Calls grow for more oversight of California's groundwater

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Water tables have been dropping sharply in places across California as farms and expanding suburbs pump vast quantities of water during successive dry years, taking a heavy toll on many of the state's aquifers.

Measurements of water levels in wells throughout the state show that aquifers are being significantly depleted in many areas as more water is drained out than seeps back into the ground.

An analysis of groundwater data provided by the U.S. Geological Survey and two other agencies has found that, of 3,394 wells across the state, water levels declined in about 62 percent of the wells between 2000 and 2013.

Even with many wells lacking data for part of that 14-year period, the average drop in water levels among the declining wells was more than 15 feet. A total of 121 wells, mostly in Southern California and the San Joaquin Valley, had large declines of 50 feet or more in their water levels.

After one of California's driest years on record and an abnormally dry decade, the pressures on groundwater — which accounts for about 40 percent of the state's water supply — are increasing. Flows through rivers and canal systems have grown less reliable during the prolonged drought, diminishing the deliveries of water supplies that have traditionally sustained Central Valley farms and Southern California cities.

State and local officials have known about California's chronic problem of groundwater depletion for decades, and in some areas have taken steps to combat the declines. The state's history has been defined by more than a century of moving water to dry regions to defy the arid climate. But the continued downward trends in some aquifers reveal how California's approach to managing groundwater has serious flaws and how, in many cases, officials charged with watching water supplies haven't been able to get a grip on the problem.

Water scientists and some state policymakers have recently been calling for greater oversight of groundwater pumping, recommending that government agencies do a better job of tracking areas with critical problems and finding long-term solutions.

Falling water levels carry with them a host of impacts and risks, including higher costs to pump from wells and drill new wells, diminishing water quality, sinking ground that has damaged homes, and threats to wilderness areas where plants and animals depend on ample groundwater.

In an investigation of groundwater depletion in California, Gannett newspapers in the state — including The Desert Sun, the Visalia Times-Delta/Tulare Advance Register and The Salinas Californian — teamed up to collect data and interview those at the forefront of the problem, including farmers, well drillers, scientists and officials of water agencies.

The examination of three areas of the state revealed that declines in aquifers pose a variety of dilemmas depending on the region:

• In the San Joaquin Valley near Visalia, farmers are seeing wells on the verge of going dry and are being forced to drill new, deeper wells to reach the receding waters. A recent U.S. Geological Survey report found that so much water has been drained in some areas of the San Joaquin Valley that the ground has sunk at rates of nearly 1 foot a year.

• On the coast, areas such as Monterey County are battling saltwater intrusion, which is caused by over-

pumping and threatens to render some farmland unusable. Flows from rivers and reservoirs have been channeled to farming areas to try to diminish reliance on groundwater and keep at bay the seawater seeping into the freshwater aquifers.

• In the Coachella Valley, groundwater levels have been declining over the years despite deliveries of imported Colorado River water. As water levels have fallen, the ground has sunk in some areas and damaged homes, leaving cracked foundations and buckled streets. New scientific research has also found that groundwater depletion has contributed to the deaths of mesquite trees in desert sand dunes, harming an increasingly rare ecosystem that normally provides an oasis for wildlife.

• Well measurements across the state show that areas with declines of more than 50 feet in water levels were spread across the state, from the Central Valley near Merced and Fresno to Southern California cities such as San Bernardino, Victorville and Beaumont.

The effects of groundwater depletion are often invisible to most Californians. But the emerging impacts, if not adequately addressed, could eventually force controls on pumping in some areas and restrictions on development, and could threaten some of the state's $45-billion-a-year agriculture industry. Eventually, experts say, areas where groundwater levels have fallen dramatically are likely to be forced to come up with water budgets that strike a balance between inflows of water and the quantities being pumped out.

The use of groundwater is largely unregulated in California. Compared to other Western states such as Oregon, Nevada and New Mexico, California offers more of a free-for-all situation in which irrigators can pump massive quantities without having anyone tell them they shouldn't, said Michael Campana, a groundwater expert and professor at Oregon State University.

"The state needs to take some leadership, and I just haven't seen that," Campana said. He recalled that when he was a graduate student in the 1970s, his adviser pointed to the sinking ground in the San Joaquin Valley as "an egregious example of one state failing to take responsibility." And he said that recent research showing the ground is still rapidly sinking suggests that key lessons haven't been learned.

"Here we are 40-some years later, and they're still doing the same thing. It's like the classic definition of insanity," Campana said. "We don't pay as much attention to it until it's too late, like your ground surface starts dropping, or your wells dry up or your springs dry up. It's out of sight, out of mind. It's very easy to ignore it until it's too late."

Drilling deeper

Wes Harmon's phone has been ringing off the hook for the past six months. As a well driller in the remote San Joaquin Valley town of Riverdale, Harmon's is the number growers reach for when their wells start to sputter and slow — and this year he's been running from site to site. The next opening for just a little of Big River Drilling's time, even just an estimate, is in March.

"I don't like to see this," Harmon said. "The people who are suffering are the folks who don't have the money to get their water anywhere else."

Water normally flows down to the valley from the Sierra Nevada, feeding a vast labyrinth of canals. But farmers who rely on ditches fed by the Tulare Irrigation District had their water run out in August, the first time that's happened since 1990. So, with valuable permanent crops in the ground like walnuts and almonds, many farmers had no choice but to turn on their pumps.

And that pumping has come with a price as water levels throughout the San Joaquin Valley are dropping. Last

year alone, pumping in the Westlands Water District totaled 355,000 acre-feet, enough water to fill Hetch Hetchy, the reservoir that supplies the city of San Francisco.

As a result, groundwater levels dropped an average of 48 feet along the west side of the San Joaquin Valley, according to Westlands' data.

For many farmers, that means spending more than $10,000 to drill an agricultural well to a deeper level, often an additional 400 to 500 feet. Water levels in the San Joaquin Valley vary widely, from about 50 feet to 1,200 feet.

And as water levels fall, farmers are being forced to spend more on power bills to run their pumps or upgrade their pumps to add more horsepower.

"There's too many straws in the hole," Harmon said. "You can spend thousands of dollars chasing water — and drilling as many wells as you want — but that's not going to make the situation any better."

Scientists estimate that the Central Valley accounts for about 20 percent of the groundwater that is pumped in the nation. It's the lifeblood of the flourishing agriculture industry, producing crops from almonds to plums, nectarines and cotton.

So much water is used to irrigate the crops of the Central Valley that its aquifers have been losing groundwater at an estimated rate of more than 3 cubic kilometers each year. Hydrologist Jay Famiglietti, a UC Irvine professor who together with NASA researchers has studied the region, has calculated that over a decade, the amounts of groundwater extracted would be just about enough to fill Lake Mead, the nation's largest reservoir.

As the water is drained from the aquifers, spaces remain deep in the soil. The ground can collapse, causing the land surface to sink. It's been a problem for decades in the San Joaquin Valley, and from 1926 to 1970, researchers calculated that some areas saw declines of up to 28 feet.

Until recently, water managers thought the problem had been somewhat alleviated by imported supplies of water. But last month, the USGS released a report showing that in one area of the San Joaquin Valley, the ground sank 21 inches in two years.

Researchers had initially been studying places along the Delta-Mendota Canal, but they found the most pronounced subsidence in another area to the northeast.

"Those are among the fastest rates ever measured in the San Joaquin Valley, even in the '50s and '60s," said Michelle Sneed, a USGS hydrologist and lead author of the study. "The location was surprising, the rate was probably the most surprising, and it was such a large area, too."