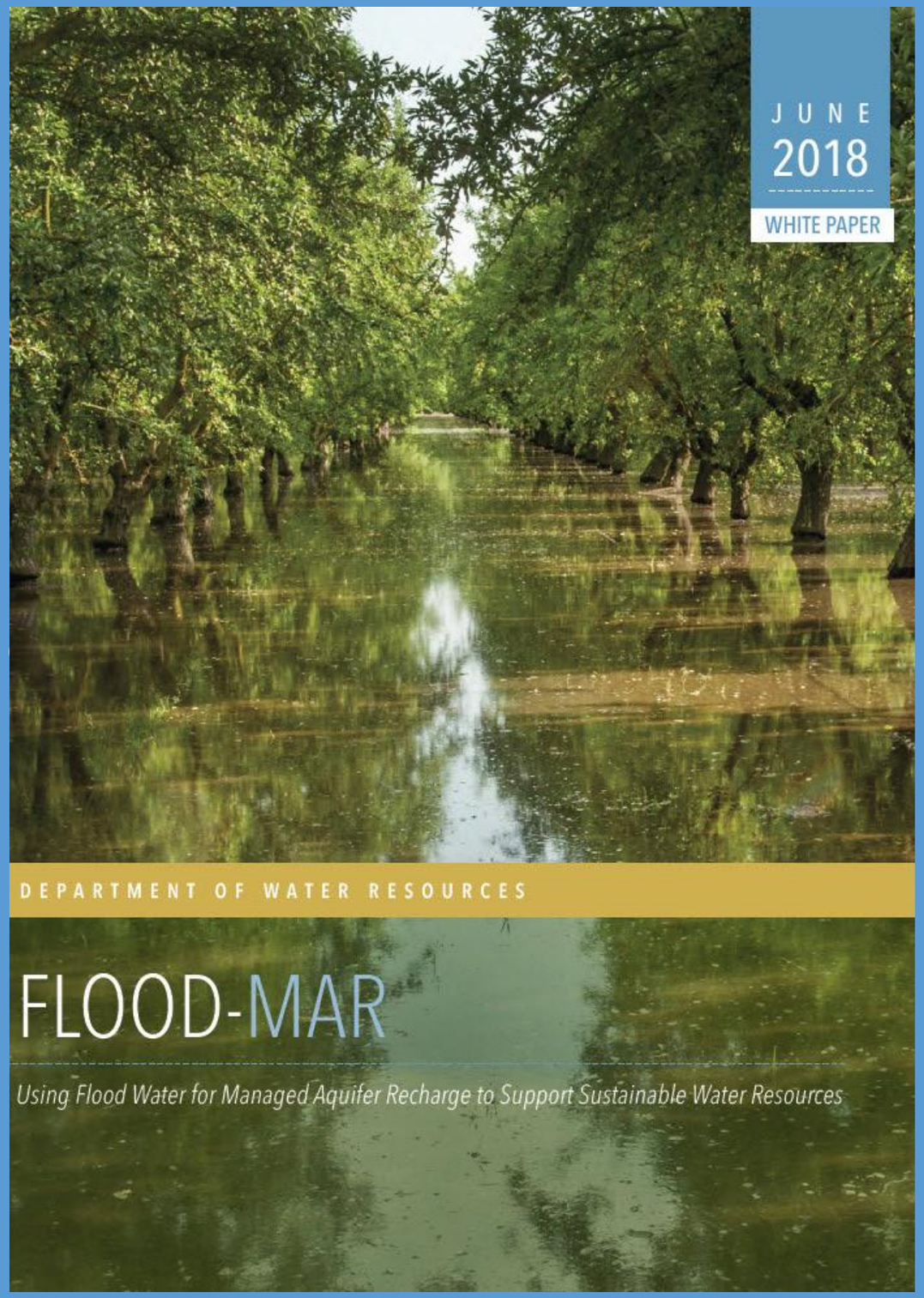
Flood-MAR

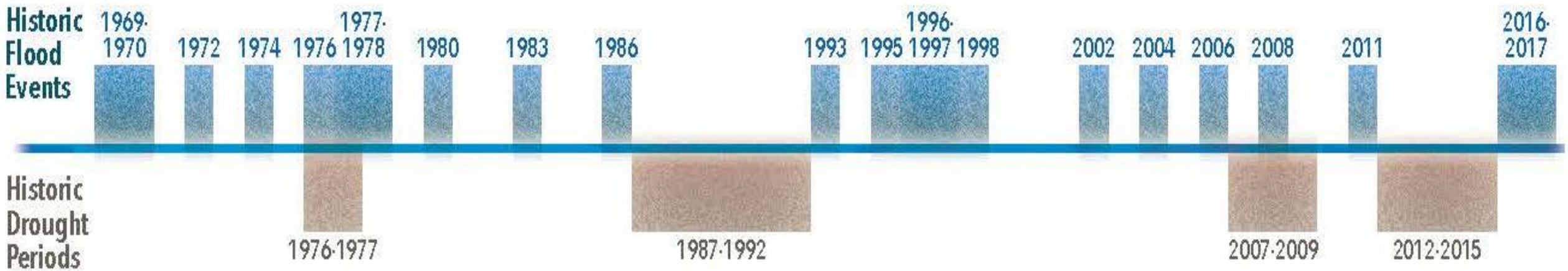
Using Flood Water for Managed Aquifer Recharge

FIRO Workshop
August 1, 2018

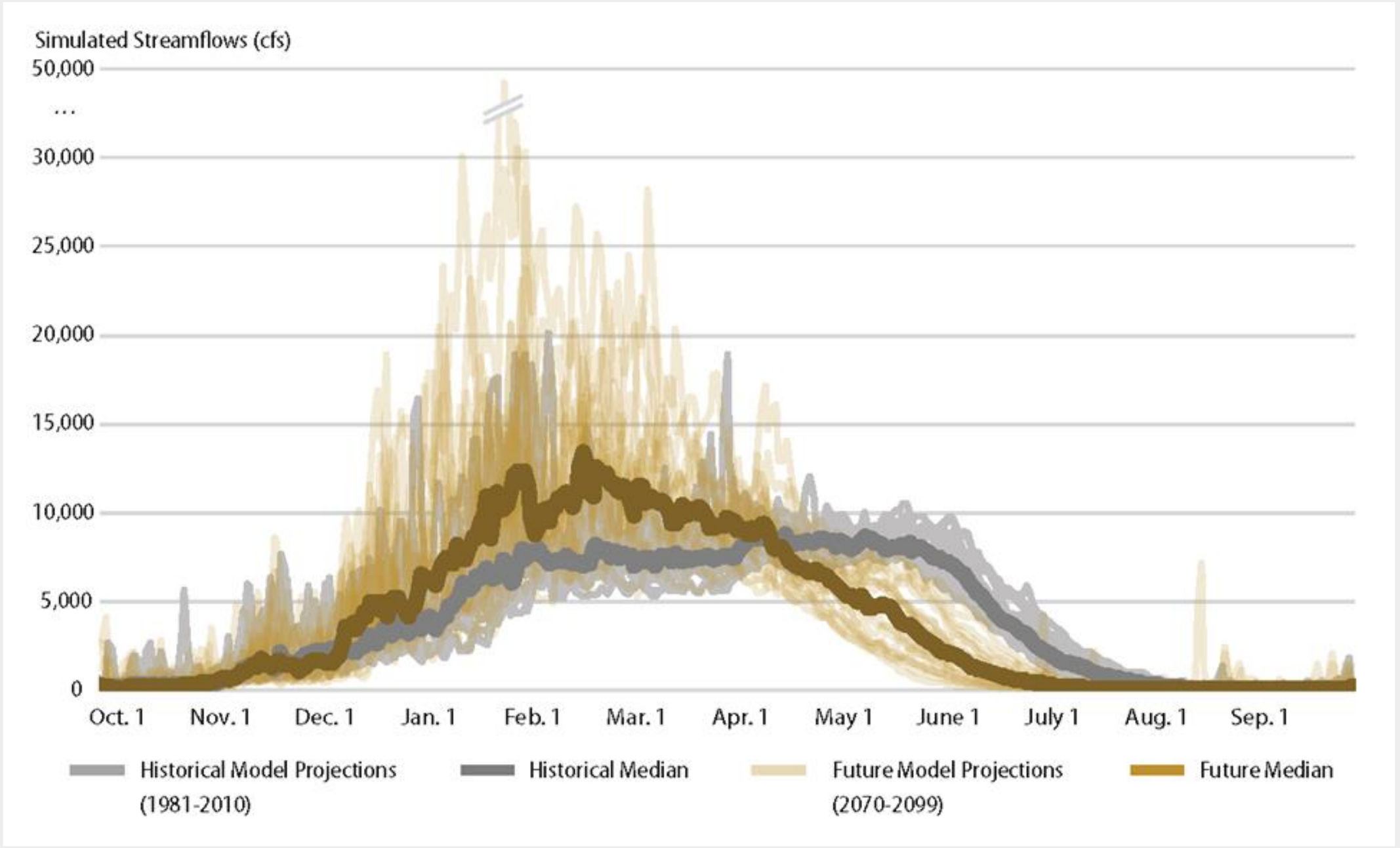


CALIFORNIA DEPARTMENT OF
water resources

California's Water Management
A Tale of Two Extremes

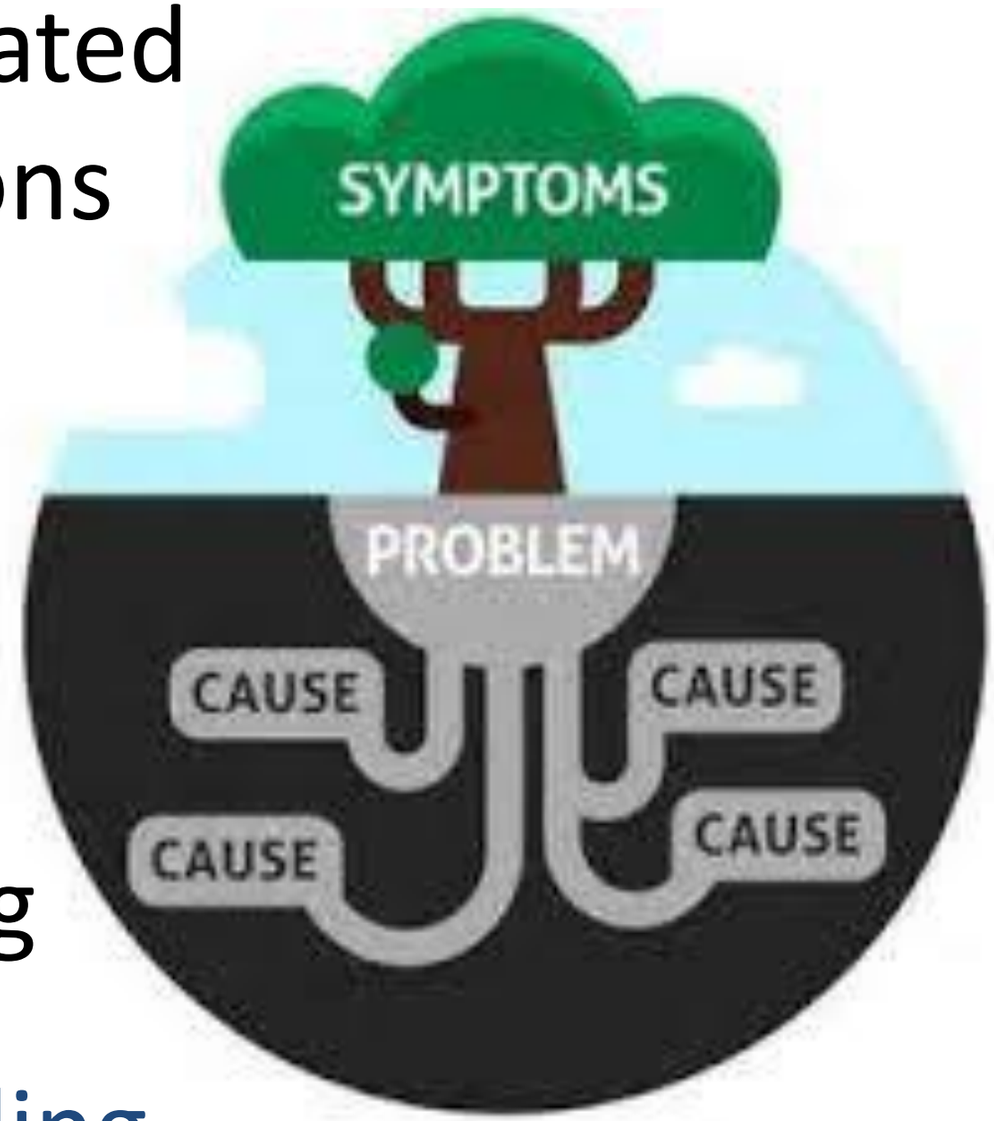


Effects of Climate Change Necessitate Wholesale System Changes



Systemic Challenges - Root Cause of Others
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

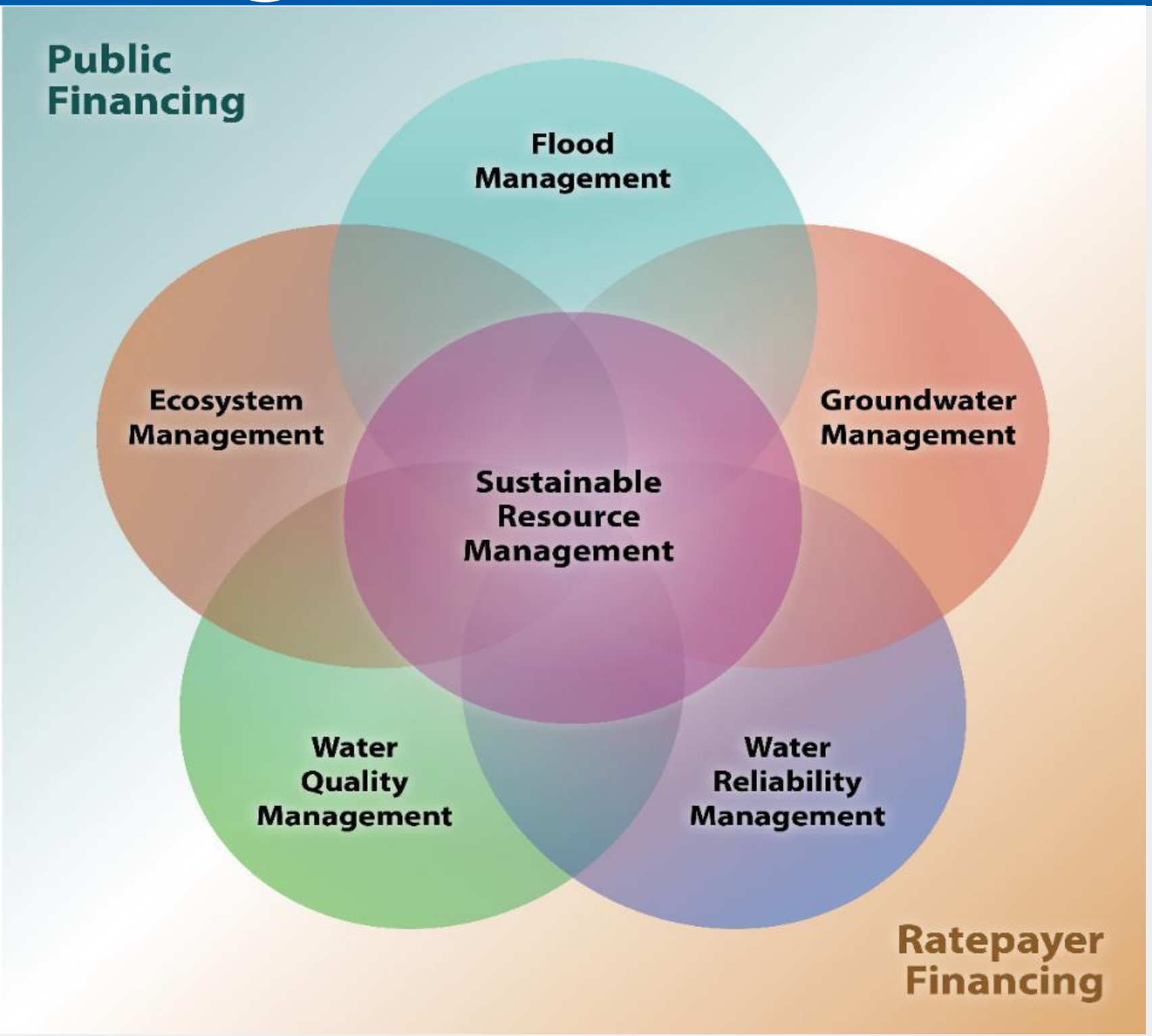


Sustainable and Integrated Water Resources Management

Call for multiple benefit projects that include ecosystem enhancements to move California's water resources toward sustainability

- Governor's Water Action Plan
- Sustainable Groundwater Management Water Act
- 2017 Central Valley Flood Protection Plan Update
- California Water Plan Update 2018

Sustainability Requires Alignment



Multi-Sector Collaboration

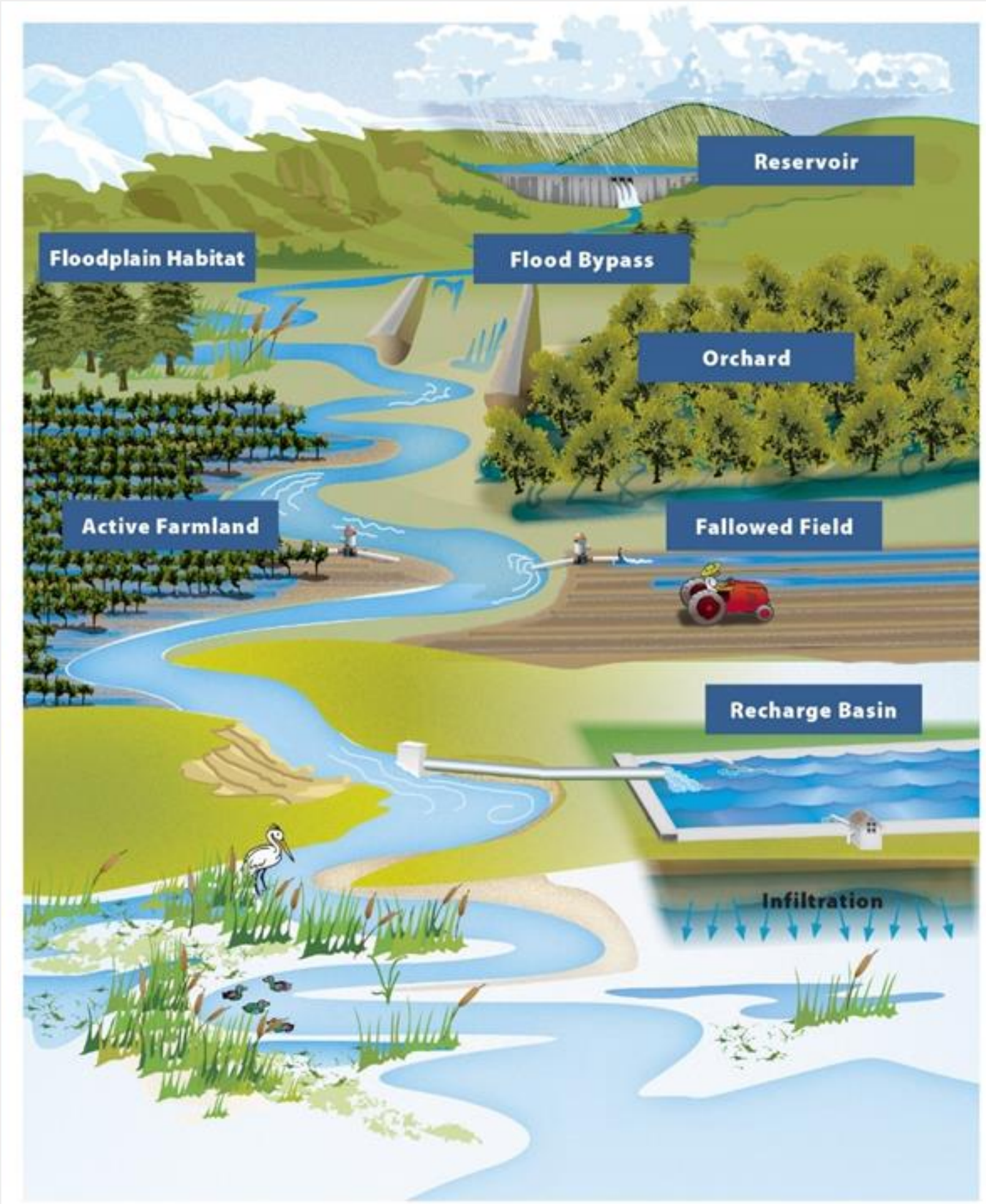
Multi-Discipline Planning

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 and working landscapes

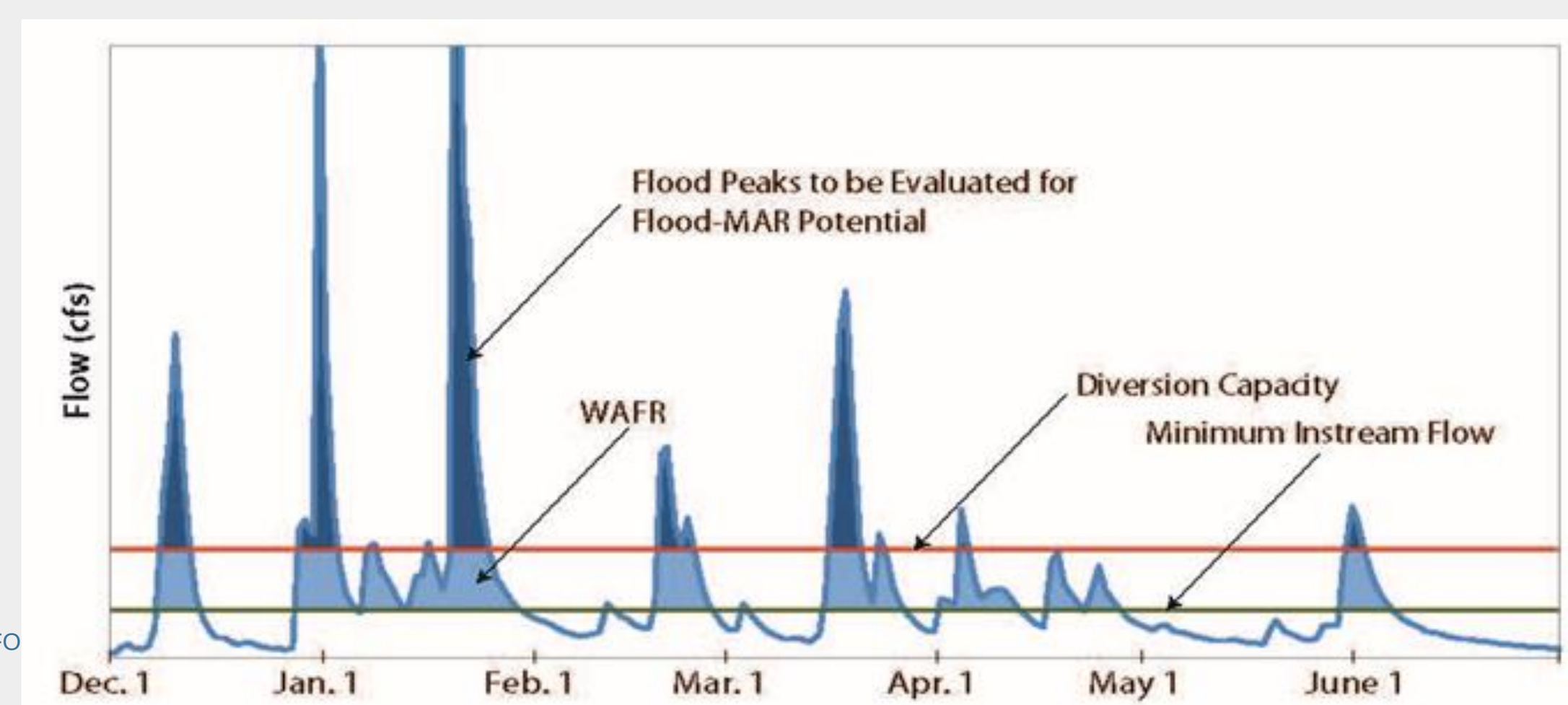


Flood-MAR is…

- … an integrated & voluntary management strategy to improve water resources sustainability & climate resiliency
- … multi-sector (flood, groundwater, ecosystem, quality)
- … scalable (farm, GSA, basin, regional, 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 (July 2018)



CALIFO

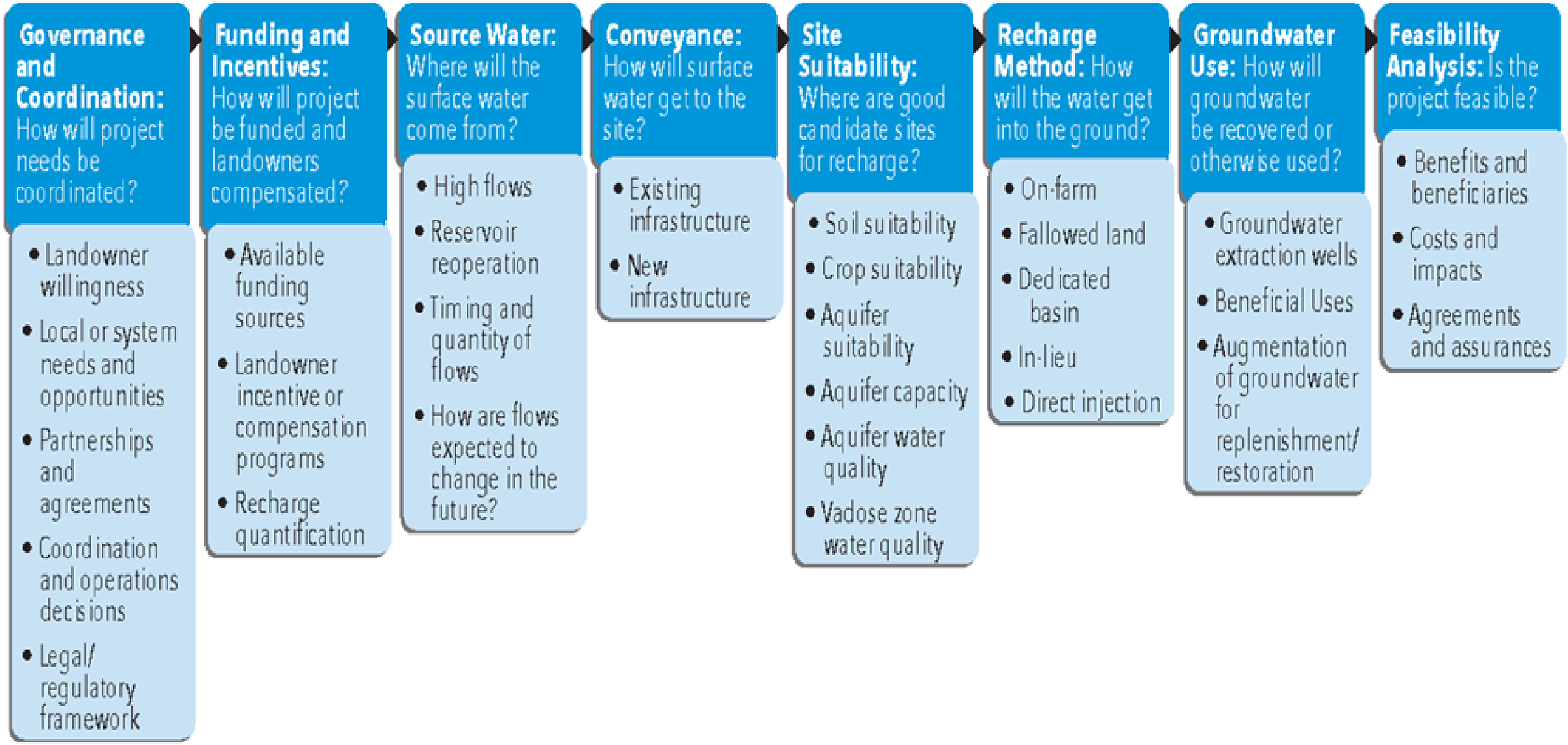
Public Benefits of Flood-MAR

- Flood risk reduction ★
- Drought preparedness ★
- Aquifer replenishment
- Ecosystem enhancement ★
- Groundwater remediation/water quality ★
- Working landscape preservation and stewardship
- Climate change adaptation
- Recreation and aesthetics ★

★ Public benefits defined in Proposition 1

Green Infrastructure

Flood-MAR Implementation Factors

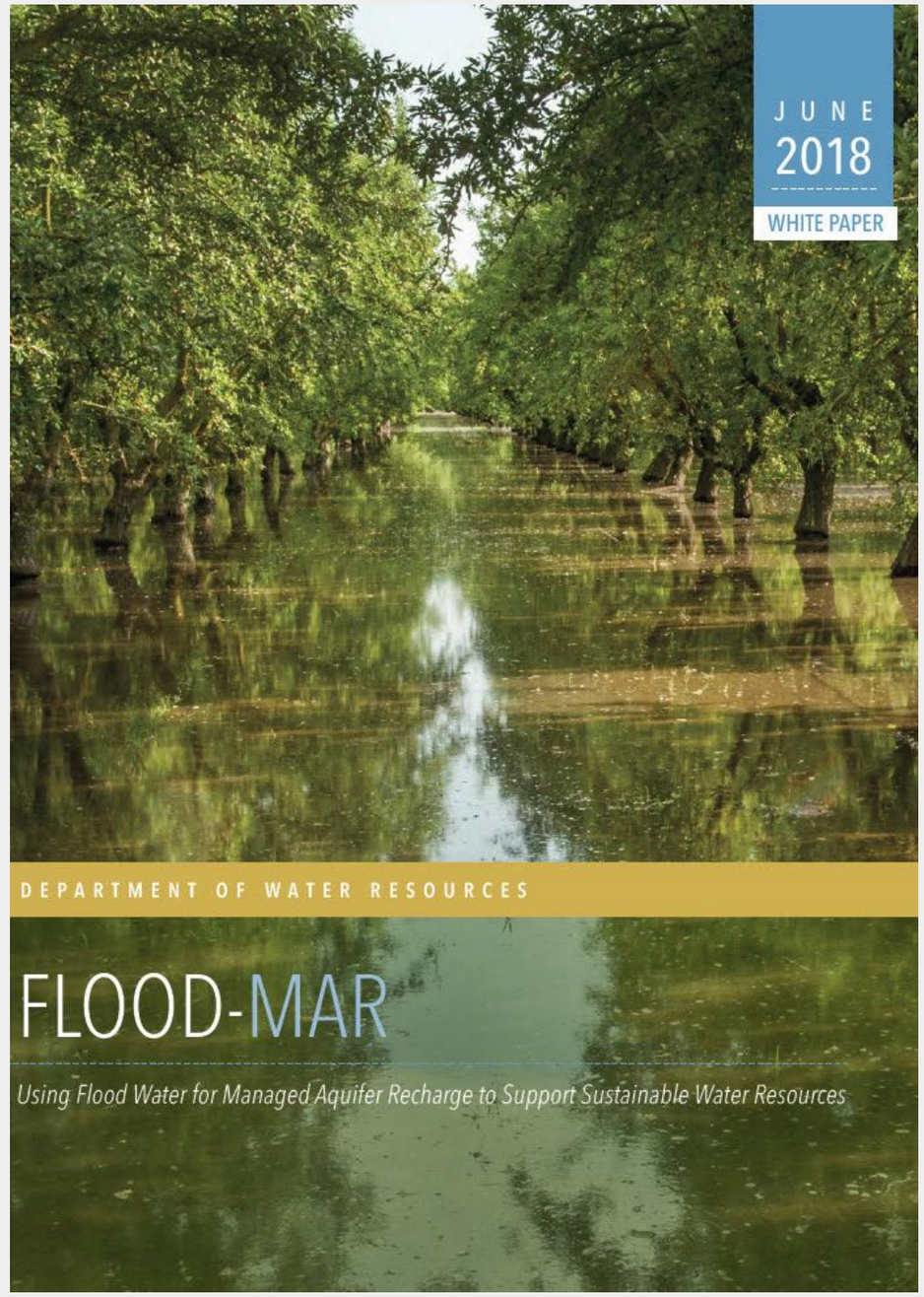


Potential Barriers to Flood-MAR Implementation

- **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
- Convening Research Advisory Committee
- Merced River Basin Conceptual Study
- Tuolumne River Climate Vulnerability Study



Research & Data Development Framework

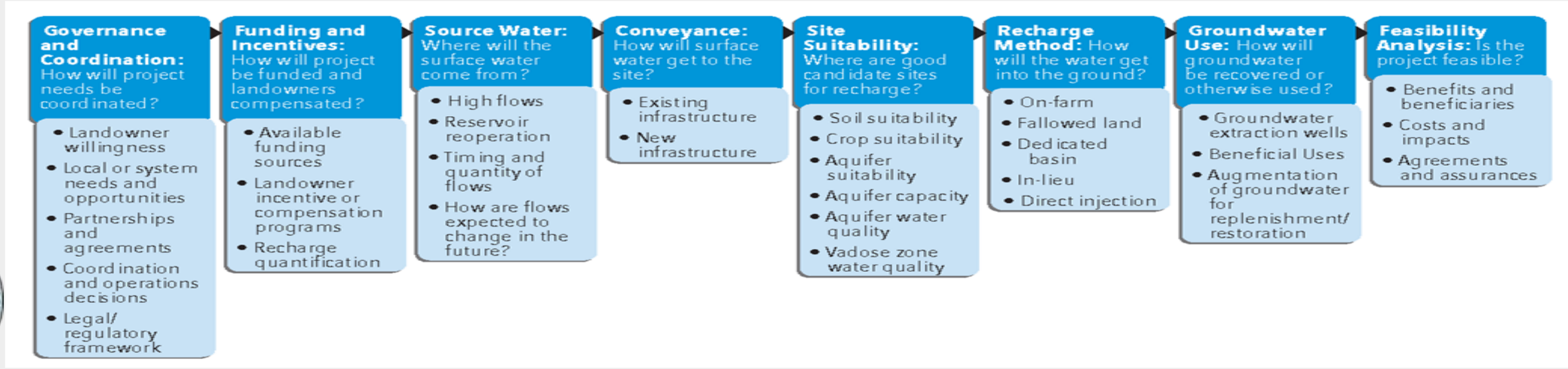
- Assemble body of knowledge and a living inventory of technical research needs
- Inventory, develop, and coordinate technical expertise
- Convene Flood-MAR Research Advisory Committee -- network of experts and advisors
- Develop an R&D Plan to frame long-term and continued research and data development
- Improve availability of research and technical expertise for all stakeholders
- Provide guidance and technical assistance to stakeholders to support project planning & implementation

Research Themes

1. Hydrology Observation and Prediction
2. Reservoir Operations
3. Infrastructure Conveyance and Hydraulics
4. Crop Suitability
5. Soil Suitability
6. Geologic and Aquifer Characterization
7. Land Use Management
8. Water Quality
9. Recharge and Extraction Methods
10. Environment
11. Social Impacts
12. Economic Analysis
13. Local, State, Federal Policies and other Legal Constraints
14. Tool & App Development

Merced River Flood-MAR Study

- Investigate white paper concepts and research themes
- Integrates surface and groundwater modeling
- Multi-benefit analysis and economic assessment
- Analyze multiple scenarios within 3 Flood-MAR levels
  - Level 1 > Existing Water Operations & Existing Infrastructure
  - Level 2 > Revised Water Operations & Existing Infrastructure
  - Level 3 > Revised Water Operations & Expanded Infrastructure



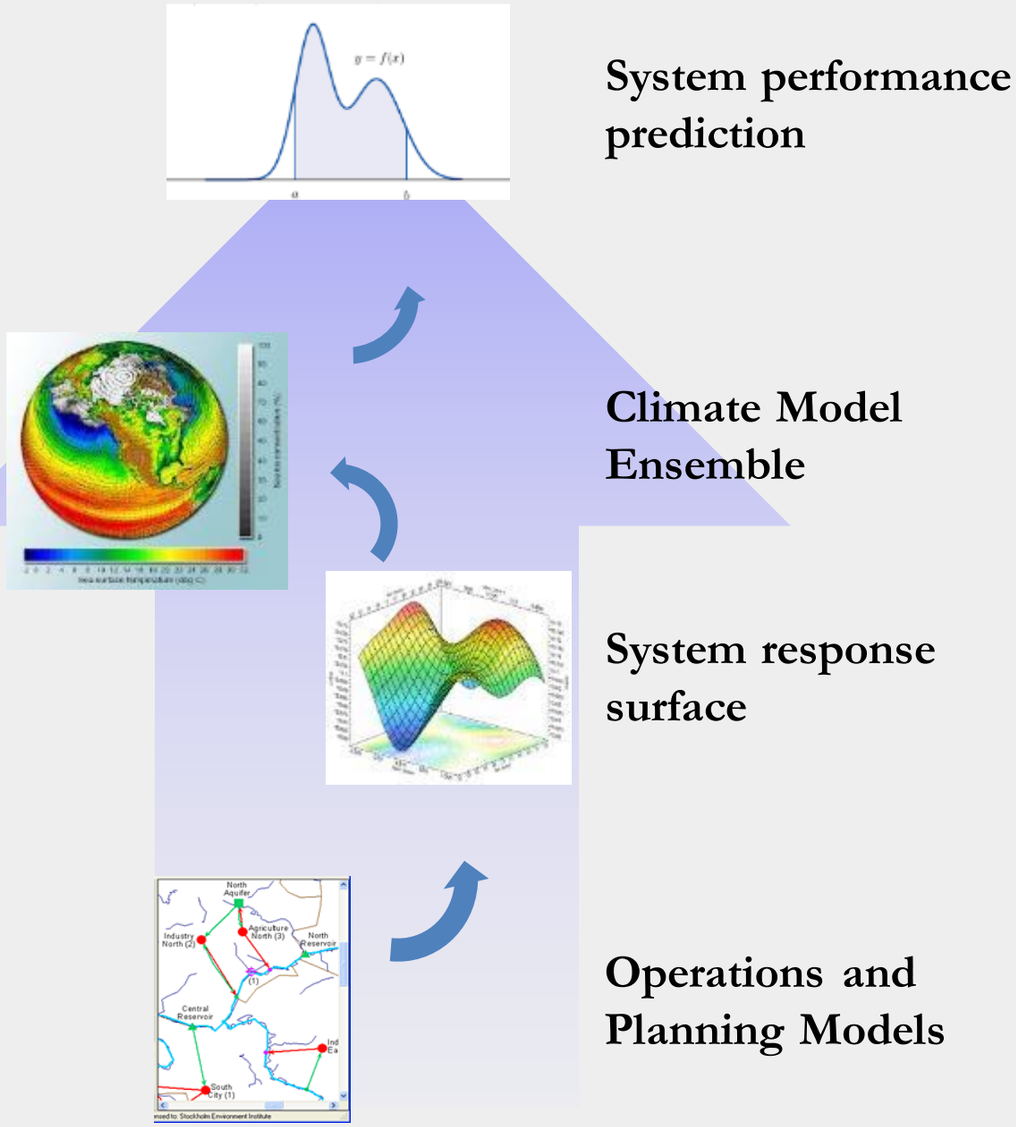
Tuolumne Climate Vulnerability

- Quantify deep uncertainties in flood prediction, water supply and ecosystem vulnerability under climate change

- Formulate a systematic framework for assessing future risks and developing economically efficient, robust, and flexible plans to mitigate risk

- Inform other projects and planning efforts

Bottom Up Systems Analysis (Study Approach)



Next Steps

- Roll-out White Paper and draft Research & Data Development Framework
- Engagement – RAC, stakeholders, public
- Incorporate comments on R&D Framework
- Complete Merced River Study & Tuolumne R. Climate Vulnerability Study
- Planning and Implementation Guidance
- Identify and implement Flood-MAR studies, pilots, and projects

Questions?

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