with on the local level."

Officials are trying to encourage regional authorities to exercise more power over groundwater withdrawals.

The state water board released a draft in October suggesting that agencies set water quantity and quality standards for the most at-risk water basins and then monitor groundwater to ensure that the standards are being met. The state would step in only in those cases where local or regional agencies could not.

"If you're managing groundwater at the regional level, you don't need the state to do it," said Marcus of the water board. But "it's sort of been an underground, 'You can't see it' issue. We're going to have to figure out collectively how to better manage water both above and below ground in the face of climate change and population growth. We're going to have to be better at all of it -- more efficient and just more real about using it more than once."

"The fix to the problem would be to maintain groundwater levels," USGS's Sneed said. "That's easier said than done in a state with very little laws about what you can pump."

But Marcus pointed to some success stories. In San Jose, which subsided about 13 feet between 1915 and 1970, for example, the Santa Clara Valley Water District not only monitors its groundwater quality and levels but also uses water recycling and reinjects treated water.

Solutions are difficult in the Central Valley because the area of subsidence is outside any water district's current jurisdiction. But White said landowners have stepped up to conserve water.

"They've managed their groundwater differently over the last year and a half and cut subsidence in half," he said. "The idea is to get it down to zero."