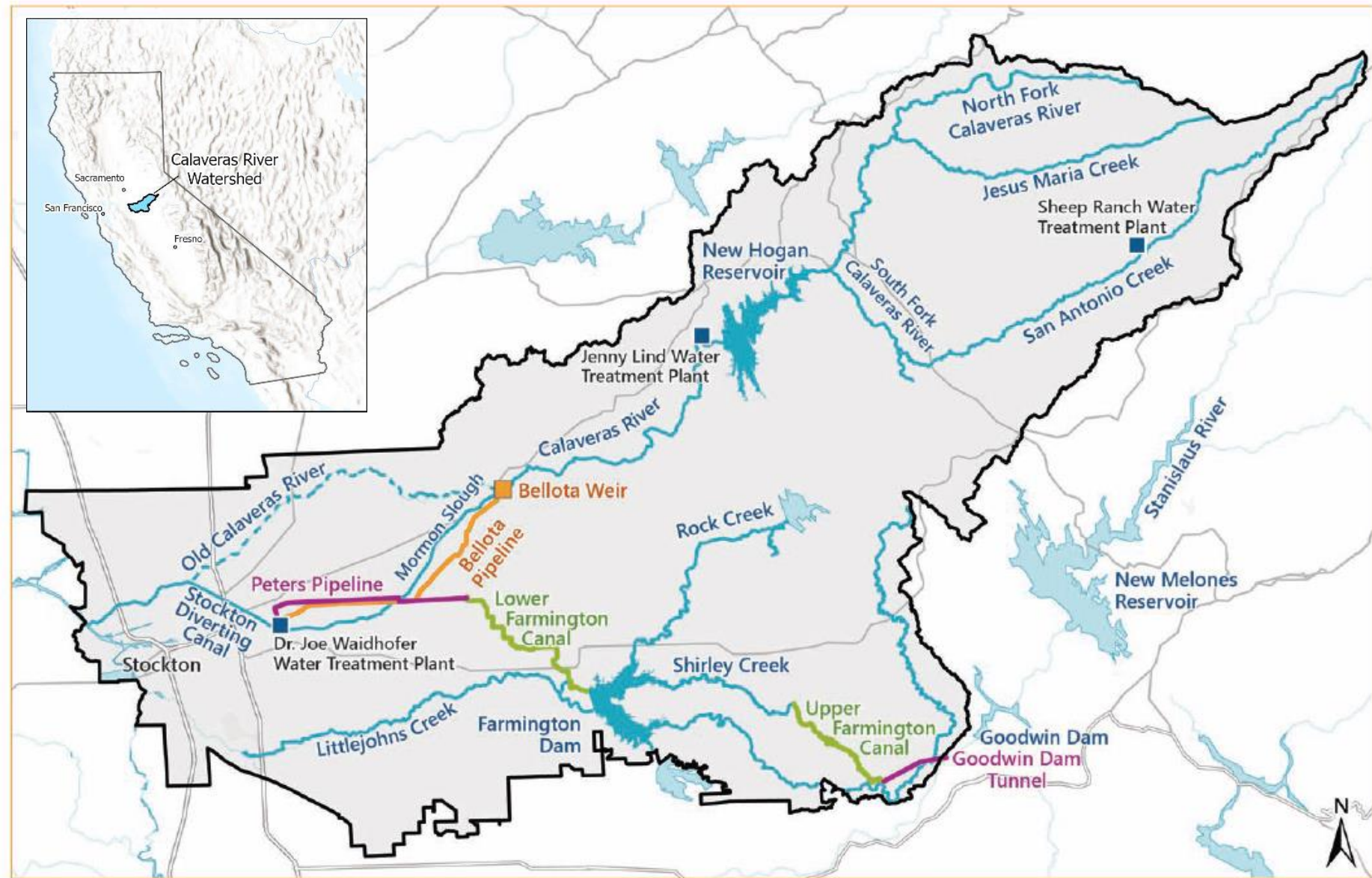


Calaveras River Watershed Resilience Plan

IRWM Roundtable of Regions General Membership Meeting
June 17, 2026

Welcome to the Calaveras River Watershed

"The Calaveras River Watershed is vital to our region, supporting communities, agriculture, ecosystems, and local economies from the Sierra foothills to the San Joaquin Valley." – Stockton East WD GM



Key landscape features include:

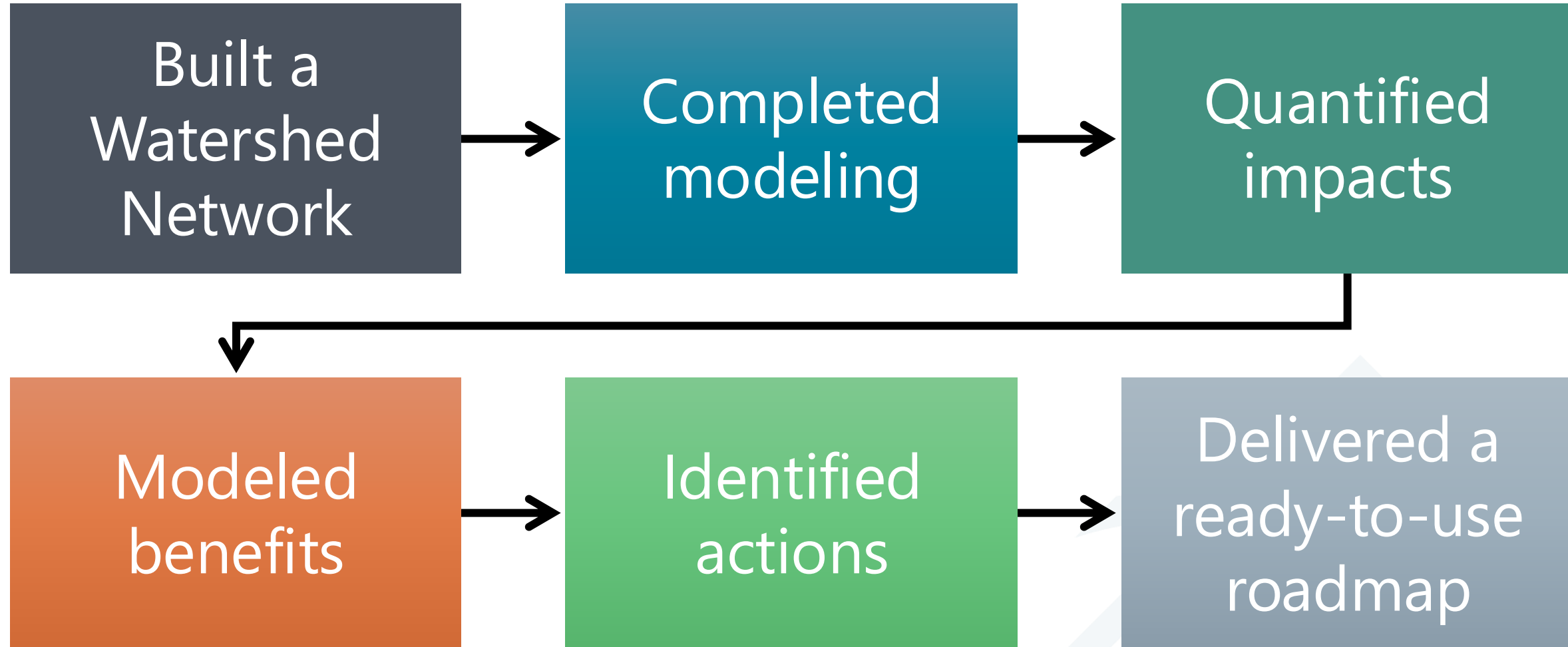
Upper Watershed headwaters, characterized by forested lands and steep terrain

Reservoir and managed water/flood storage areas, including New Hogan Reservoir and Farmington Reservoir

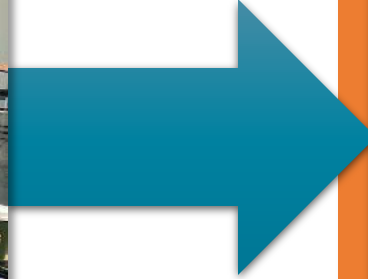
Agricultural lands that rely on surface water and groundwater supplies

Urban and suburban communities that depend on reliable water supply and flood protection

Our Approach: Achievements that Compounded

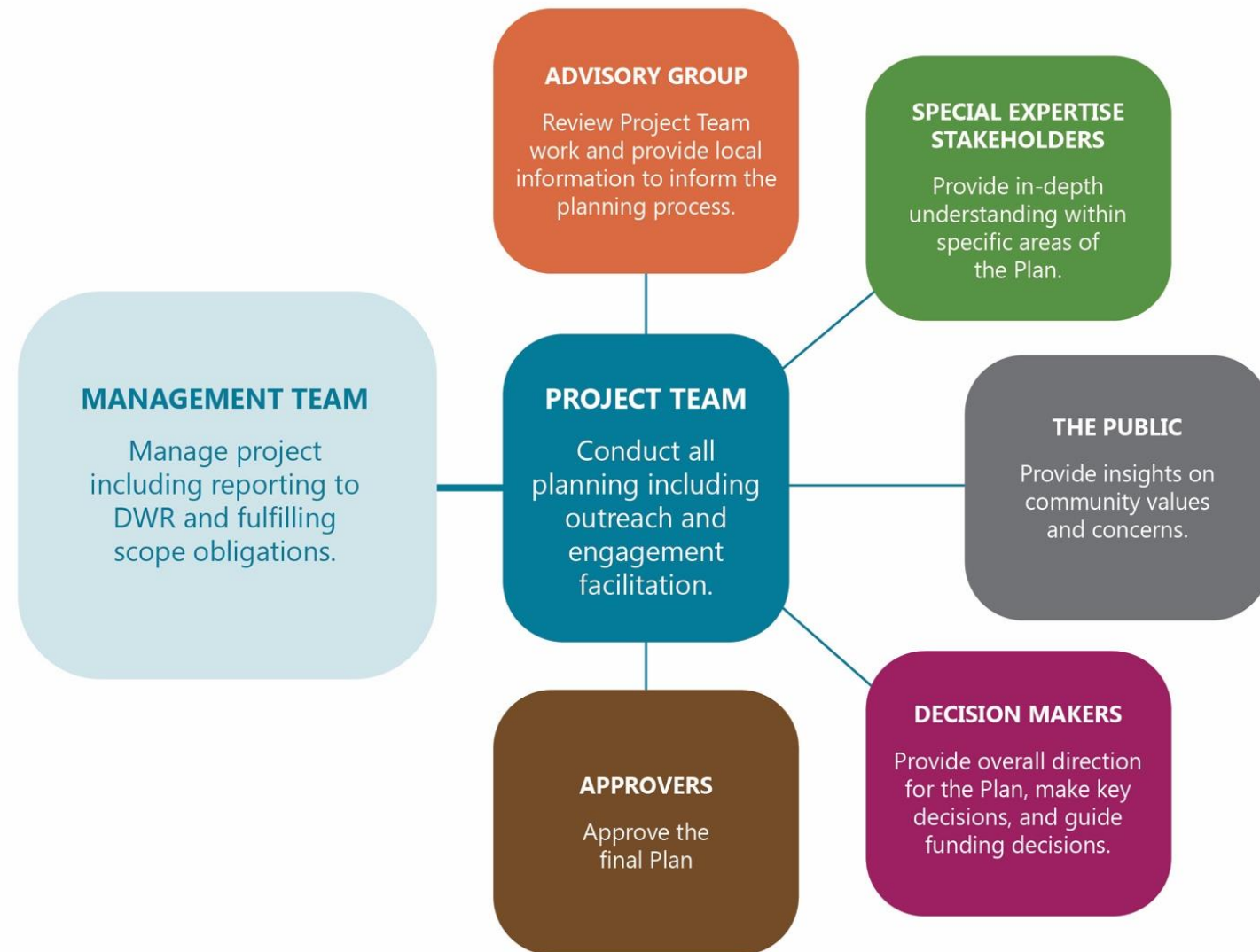


A Critical Pivot Strengthened the Project



Maximizing Value While Minimizing Burden

- ▶ A collaborative, multi-sector group spanning the upper and lower watershed
- ▶ Designed to connect water, land, and emergency planning at the watershed scale
- ▶ Broken into categories for more efficient meetings and input



Analytical Framework Structured the Technical Work

Hydrologic Modeling

Risk Area	Impact
Direct Impacts	Hydrology
	Water Demand
Flood	Flood Space Management
	In-Stream Flood Conditions
Water Supply	Surface Water
	Groundwater Use
	Supplemental Supplies
Groundwater Basin	Groundwater Storage
	Groundwater Levels
	Interconnected Surface Water
	Inter-Watershed Dynamics

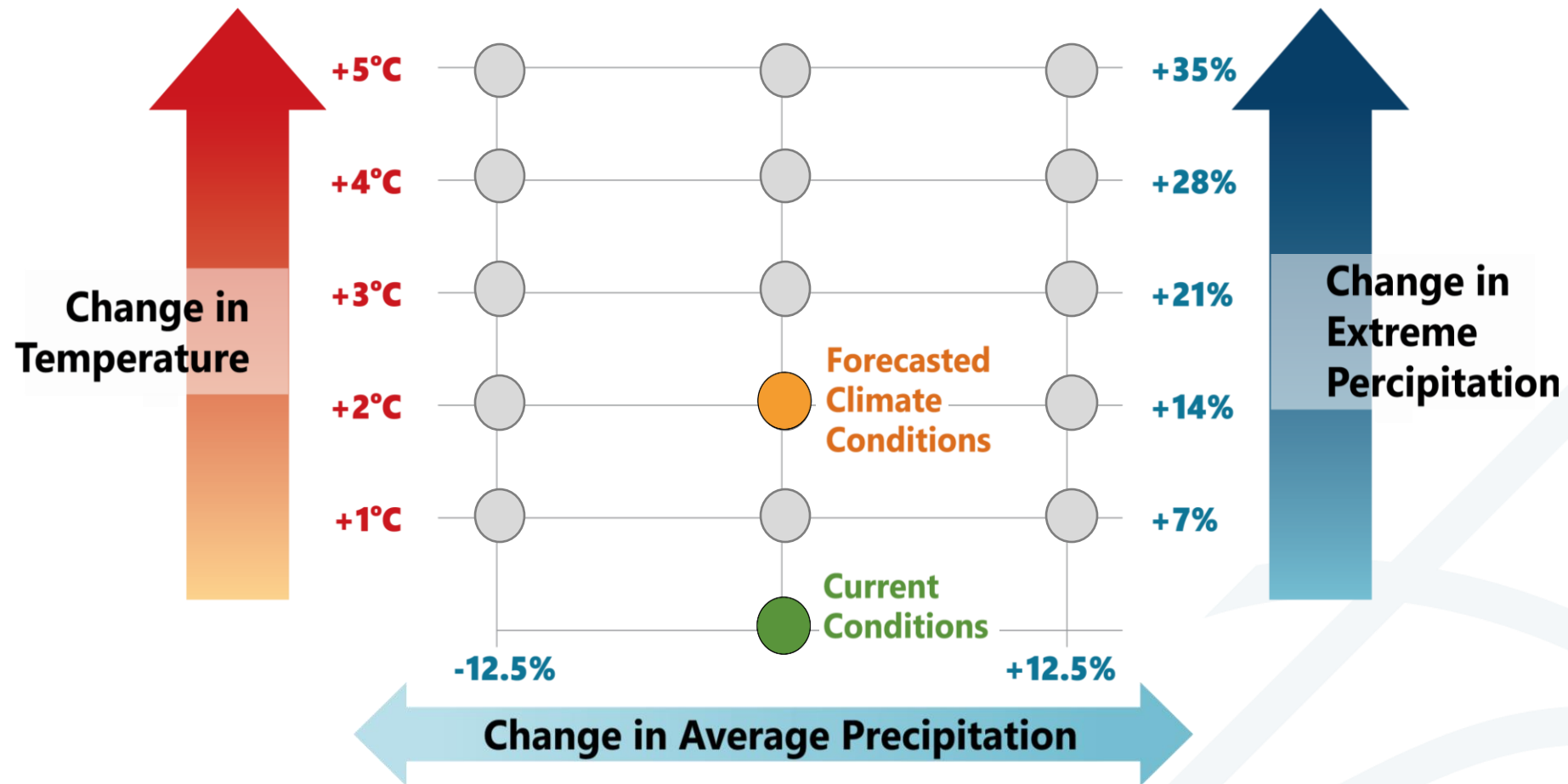
Environmental Modeling

Risk Area	Impact
Wildfire	Footprint
	Intensity
	Ecosystem
	Water Resources
	Community Safety
Surface Water Quality	Environmental Water Quality

Qualitative Analysis

Risk Area	Impact
Economy	Agriculture
	Urban
	Forestry & Recreation

Climate Change Vulnerability Analysis Forecasts Range of Futures



Key Climate Change Risk Findings



Extreme precipitation events increase (+14% of normal)



Increased water demand (+3.8%) and evapotranspiration (+3.2%)



Higher flood risks (New Hogan inflow/outflow +3%)



Increased groundwater stress (groundwater levels drop 20 feet)

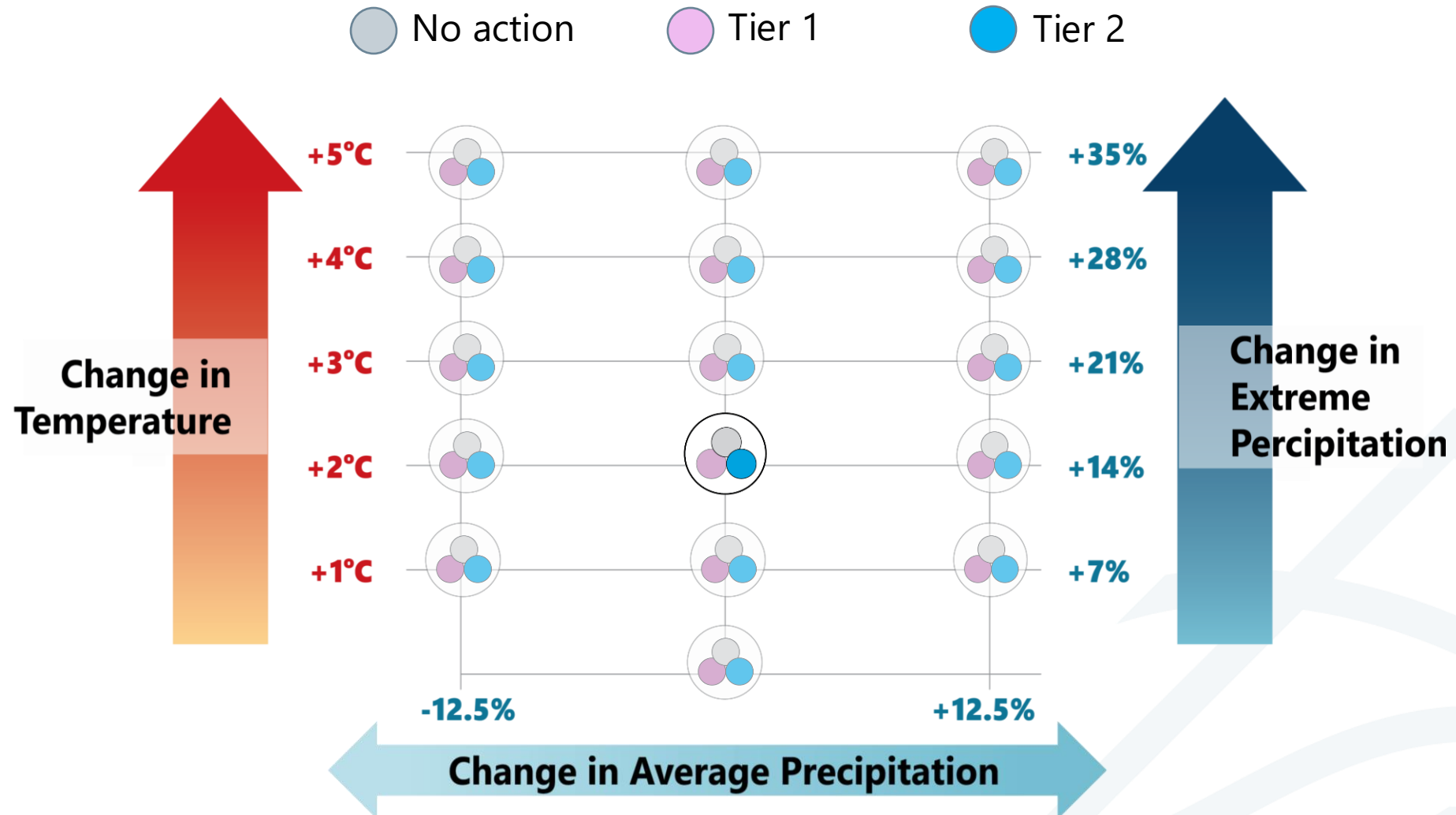


Wildfire risk concentrated in upper watershed

Analysis Considers Six Risk Categories

Risk Area	Impact	Metric (modeled CC impact)
Flood	Flood Space Management	Δ New Hogan Inflow (Maximum)
	In-Stream Flood Conditions	Δ New Hogan Outflow (Maximum)
Water Supply	Surface Water	Δ New Hogan Inflow (Average)
		Δ Surface Water Deliveries
	Groundwater Use	Δ Groundwater Production
	Supplemental Supplies	Δ Supplemental Supplies
Groundwater Basin	Groundwater Storage	Δ Groundwater Storage
	Groundwater Levels	Δ Groundwater Level
	Interconnected Surface Water	Δ Stream-Aquifer Interaction
	Inter-Watershed Dynamics	Δ Subsurface Inflow
Wildfire	Footprint	Annual Burn Probability
	Intensity	Characteristic Flame Length
	Ecosystem	Wildfire Risk to Wildlands Health
	Water Resources	Wildfire Risk to Water Resources
	Community Safety	Wildfire Risk to Community Safety
Surface Water Quality	Environmental Water Quality	Temperature (Proxy: Δ Stream Stage and Storage)
		Constituent Transport (Proxy: Δ Stream Stage)
		Sediment Yield (Proxy: Erosion Rates)
Economy	Agriculture	Indirect
	Urban	Indirect
	Forestry & Recreation	Indirect

Climate Futures Re-analyzed With Adaptation Projects



Strategies Reduce Climate Change Impacts

Improve water supply reliability

- 8,800 AF of additional surface water supply

Reduce groundwater declines

- 54,000 AF of additional groundwater supply

Reduce peak flood flows

- Peak daily flows reduced by 44%

Lower wildfire intensity and erosion

- Reduces burn probability in some areas up to 24%

Communicating Complicated Technical Information

Calaveras Watershed RESILIENCE 2026

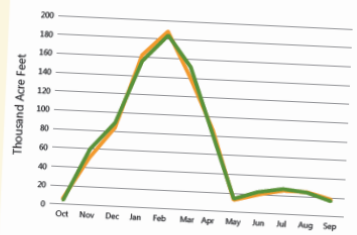


Flood Impacts

New Hogan Reservoir captures runoff from the upper Watershed and regulates flood conditions through seasonal and multi-year storage. Flood-related impacts are thus assessed through two primary metrics: inflow to and outflow from New Hogan Reservoir. Together, these metrics describe the system's ability to maintain adequate storage capacity for flood control and quantify the magnitude of potential downstream releases. Under the most probable climate change conditions, peak monthly inflows increase by 3% (5,600 AF) indicating more intense extreme precipitation events. To manage this additional flow, the monthly maximum downstream flow also increases by 3.1% (5,700 AF) at the Jenny Lind Gauge. Together, these metrics indicate an increased risk of flooding in the Watershed due to climate change.

Maximum monthly outflows from New Hogan Reservoir provide a direct indicator of flood risk to downstream communities and infrastructure. Under the most probable climate change conditions, maximum monthly outflows increase, reflecting the need to pass larger flood volumes through the reservoir system. Outflows follow precipitation and temperature patterns with high outflow occurring in wetter months (December through March) and minimal outflow in warmer summer months (May through October).

Climate Change Increases New Hogan Reservoir Outflow



IMPACT: FLOOD SPACE MANAGEMENT

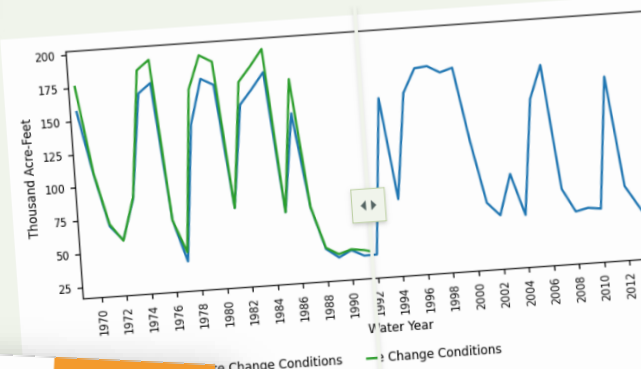
Key Metric	Most Probable Scenario	Relative Impact
Δ New Hogan Inflow (Maximum)	+5,600 AF (3.0%)	1

IMPACT: IN-STREAM FLOOD CONDITIONS

Key Metric	Most Probable Scenario	Relative Impact
Δ New Hogan Outflow (Maximum)	+5,700 AF (3.1%)	1

Surface Water Flows

This chart shows how surface water flows are expected to change as the climate warms, and those changes can shift when watershed strategies are implemented. Slide to compare a no-action future (climate impacts only) with a strategy future where coordinated projects and operational improvements help reduce vulnerability and improve reliability.



Flood Solutions



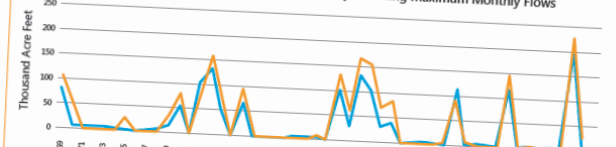
MAXIMUM MONTHLY FLOWS REDUCED BY 9 TAF

Maximum monthly flows are reduced by 9 TAF, from an average of 40 TAF pre-strategy implementation to 31 TAF post-implementation, with higher impacts during wet years.

PEAK DAILY FLOWS REDUCED BY 44%

Peak daily flows are reduced to approximately 7,000 cubic feet per second (cfs), compared to maximum flows of 12,400 cfs under the no-strategies with climate change scenario. This 44% reduction in peak discharge directly translates to reduced flood risk for downstream communities and infrastructure along the lower Calaveras River.

Adaptation Strategies Decrease Flood Risk by Reducing Maximum Monthly Flows



Key Takeaways

Key Takeaways for Agencies



Coordinated strategies outperform isolated projects

Watershed-scale works even across diverse geographies

Modeling helps defend infrastructure investments

Storage unlocks multiple benefits (supply, recharge, flood)

Wildfire mitigation should be treated as water infrastructure

Feedback to DWR

Strengthen Tribal
engagement

Extend Project
timelines

Formalize
performance
tracking

Expand technical
support

Align planning
with
implementation
funding

Sustain investment
in Watershed
Network
coordination

Increase
Watershed Hub
customization

BACKUP

Integrated Hydrologic Modeling

Local Model Integration

Precipitation

Evapotranspiration

Stream Flow

Surface Water Operations

Climate Vulnerability

Reservoir Operations

Land Surface System

Stream System

Groundwater System

Adaptation Strategies

Surface Water Infrastructure
and Expansion Projects

Forecast-Informed Reservoir
Operations

Flood-Managed Aquifer
Recharge

Land and Fire Risk
Management

Watershed Modeling and the Integrated Toolset

- ▶ Integrated ESJWRM model (used for GSP) into DWR's "headwaters to groundwaters" integrated modeling toolset
 - Updated evapotranspiration, surface water operations and stream dynamics
 - Modeled baseline and climate scenarios to assess vulnerability and adaptation

