

Using floodwaters to combat groundwater loss in Fresno and the Central Valley

A recent [story published in The Fresno Bee](#) raised eyebrows: It claimed that climate change trends are going to make the San Joaquin Valley increasingly dangerous to live in, which means homeowners insurance will become difficult and expensive to get. That, in turn, means home mortgage loans (which require homeowners insurance) will also become difficult to get. Consequently, nearly half of Fresno's population would be forced to move away (and, apparently, [Sacramento faces the same problem](#)).

While there have been some skeptical reactions to this report, from the organization First Street, over the way its models predict long-term devastation for Fresno, it does make a few important points.

The report argues that climate change is exacerbating three dangerous trends: fire, wind and flooding, with flooding being the most destructive. Even if the magnitude of these threats is uncertain, we largely agree with the assessment that these are the biggest challenges the Central Valley faces (not just the city of Fresno).

But if flooding is the biggest threat, it may also be our greatest opportunity.

Most Valley residents remember the enormous floods of 2023. [The Kings River's annual run-off volume swelled to 4.5 million acre-feet](#), a 40-year record that produced floods so large that most of Tulare Lake was revived as floodwater collected in the old basin. A great deal of damage was done to Valley agriculture, with about 94,000 acres of farmland inundated and threatening many of our communities, including those without the resources to protect themselves.

Yet, that increase in temperature leading to the rapid melt of Sierra Nevada snow, also provides a significant opportunity to solve another serious problem in the Valley exacerbated by climate change: groundwater loss and the resulting land subsidence.

For decades, we have over-pumped our groundwater to the point where many aquifers are badly depleted, allowing the land to compact and sink. This subsidence causes significant physical damage.

What better way to replenish our groundwater and prevent further subsidence (as required by state law known as the Sustainable Groundwater Management Act), than by capturing floodwaters and using them to refill our aquifers? Unfortunately, that opportunity was partially wasted in 2023 as floodwaters came quickly. In some areas, the infrastructure was simply not there to capture the water. In others, suitable recharge facilities had not been identified. There were also legal problems because it was unclear what requirements concerning the acquisition of water rights and beneficial use of water applied to these floodwaters.

We must be better prepared next time the big floods come, and it is only a matter of time before they do come again.



At the California Water Institute at California State University, Fresno, we believe the best path forward is a regional approach that includes multiple counties and agencies. To create this regional vision, the institution is leading a research project funded by the Governor's Office of Land Use and Climate Innovation. The goal is to optimize the use of floodwater for recharge that would otherwise flow out of the San Joaquin River watershed out to the Delta and the San Francisco Bay.

The theory is that this regional approach will increase the capture and recharge of floodwater, rather than individual efforts from counties or agencies.

Our research explores whether groundwater sustainability agencies, water agencies and water managers can work together to create a regional approach to groundwater recharge. This requires talking to water managers to understand the constraints, objections and opportunities of a regional approach to recharge. From there, we will develop a framework for a regional recharge management team to prepare for and help coordinate regional recharge. This team would consist of water managers from across Merced, Madera, Fresno and Tulare counties.

To accomplish this, the California Water Institute is developing a Geographic Information System tool to track, catalogue and visualize how existing groundwater recharge facilities are being used in the four-county area. The institute will test the tool's ability to help a regional response team optimize the use of floodwater for recharge.

Beyond improving groundwater recharge in the San Joaquin Valley, this strategy offers flood protection benefits — an opportunity that was missed in 2023.

The time for action is now. While individual agencies and counties have made important strides in groundwater management, the scale and urgency of our water challenges demand that we think beyond jurisdictional boundaries.

The next major flood event will come, and when it does, we can either watch valuable floodwater rush past our communities or we can be ready with coordinated, regional systems that capture and store this precious resource for the dry years ahead.

