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Replenishing Groundwater in the San Joaquin Valley: 2024 Update

Caitlin Peterson, Ellen Hanak, and Zaira Joaquín Morales with research support from Meagan Brown, Spencer Cole, and Kyle Greenspan

Highlights

- Groundwater recharge is an important water supply strategy across California—and particularly in the San Joaquin Valley, which is ground zero for implementing the Sustainable Groundwater Management Act.
- The valley's groundwater sustainability agencies have identified recharge as the single biggest solution for bringing their groundwater basins into balance.
- However, numerous technical and institutional constraints could prevent local agencies from accomplishing this goal.
- Winter and spring 2023 were among the wettest on record in the southern valley. We wanted to see how much progress has been made on recharge since 2017—another very wet year—as well as remaining barriers to expanding this practice.

Replenishing aquifers can help basins achieve groundwater sustainability

California is now in its tenth year since the fall 2014 passage of the Sustainable Groundwater Management Act (SGMA), the state's first major foray into groundwater regulation. Under SGMA, local groundwater sustainability agencies (GSAs) are charged with bringing groundwater basins into balance by ending long-term overdraft and avoiding undesirable results of groundwater use.

While demand reduction remains an important approach, most groundwater sustainability plans (GSPs) emphasize recharging groundwater during wet periods as a supply-side strategy for addressing overdraft in the San Joaquin Valley, one of the most heavily overdrafted regions in the state. Valley-wide, these GSPs lay out a goal of increasing recharge over current levels by 1 million acre-feet (maf) per year on average across both wet and dry years.

Yet there remain both technical and institutional barriers to expanding recharge in this region. The recent 2023 wet year gave us an opportunity to survey local water agencies about their recharge efforts and to examine how they have progressed since our last survey in 2017.

Recharge volumes are up, and methods are evolving

Recharge efforts expanded significantly in 2023. Survey respondents recharged 5.3 maf within their service areas, and we estimate that the total volume recharged valley-wide was 7.6 maf, an increase of 1.1 maf (17%) over 2017—a year with similar precipitation. As in 2017, the Kern subregion and agencies with access to ample surface water led the way on recharge.

Rechargers used a variety of methods. Dedicated recharge basins captured more than half of all reported recharge. We also saw large volumes of water recharged via "in-lieu" methods, or replacing groundwater use with surface water use, and more passive methods like recharge via unlined canals and streambeds.

Spreading water on cropped or fallowed farmland—a relatively new and cost-effective approach—has nearly doubled since 2017, but still accounts for less than 10 percent of total recharge volumes.

Barriers to recharge remain

While much progress has been made in making recharge an effective water supply strategy, challenges linger:

- Limited conveyance and other infrastructure were major concerns in 2017, and this is still very much on the radar in 2023.
- On-farm recharge efforts expanded dramatically in 2023, but there is still a need to address limited grower know-how, improve accounting systems, and strengthen incentives for growers to use their lands for this purpose; and
- Regulatory bottlenecks, especially around securing permits for diverting water and constructing relevant projects, remain a major challenge.

Local and state policies, planning, and coordination are supporting recharge

Better groundwater accounting has facilitated the tracking of recharge, and some agencies are providing incentives for landowners—such as pumping or allocation credits—to support the expansion of recharge on farmland.

Respondents also credited two state policies with making recharge easier. First, Executive Orders (EOs) N-4-23 and N-7-23 relaxed constraints on diverting floodwater for recharge, alleviating some legal barriers. Second, the state helped agencies and landowners acquire temporary pumps and other equipment to facilitate recharge—another action that managers flagged as especially helpful.

More can be done to foster recharge

While 2023 was a banner year for recharge in the San Joaquin Valley, we estimate that a substantial amount of Delta outflow might have been safely available to recharge without harming downstream water users or the environment. Expanding recharge could help the region move closer to its goal of bringing in 1 maf per year on average in new supplies, while helping to reduce downstream flood risk.

- The state should prioritize clarifying when and how much water can be diverted safely, using watershed-scale assessments that consider effects on downstream water users and the environment.
- Easing the process to obtain permits for building and operating projects remains a priority; in some cases this will require different regulatory agencies to align their approaches.
- State and local agencies should work together to identify key infrastructure needs (including regional conveyance), refine recharge tools, secure funding, and build partnerships to expand the benefits of recharge projects.
- Locals should make continued progress on the fundamentals of groundwater management—including developing strong accounting and recharge crediting systems.
- Accelerating on-farm recharge is key to cost-effective capture of more wet-year water; improving grower familiarity with recharge fundamentals and developing landowner incentive programs can help.
- Many new partnerships have arisen; local and state agencies can do more to foster local partnerships and collaborations, including multi-benefit projects and off-site banking partnerships.

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