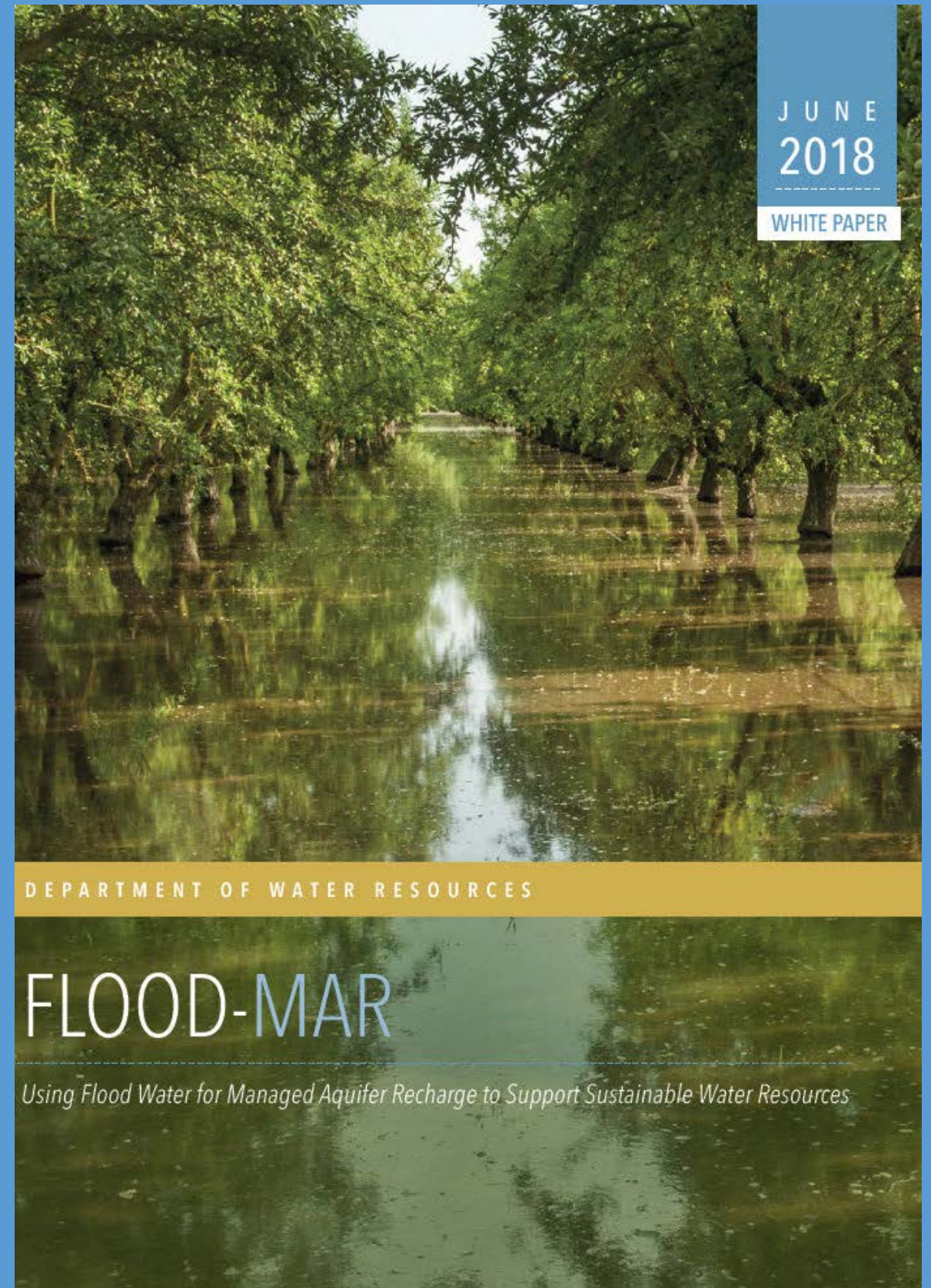


Flood-MAR

Using Floodwater for
Managed Aquifer Recharge

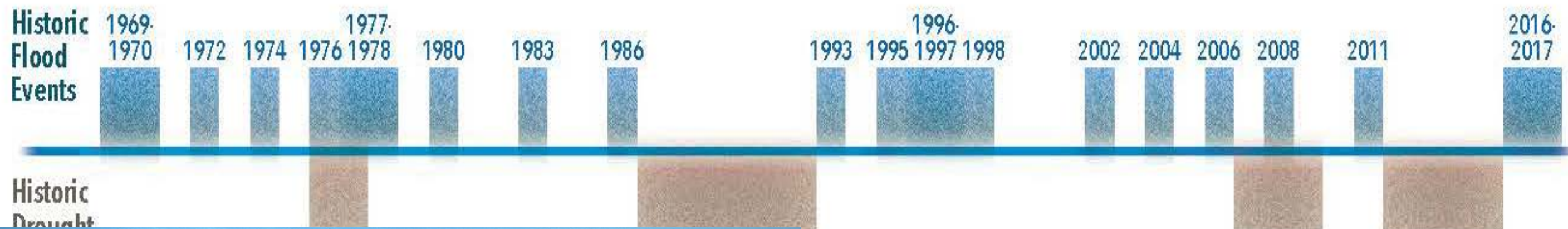
California Water Commission
March 20, 2019



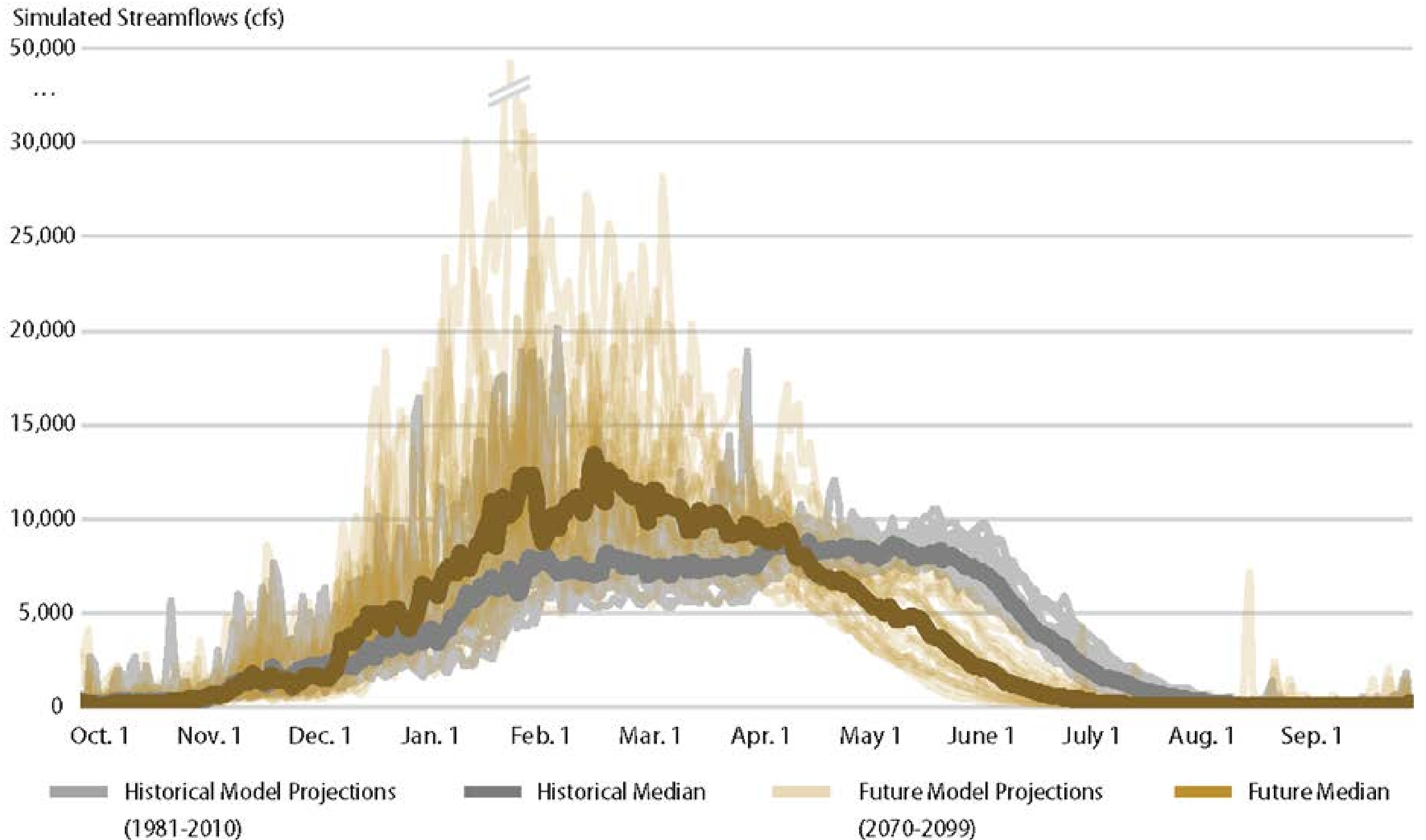
CALIFORNIA DEPARTMENT OF
water resources

California's Water Management

A Tale of Extremes



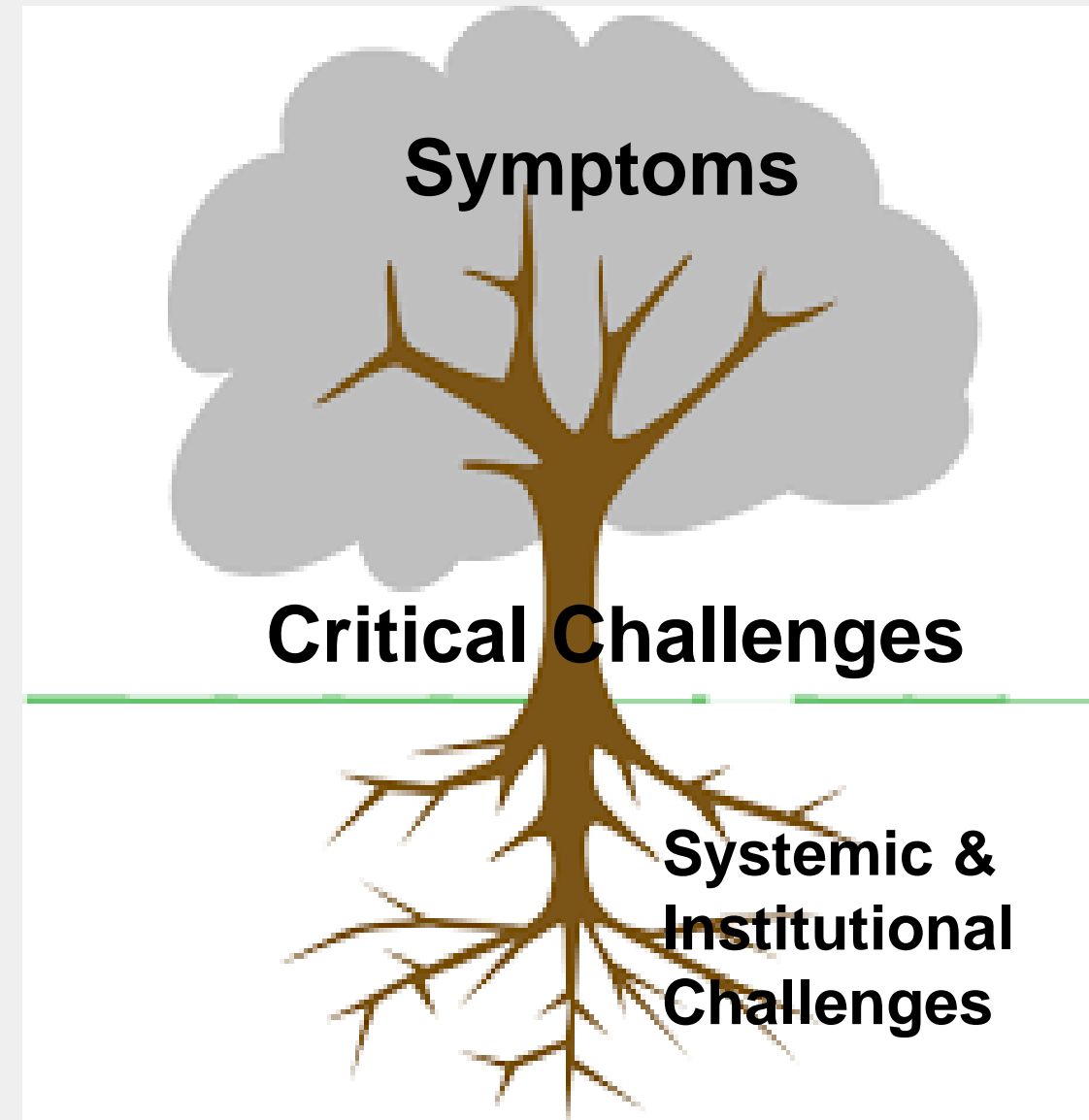
Effects of Climate Change Necessitate Wholesale System Changes



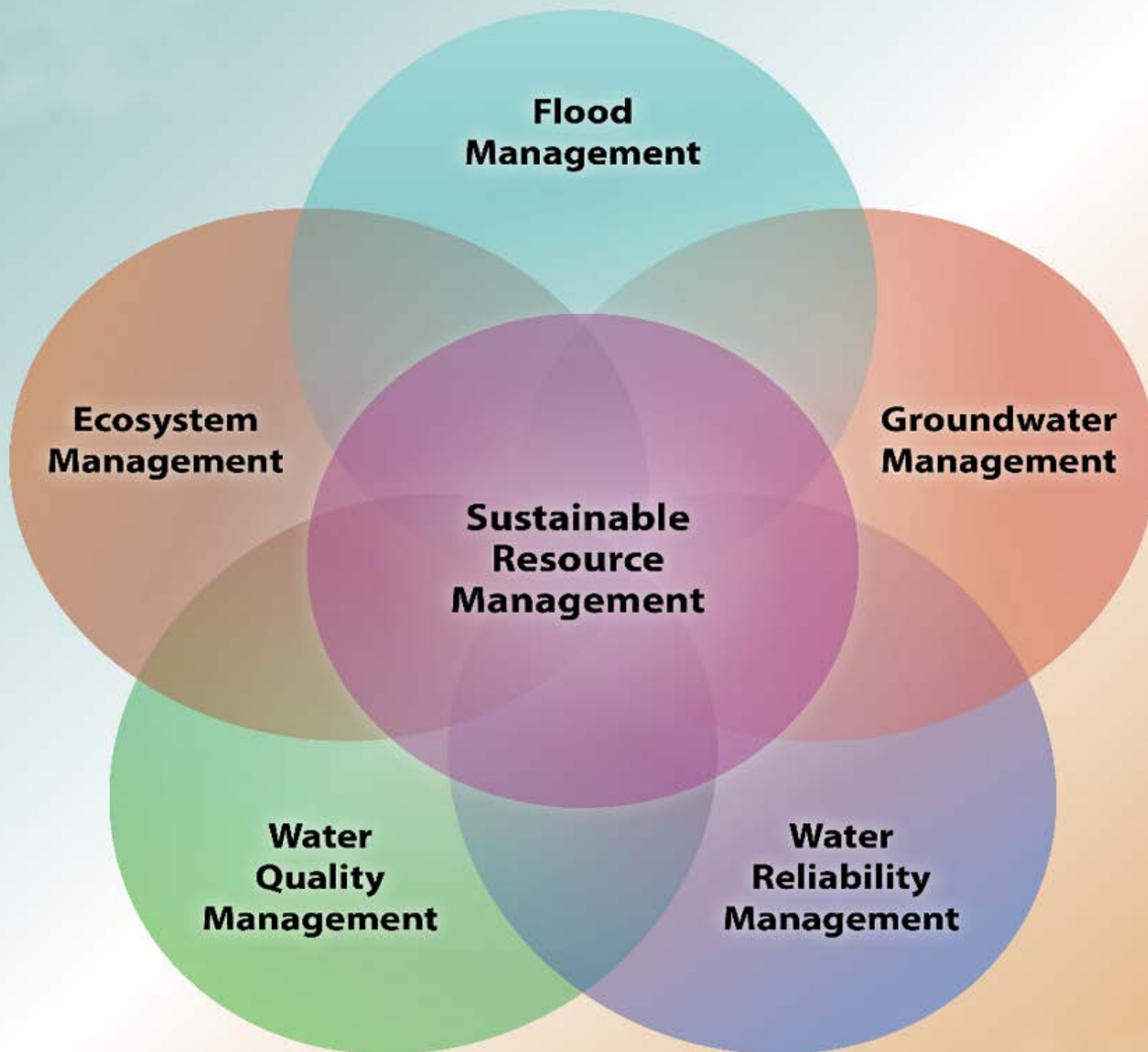
Systemic & Institutional Challenges

Overcoming them Increases Return on Investment

- Fragmented and uncoordinated decisions, initiatives & actions
- Inconsistent, inflexible, & conflicting regulations
- Insufficient capacity for data-driven decision-making
- Insufficient & unstable funding
- Inadequate performance tracking



For Sustainability -- Need to Align & Integrate Water Management Sectors



Multi-Sector
Collaboration

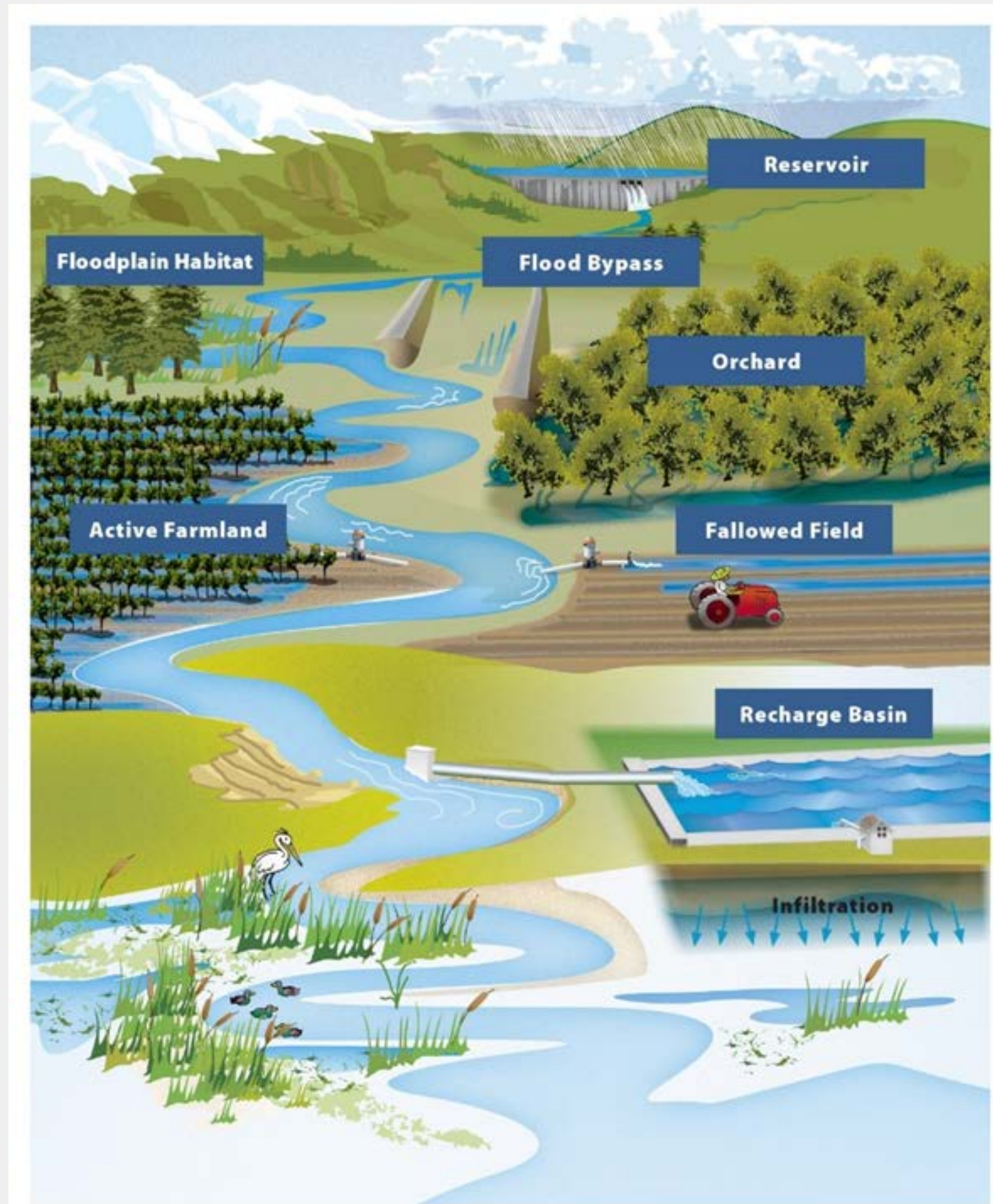
Multi-Discipline
Planning

Multi-Benefit
Projects

Multi-Fund
Investments

What is Flood-MAR?

Using high flows from, or in anticipation of, rainfall or snowmelt, for managed aquifer recharge on agricultural lands, working landscapes, and natural managed lands



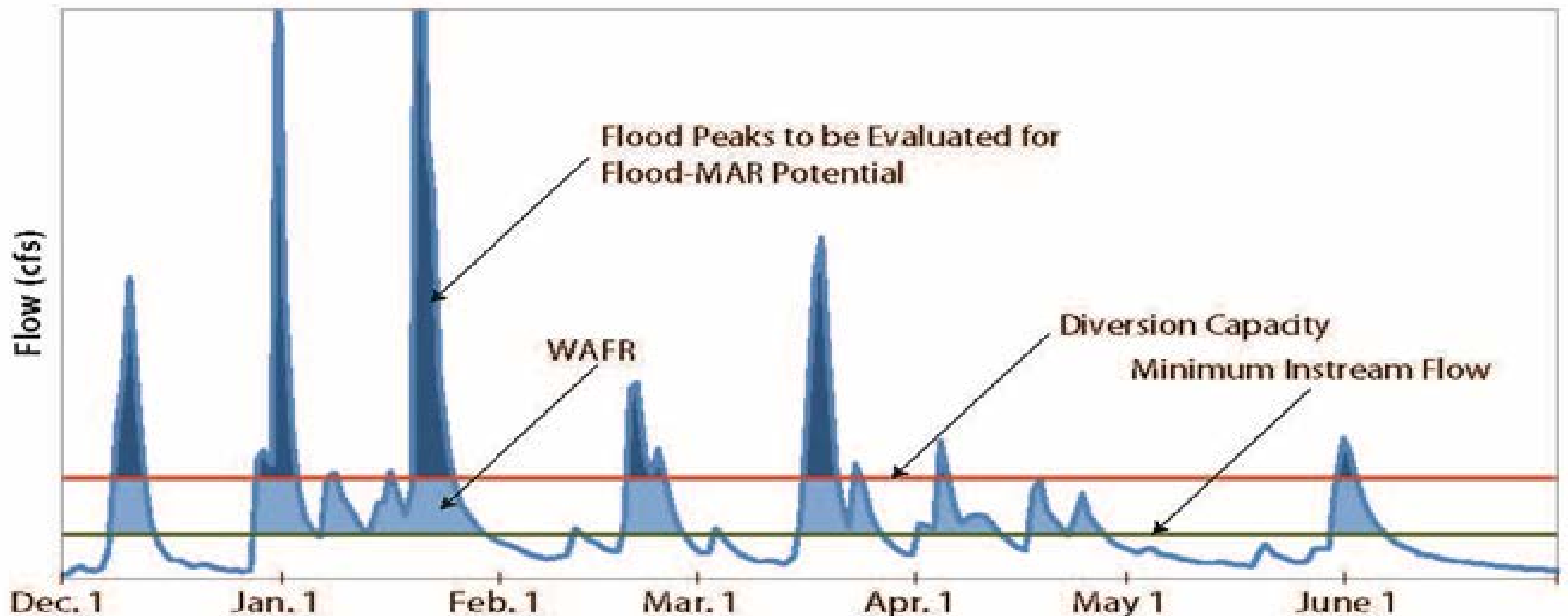
Flood-MAR is also...

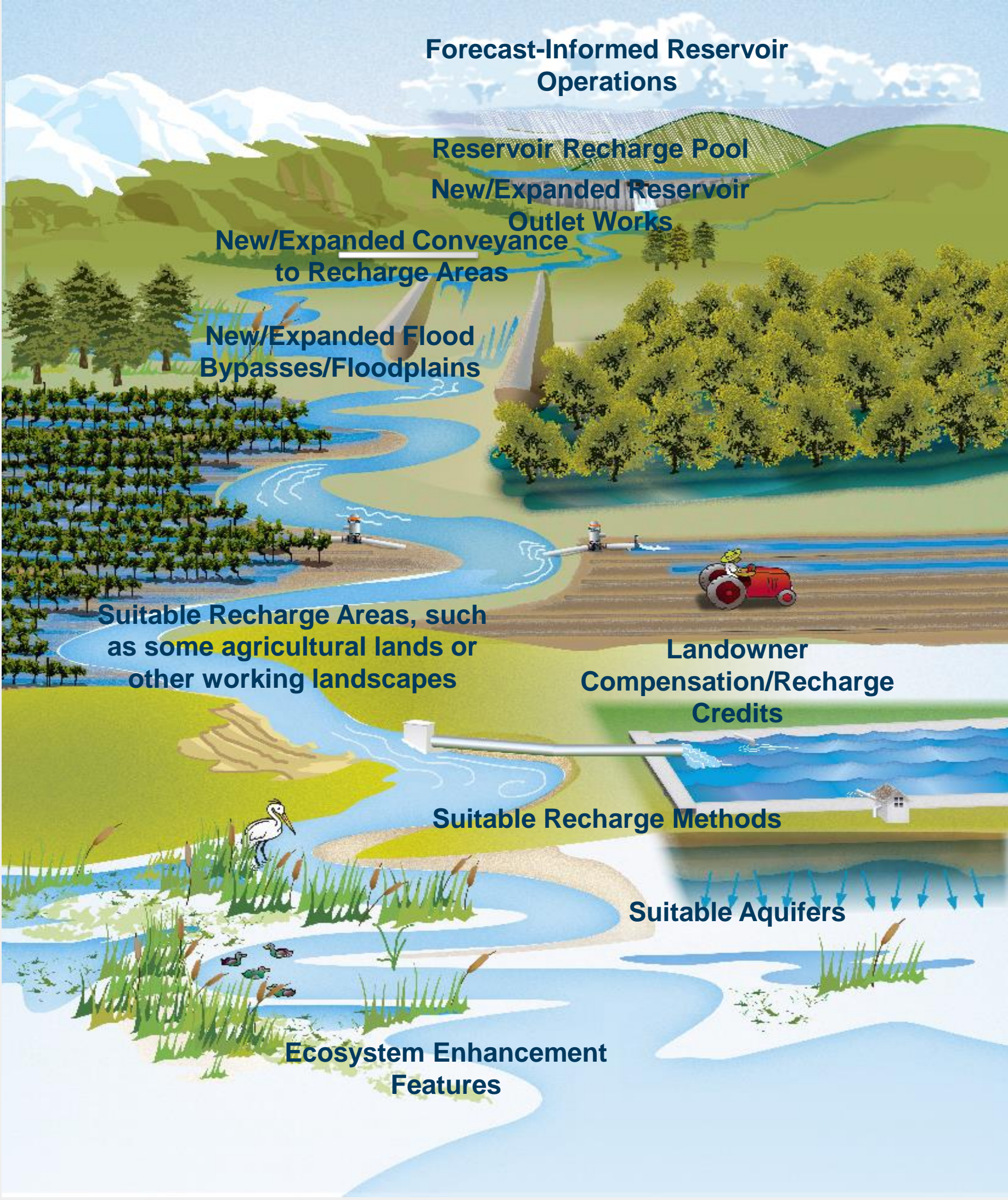
- ... an integrated & voluntary management strategy to improve water resources sustainability & climate resiliency
- ... multi-sector (flood, surface & groundwater, ecosystem, quality)
- ... scalable (farm, GSA, basin, region, watershed)
- ... multi-faceted (reoperation, conveyance, storage, recharge, banking, transfers, cultivation, restoration, etc.)
- ... an untapped part of California's water portfolio



State Recommends Flood-MAR

- 2017 CV Flood Protection Plan Update (Aug. 2017)
- System Reoperation Study Phase 3 Report (Aug. 2017)
- State Board of Food & Agriculture letter (May 2018)
- CA Water Plan Update 2018 Public Draft (Dec. 2018)





Forecast-Informed Reservoir Operations

Reservoir Recharge Pool

New/Expanded Reservoir

Outlet Works

New/Expanded Conveyance to Recharge Areas

New/Expanded Flood Bypasses/Floodplains

Suitable Recharge Areas, such as some agricultural lands or other working landscapes

Landowner Compensation/Recharge Credits

Suitable Recharge Methods

Suitable Aquifers

Ecosystem Enhancement Features

Example Components of Flood-MAR Projects

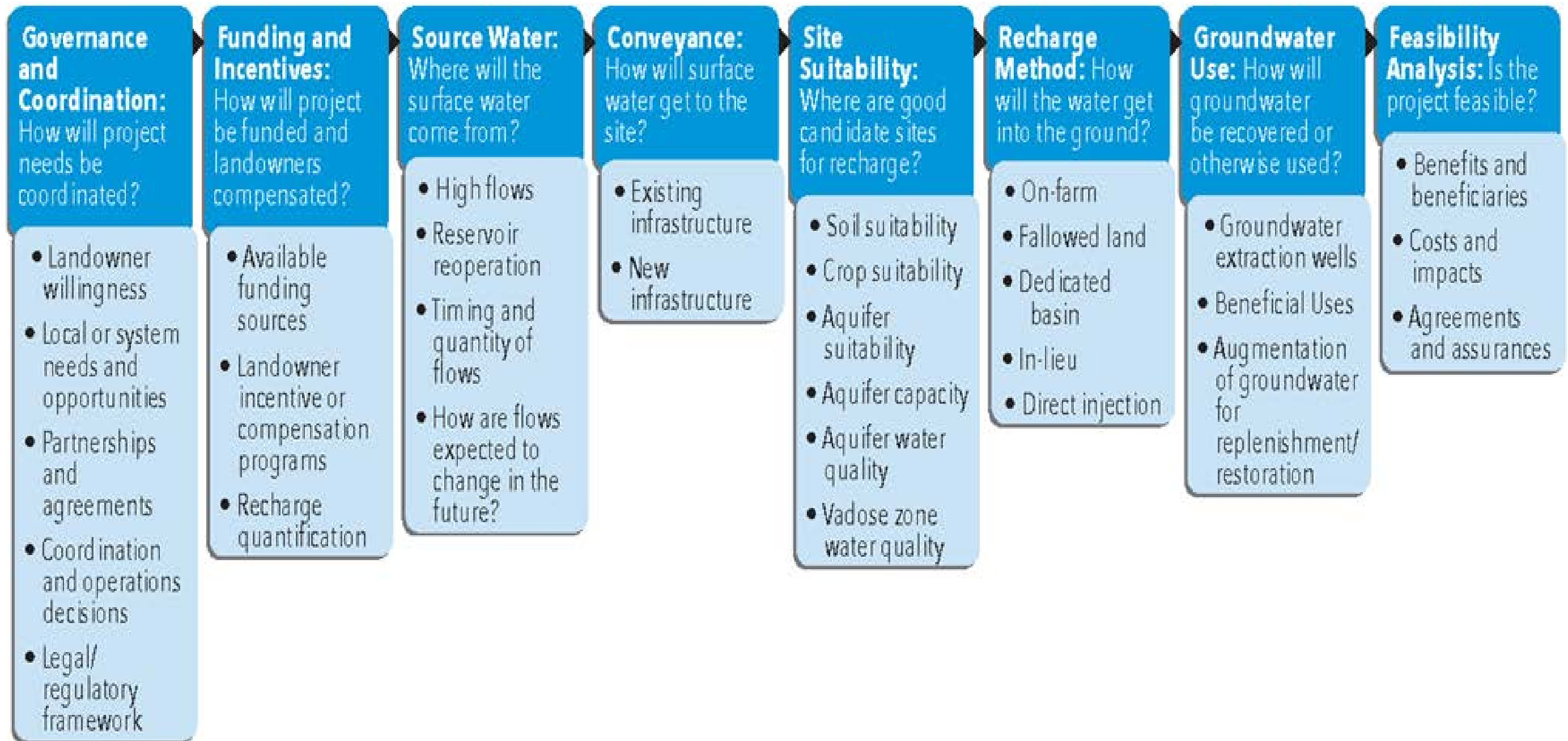
Public Benefits of Flood-MAR

- Flood risk reduction ★
 - Drought preparedness ★
 - Aquifer replenishment ← **Green Infrastructure**
 - Ecosystem enhancement ★
 - Groundwater remediation/water quality ★
 - Working landscape preservation and stewardship
 - Climate change adaptation
 - Recreation and aesthetics ★
- ★ Public benefits defined in Proposition 1



Flood-MAR

Implementation Factors



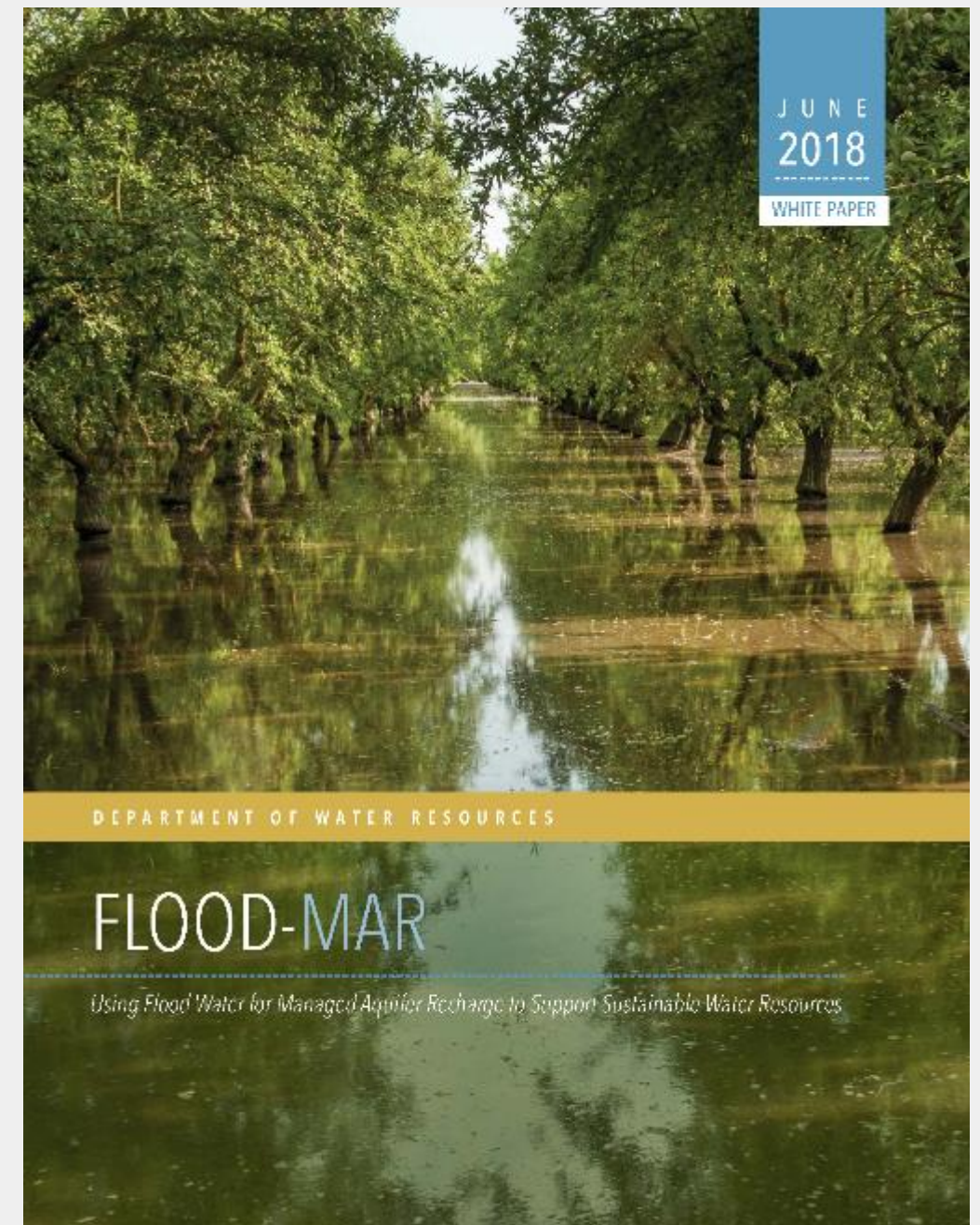
Potential Barriers to Flood-MAR Implementation

- **Cooperation and Governance** – trust, sector coordination, operations agreements
- **Legal** – water rights, regulations, permitting
- **Policy** – public benefit, beneficial use, landowner compensation/incentives
- **Implementation** – land use, recharge/recovery suitability, conveyance, reservoir operations, economics, funding



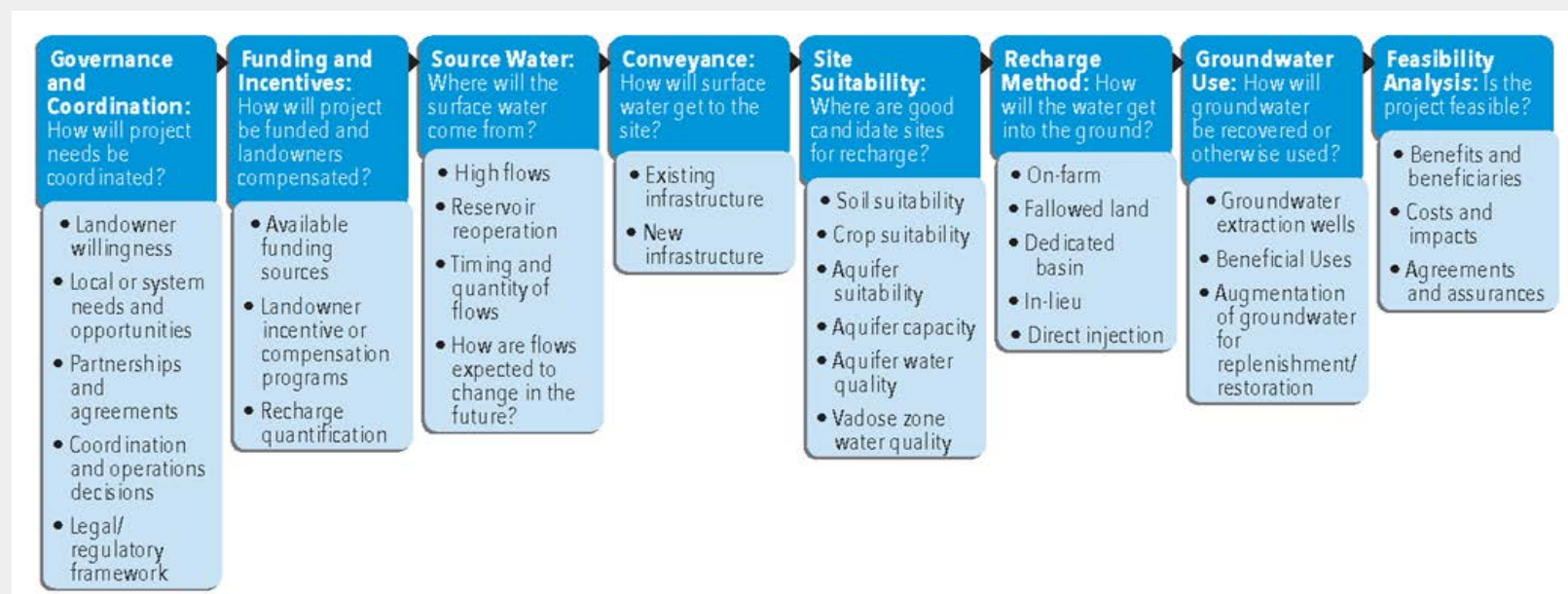
Current Plans and Activities

- Fact Sheet
- White Paper
- Draft Research & Data Development Framework
- Merced River Basin Conceptual Study
- Tuolumne River Climate Vulnerability Study
- Convened Research Advisory Committee



Developing Flood-MAR R&D Plan

- Identify & compile existing studies, data & tools
- Identify data & knowledge gaps
- Recommend studies / actions to fill gaps
- Organize & relate recommendations to Flood-MAR implementation factors
- Identify high leverage studies / actions
- Develop a roll-out & communication plan



Research Themes:

1. Hydrology Observation and Prediction
2. Reservoir Operations
3. Infrastructure Conveyance and Hydraulics
4. Crop Suitability
5. Soil Suitability, Geology, and Aquifer Characterization
6. Land Use Management
7. Water Quality
8. Recharge and Extraction Methods and Measurements
9. Environment (Aquatic, Riparian and Terrestrial)
10. People and Water
11. Economic Analysis
12. Local, State, Federal Policies and Legal
13. Tool and Application Development



Research Advisory Committee Activities

- Compile living library of knowledge
- Provide guidance for technical and scientific activities, plans & programs
- Provide independent, transparent, credible, and competent recommendations for needed technical studies to fill gaps
- Lead and develop an integrated training and education program



Venues for Stakeholder Coordination

- Join listserv & follow on social media
- Comment on program documents
- Coordinate with DWR on future studies
- Work with DWR to develop strategies & projects to overcome obstacles
- Participate in future meetings



What Can I Do ?



- **Landowners** -- Look for project opportunities and expand partnerships
- **Academia and Private Researchers** -- Continue to fill data gaps and conduct pilot projects
- **NGOs and Other Stakeholders** -- Encourage broad public benefits and look for partnership opportunities
- **Gov't Agencies** -- Provide technical and facilitation assistance (financial assistance, when available)
- **Regulators** -- Streamline processes and provide compliance assistance
- **Policy- and Decision-Makers** -- Authorize & fund agencies to remove barriers, conduct research, and support projects



Questions?

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Management

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www.water.ca.gov/Programs/All-Programs/Flood-MAR

