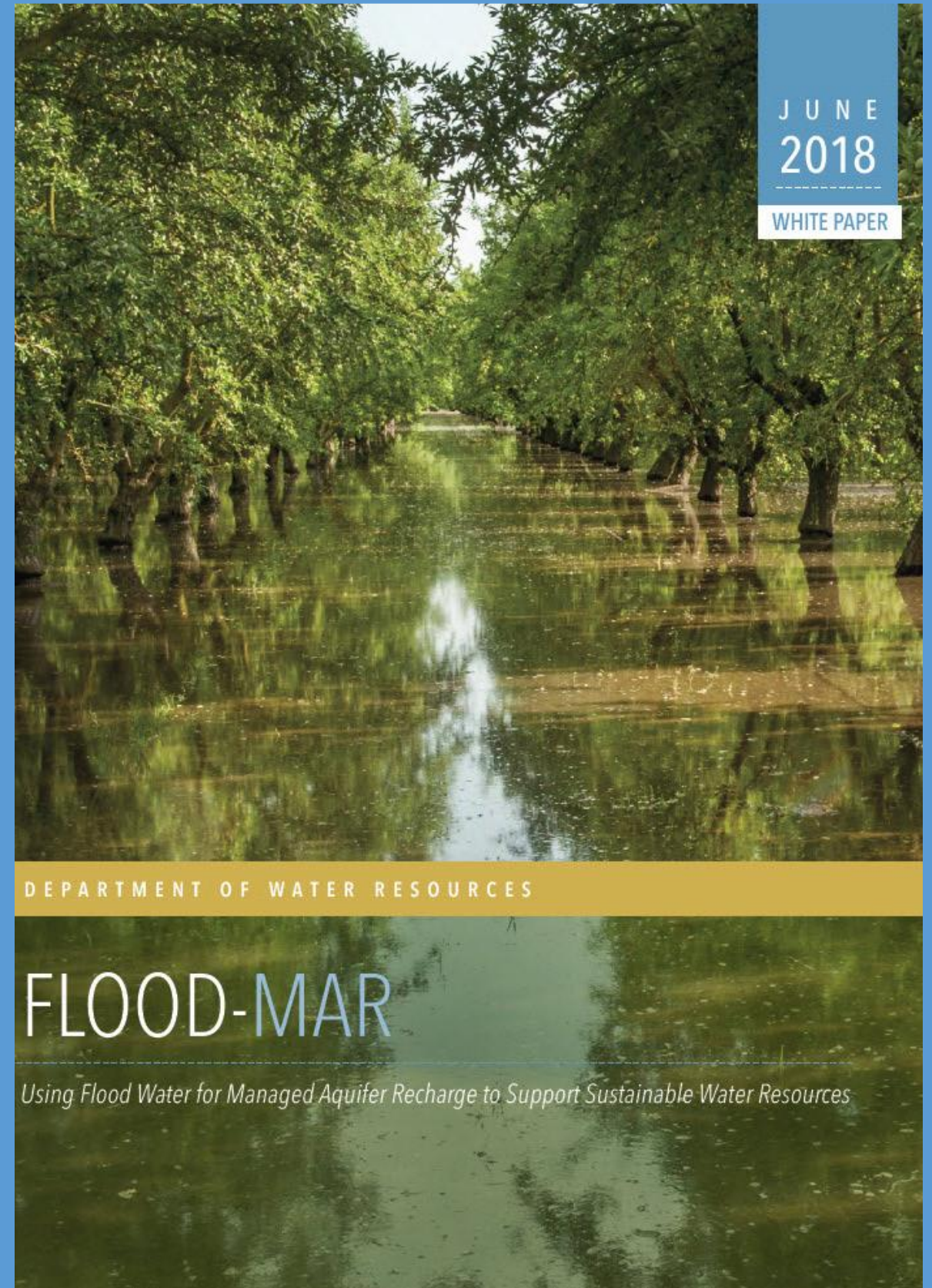


Flood-MAR

Using Floodwater for
Managed Aquifer Recharge

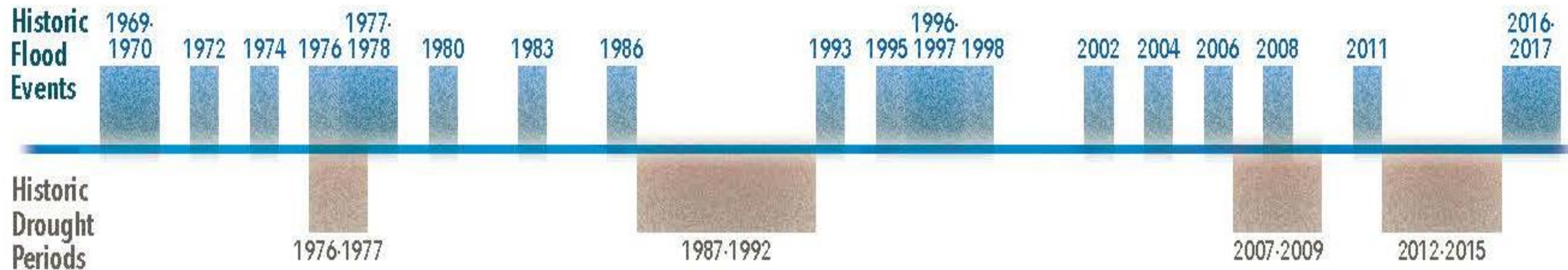
Groundwater Tour
Water Education Foundation
February 8, 2019



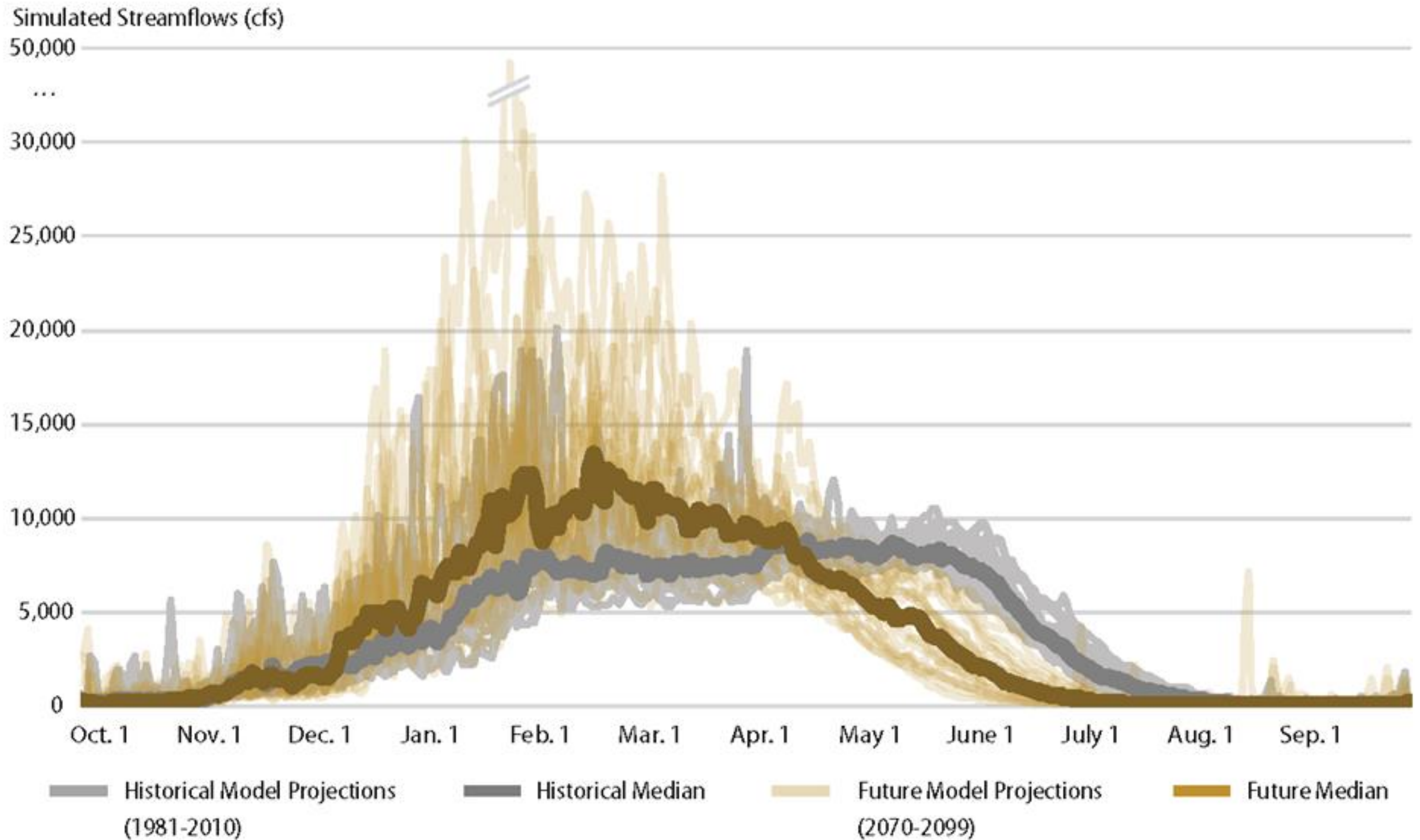
CALIFORNIA DEPARTMENT OF
water resources

California's Water Management

A Tale of Extremes



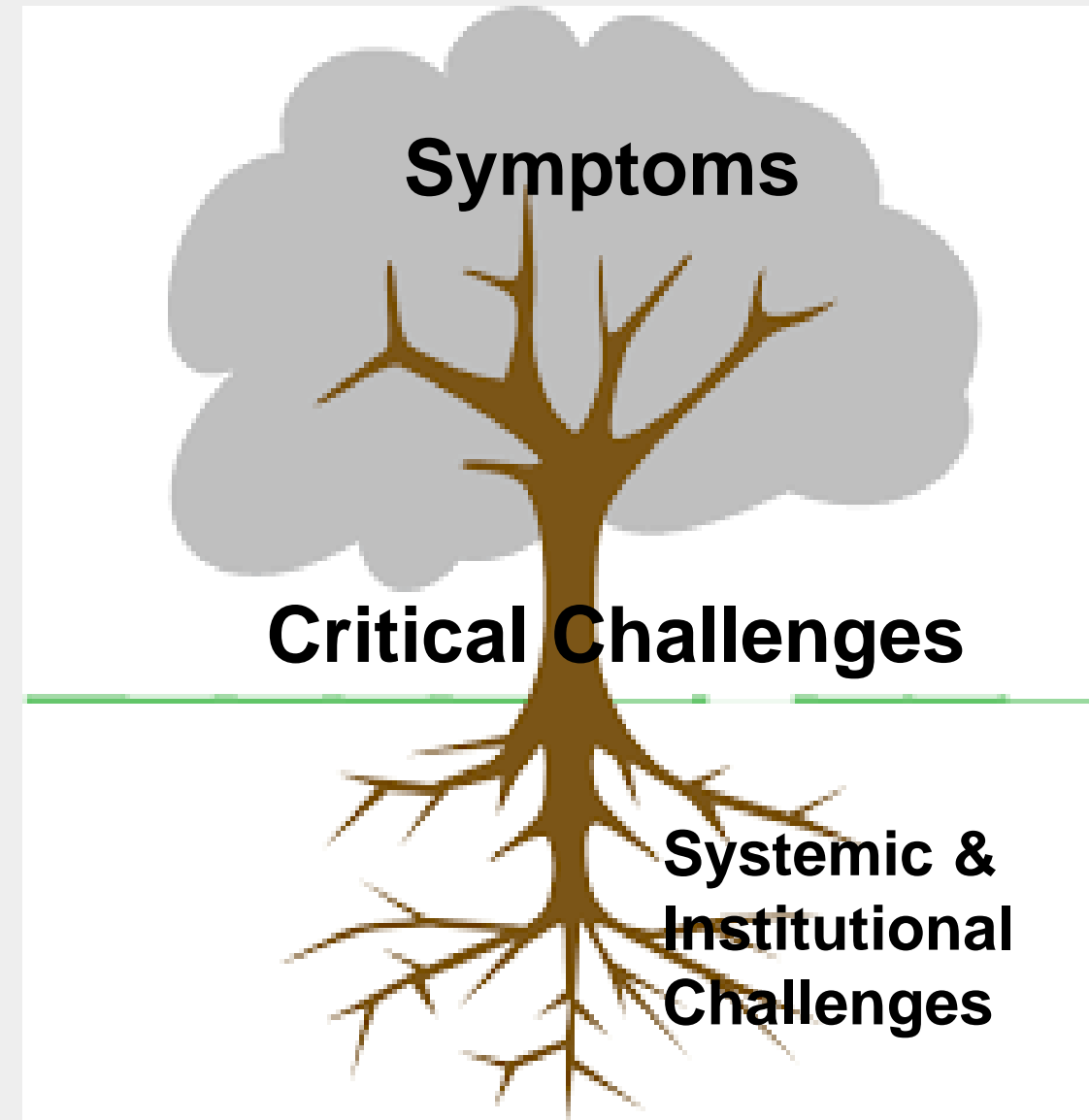
Effects of Climate Change Necessitate Wholesale System Changes



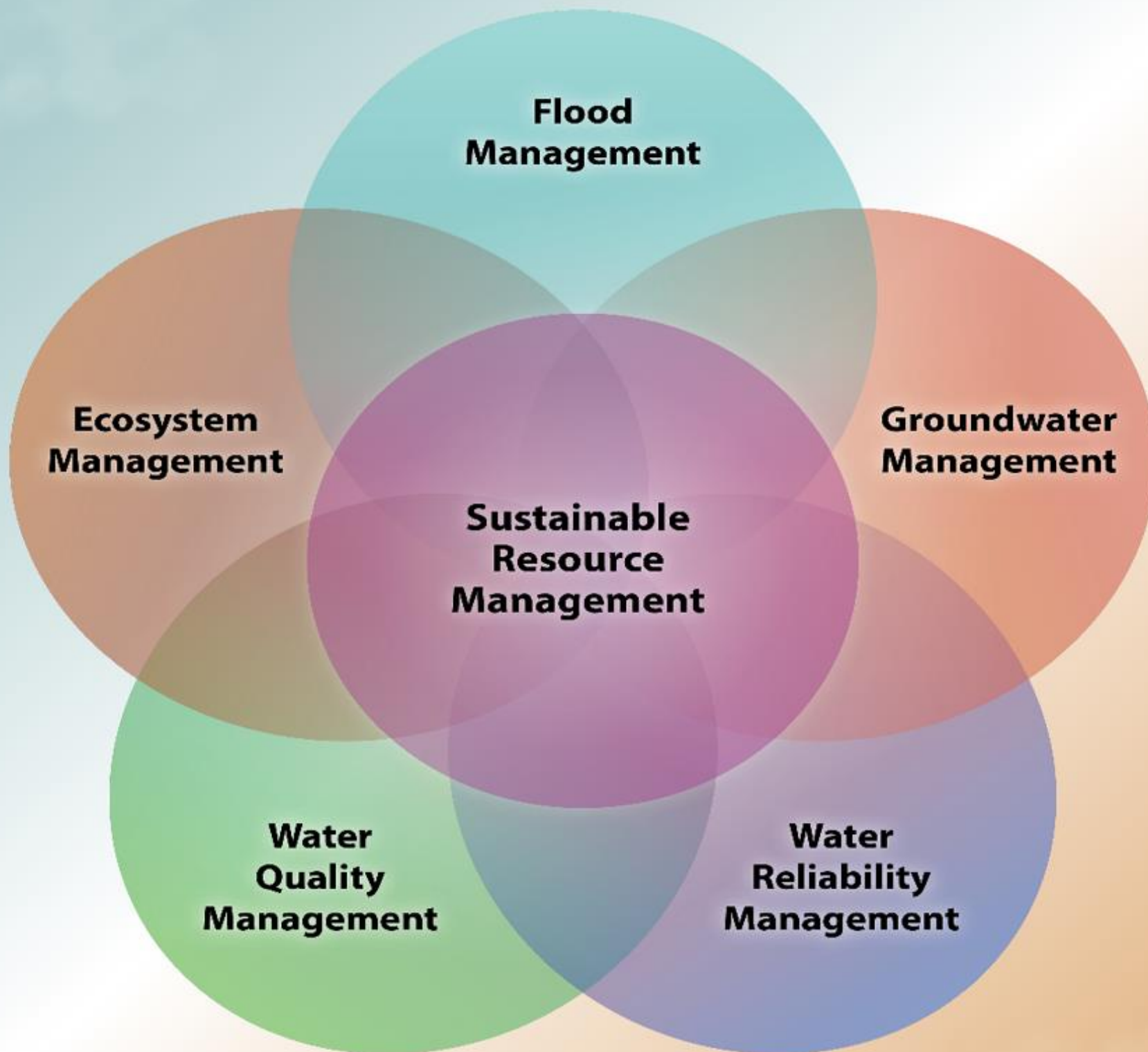
Systemic & Institutional Challenges

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

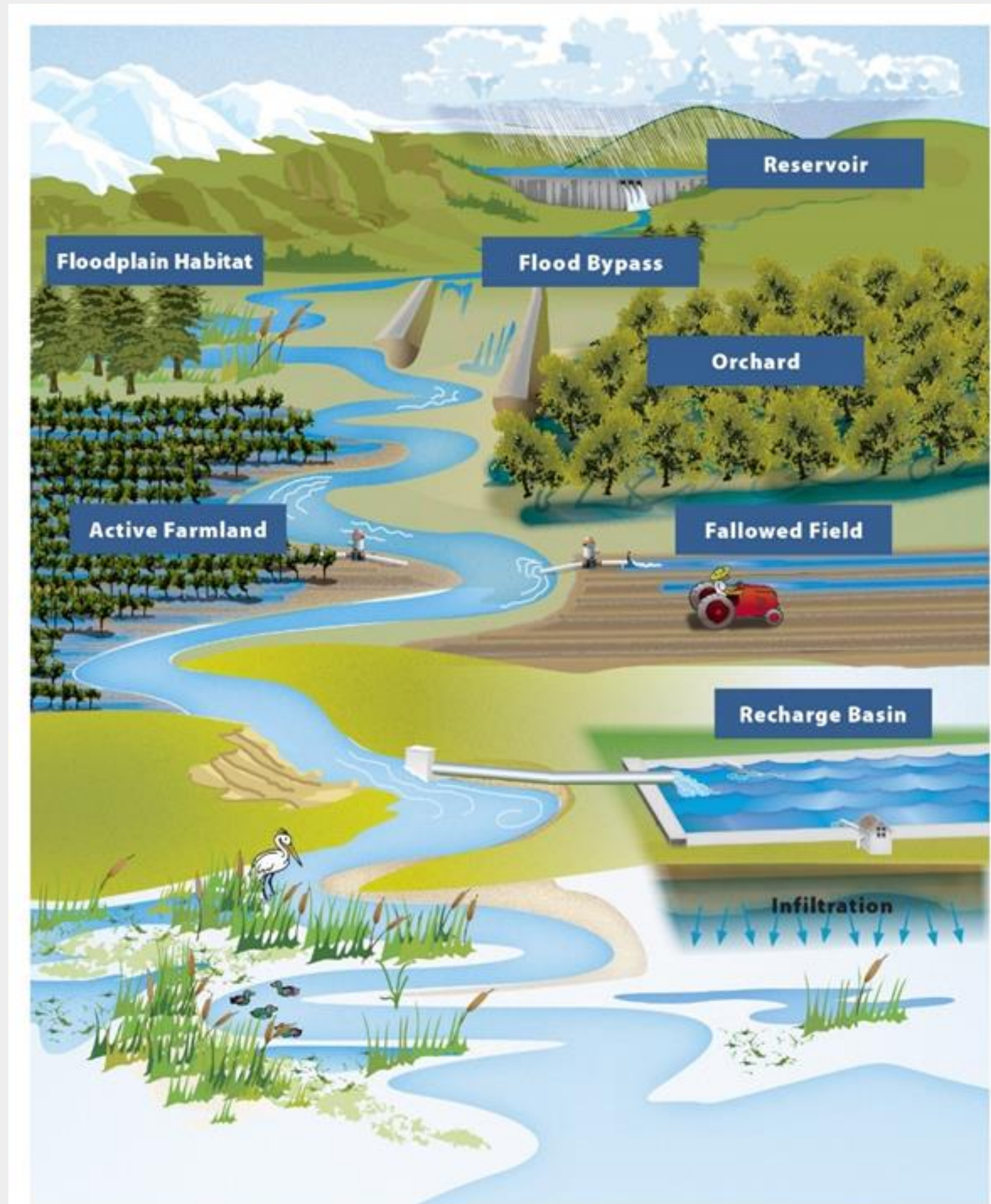
Multi-Discipline
Planning

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



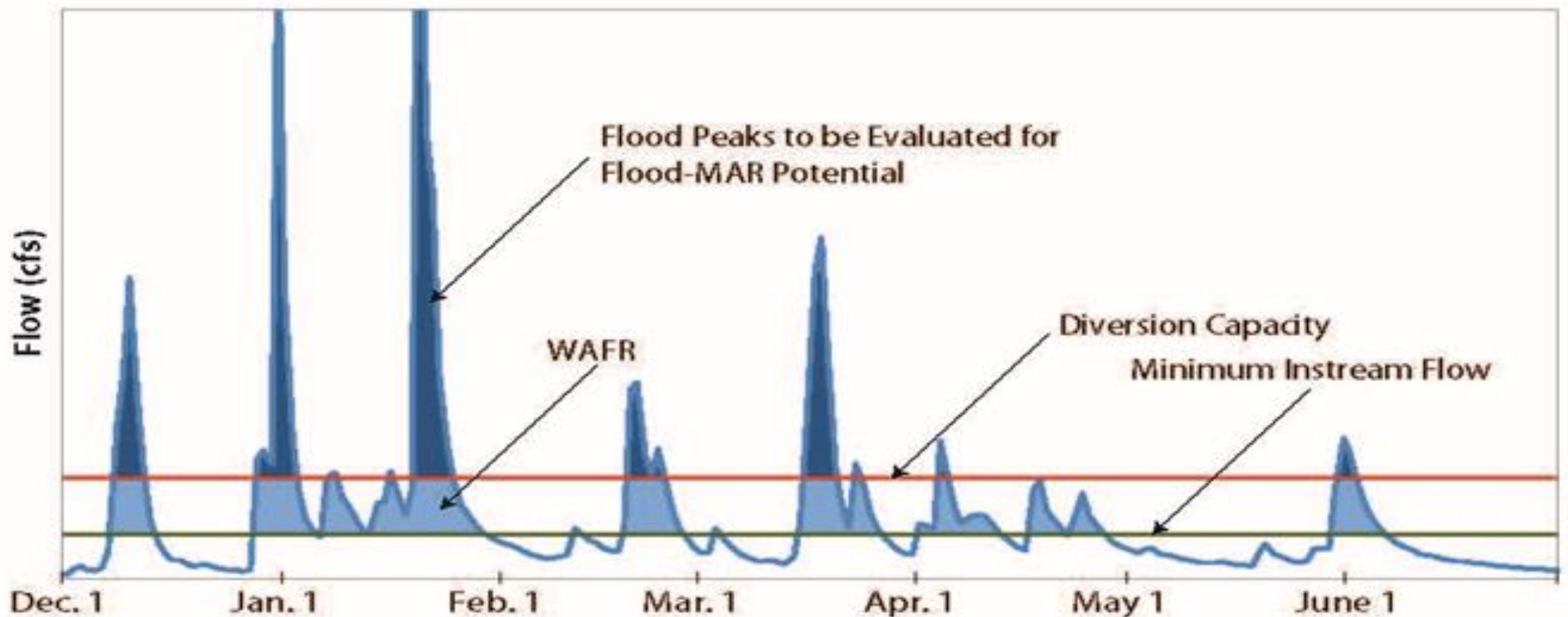
Flood-MAR is also...

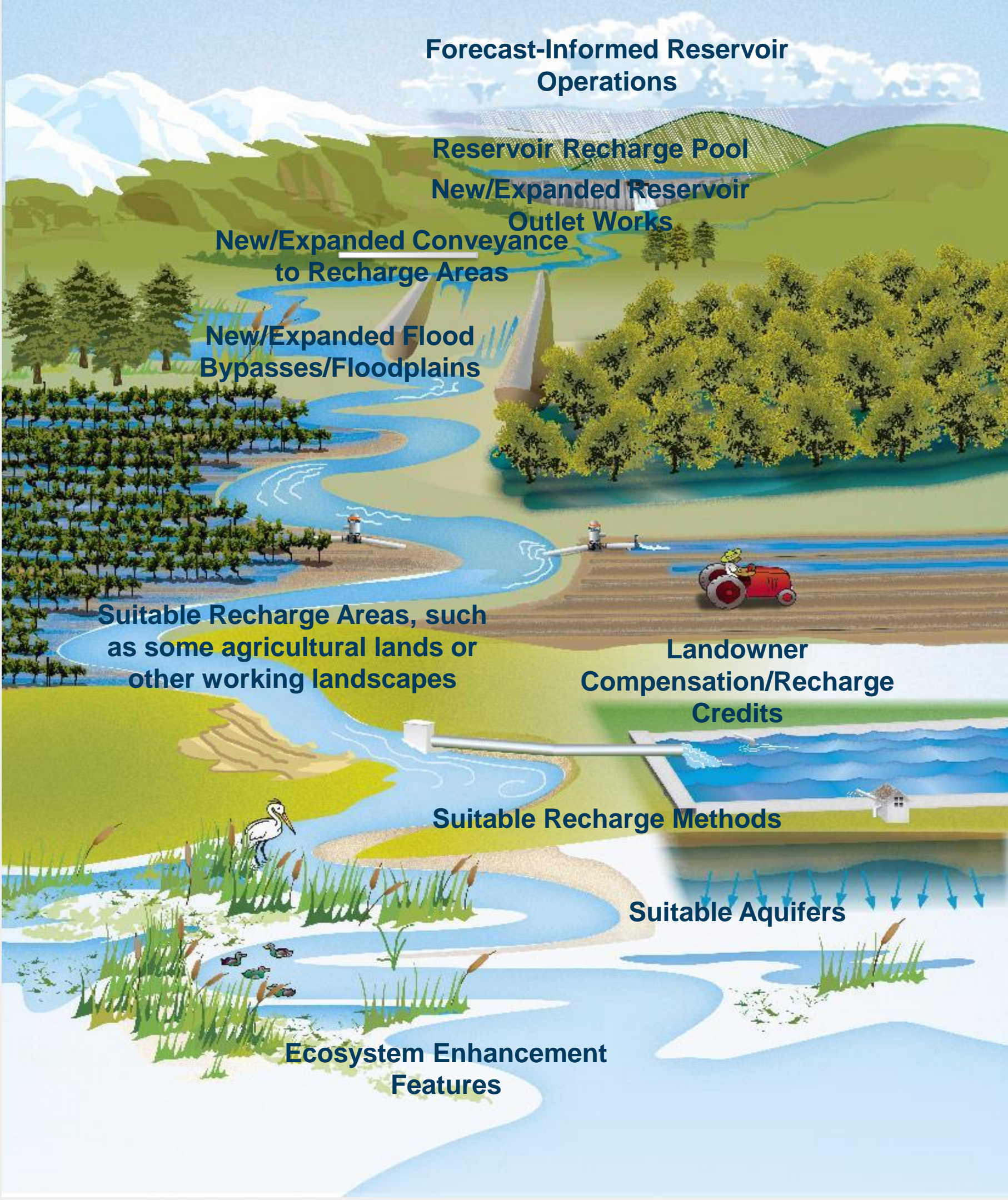
- ... an integrated & voluntary management strategy to improve water resources sustainability & climate resiliency
- ... multi-sector (flood, surface & groundwater, ecosystem, quality)
- ... scalable (farm, GSA, basin, region, watershed)
- ... multi-faceted (reoperation, conveyance, storage, recharge, 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

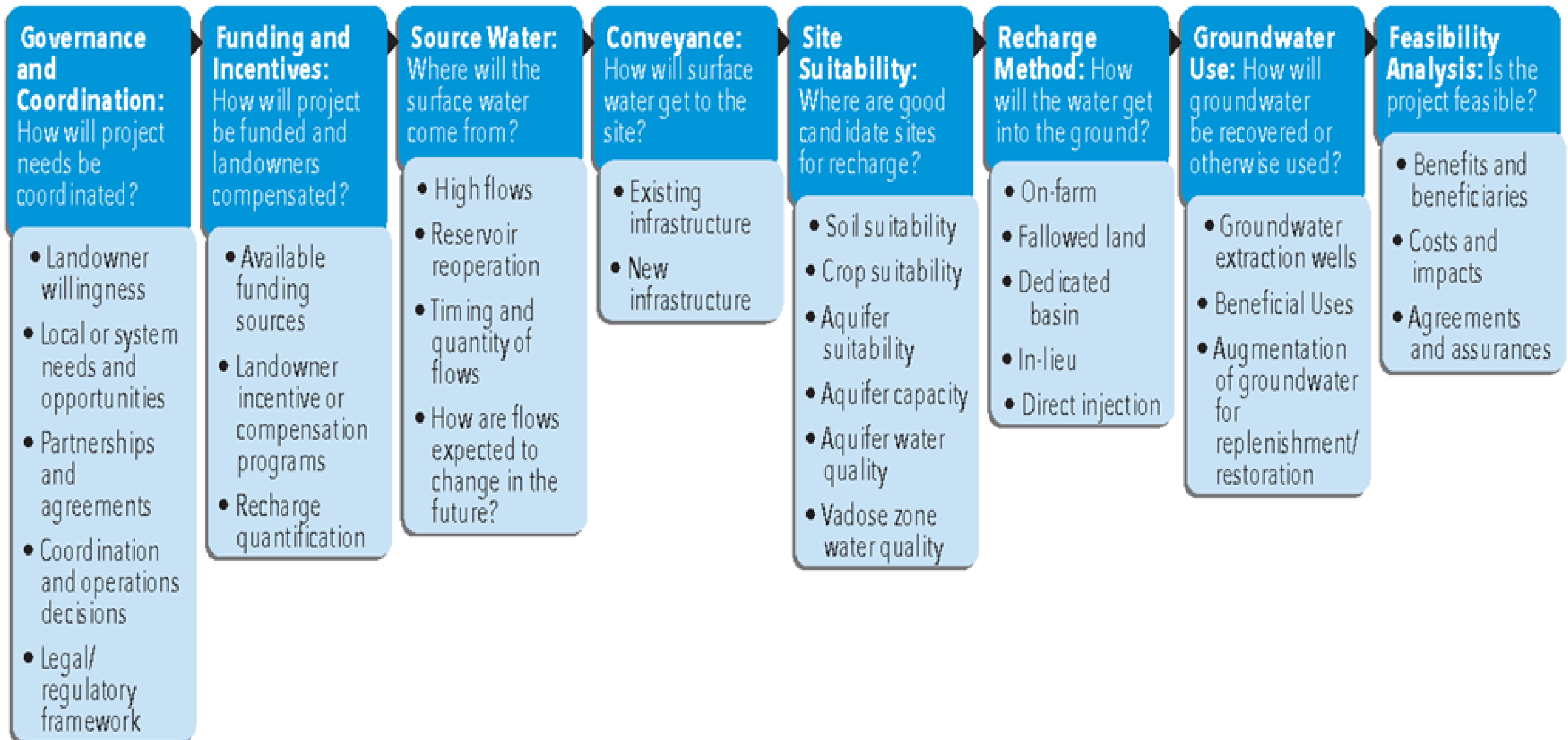
Example Components of Flood-MAR Projects

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



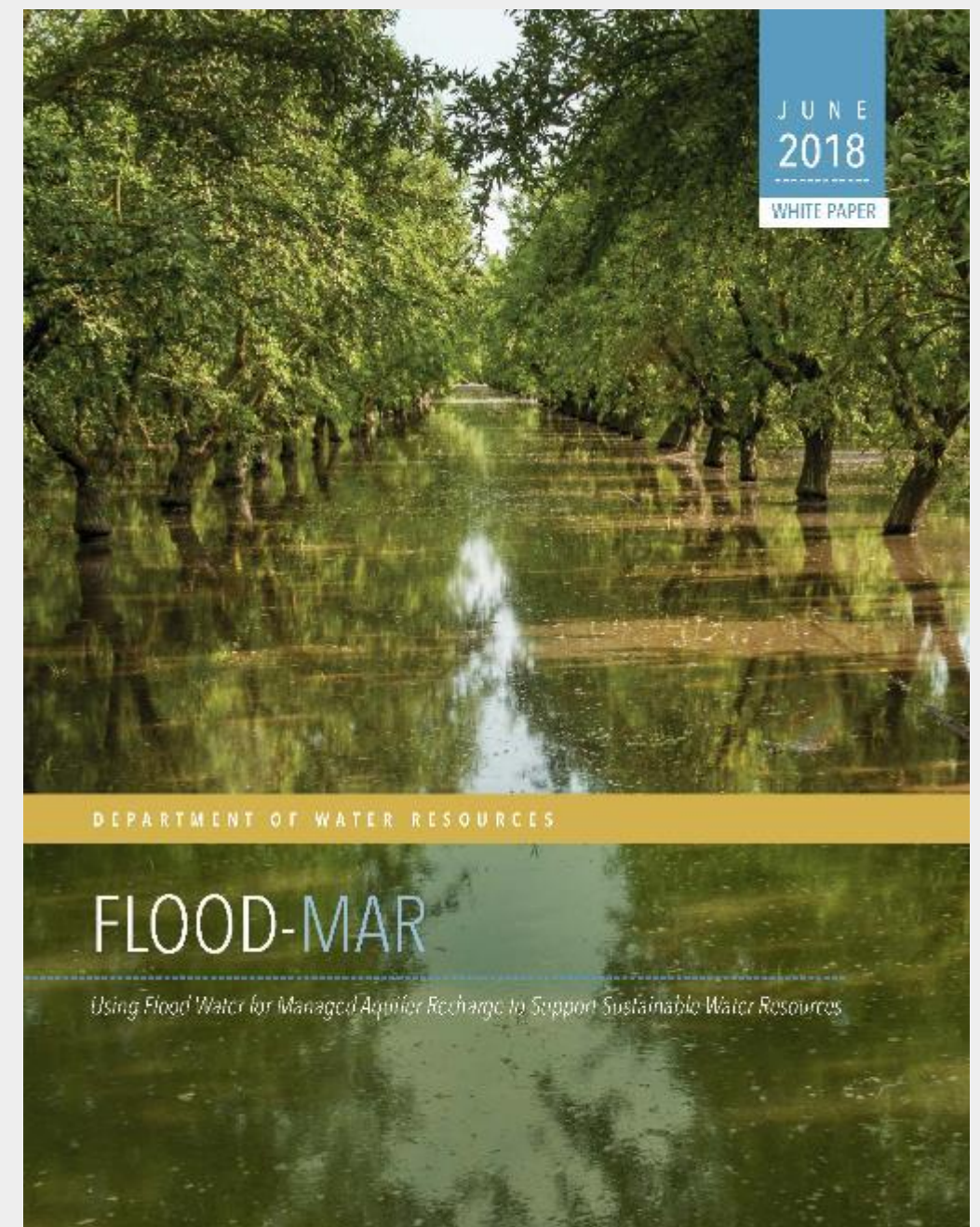
Potential Barriers to Flood-MAR Implementation

- **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



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

