



# FLOOD-MAR FORUM 2025

GROUNDING IN SUCCESS  
GROWING TOWARDS THE FUTURE



**“If we happen to be lucky enough to be successful enough in Flood-MAR and other recharge endeavors—to actually fill up these basins enough so that the natural discharge processes resume—then ecosystem benefits, I would say, could be bigger than we’re imagining now.”**

—Graham Fogg, UC Davis, on the opportunity for recharge to enhance ecosystems

**A**t the Flood-MAR Network’s fifth biennial Flood-MAR Public Forum held in November 2025, over 150 practitioners, landowners, scientists, water managers, academics, and interested members of the public gathered to celebrate successes and grow towards a more resilient water future in California.

Just a few years ago, using flood waters to recharge depleted groundwater aquifers was merely a concept. Fast forward to today, many practitioners have moved beyond the pilot phase and entered a more robust implementation era of managed aquifer recharge (MAR) projects, spurred by intensifying atmospheric rivers and implementation of the Sustainable Groundwater Management Act.

Panel sessions at the 2025 Flood-MAR Forum spanned a range of perspectives and themes on how Flood-MAR has become a statewide strategy. Day 1 of the Forum included reflections from early Flood-MAR influencers, insights and lessons learned from implementers, and state regulatory and policy perspectives. On Day 2, panelists highlighted approaches for harnessing multi-benefit opportunities, navigating water quality challenges, adapting to climate extremes, scaling Flood-MAR projects, advancing ecological outcomes, and leveraging financial incentives to support implementation. **Out of this series of discussions, six main takeaways emerged.**

## 1. Investment and trust in Flood-MAR stems from demonstrating and communicating its full value and benefits

Unlike built infrastructure, benefits from recharge basins are harder to see and appreciate. Groundwater flows out of sight, and increases in storage accrue slowly, so successful innovations are not always easy for landowners, growers, or communities to see. Many Forum participants stressed that the “out-of-sight” nature of Flood-MAR can make it harder for people to understand why the practice matters and is worth supporting.

Buy-in is essential for accessing land and sustaining long-term operations and funds. Practitioners, consultants, and agencies were encouraged to take a more proactive role in communicating the story of recharge: highlighting the science, translating the data into relatable outcomes, and showcasing the benefits that are most meaningful for the public, whether that be improved groundwater levels, increased drought resilience, enhanced ecosystems, and/or reduced flood risk. Strengthening outreach and messaging is critical if California is to scale Flood-MAR into a widely supported, statewide water management strategy.

Resources that document the value and benefits of Flood-MAR projects include:

- [Flood-MAR White Paper June 2018](#)
- [San Joaquin Basin Flood-MAR Watershed Studies](#)
- [Flood-MAR FAQs](#)

## 2. Multi-benefit Flood-MAR offers exciting opportunities to restore wetland ecosystems

A major theme that emerged from the Forum was wider recognition of Flood-MAR as an opportunity to address environmental needs. California’s historical wetlands were once among the most ecologically productive systems in North America, providing habitat for migratory birds and native species as well as much-needed natural flood buffer. Flood-MAR presents a rare opportunity to reconnect flood plains, contribute to seasonal wetlands, and restore natural infiltration. Practitioners can design projects that recharge groundwater, provide habitat, improve water quality, and increase ecological resilience.

**“We don’t necessarily have to compromise on groundwater recharge when considering habitat. Those multi-benefit areas are really punching above their weight in terms of the area that they take up and their ability to recharge.”**

—Janice Wheeldon, Verdantas, on multi-benefit projects

Many participants stressed that multi-benefit projects are not just desirable—they are essential. Aligning groundwater recharge with habitat restoration creates broader public support, unlocks additional funding pathways, and strengthens partnerships with Tribes, conservation groups, and wildlife refuges. Integrating environmental benefits into project objectives can also accelerate permitting and enhance long-term sustainability outcomes.

Flood-MAR is uniquely positioned at the intersection of water supply reliability and ecological restoration. By embracing multi-benefit design, California can repair degraded ecosystems while building a more resilient water future.

Resources on multi-benefit projects include:

- [Pajaro River Flood Risk Management Project—Engineering With Nature](#)
- [Multiple Benefit Flood plain Restoration Studies](#)

### 3. Equity and community benefits need greater focus

Flood-MAR projects have been increasingly recognized as a way to support Human Right to Water goals and improve water supply reliability for disadvantaged communities and rural agricultural systems. Ensuring the equitable distribution of benefits while avoiding harm to communities is central to building trust.

From project conception, Flood-MAR projects can take care to integrate water quality impact considerations into project design, monitoring, and operations. As recharge expands, so does the need to carefully manage nitrate mobilization, sediment transport, and other water quality risks. Panelists encouraged practitioners to plan MAR with safeguards and monitoring from the beginning.

Presenters also suggested aligning recharge projects with implementation of Senate Bill 659 to identify best practices that protect water quality. Some have also started to develop resource maps for aiding in identifying optimal recharge locations with water quality considerations, such as proximity to domestic wells.

**“The majority of the discussion about Flood-MAR has been about quantity, which is fair enough. There’s no point in talking about the quality of water you don’t have. But conversely, there’s no point in having water that you can’t use because of the quality of it.”**

—Peter Nico, Lawrence Berkeley National Laboratory, on water quality being an important part of the conversation

Resources for navigating water quality and MAR include:

- [Drinking Water Tool | Community Water Center](#)
- [Aquifer Recharge and Groundwater Quality Tool | California State Water Resources Control Board](#)
- [GAMA \(Groundwater Ambient Monitoring and Assessment\)—Online Tools | California State Water Resources Control Board](#)

### 4. Streamlined regulatory pathways make recharge easier

Forum participants highlighted that permitting and regulatory complexities remain bottlenecks to capturing more water. Even when hydrology is optimal, opportunities for recharge are lost because current frameworks are too slow, too expensive, or too restrictive.

Panelists spoke about the need for clear and efficient pathways that allow entities to divert and recharge water without unnecessary delays. Speakers emphasized the importance of advancing mechanisms that would simplify access to permanent water rights.

Recent efforts to streamline the system include California Water Code 1242.1, however, feedback indicated that the high flow thresholds required under 1242.1 can limit its practical usefulness for many regions. Water quality permitting guidance is also in development to help entities navigate new potential requirements.

Overall, Forum participants felt that California needs to modernize and streamline its regulatory system to capture more flood water, protect water quality, and scale multi-benefit recharge projects statewide.

Resources for navigating regulatory pathways include:

- [Flood Recharge Diversions \(Water Code §1242.1\) | California State Water Resources Control Board](#)
- [California Environmental Flows Framework | UC Davis](#)

**“I think there’s a misconception that you can’t have your cake and eat it too, but there are creative ideas we can bring to recharge permitting pathways that might result in more water available for diversion while still protecting functional flows.”**

—Nicolas Murphy, *The Nature Conservancy, on the California Environmental Flows Framework*

## 5. Funding gaps remain a primary barrier to recharge projects

Funding is still one of the biggest obstacles to Flood-MAR project implementation, especially for those that provide multiple benefits.

Many panelists noted that even when a project is technically feasible, an unclear financial future can make it difficult for water managers, growers, and other practitioners to move from planning to construction and long-term operation.

Moving water is costly—often requiring new infrastructure, staff monitoring, new or modified conveyance systems, or more. For many, these expenses make MAR cost prohibitive. To broaden participation and enable projects at scale, California can explore new partnerships, incentive structures, cost sharing models, and streamlined access to financial support.

Strengthening funding pathways and making recharge more economically viable can expand opportunities for Flood-MAR beyond early adopters to a truly statewide, scalable strategy. Examples of possible incentives

**“You’ve got to start somewhere. Land’s only going to increase in price, construction costs are only going to increase, you’ve got to start. We were very successful with partnerships and getting grants that defrayed a lot of those costs.”**

—Bill Stretch, *Fresno Irrigation District, on local urgency to start investing in recharge basins*

mentioned during the Forum included grants, reduced or reimbursed costs for recharge operations, technical assistance to lower the burden on landowners and small agencies, pumping or recharge credits, flood easements or temporary access agreements, and cost sharing for infrastructure, maintenance, or monitoring.

The Network’s Incentives Action Team also previewed an upcoming tool that will be posted to the Flood-MAR Hub to catalog available incentive options.

Resources on funding include:

- [California Grants Portal](#)

## 6. The future of Flood-MAR depends on coordinated, adaptive, and collaborative management

Lastly, coordinated operations and communication can dramatically affect recharge outcomes during critical storm windows. Permitting, operational rules, and flood management priorities all must align for Flood-MAR to be feasible at scale, and panelists stressed the importance of strong communication channels to help connect the dots.

As Flood-MAR practices are adopted, evolved, and scaled, project successes will rely on management approaches that can adapt to rapidly changing hydrology, emerging science, and the evolving needs of communities and landowners. Forum participants emphasized the role of the Flood-MAR Network in making this collaboration and adaptation possible.

A unique strength of the Network is its Action Teams, made up of members who want to tackle a shared challenge, advance a topic, or co-develop a project.

**“It’s that give and that get. You undoubtedly have something to share that other people would learn from, and they will return that in kind, and so if you give that out to a group, and that group gives it back to you, you’ll leave richer than you came.”**

—Mike Antos, Stantec, on the role and power of Networks

To get involved, visit:

- [Get Involved—California Flood-MAR Hub](#)

As a central hub for sharing research, aligning strategies, coordinating across agencies, and elevating new tools and lessons learned, the Network is more vital than ever for ensuring that Flood-MAR practitioners move forward together. Ultimately, successful, scalable Flood-MAR is a team effort.

**“We didn’t come to this and say, ‘this is what the people of California need to do.’ It was working with farmers, listening to industry groups, listening to flood management folks, listening to irrigation districts, and hearing what all of them were saying and planting seeds of new ideas...”**

—Daniel Mountjoy, Sustainable Conservation, on Flood-MAR being a bottom-up, collaborative approach

## Concluding Thoughts

The Flood-MAR Network extends its thanks to every participant, speaker, moderator, and sponsor who joined us for this year’s Flood-MAR Forum! Your expertise, perspectives, and dedication to advancing Flood-MAR are what make this community so strong.

The discussions and ideas shared during the 2025 Forum sessions highlight how far Flood-MAR implementation has come and the potential that lies ahead as we continue to innovate, collaborate, and adapt. A strong, engaged Network is key to maintaining momentum, avoiding duplicative effort, and ensuring that Flood-MAR remains grounded in the best available science as California scales recharge statewide. We look forward to seeing where this momentum takes us in the coming years and to exploring emerging topics, new tools, and future challenges together at the next Forum.

For more resources, visit:

- [California Flood-MAR Hub—Flood Managed Aquifer Recharge](#)
- [From Concept to Practice: Reflections on the 2025 Flood-MAR Network Forum | Sustainable Conservation](#)



Flood-MAR Forum 2025 session presentation to program attendees