

2021 Flood-MAR Forum

Exploring Needs and Opportunities to Expand Flood-MAR Implementation for Multiple Benefits

At the Flood-MAR Network's third biennial Flood-MAR Public Forum in November 2021, practitioners, agricultural producers, water managers, Tribal representatives, researchers, and members of the public gathered to explore opportunities to expand Flood-MAR implementation across California.

Following the 2019 Flood-MAR Forum, the **Flood-MAR Network** formed to advance collaboration and implementation statewide. The Network established several initiatives focused on improving communication, expanding information sharing, identifying research needs, and tracking progress on the Flood-MAR Research Advisory Committee's priorities.

The 2021 Forum built on this momentum by again bringing together a diverse community of practitioners to discuss lessons learned, technical challenges, and opportunities to scale Flood-MAR implementation. Through panel discussions, listening sessions, and technical workshops, participants explored how partnerships, research, and coordinated action can support Flood-MAR projects that provide multiple benefits for communities, ecosystems, and agriculture.

Out of these discussions, **five main takeaways emerged.**

1. Strong Partnerships are Essential for Advancing Flood-MAR

Because Flood-MAR is often implemented on agricultural and working landscapes, collaboration among landowners, water managers, researchers, and agencies is critical. Forum participants emphasized that no single entity can advance Flood-MAR alone. Successful projects depend on coordinated efforts across sectors and institutions.

The Flood-MAR Network provides a platform for building these relationships and sharing lessons learned across regions. Collaborative partnerships help align expertise, identify opportunities for recharge, and support implementation efforts that benefit multiple communities and water users. Forum speakers highlighted the importance of working together to understand local conditions, operational constraints, and management priorities when planning recharge projects. Forum participants also emphasized the value of building trust and celebrating successes to strengthen collaboration across the Network.

Photo Credit: Kelly M. Grow | California Department of Water Resources

"Partnership is more critical than ever, and it is sustained by having a collaborative leadership mindset."

— Sharron Farrell, Golden Gate National Parks Conservancy

2. Flood-MAR Projects Require Coordinated Operations and Decision-Making

Flood-MAR implementation often requires rapid decision-making during storm events when water is available for diversion and recharge. Successfully capturing these opportunities depends on coordination among multiple entities, including reservoir operators, water districts, regulators, and landowners.

Forum discussions highlighted the need for operational flexibility and improved coordination among agencies to maximize water capture while maintaining flood protection and water quality safeguards.

Participants emphasized that effective Flood-MAR projects often rely on:

- Multi-agency agreements that support coordinated operations
- Access to infrastructure capable of diverting and distributing flood flows
- Clear water rights and operational authorities
- Early coordination with permitting agencies

Strengthening coordination across agencies and partners will help ensure that Flood-MAR opportunities can be captured during future wet years.

"Recharge is local, but recharge benefits are regional."

— Graham Fogg, University of California, Davis

Tribal Perspectives and Watershed Stewardship

A dedicated listening session with Native California Tribes highlighted the importance of incorporating Tribal perspectives and ecological knowledge into water management strategies.

Tribal representatives emphasized the value of watershed-based management, long-term stewardship of water resources, and the importance of collaborative approaches that respect Tribal sovereignty and cultural connections to water and land.

Participants noted that expanding dialogue and partnerships with Tribal communities will strengthen Flood-MAR efforts and contribute to more holistic water management across California.

3. Technical Knowledge and Data are Critical to Scaling Flood-MAR

Participants highlighted the importance of continued research and improved data to support Flood-MAR implementation.

Better understanding is needed around:

- Soil and aquifer characteristics
- Groundwater-surface water interactions
- Water availability and water quality conditions
- Optimal locations for recharge projects

Improved tools and datasets can help practitioners evaluate site suitability, design projects more effectively, and estimate recharge outcomes.

Researchers also emphasized the importance of improving water accounting methods and developing mapping tools that identify potential recharge areas across the state.

Tools and Resources for Flood-MAR Implementation

A growing set of resources is available to support planning and implementation of Flood-MAR projects, including:

- Flood-MAR guidance documents and research reports
- Recharge suitability and groundwater mapping tools
- Geospatial datasets and decision-support platforms
- Funding programs and technical assistance opportunities

These tools help water managers, landowners, and agencies identify suitable recharge locations, evaluate project feasibility, and design projects that maximize multiple benefits.

4. Flood-MAR Can Deliver Multiple Benefits Beyond Groundwater Recharge

Flood-MAR projects can provide a range of benefits beyond replenishing groundwater aquifers. Participants highlighted opportunities to design projects that also support flood risk reduction, ecosystem restoration, and climate resilience.

By reconnecting floodplains and allowing water to infiltrate naturally into groundwater systems, Flood-MAR can help restore ecological functions while improving water supply reliability. Participants emphasized that integrating multiple benefits into project planning can strengthen partnerships, expand funding opportunities, and increase public support for Flood-MAR initiatives.

"Let's not pave over these prime recharge areas and later regret doing it."
— Kamyar Guivetchi, California Department of Water Resources

5. Expanding Flood-MAR Will Require Supportive Policies, Funding, and Incentives

Forum participants emphasized that scaling Flood-MAR implementation will require continued investment and supportive policy frameworks.

While many pilot projects have demonstrated the potential of recharge strategies, broader implementation will depend on addressing barriers such as permitting complexity, infrastructure costs, and limited funding for project development.

Participants highlighted the importance of:

- Streamlining permitting pathways
- Developing financial incentives for landowners
- Expanding technical assistance and funding programs
- Protecting key recharge areas

Strengthening these enabling conditions can help make Flood-MAR a more accessible and scalable strategy across California.



Photo Credit: Sara Nevis | California Department of Water Resources

Looking to the Future

The Flood-MAR Network and its biennial forums provide an important space for collaboration, learning, and innovation among practitioners working to expand managed aquifer recharge across California. Continued coordination across agencies, landowners, researchers, and communities will be essential for advancing Flood-MAR from pilot projects toward broader implementation.

Through shared learning, improved science, and strengthened partnerships, Flood-MAR has the potential to play a significant role in addressing groundwater overdraft, improving water resilience, and supporting sustainable water management statewide.

The Flood-MAR Network invites practitioners and stakeholders to stay engaged by sharing knowledge, participating in Network discussions, and contributing to ongoing efforts to advance Flood-MAR implementation.



Photo Credit: Andrew Innerarity | California Department of Water Resources

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