

SWP Adaptation Strategy



CWMF
May 14, 2025

Issue:

- Climate change will result in significant declines in SWP delivery reliability (12-24% by 2043)
- Recent years have shown system vulnerabilities and limitations
- **SWP is developing several significant projects that would provide climate adaptation and resilience**



DWR's Climate Action Plan

Phase 1: Reduce Drivers

Greenhouse Gas Emissions Reduction Plan

By 2030, reduce GHG emissions to at least 60 percent below the 1990 level.

By 2045, supply 100 percent of electricity load with zero-carbon resources and achieve carbon neutrality.

Key Objective:

Contribute to state/federal/global goals

Phase 2: Evaluate Risks

Consistent climate change analysis across all DWR programs

Establish a screening and approach process for project managers to incorporate climate change impact analysis into DWR activities, including strategic planning documents, investment decisions, risk assessments, and infrastructure development.

Key Objective:

Ensure all investments are climate resilient

Phase 3: Address Risks

Vulnerability Assessment and Adaptation Plan

Describes, evaluates, and quantifies the vulnerabilities of DWR's assets and activities to potential climate change impacts and prioritizes DWR resiliency efforts such as infrastructure improvements, enhanced maintenance and operation procedures, revised health and safety procedures, and improved habitat management.

Key Objective:

Prepare for the future

4 Specific Adaptation Strategies:

- ★ 1. SWP Operations (This Plan)
- 2. Staff Safety
- 3. Feather River Watershed Wildfire Resilience
- 4. Landscape Resilience

There are 16 overall adaptation strategies organized into three categories:



Operational and Management Measures

- Forecast-Informed Reservoir Operations
- Improved Forecasting
- Carryover Storage Targets
- Power Shaping
- Project-Level Climate Resilience Evaluation
- Enhanced Financial Management
- Outdoor Staff Safety
- Water Storage Investment Program Project Integration (WSIP)
- Enhanced Asset Management



Nature-Based Solutions.

- Feather River Watershed Management
- Environmental Restoration
- SWP Delta Islands Management



Structural Measures

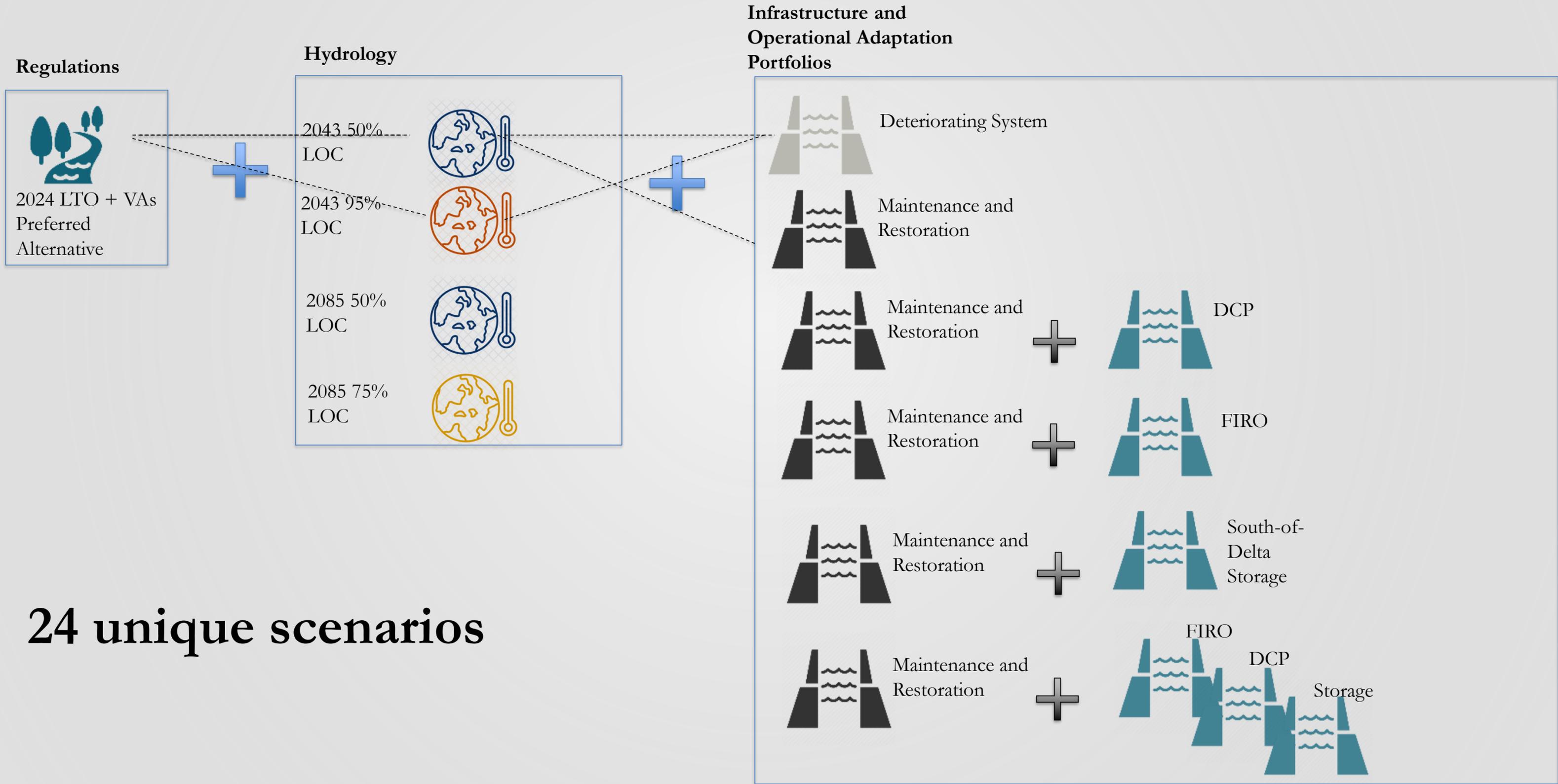
- Delta Barriers
- Delta Conveyance Project
- South of the Delta Storage
- California Aqueduct Subsidence Program (CASP)

Portfolios Representing Alternative SWP Futures

- No Adaptation Scenario—Deteriorating System
- Portfolio 2—Maintain System
- Portfolio 3—Maintain System + Delta Conveyance Project
- Portfolio 4—Maintain System + Forecast Informed Reservoir Operations
- Portfolio 5—Maintain System + South-of-Delta Storage
- Portfolio 6—Combination (Portfolios 3+4+5)



Scenario Combinations



No Adaptation: Deteriorating System Portfolio

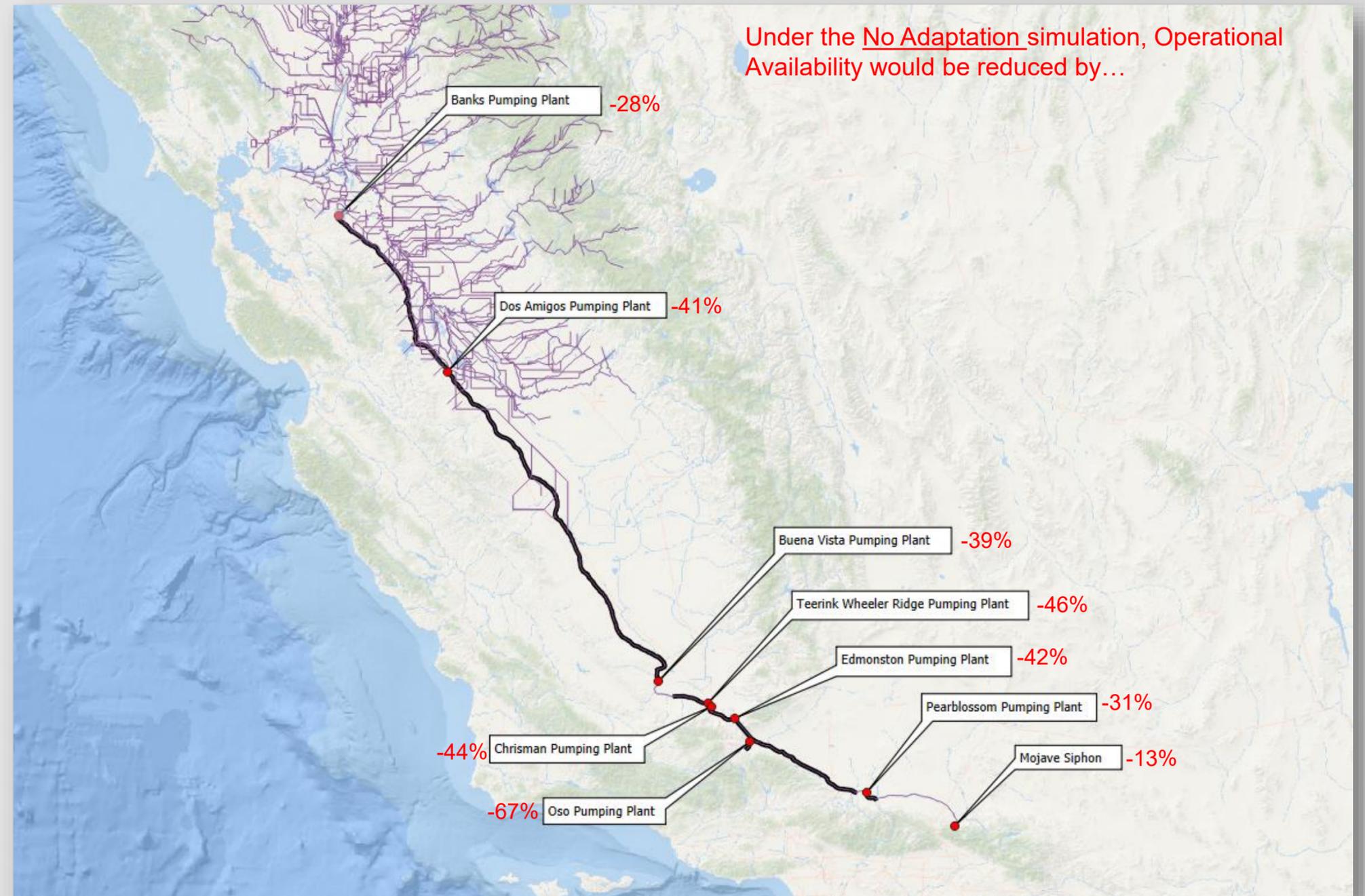
- To assess the benefits of ongoing asset management and maintenance, one scenario was considered in which minimal investment is expended to maintain existing assets.
- [We don't consider this outcome acceptable, its presented to show the consequences of inaction.]



Conveyance Interruption and Deteriorating Capacity (Part 1-Pumping Plants)

- Ongoing Enhanced Asset Management strategy is not implemented.
- This is a simplified representation of a scenario in which regular unplanned unit outages continue to occur and in addition, significant facility-wide outages also occur throughout the system on a periodic basis.

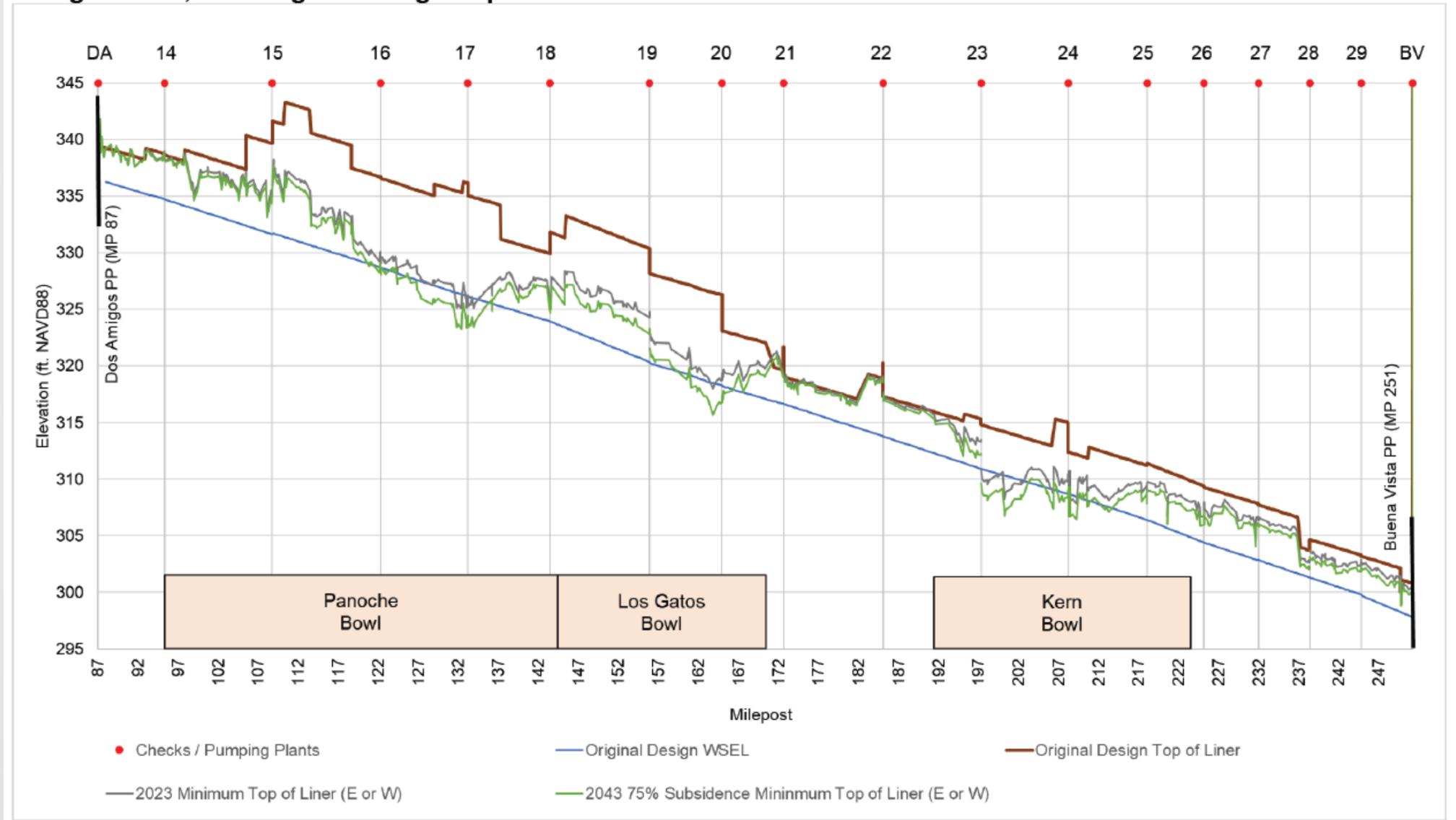
Operational Availability (OA) - Monthly Average, CFS			
	Current OA	Failing Asset Management/Run Flat	Percent Reduction Compared to Current
Banks	8,715	6,274	-28%
Dos Amigos	12,385	7,308	-41%
Buena Vista	4,707	2,865	-39%
WH. Ridge	4,419	2,391	-46%
Windgap	3,886	2,190	-44%
Edmonston	3,905	2,267	-42%
Pearblossom	2,136	1,474	-31%
Mojave Siphon	2,110	1,833	-13%
Oso	2,808	928	-67%



Conveyance Interruption and Deteriorating Capacity (Part 2-Aqueduct Conveyance)

- Differential subsidence along the CA alignment have already reduced conveyance capacity
- Without immediate action, further subsidence will reduce capacity to critical levels

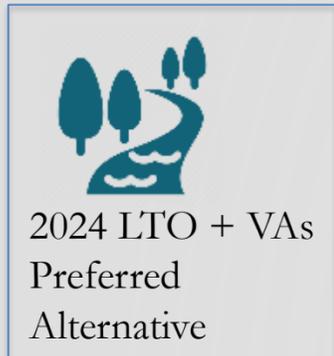
Figure 3 2043 75th Non-exceedance Subsidence Percentile Top of Liner Profile with 2023 Top of Liner, Original Design WSEL, and Original Design Top of Liner Profiles



Scenario Combinations

No CASP investments, loss of pumping plant reliability, periodic significant interruption

Regulations

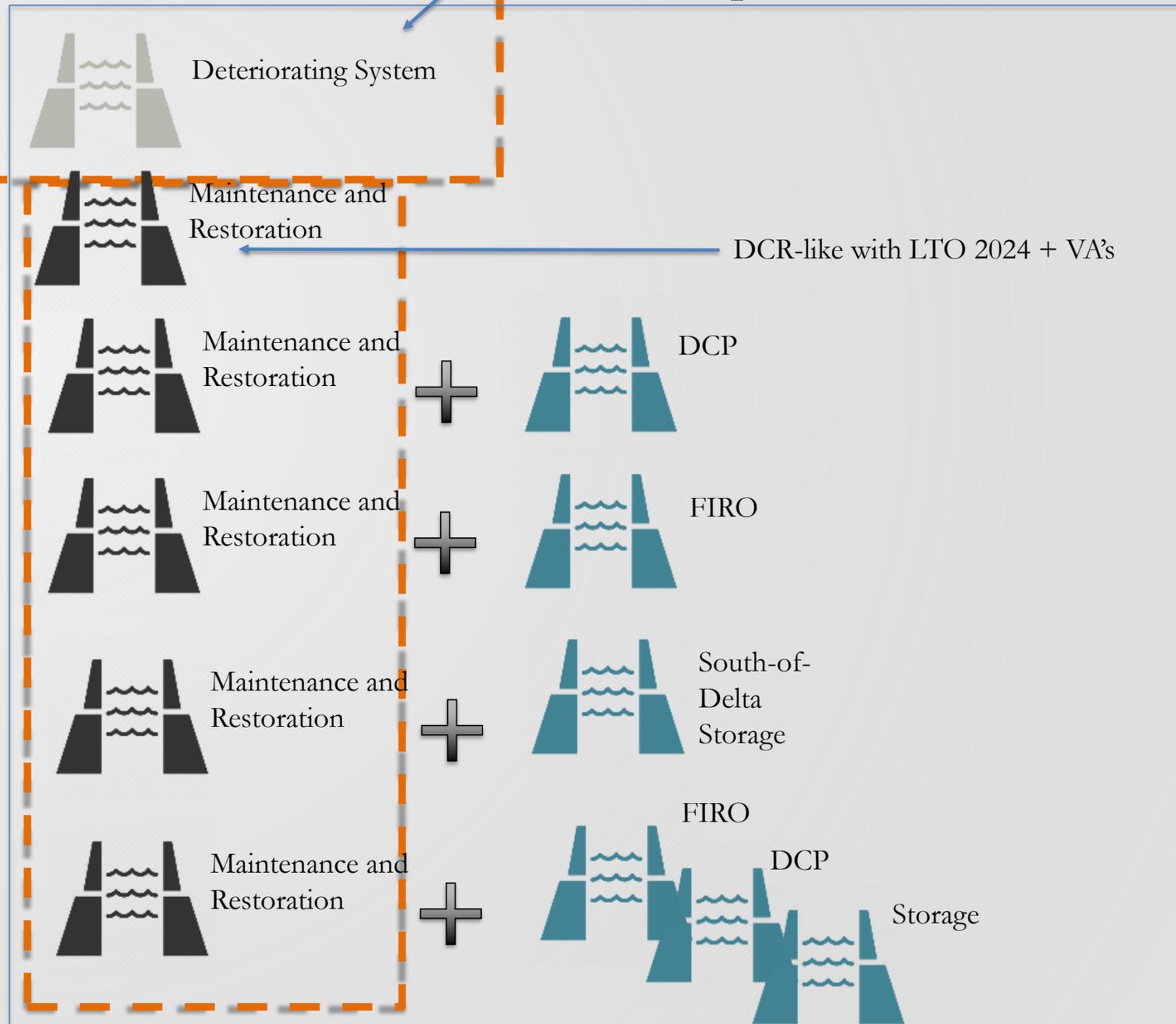


Hydrology

2043 50% LOC	
2043 95% LOC	
2085 50% LOC	
2085 75% LOC	



Infrastructure and Operational Adaptations



Assumes CASP interim measures and continuation of current Enhanced Asset Management Program.

Delta Conveyance Project

- Implement 6000 cfs facility
- Operations as described in 2024 ITP



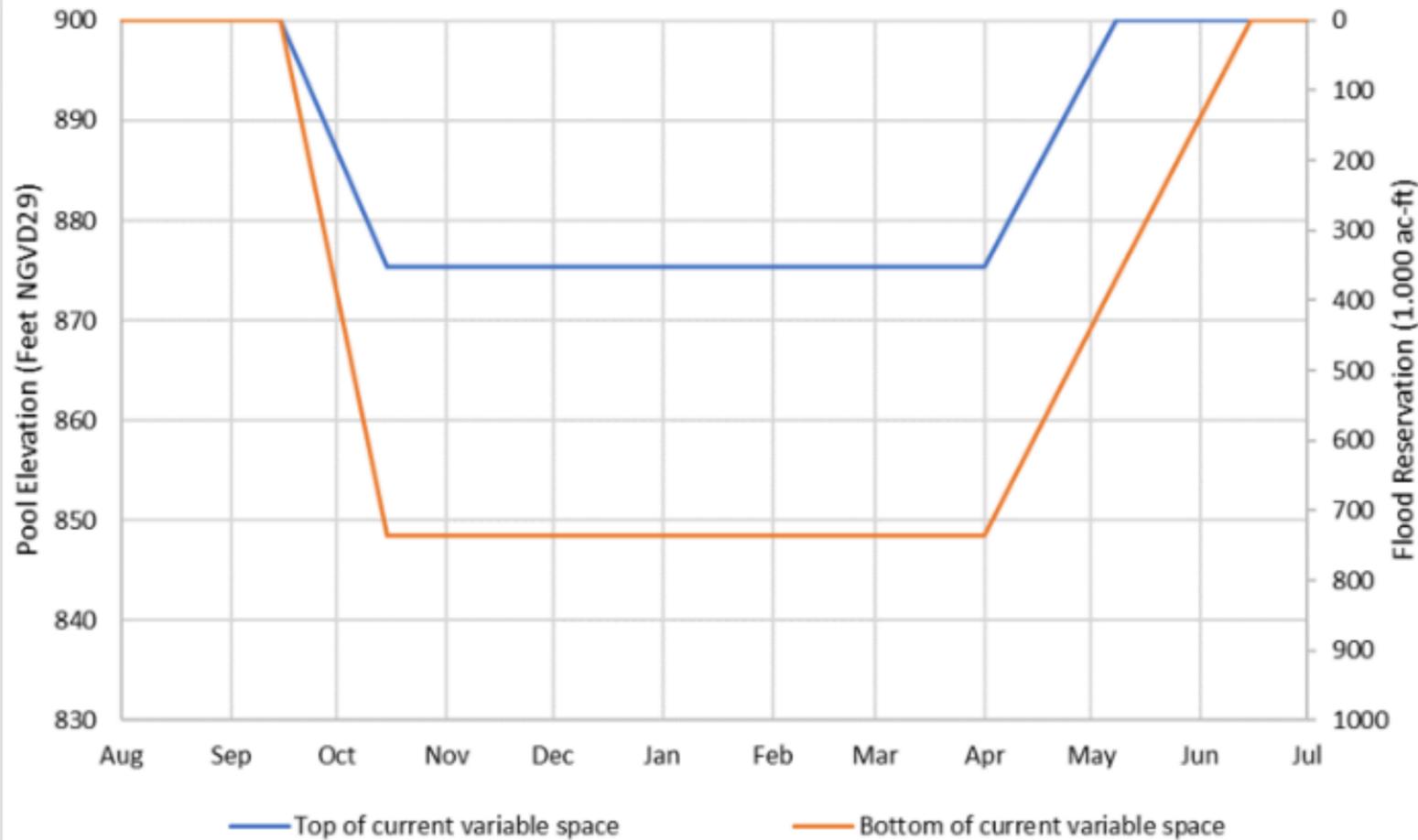
Forecast Informed Reservoir Operations at Oroville Reservoir

- Improve flood and water supply performance by modifying reservoir storage rule curve using state-of-the-science forecasts

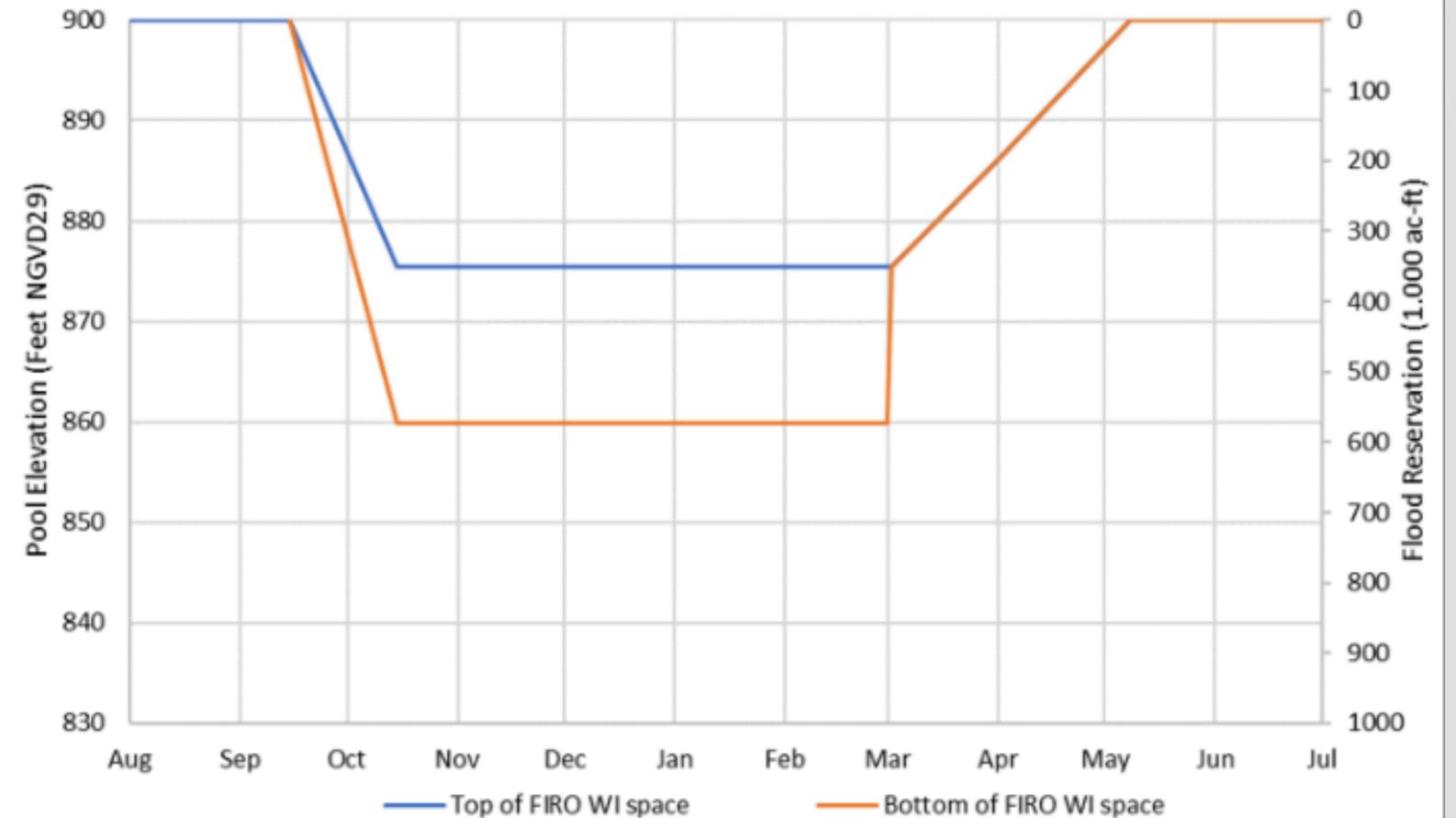


Oroville Flood Management Space

Existing



FIRO



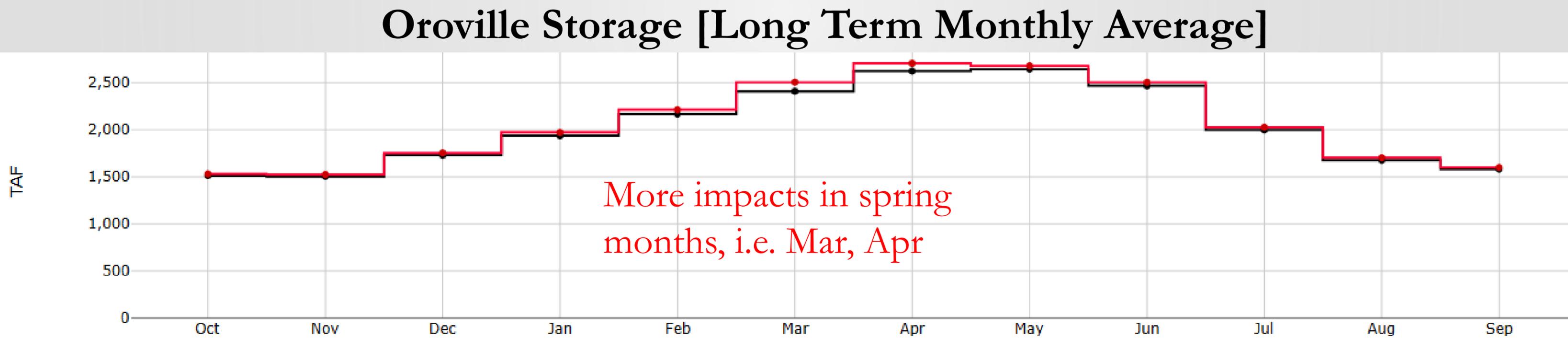
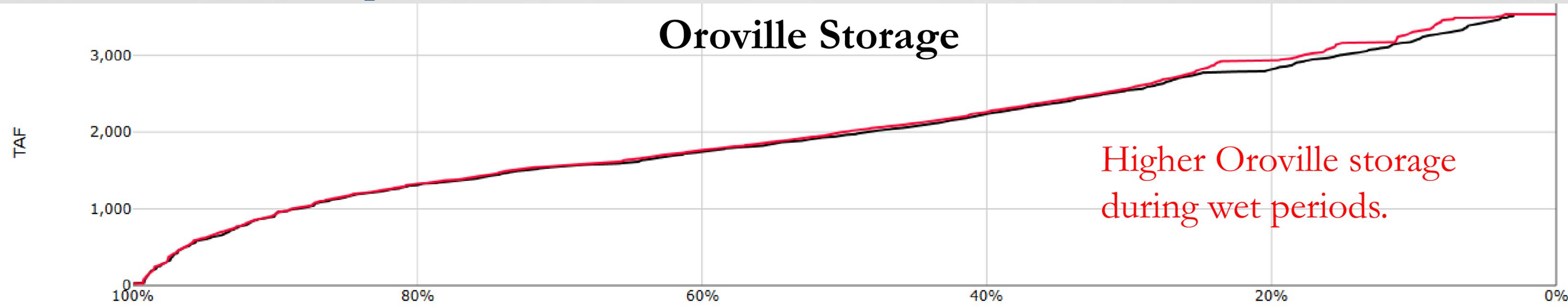
1970 WCM requires Oroville Reservoir to maintain a flood management space between 370 and 750 TAF depending on accumulated precipitation to date

Updated guide curve derived from proposed FIRO alternatives allows Oroville Reservoir storage to be operated at higher storage levels



FIRO Impacts

— No FIRO
— With FIRO



As an independent strategy, FIRO seems to bring about minimal impacts on long term annual model parameters

South-of-Delta Storage

- New generic storage node near San Luis
- Represents new surface or groundwater storage projects
- Augments Table A during droughts



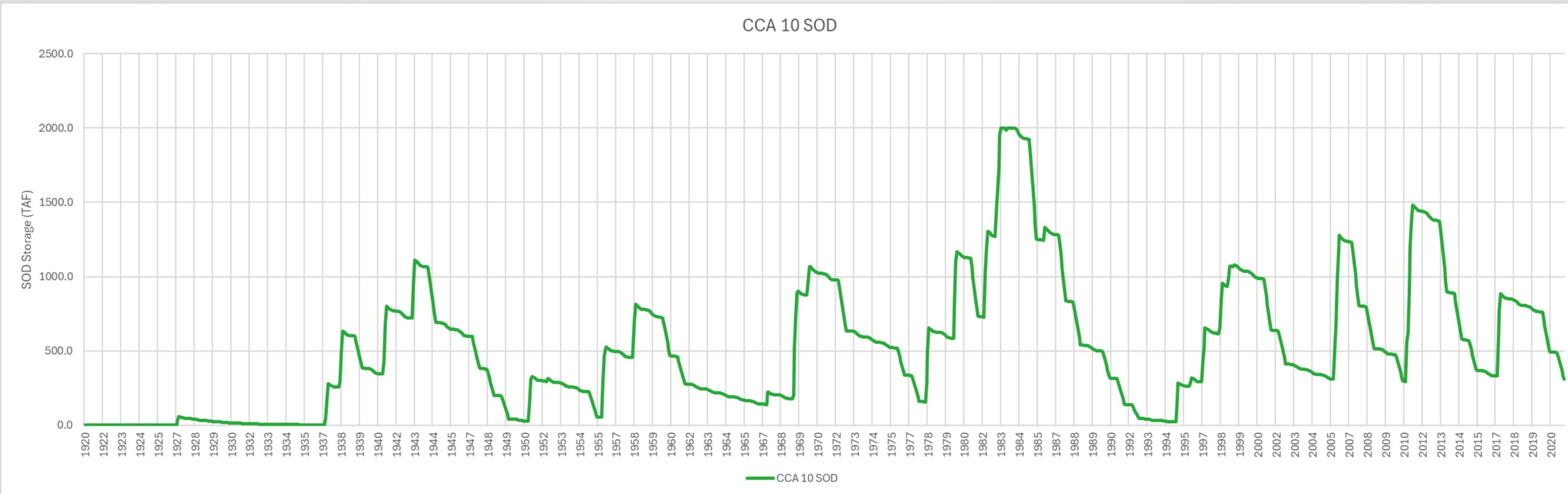
Operating Strategy

- Capture surplus water that couldn't be captured in SWP San Luis
 - Priority: Fill SWP San Luis > Fill new SOD storage > Deliver Article 21
- Augment Table A when baseline allocation falls below a user-defined threshold (30% in this analysis)
 - Preserve water for dry year use
- Define fraction of new SOD storage that will be used to augment Table A on sliding scale between 33% - 100%



Initial Results – Reservoir Storage

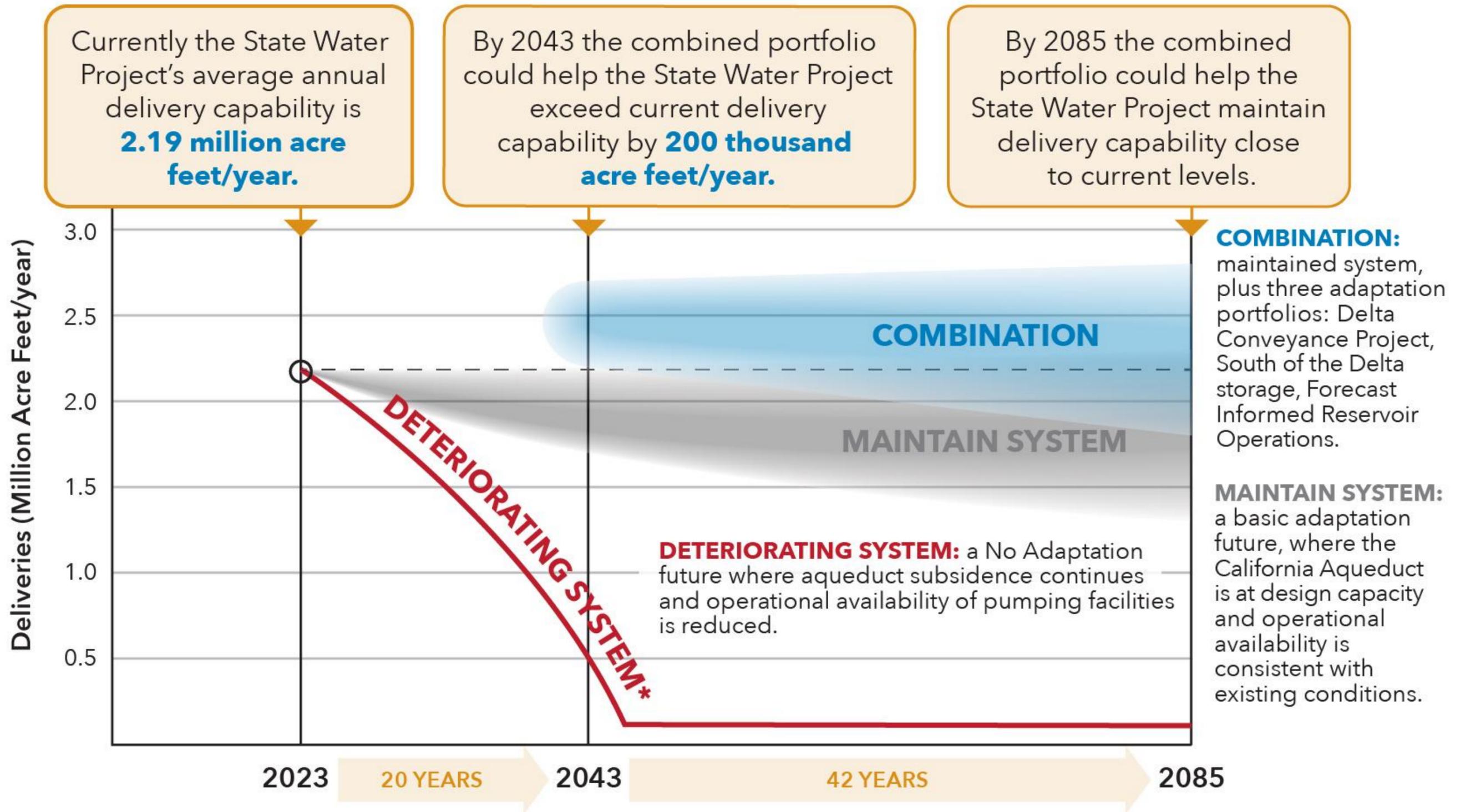
- New SOD Storage Levels



Combination Portfolio

- Maintain Infrastructure+
- DCP+
- FIRO+
- South-of-Delta Storage





*In this scenario, the system becomes so constrained by capacity limitations that hydrology and climate change are no longer a factor and delivery capability is essentially the same under all conditions.



Adaptation Strategy Outcomes

- Assessments of SWP resilience with/without adaptations
- Drought specific resilience
- **Priority order for investments in adaptation**
- Full catalogue of model runs and evaluation platform



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QUESTIONS?