

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Addressing Climate Resilience in 2022 Central Valley Flood Protection Plan Update



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California Department of Water Resources

Agenda

- Overview of 2022 CVFPP Update
 - *Climate Resilience as Major Update Theme*
- 2022 CVFPP Climate Change Resilience
- Exploration of Climate Change Adaptation Strategies and Measures
 - *Watershed-based approaches - Pilot efforts (Merced and Tuolumne)*
 - *Climate Change Adaptation Study for Conservation Strategy*
 - *Climate Change Adaptation Measures for CVFPP*
- CVFPP's Contribution to DWR's Resilience Goals



OVERVIEW OF 2022 CVFPP UPDATE

CVFPP Overview

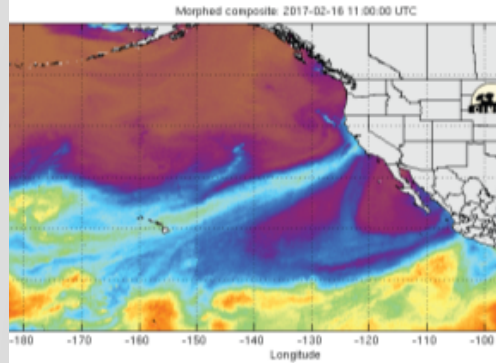
- Dynamic, long-term, programmatic plan, updated in five-year cycles – CVFPP first adopted in 2012, first “Update” in 2017
- Refines and updates State Systemwide Investment Approach (SSIA); recommends near and long-term investments and policies for Central Valley flood management
- Uses a comprehensive risk management approach to increase climate resilience and provide multiple benefits
- Aligned with other State water management efforts



**2022 CVFPP
Update**

2022 CVFPP Update

Foundational Themes



STATE OF CALIFORNIA
WATER RESILIENCE
PORTFOLIO INITIATIVE

- ✓ **Innovation** through Climate Change Resilience and Adaptation
- ✓ **Accountability** by Tracking Performance
- ✓ **Collaboration** through Alignment with other State Efforts



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2022 CVFPP CLIMATE CHANGE RESILIENCE

2022 CVFPP Climate Change Resilience

Building Upon Previous Efforts

2012 CVFPP

2017 CVFPP

2022 CVFPP

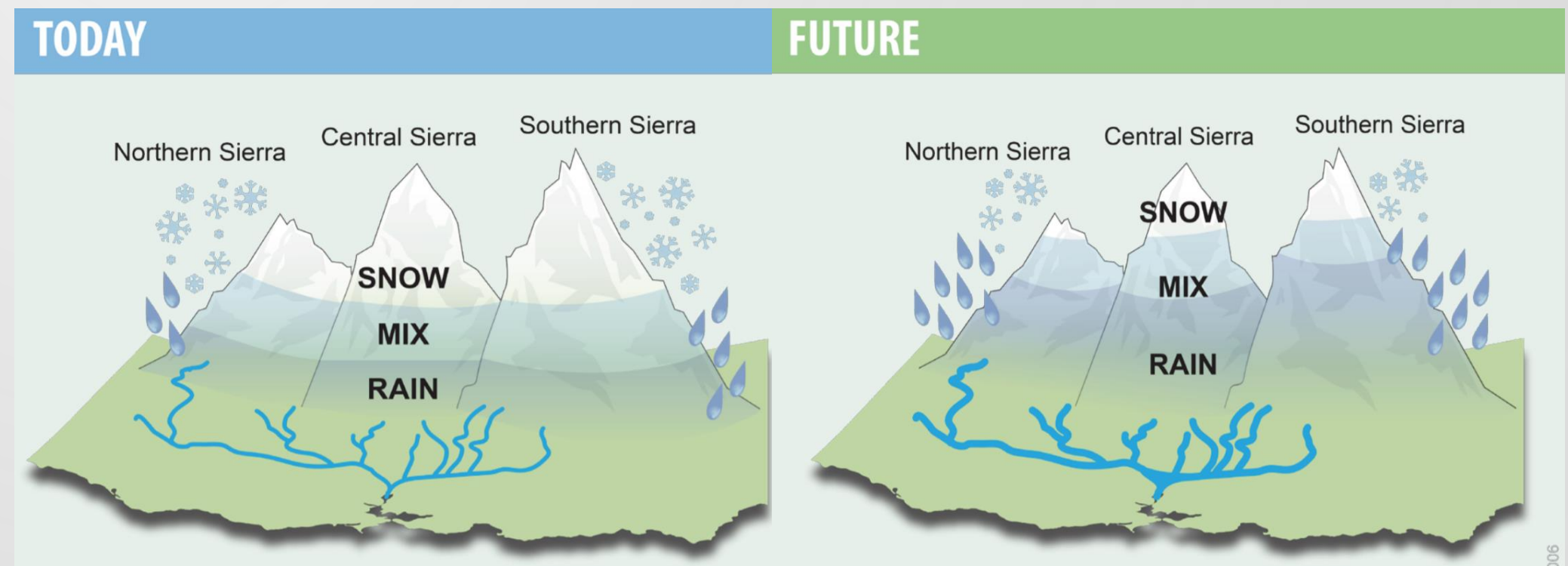
- Assessed vulnerabilities that would results from a potential 30% increase in flood size
- Built a chain-of-models analysis framework to assess flood vulnerabilities for “median” climate change scenario (more of a central tendency)
- Updated the chain-of-models framework to access flood vulnerabilities for 2072 under a **range** of future climate change scenarios



Climate Change Resilience

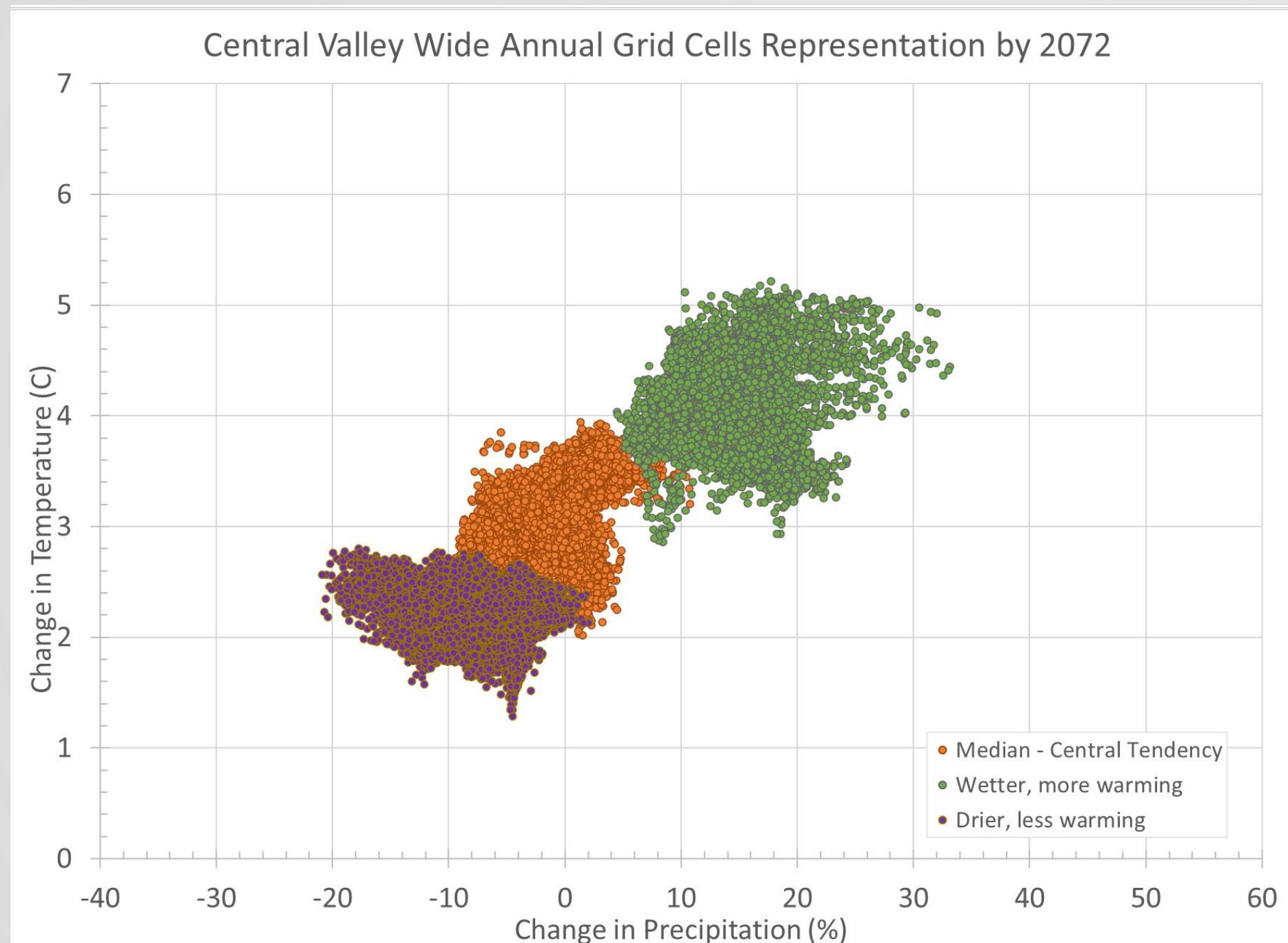
The 2022 Update is building upon analyses done in 2012 and 2017

- Be informed by new data
- Use a comprehensive risk-management approach to increase climate resilience and provide multiple benefits.
- Emphasize watershed-based approaches
- Include independent peer review



2022 CVFPP Climate Change Scenarios

Projected Changes in Temperature and Precipitation in VIC Grid cells



- 3 Climate Change Scenarios are used in CVFPP 2022 - ***improve understanding of climate change uncertainties***
- Warming under all future scenarios
- Significant increase in precipitation under warmer, wetter scenario



EXPLORATION OF CLIMATE CHANGE ADAPTATION STRATEGIES AND MEASURES

Exploration of Adaptation Strategies and Measures

Merced River Flood-MAR Reconnaissance Study

- Proof of concept study: Investigate Flood-MAR concepts on a watershed scale
- Integrated Watershed Modeling - Integrate surface and groundwater analyses and models

Tuolumne River Watershed Study

- Hydrologic Vulnerability Assessment and Adaptive Planning Pilot Project
- Enhance and extend climate change vulnerability assessment efforts and improve stakeholder understanding

Climate Change Adaptation Study for Conservation Strategy

- Adaptation measures in categories:
 - system resiliency
 - flood management-specific actions that can alleviate ecological stressors
 - hydrologic, ecological, and geomorphic process specific adaptation measures
 - habitat and species-specific adaptation measures

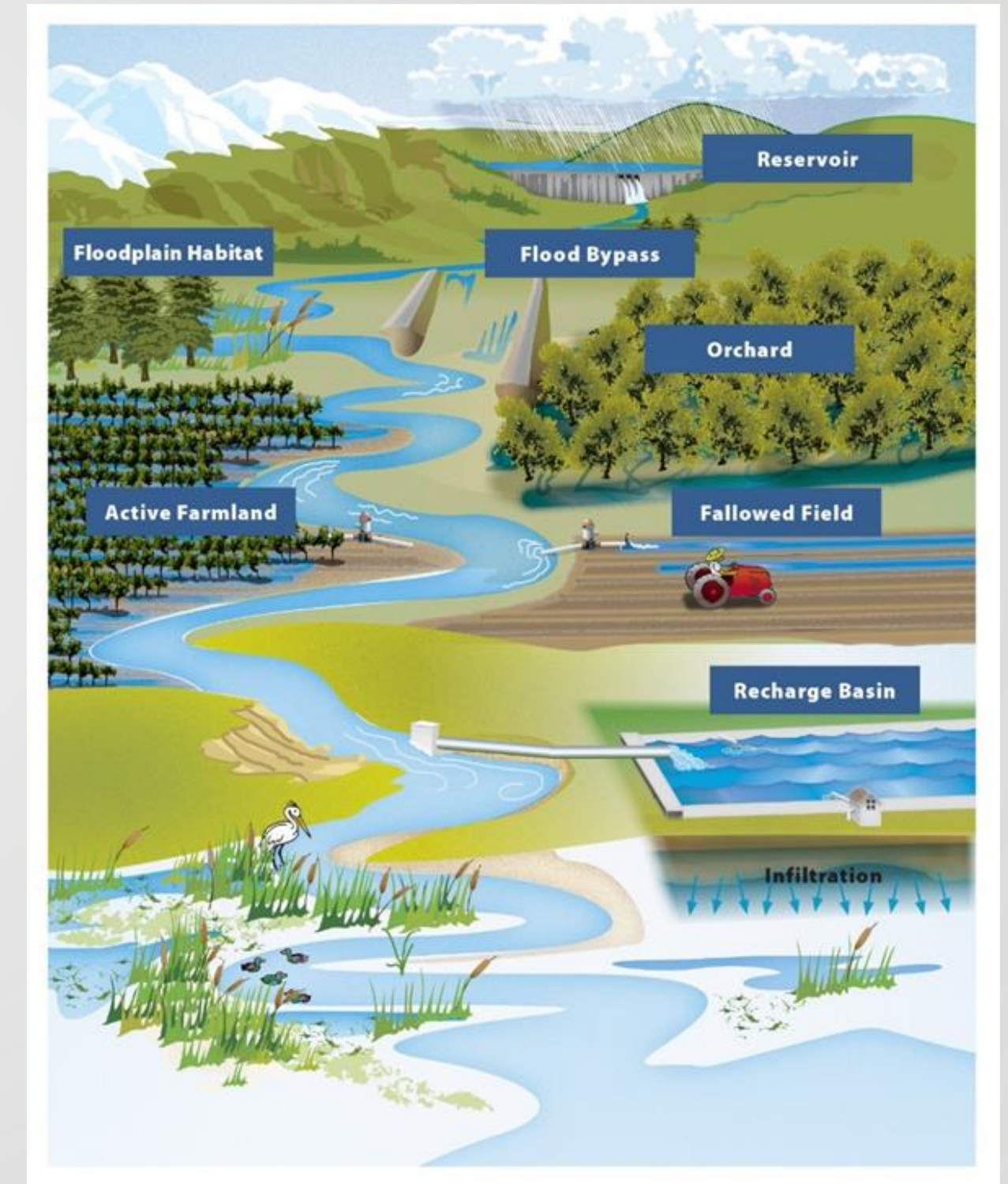
Climate Change Adaptation for CVFPP

- Broad suite of climate change adaptation measures across flood and related water management sectors
- Includes adaptation measures from the Conservation Strategy
- Enhances the Investment Strategy



Merced River Flood-MAR Reconnaissance Study

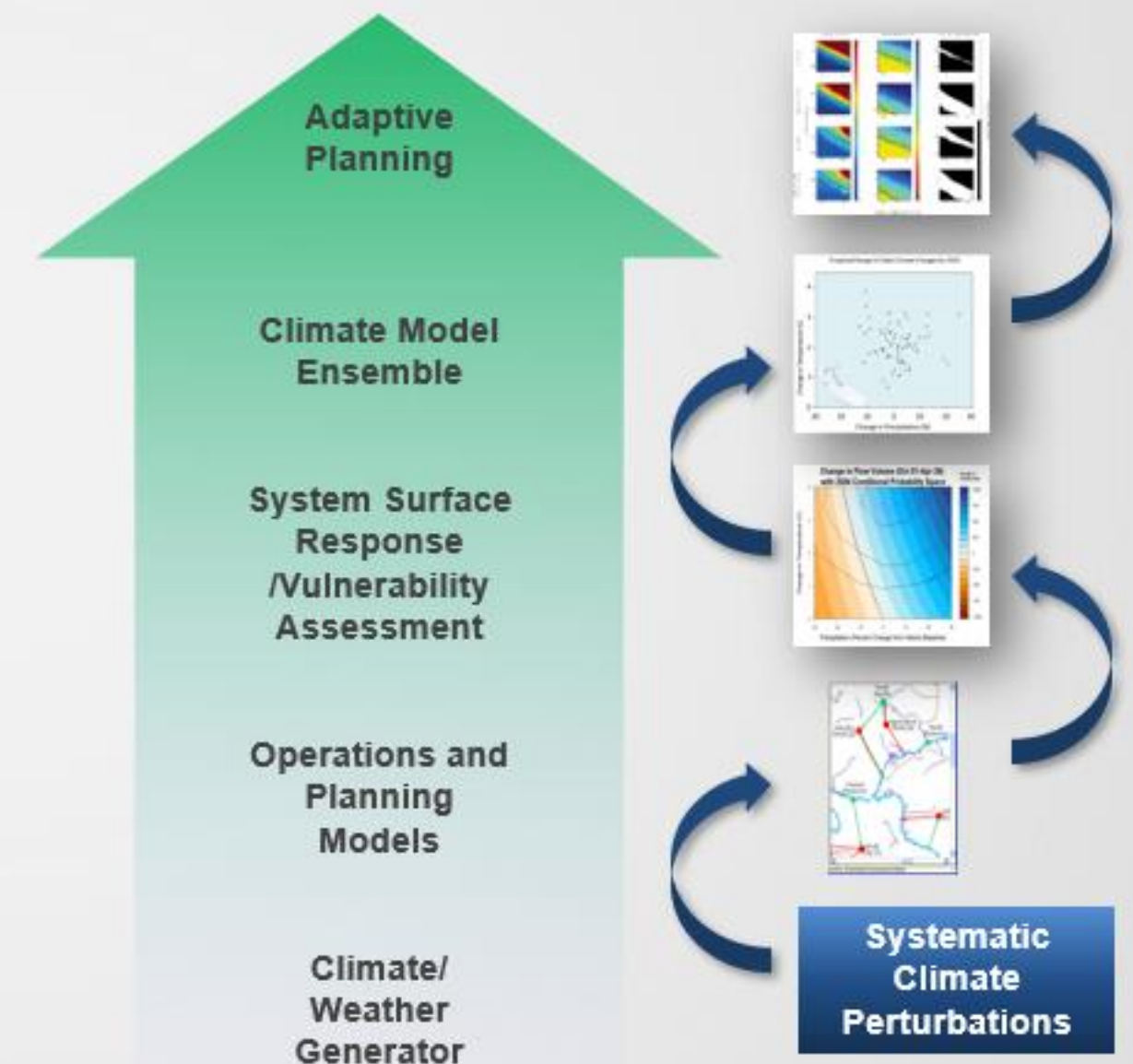
- Proof of concept study: Investigate Flood-MAR concepts on a watershed scale
- Integrated Watershed Modeling - Integrate surface and groundwater analyses and models
- Template for future studies - Document the process of planning, modeling, and analyzing a Flood-MAR project of this scale
- Reconnaissance level modeling



Tuolumne River Watershed Study

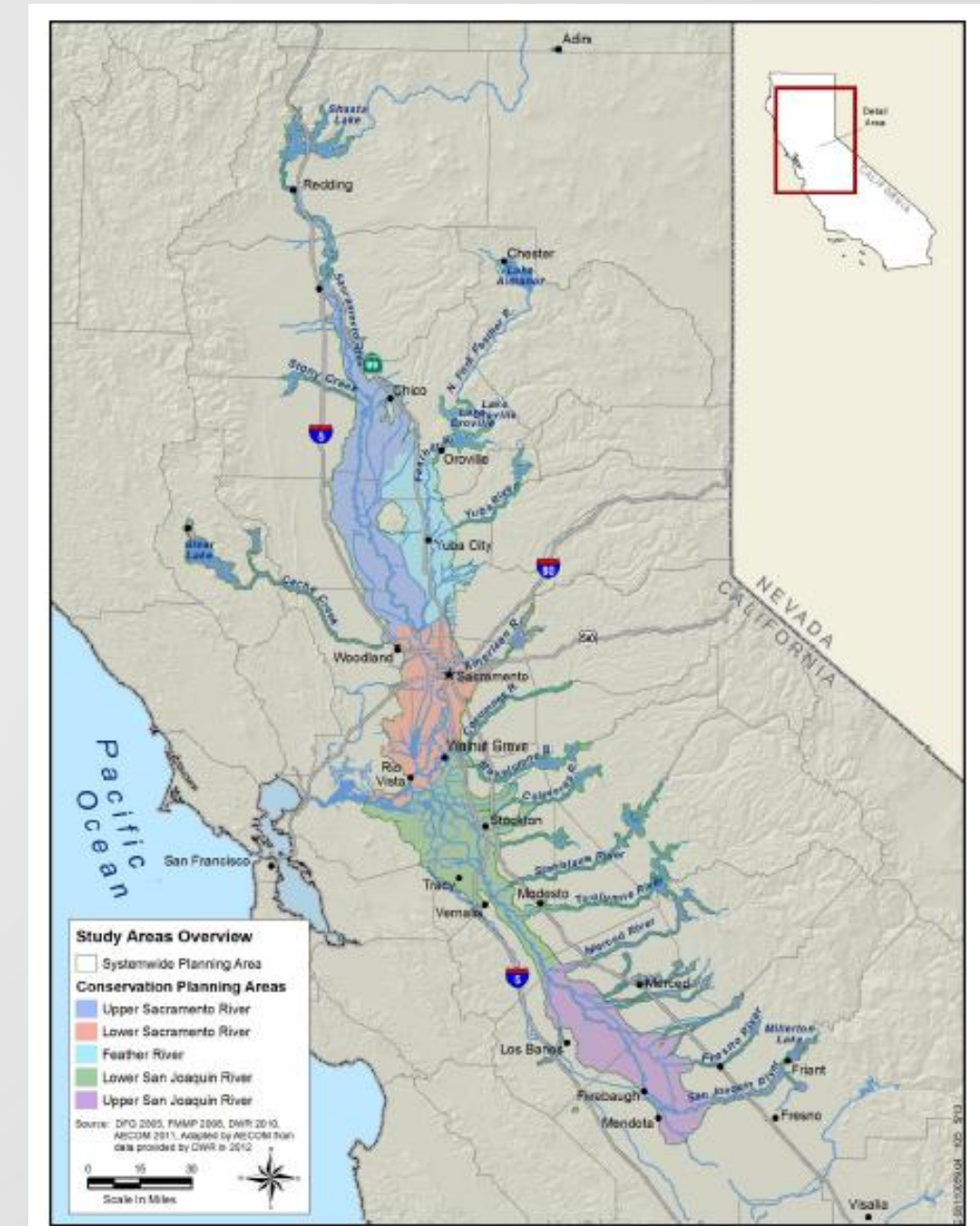
- Quantify deep uncertainties in flood and drought prediction under climate change
- Formulate a systematic framework for assessing future risks and developing economically efficient, robust, and flexible plans
- Develop integrated watershed-based planning solutions
- Inform other project/planning efforts

Bottom Up or Decision-Scaling Approach



Climate Change Adaptation Study for Conservation Strategy

- Identify ecological responses to climate change to understand potential impacts on Conservation Strategy measurable objectives and target species
- Identify adaptation strategies and considerations for increasing resiliency of multi-benefit projects
- Consider how Conservation Strategy-specific adaptation strategies also provide benefits for larger CVFPP flood-related goals



Climate Change Adaptation Measures for CVFPP

- Key vulnerabilities and risks exist between the headwaters of the Central Valley and the Delta
- A broad suite of climate change adaptation measures in CVFPP focused on flood and ecosystem water management sectors
- Principles and watershed-based approaches support investments to be made under considerable uncertainty



Adaptation Measures Example 1: Reservoir and River System Operations

- Implement Forecast Informed Reservoir Operations
- Implement Forecast Coordinated Operations
- Adaptive Reservoir Rule Curves
- Establish partnerships to coordinate flood management structure operations
- Increase flexibility of flood management



Adaptation Measures Example 2: Ecosystem Management

- Levee setbacks for creating more opportunities for riverine geomorphic processes
- Increase diversity of wetland habitats
- Extended detention wetlands to reduce flood risk and provide water quality and ecological benefits
- Intentional levee breaches and planned weir overflow designed for floodplain restoration along embanked lowland rivers
- Nature-based flood management

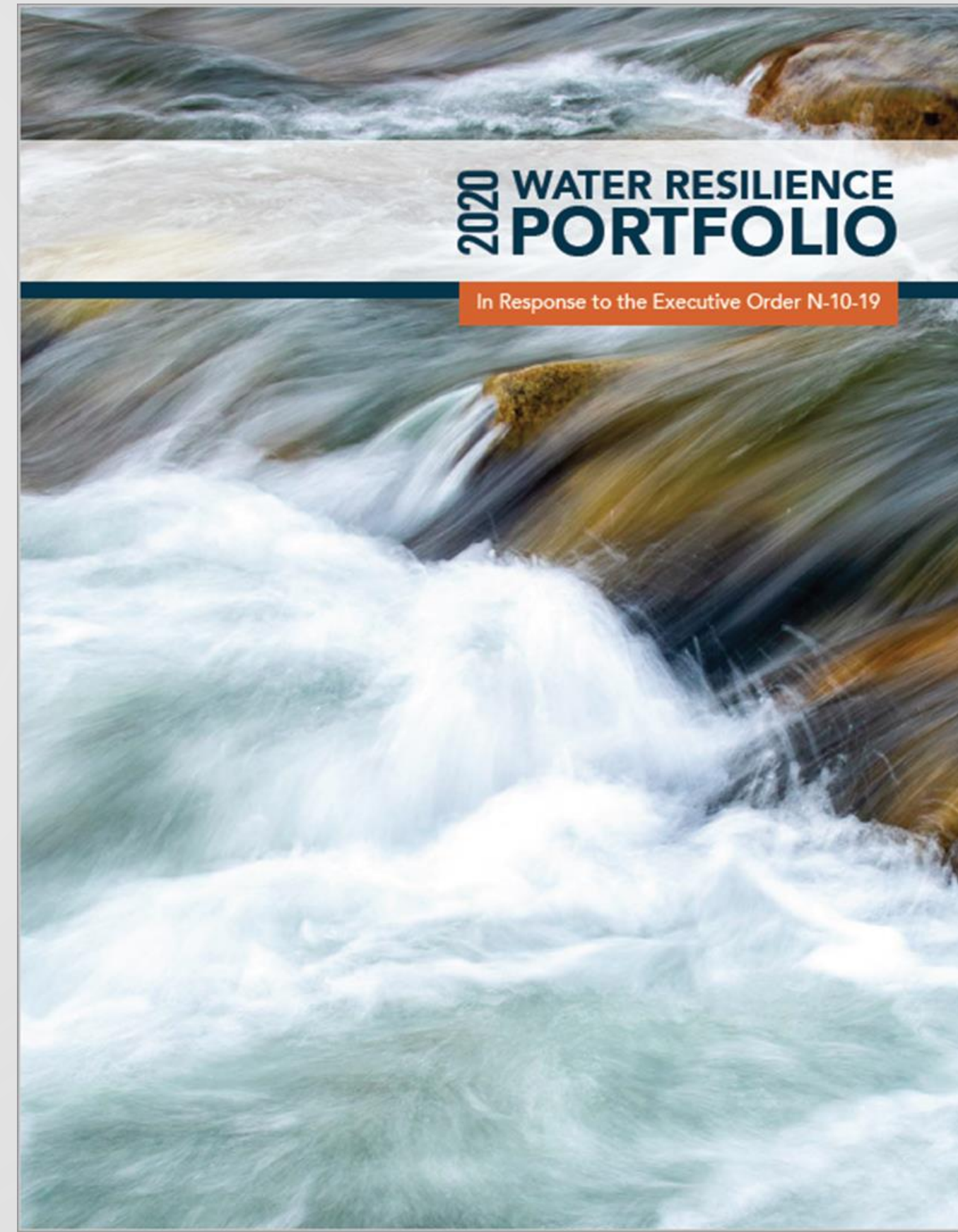


CVFPP'S CONTRIBUTION TO DWR'S RESILIENCE GOALS

2022 CVFPP Update

Alignment with Other State Efforts

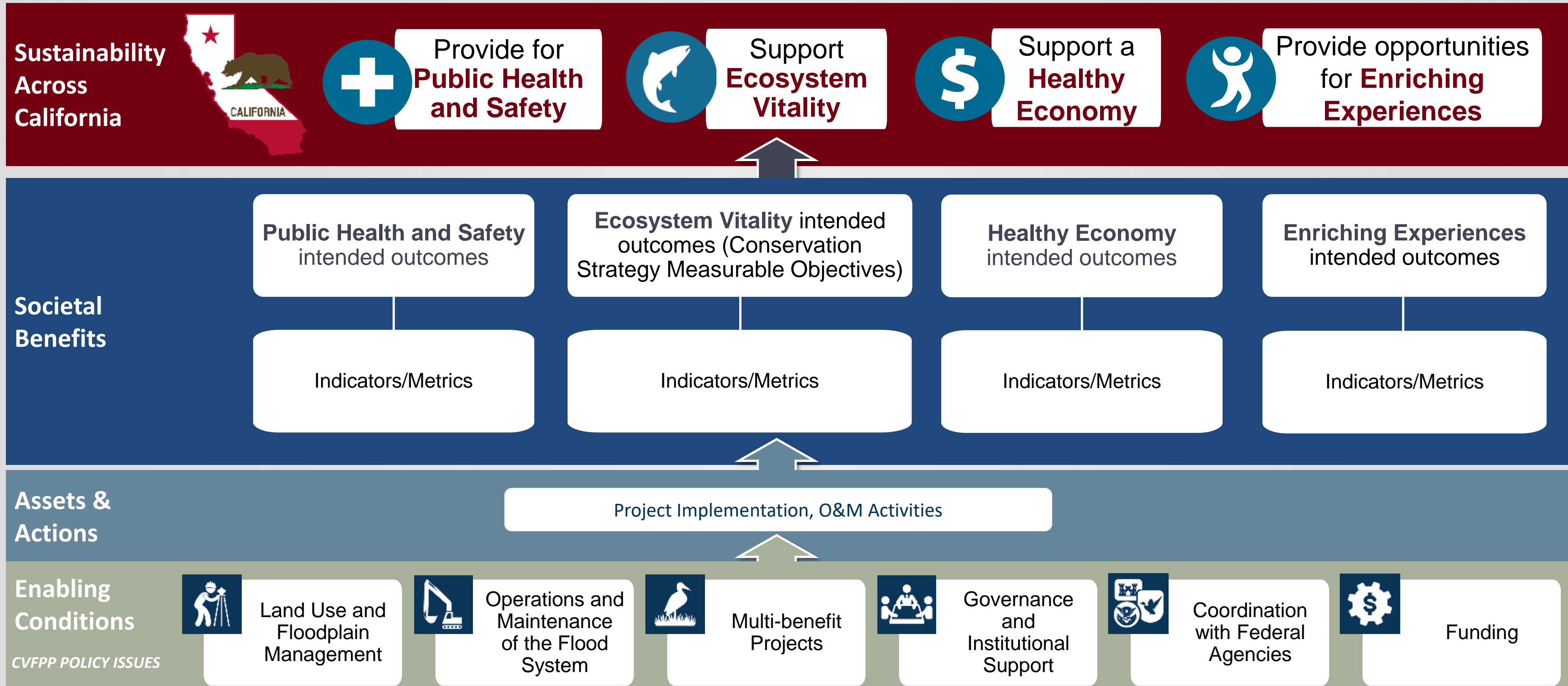
- The 2022 Update will align with other State efforts, including:
 - Governor Newsom’s Water Resilience Portfolio (WRP)
 - California Water Plan Update 2023
 - DWR Climate Action Plan
 - And more!



CVFPP Aligns with the California Water Resilience Portfolio

CVFPP Goals	Water Resiliency Portfolio Goals			
	Maintain and Diversify Water Supplies	Protect and Enhance Natural Ecosystems	Build Connections	Be Prepared
Improve Flood Risk Management	Alignment	Alignment		Strong Alignment
Improve Operations and Maintenance	Alignment	Alignment		Strong Alignment
Promote Ecosystem Functions		Strong Alignment		Alignment
Promote Multi-benefit Projects	Alignment	Strong Alignment	Alignment	Alignment
Improve Institutional Support			Strong Alignment	Alignment

Outcome-Based Performance Tracking Framework – Overview



THANK YOU!

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Division of Multi-Benefit Initiatives

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