

# BDCP Physical Modeling Update

BDCP Steering Committee  
Meeting

April 22, 2010

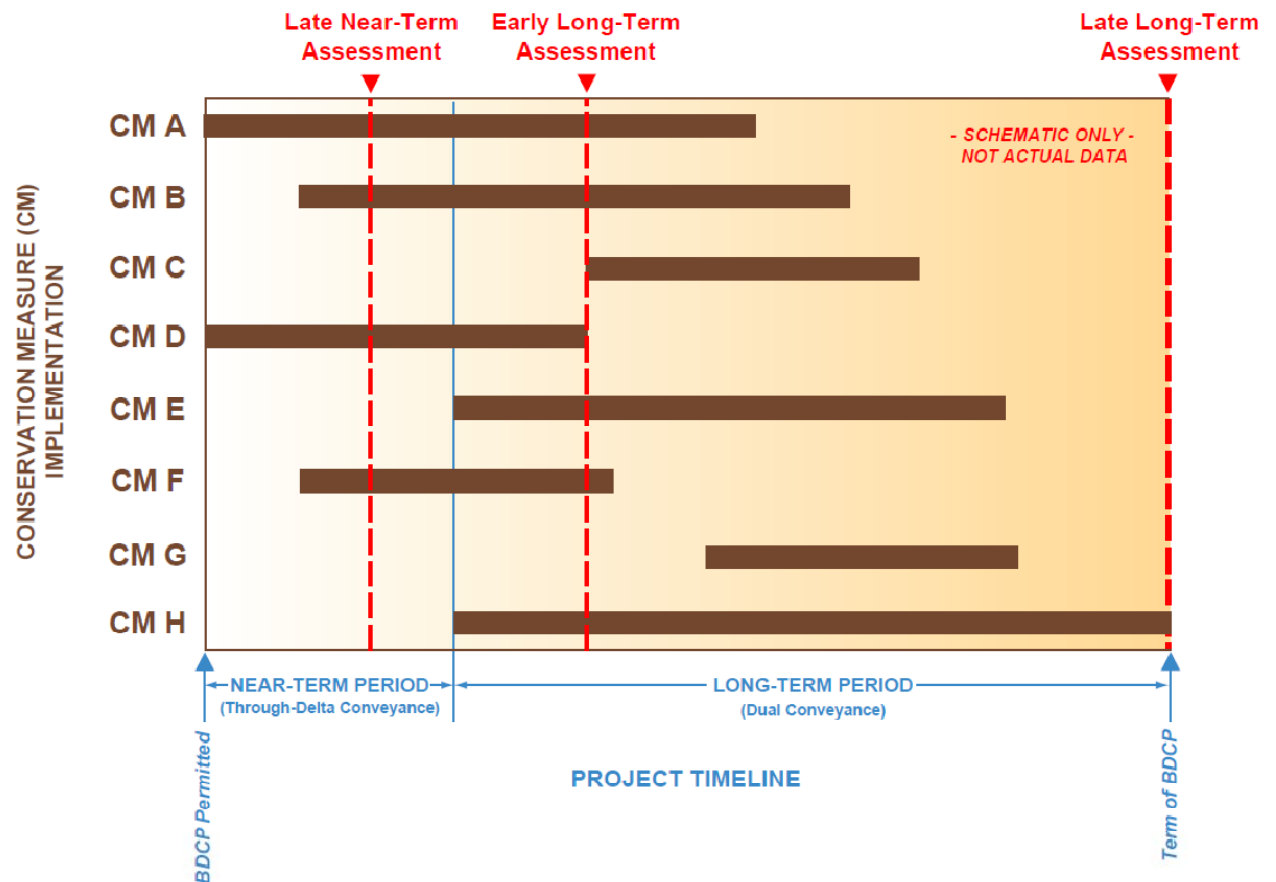
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# Outline

- Review of physical modeling process
- Future climate change and sea level rise
- Trajectory of the No Action
- Trajectory of the Proposed Project
- Summary results
- On-going work and next steps

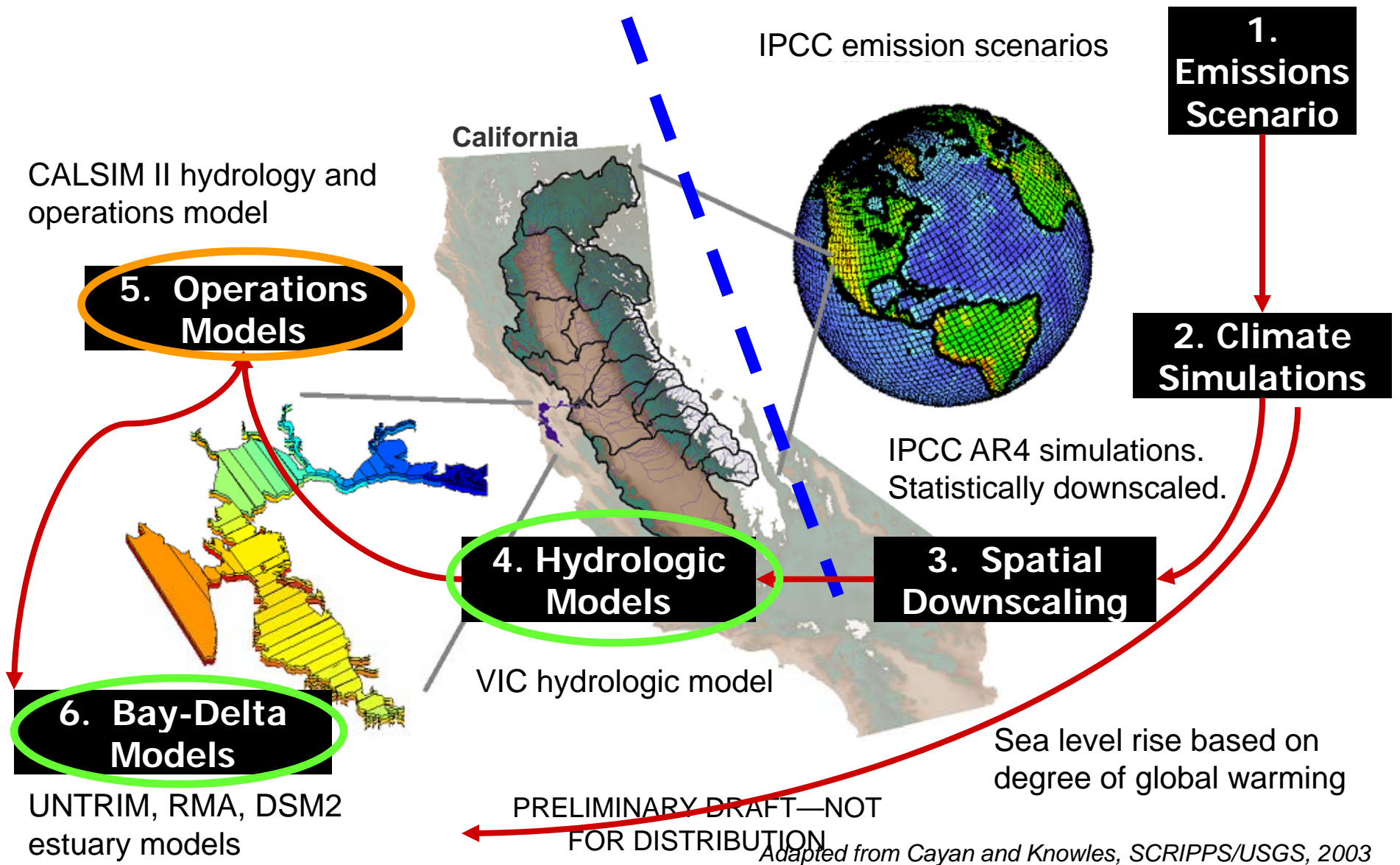
# BDCP Assessment Points in Time

- Process seeks permit for a 50-yr period
- Quantitative analysis to be prepared for disclosure of impacts/effects at three points in time
- Approximately 2015, 2025, and 2060



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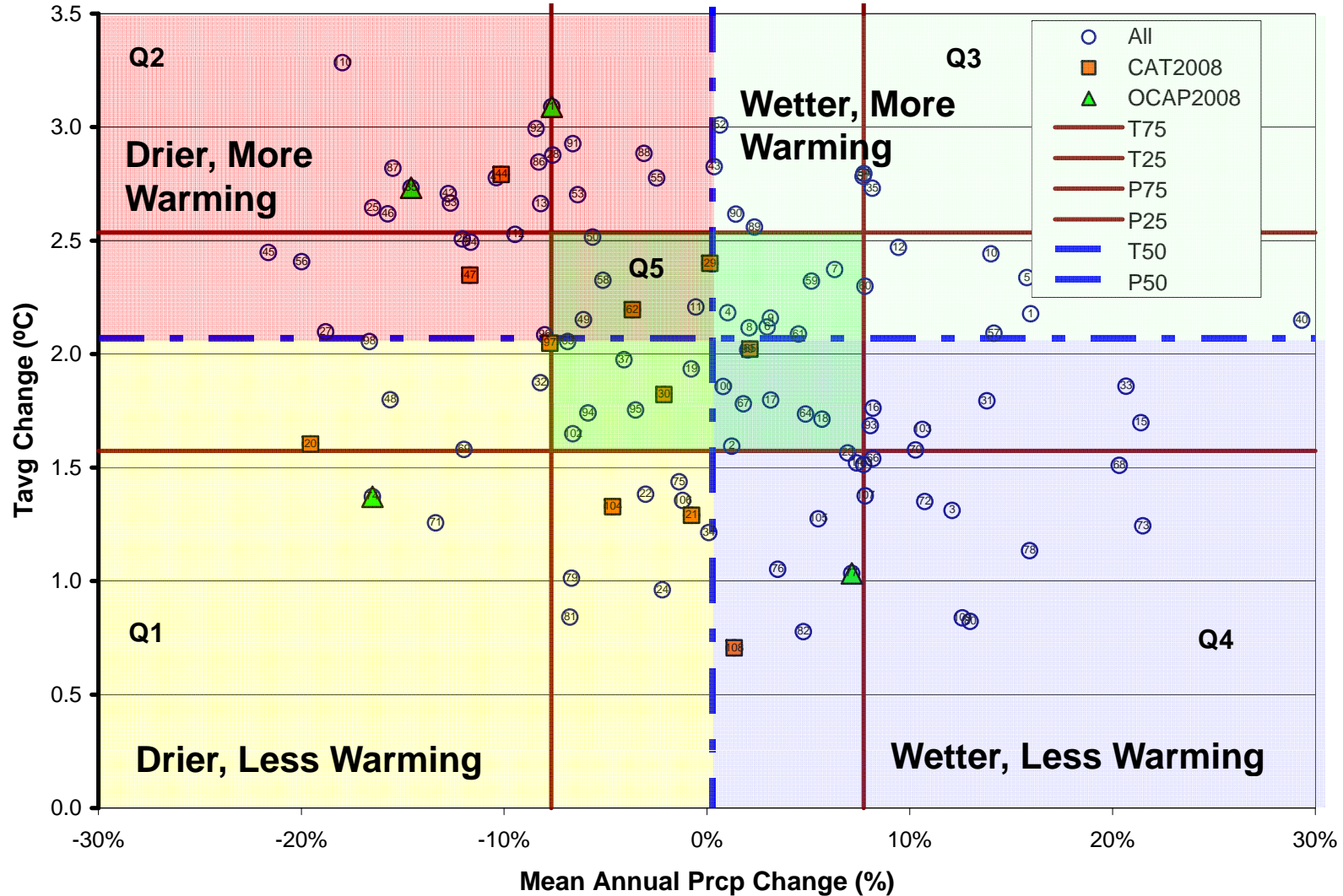
# Characterizing Climate Change Impacts – Atmosphere to Ocean



# Climate Scenarios

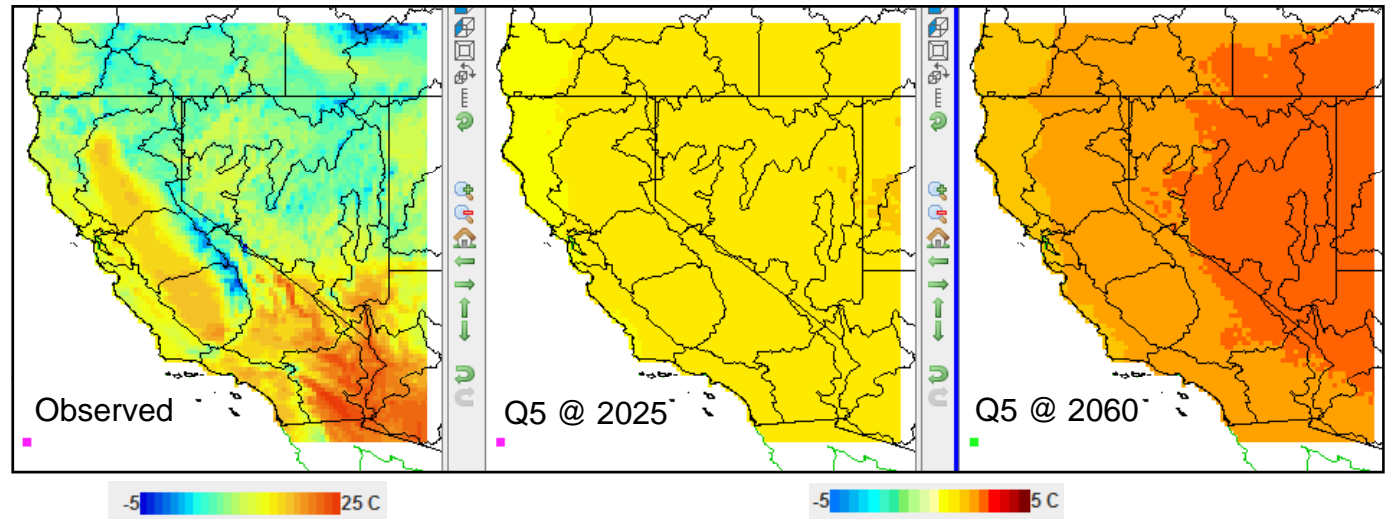
Relationship between Changes in Period-Mean Annual Precipitation and Temperature:  
Folsom

(112 projections, evaluated at 2060 [2046-75] relative to 1971-2000)

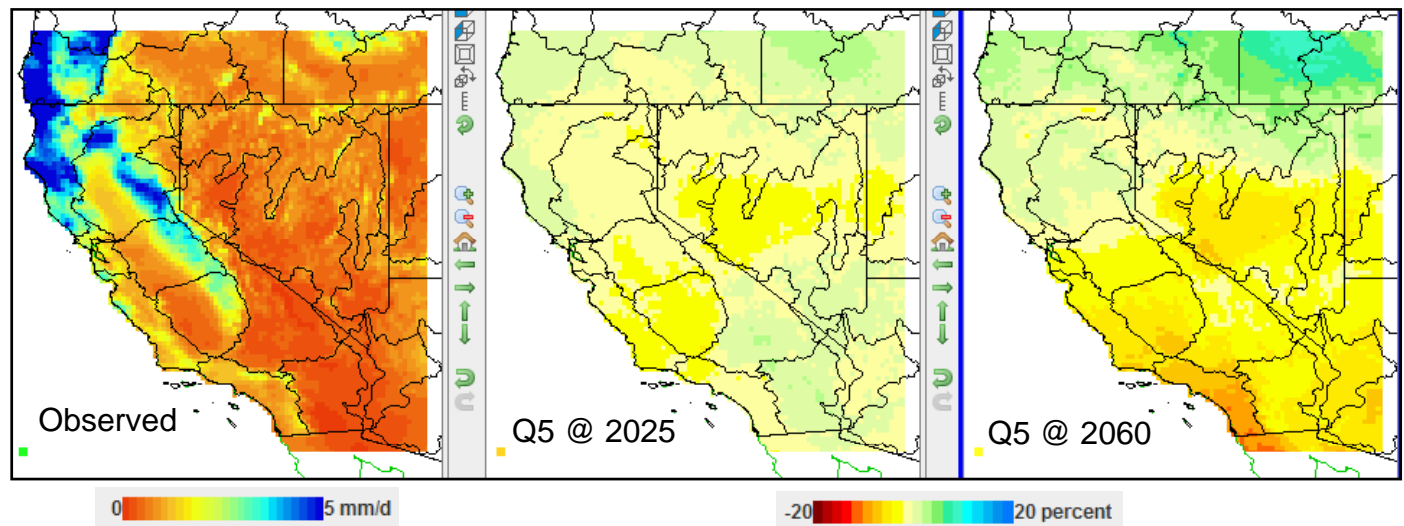


# Annual Spatial Change Patterns

Change in Annual Mean Temperature



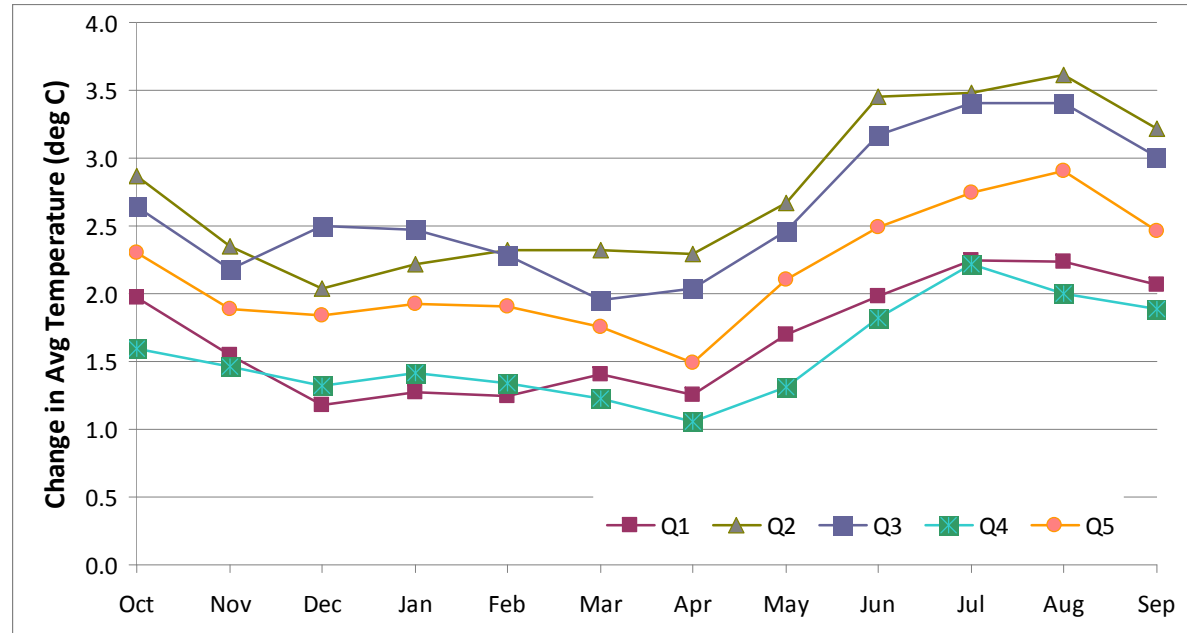
Change in Annual Mean Precipitation



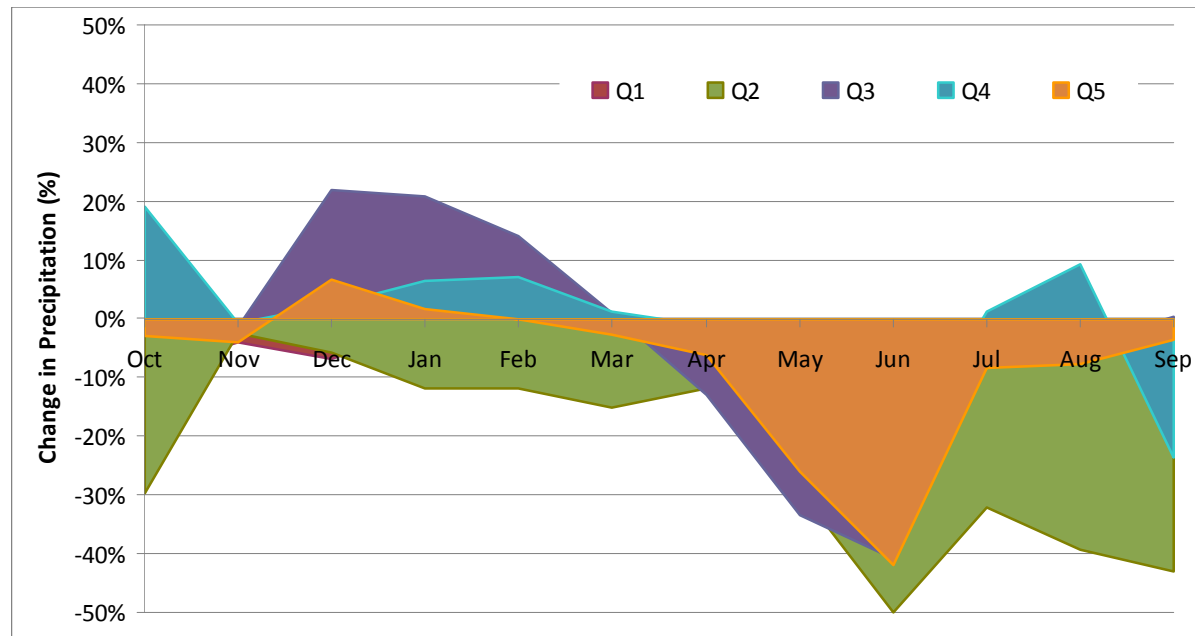
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# Ex. Seasonal Temperature & Precipitation Changes

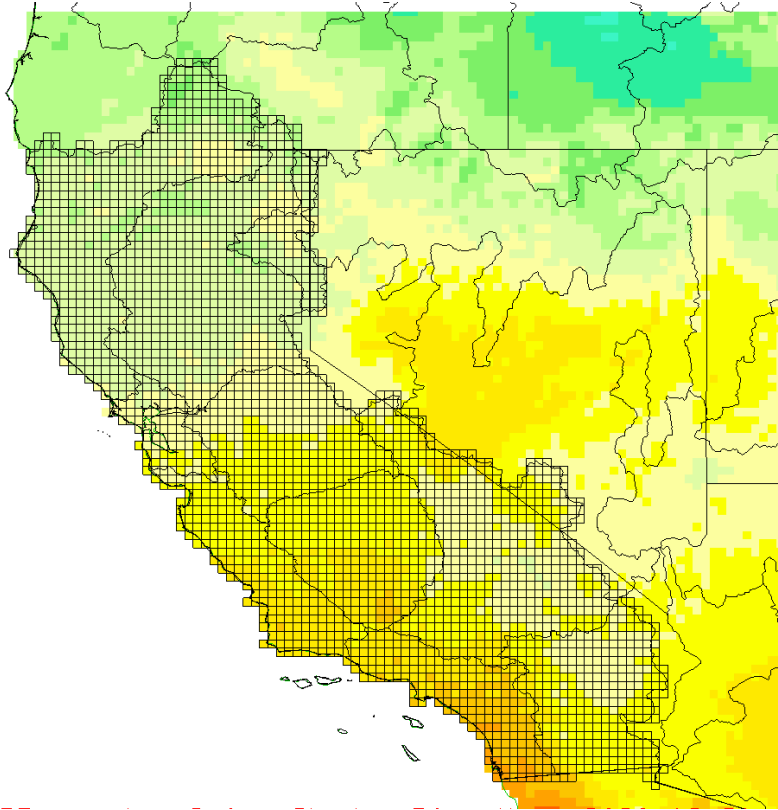
Monthly Temperature



Monthly Precipitation



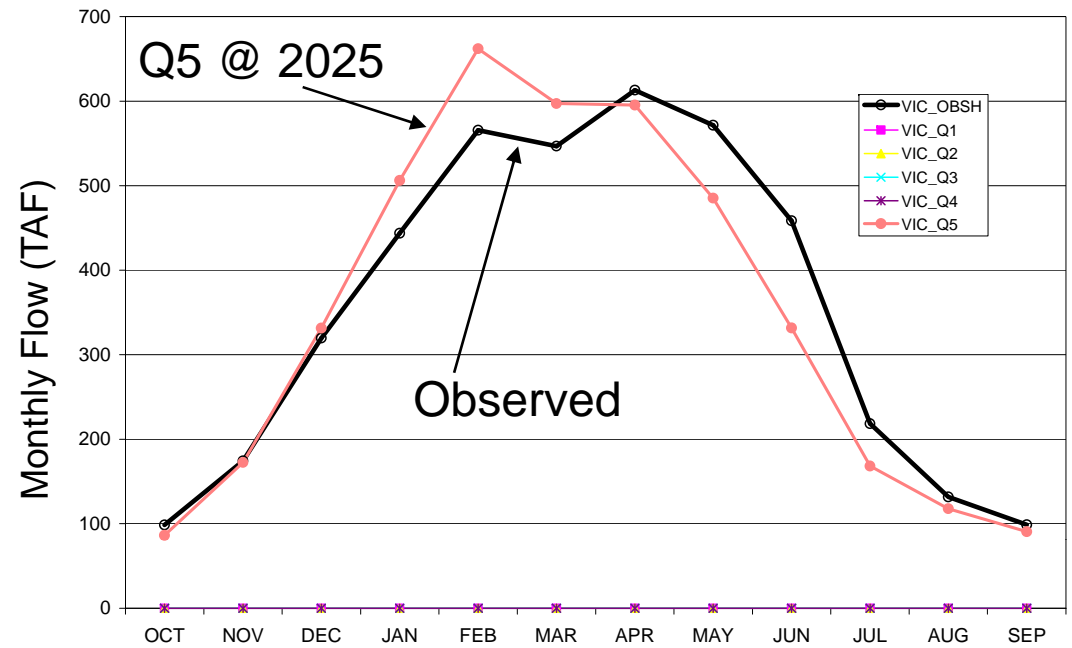
# VIC Hydrologic Analysis



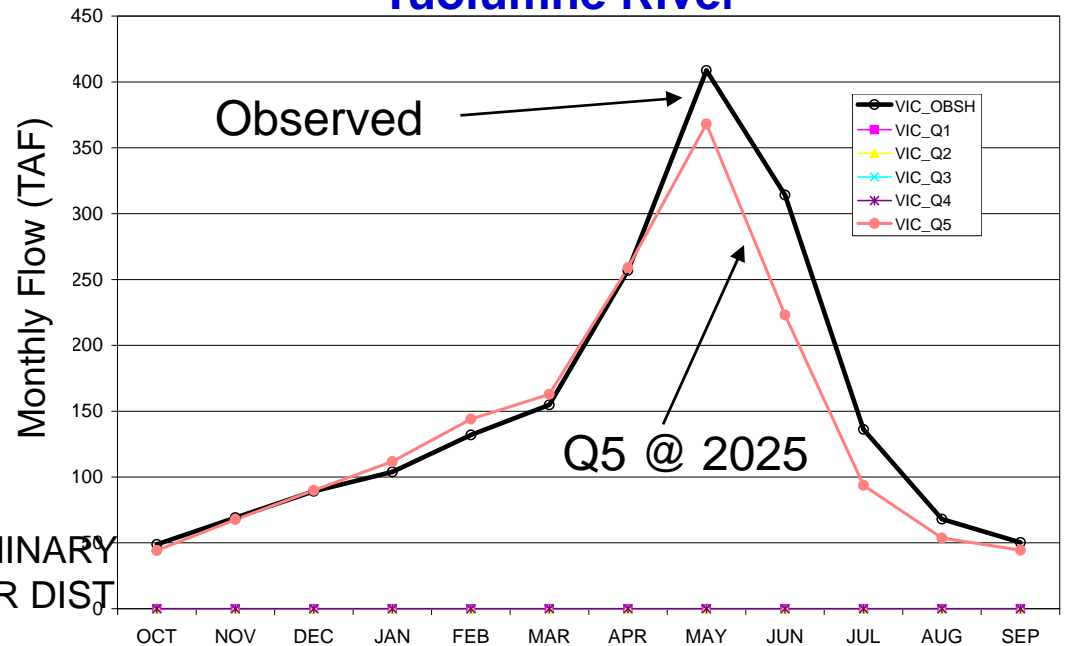
- Gridded hydrologic analysis
- Daily 1916 - 2003
- California model domain

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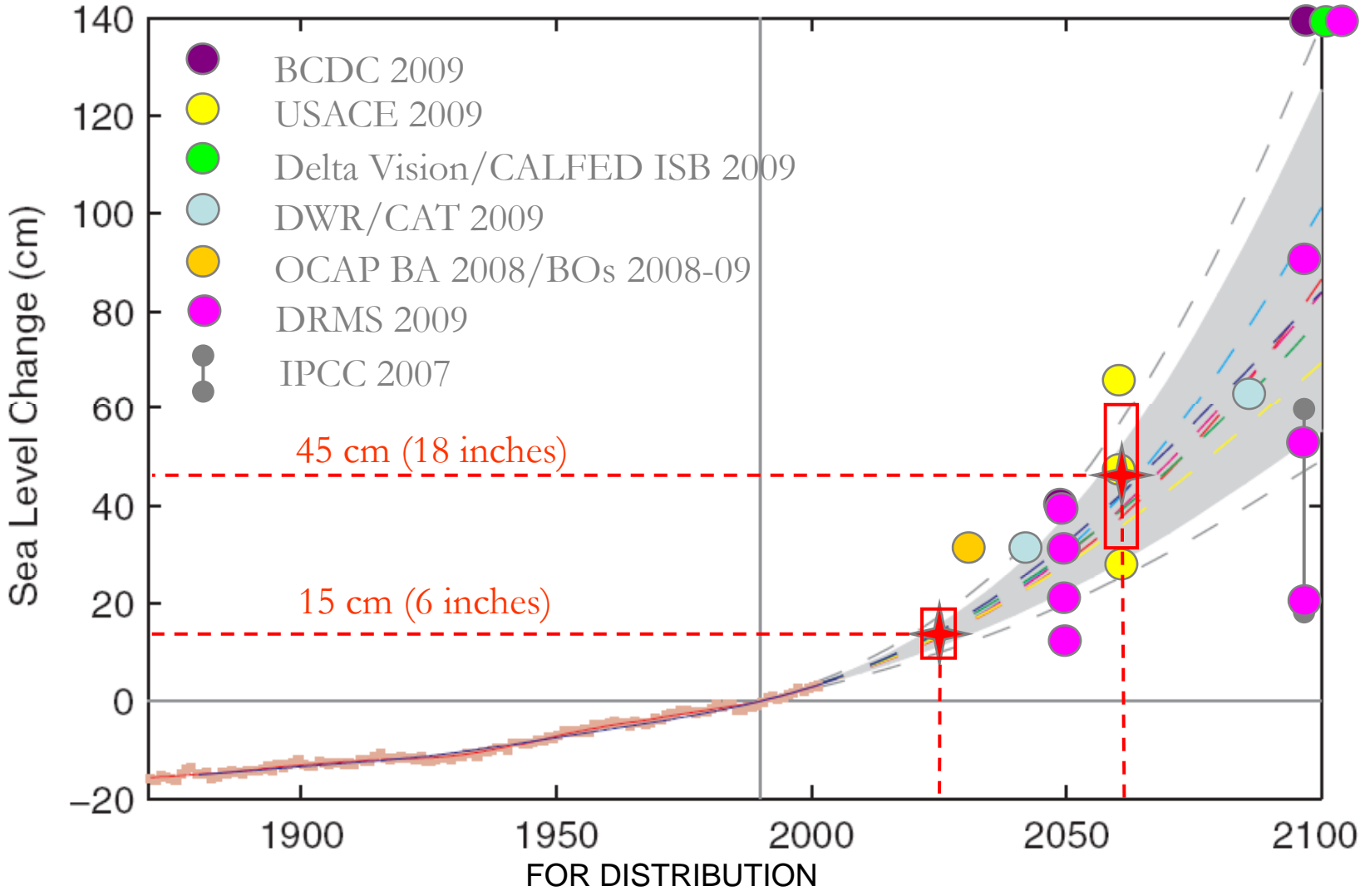
## Feather River



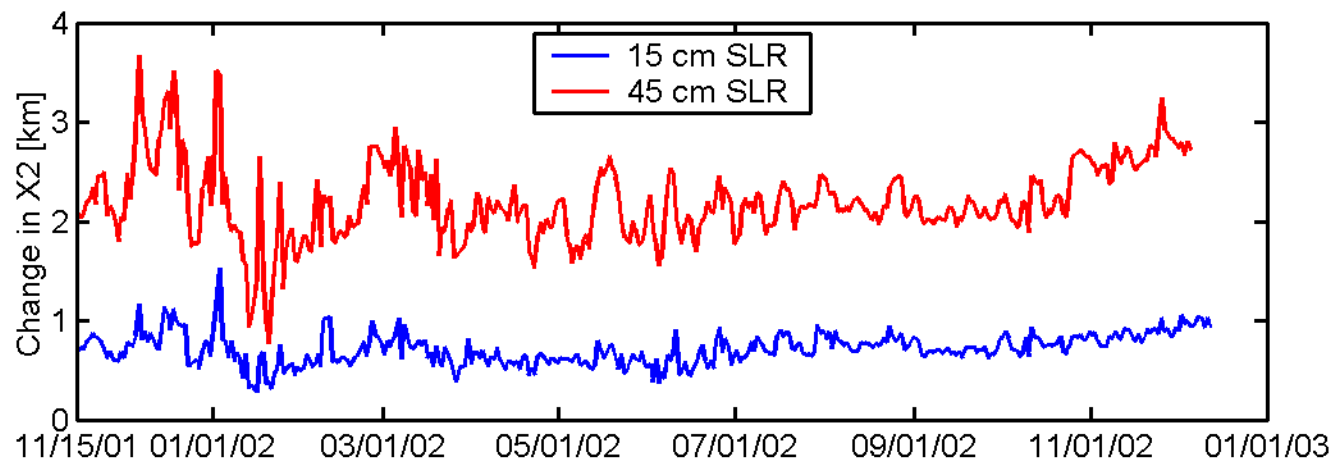
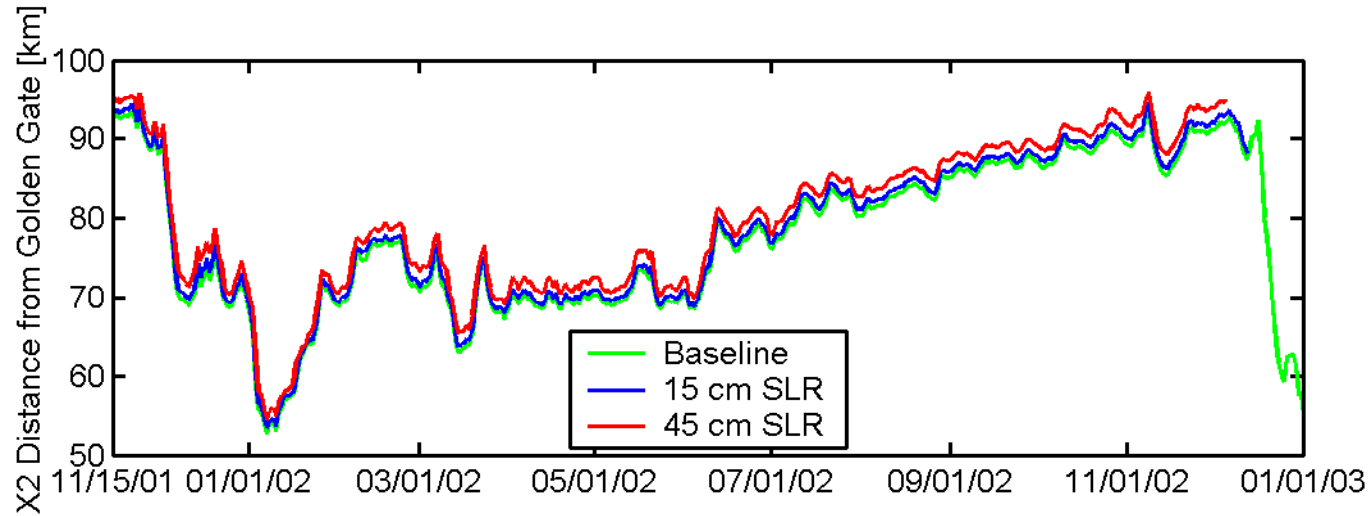
## Tuolumne River



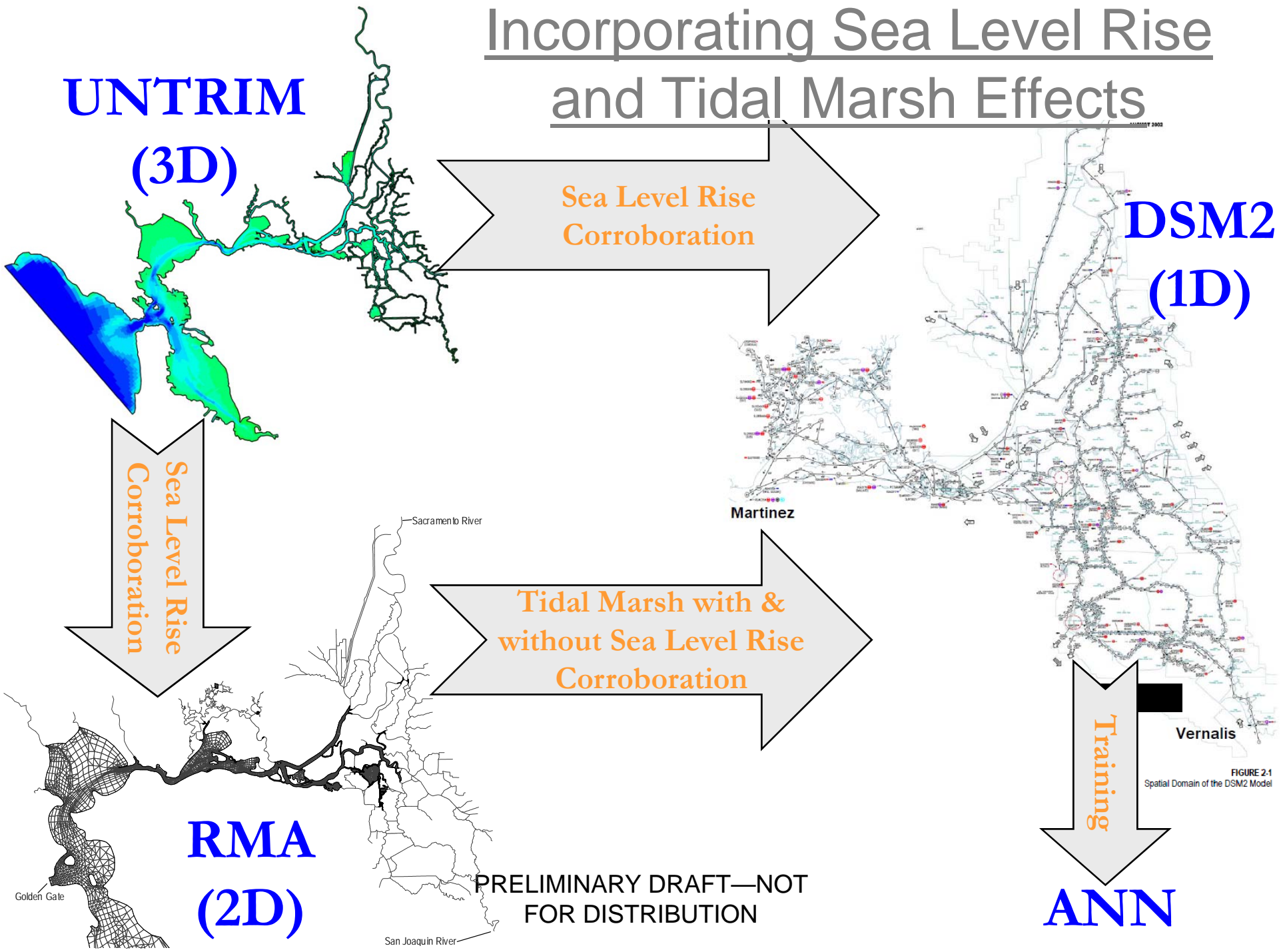
# Sea Level Rise Estimates from Rahmstorf (2007)



# Comparison of Predicted X2



# Incorporating Sea Level Rise and Tidal Marsh Effects



# Significant Improvements in BDCP Systems Modeling (CALSIM)

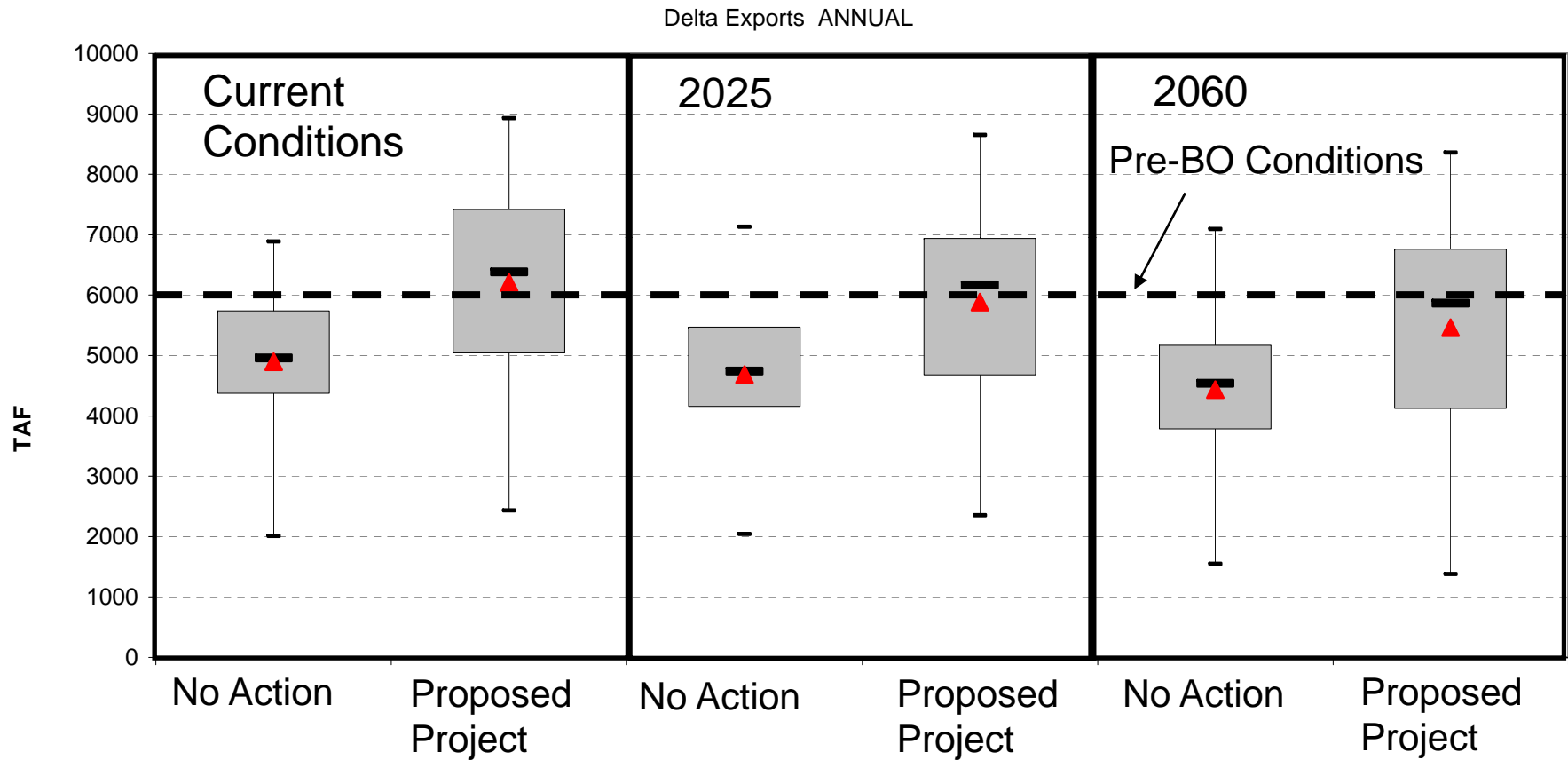
- First time that FULLY INTEGRATED scenarios have been developed
  - Regional climate change
  - Sea level rise
  - BDCP tidal marsh restoration effects
  - BDCP dual conveyance operations per January 29, 2010 ops
- Daily flow and operational analysis for
  - Fremont and Sacramento Weirs
  - Proposed North Delta Intakes
- Update for all modeling consistent with No Action

# Delta Export Results

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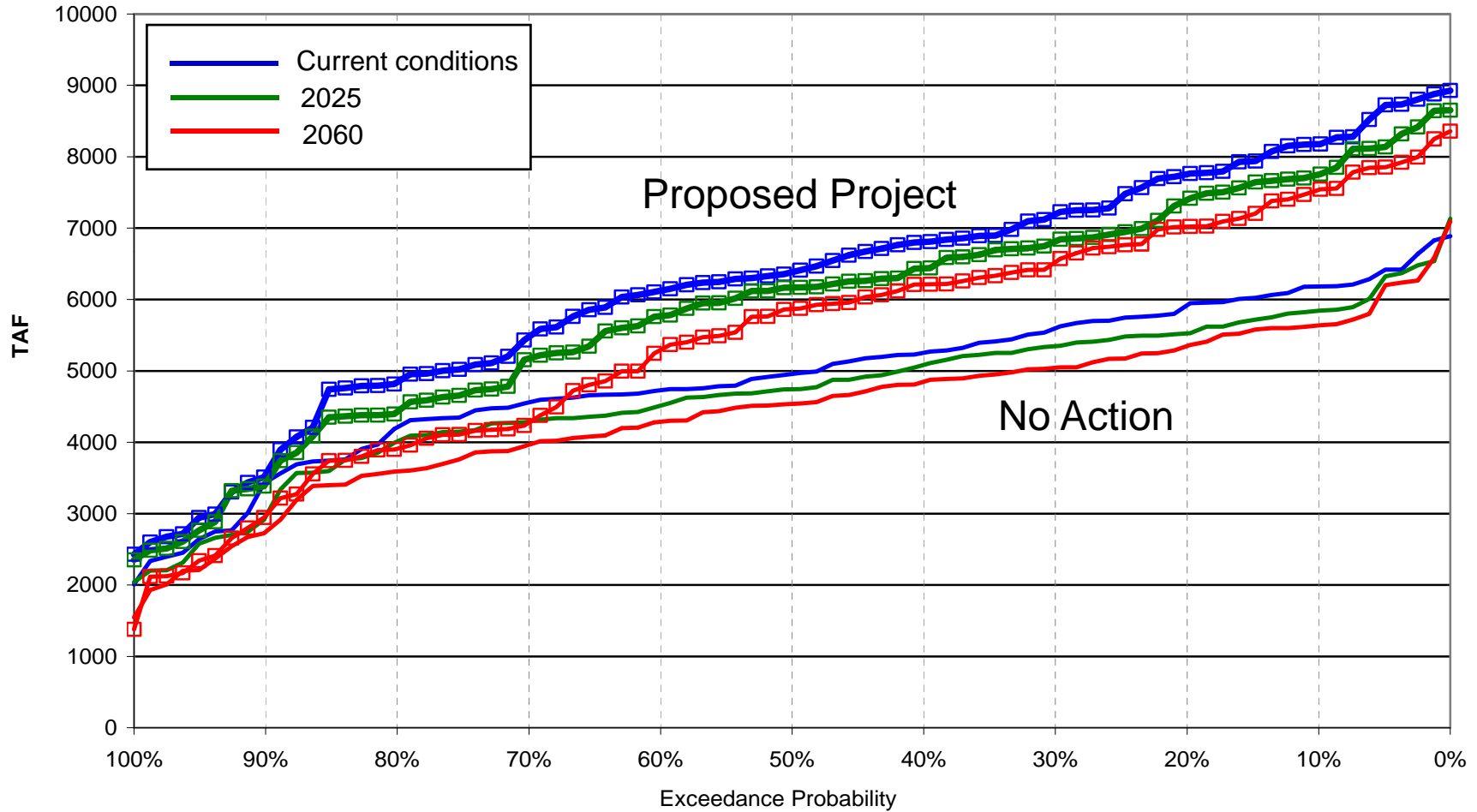
# Annual Delta Exports

(Box=25th to 75th percentile range, whiskers=min and max, dash=median, triangle=mean)



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# Annual Delta Exports

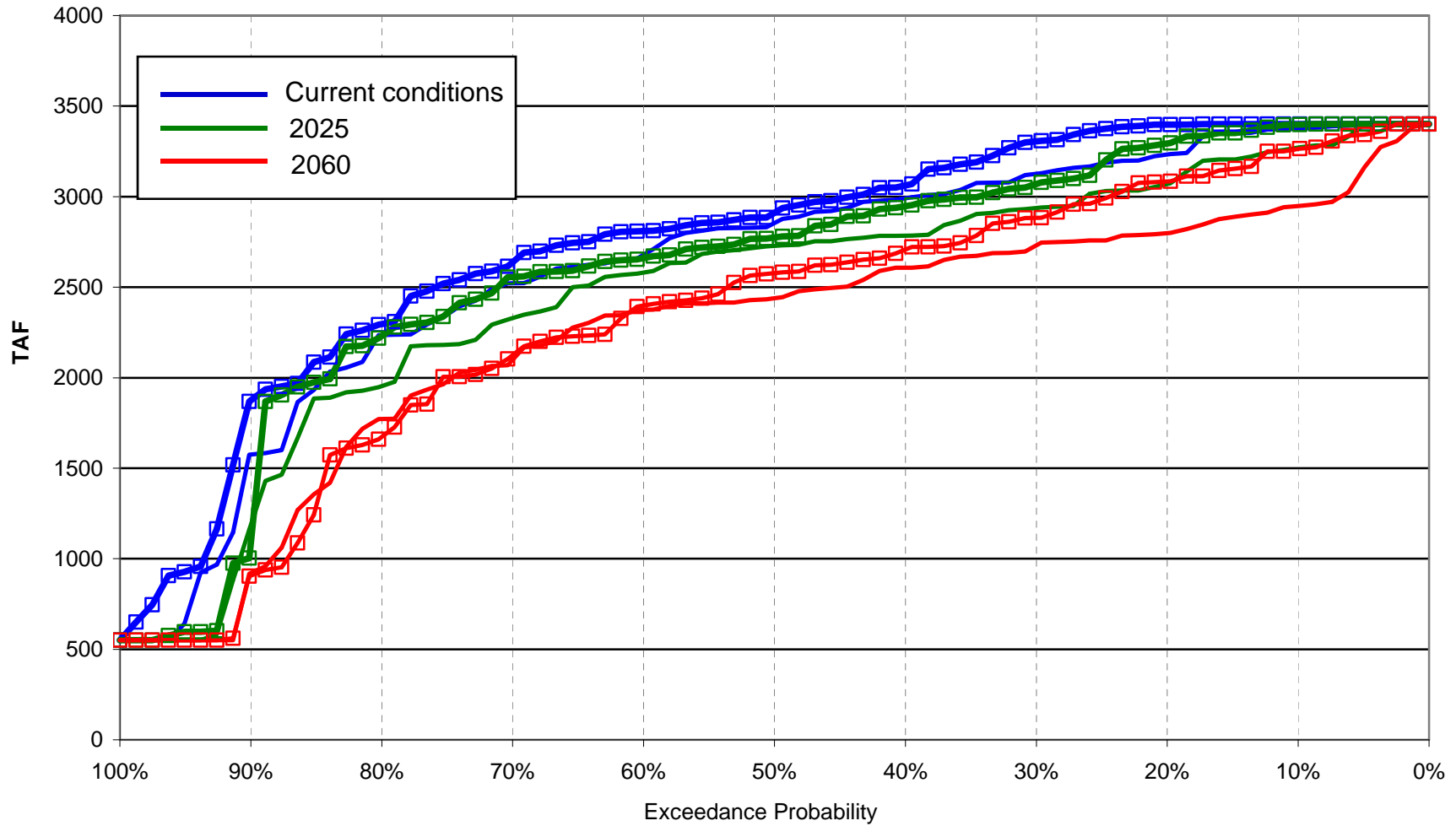


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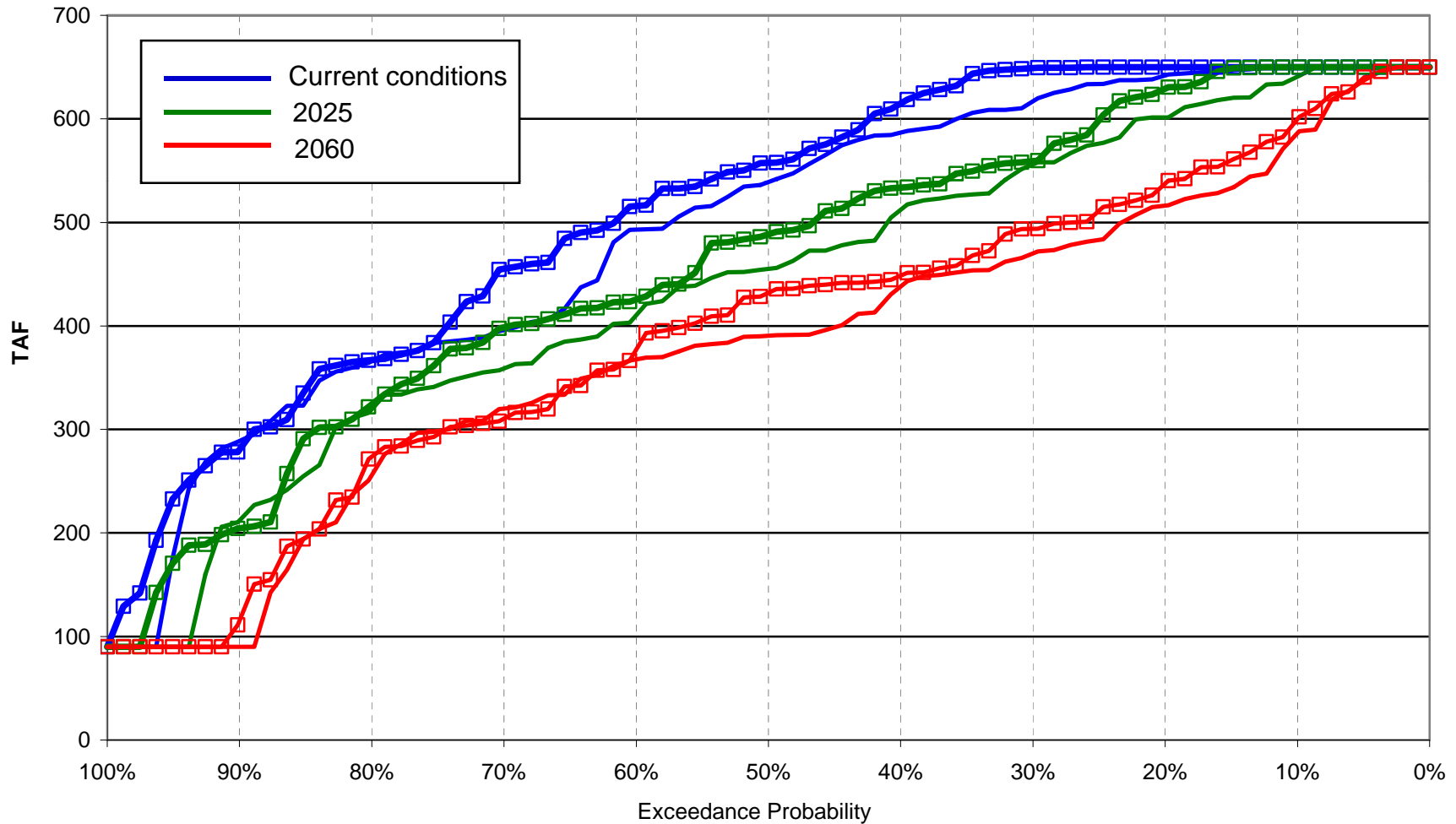
# Storage Results

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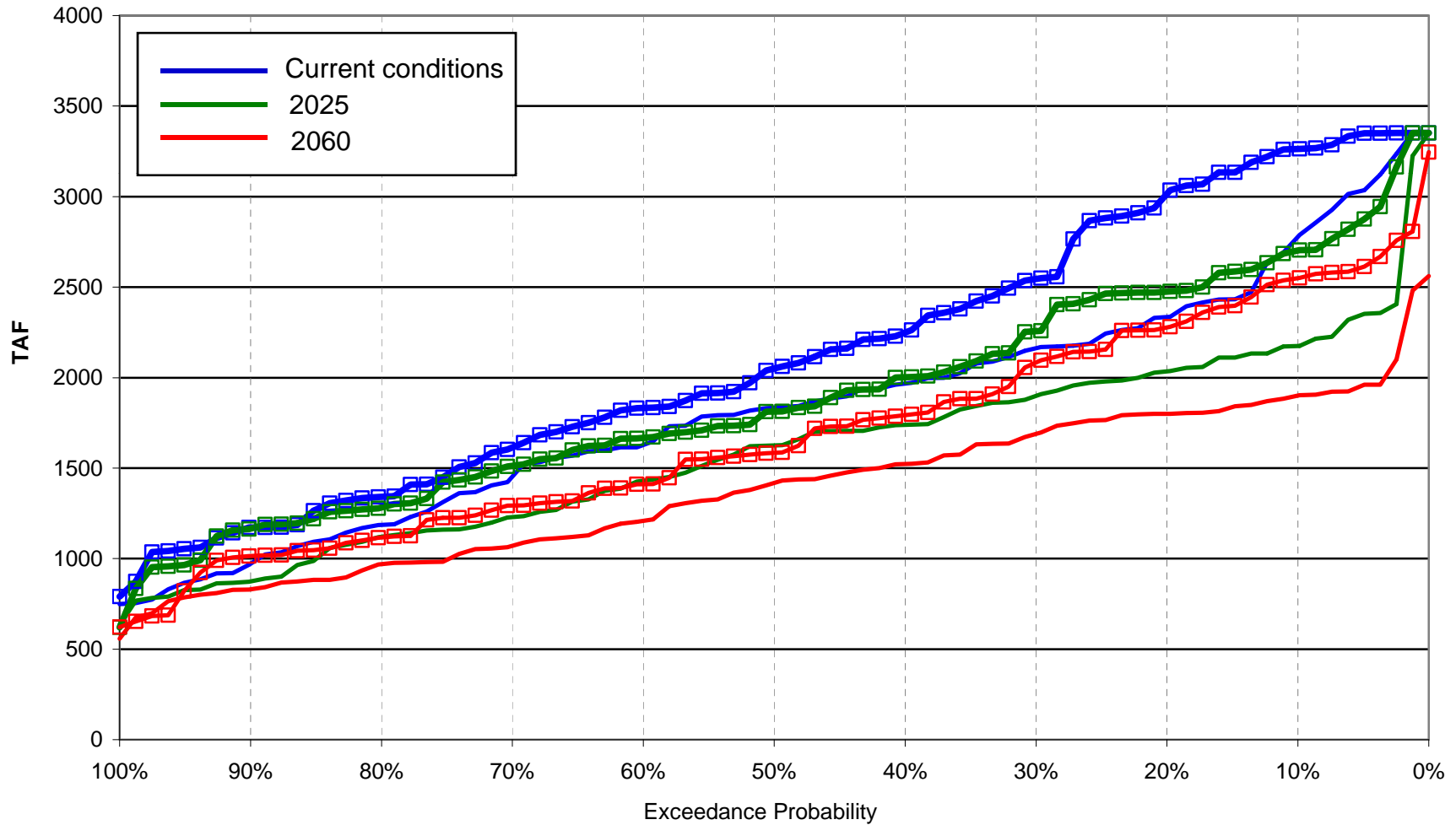
# Shasta EOS Storage



# Folsom EOS Storage



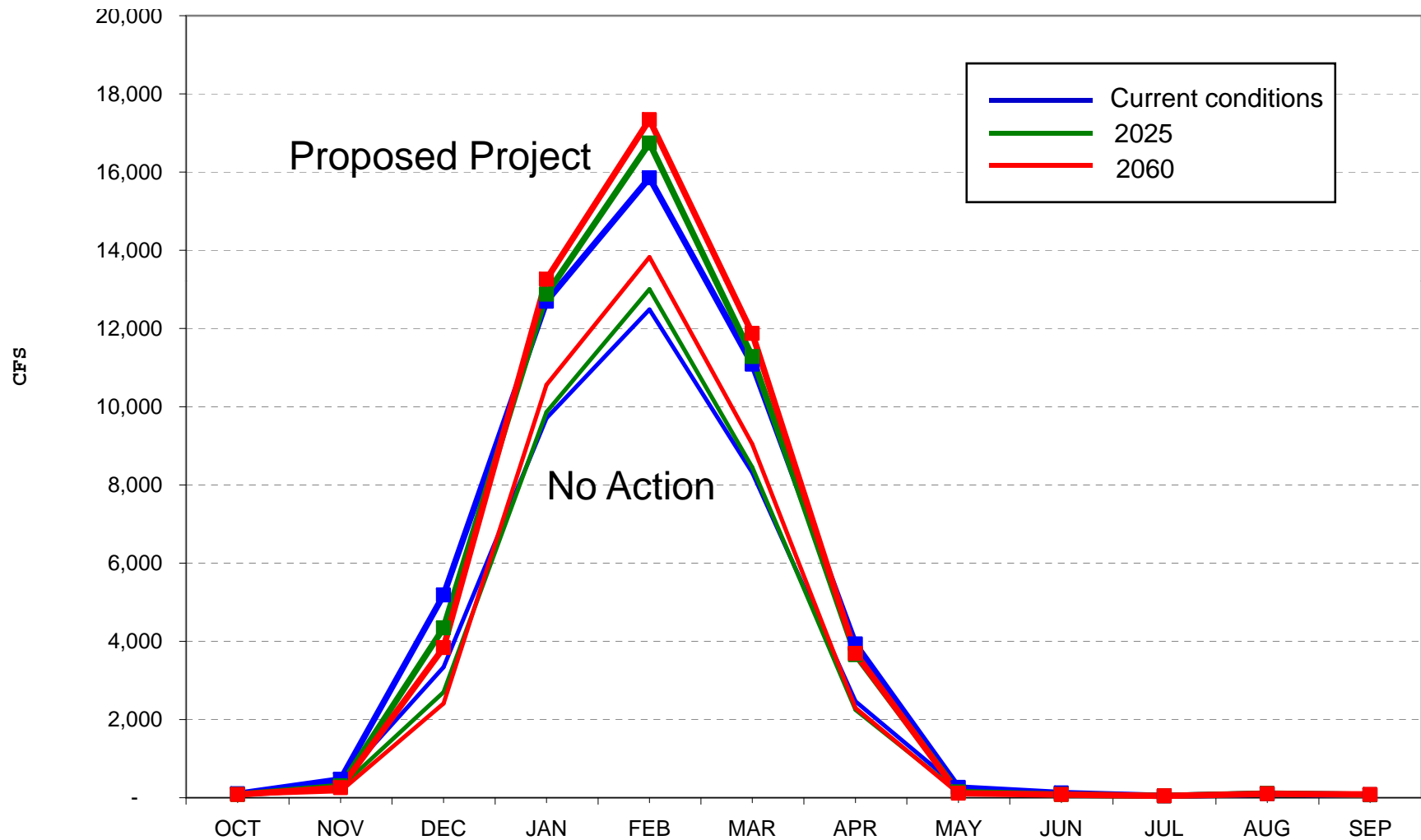
# Oroville EOS Storage



# Delta Flows

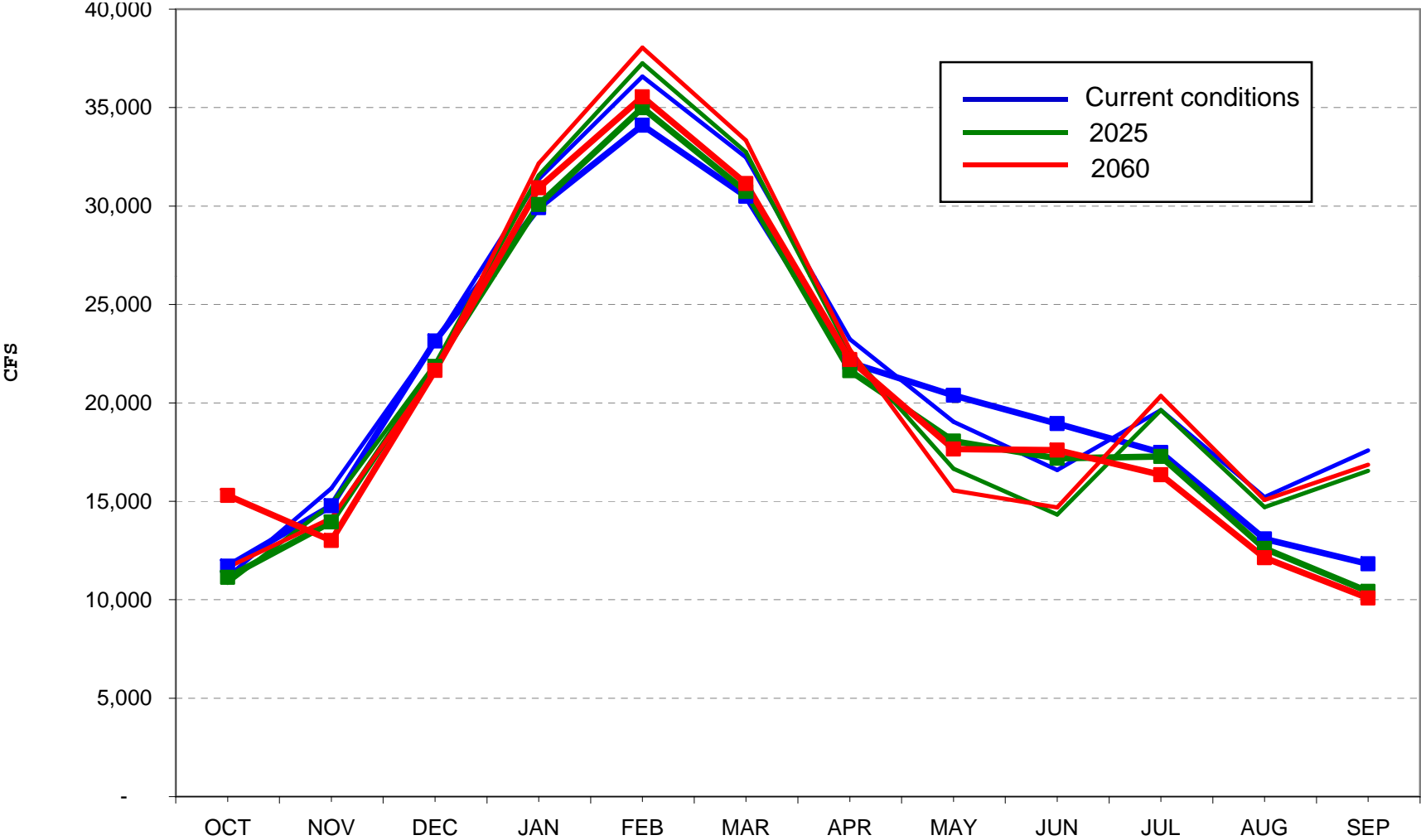
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# Yolo Bypass Flow at Delta



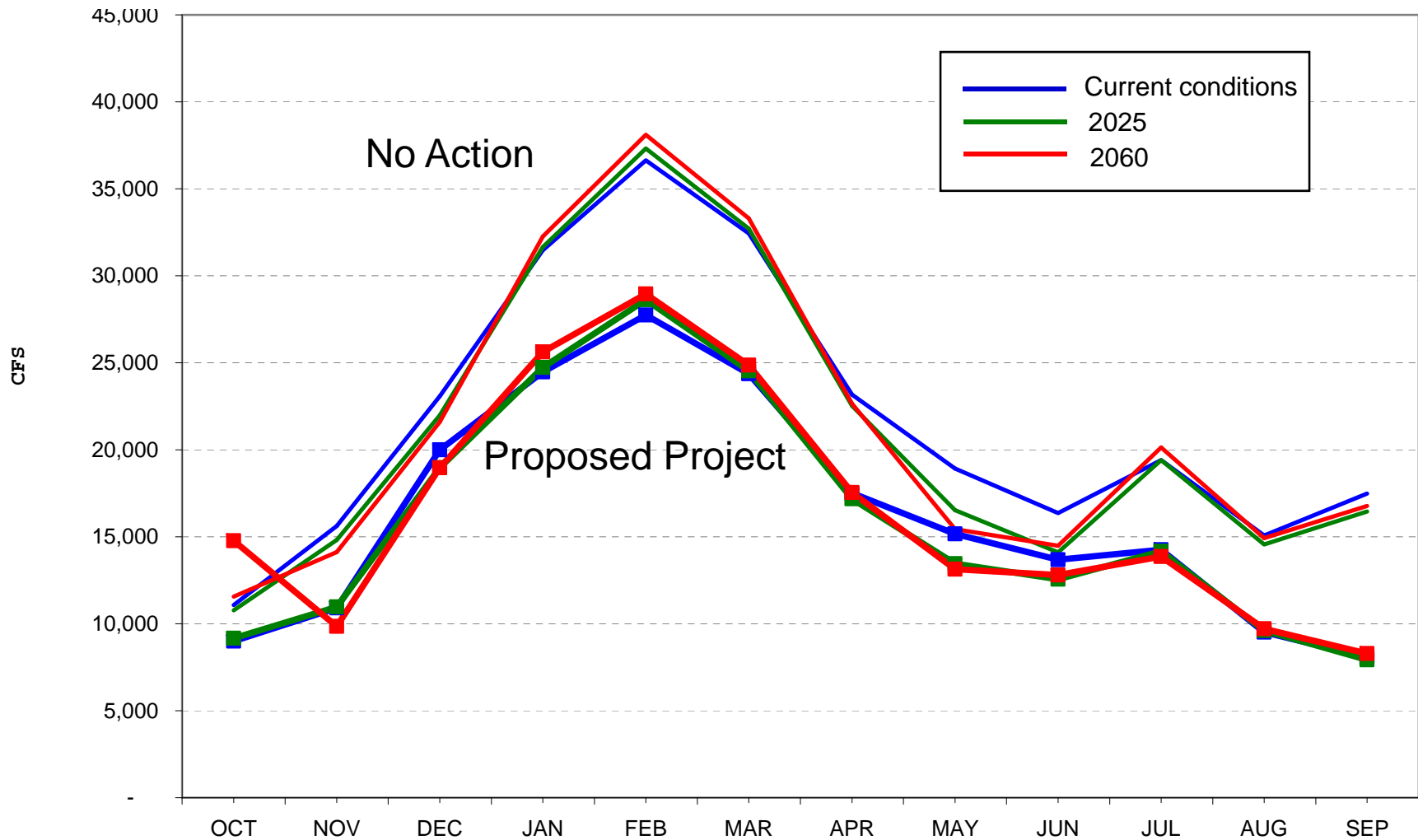
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# Sacramento River at Freeport



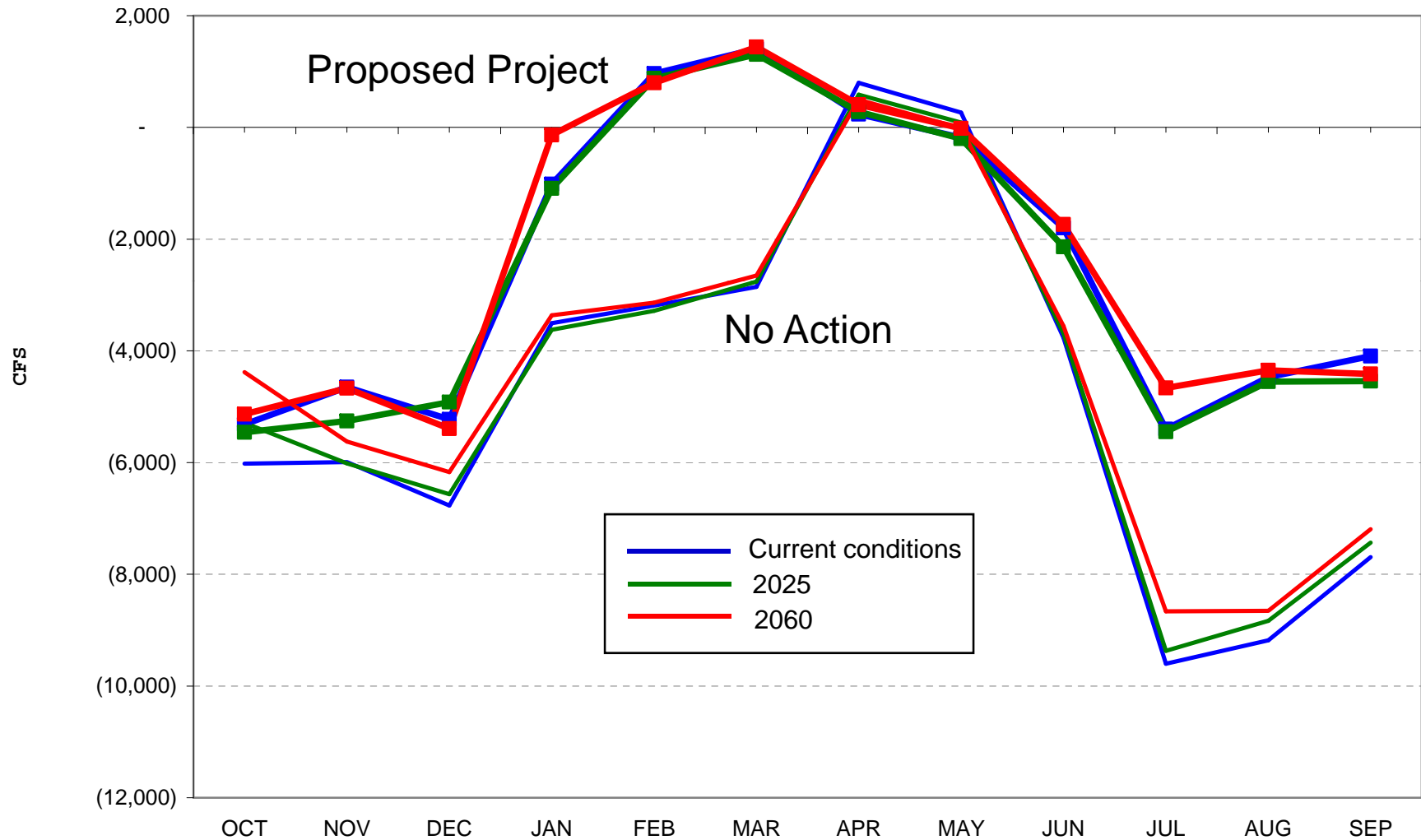
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# Sacramento River d/s of Intakes



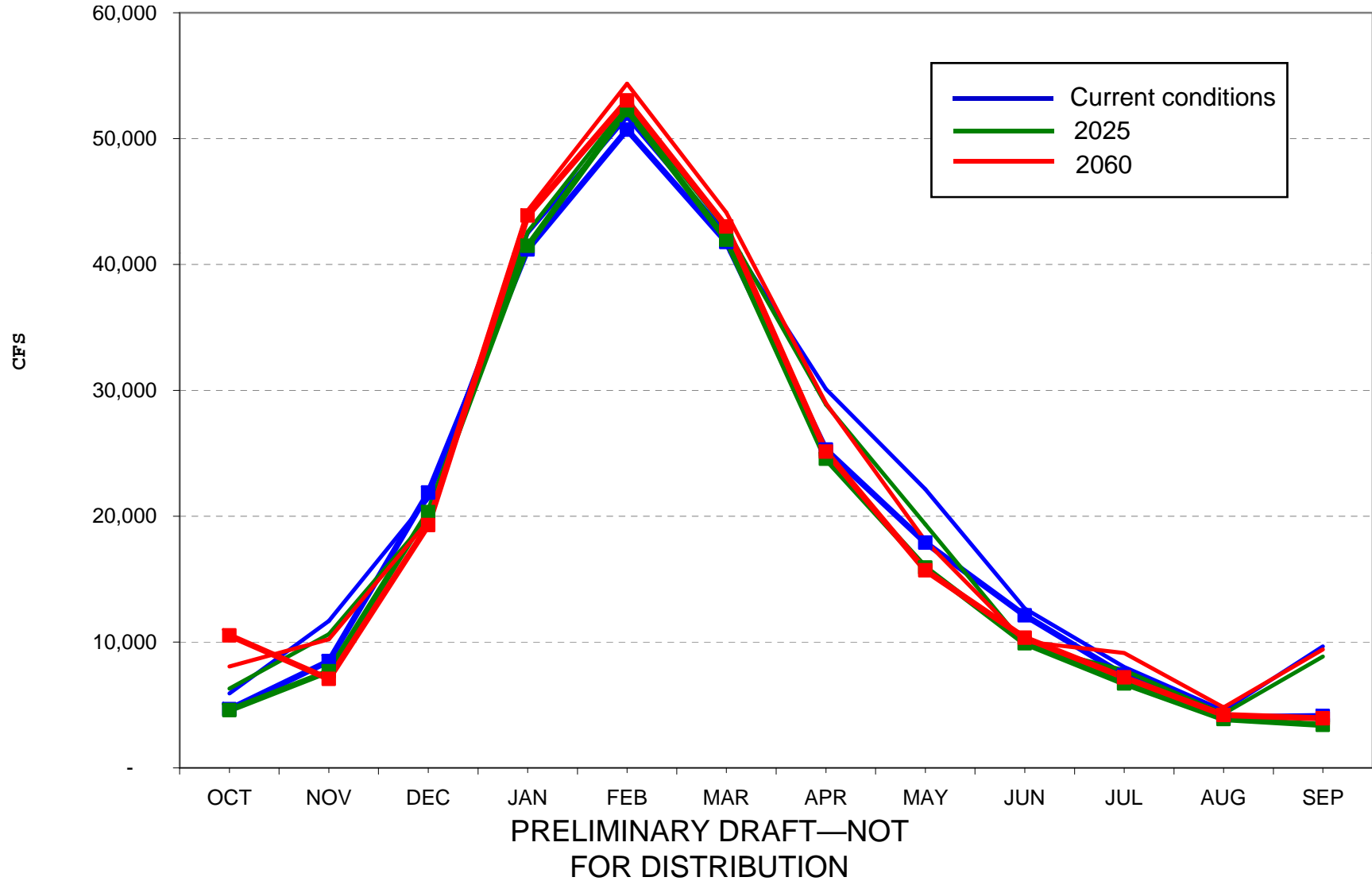
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# Old & Middle R Flows

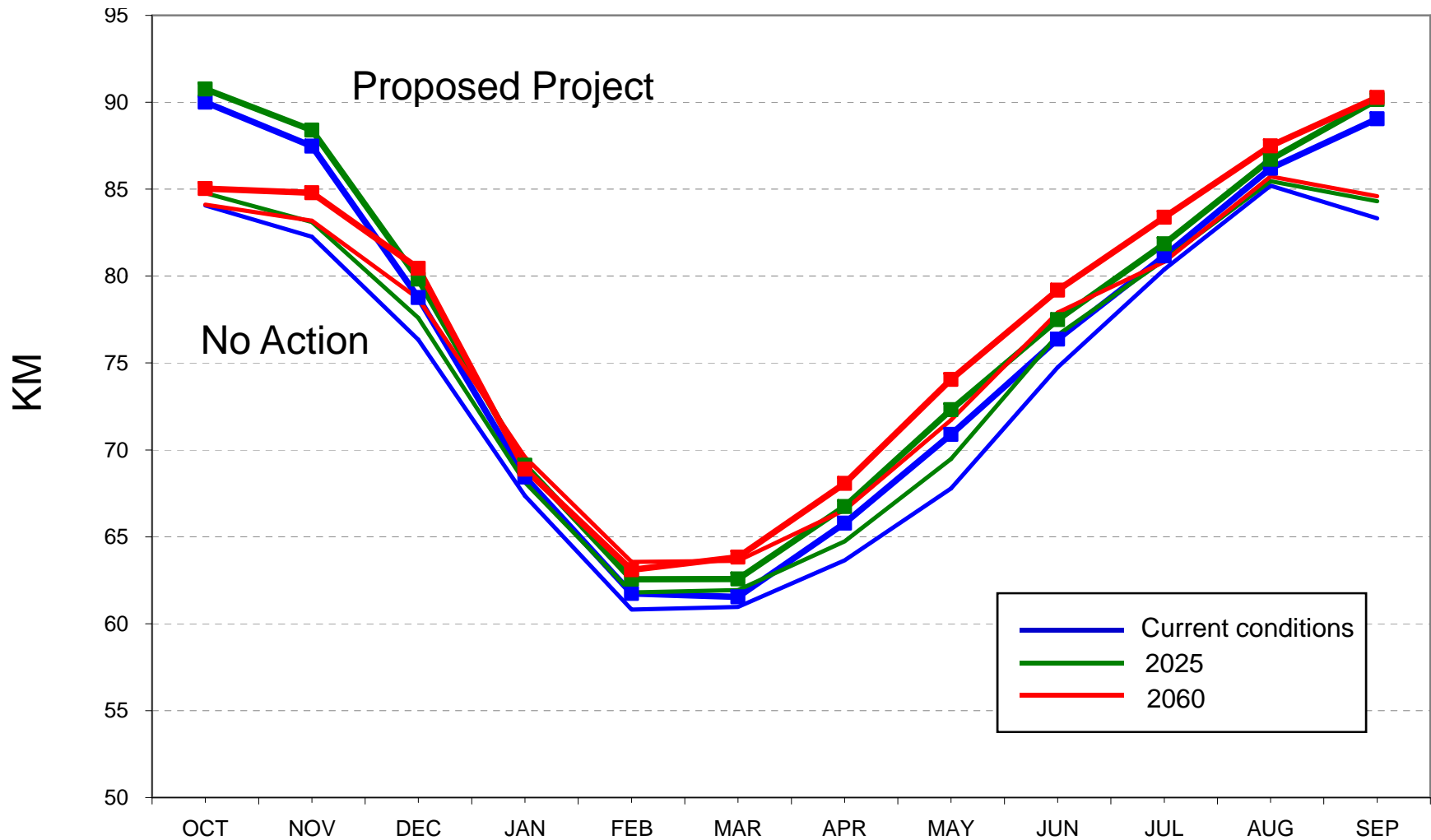


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# Delta Outflow



# X2 Position



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# On-going Work and Next Steps

- Complete review of CALSIM studies and climate scenarios
- Initiate river temperature modeling
- Initiate DSM2 and RMA Delta hydrodynamic, water quality, and particle tracking modeling
- Evaluate sensitivity of “adaptive ranges”
- Compile results database and support Effects Analysis