

# Strategies Under Changing Climate for Nevada Irrigation District

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# Plan for Water (PFW)



Support Nevada Irrigation District (NID) in planning for future water management in response to anticipated changes in climate, runoff patterns, water demand, and regulatory conditions.

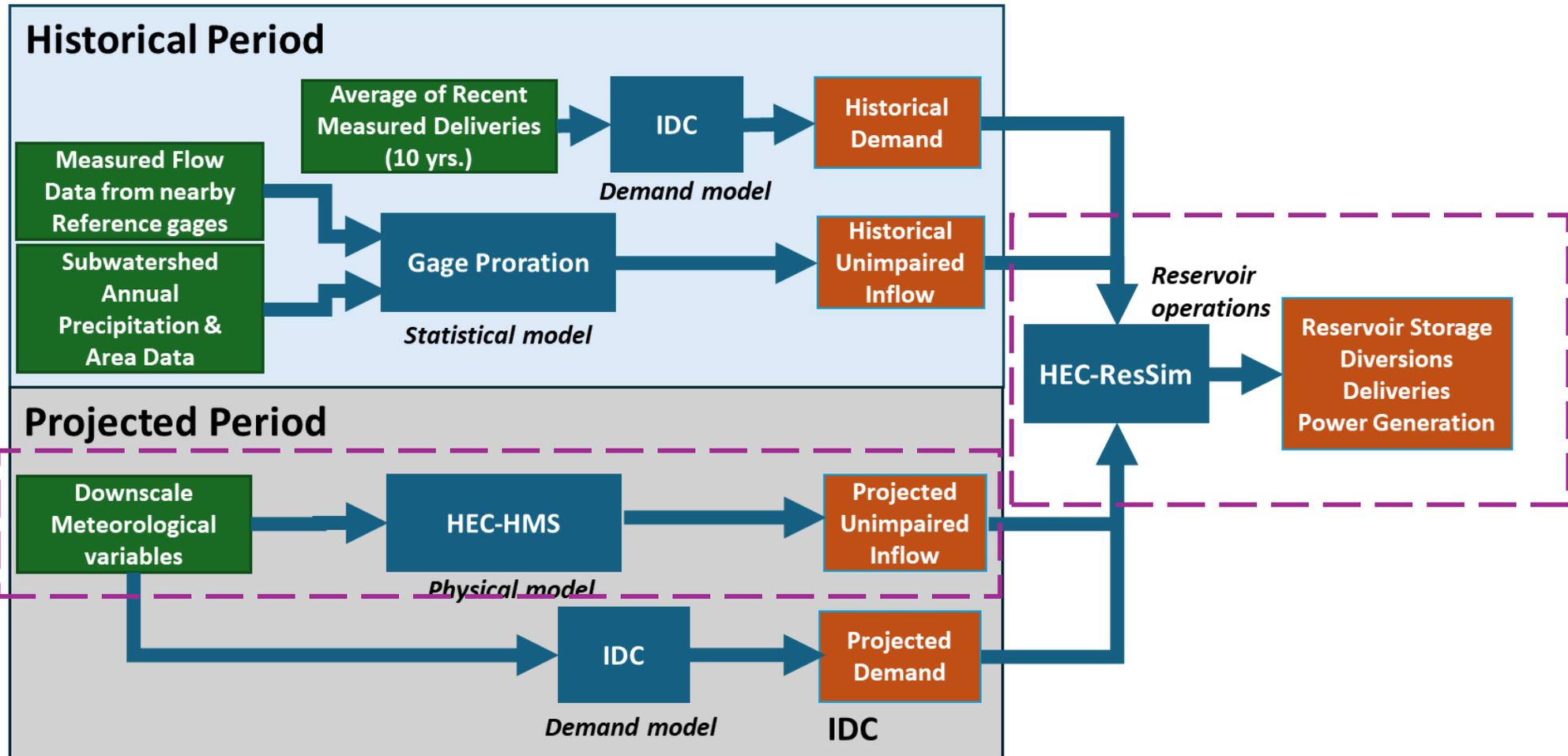


Conducted detailed technical analyses of NID hydrology, climate change, projected water demand, regulatory issues, and reservoir operations over a 50-year time horizon.



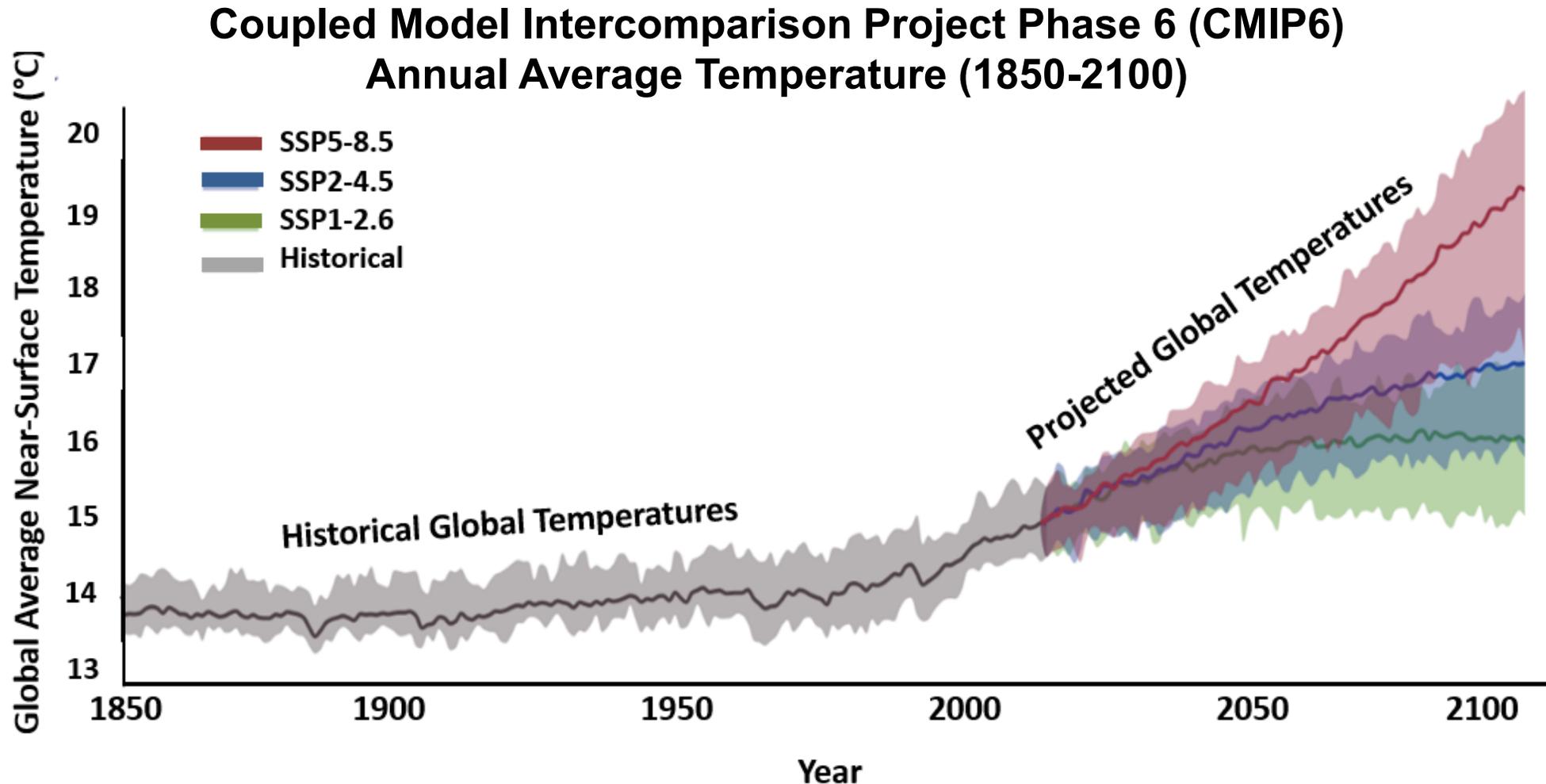
Voted to withdraw the proposed Centennial Dam from future consideration as viable alternative during the NID Board meeting (09/09/2025).

# Approach



**Data**   **Model/Procedure**   **Output**

# Downscale Metrological Variables

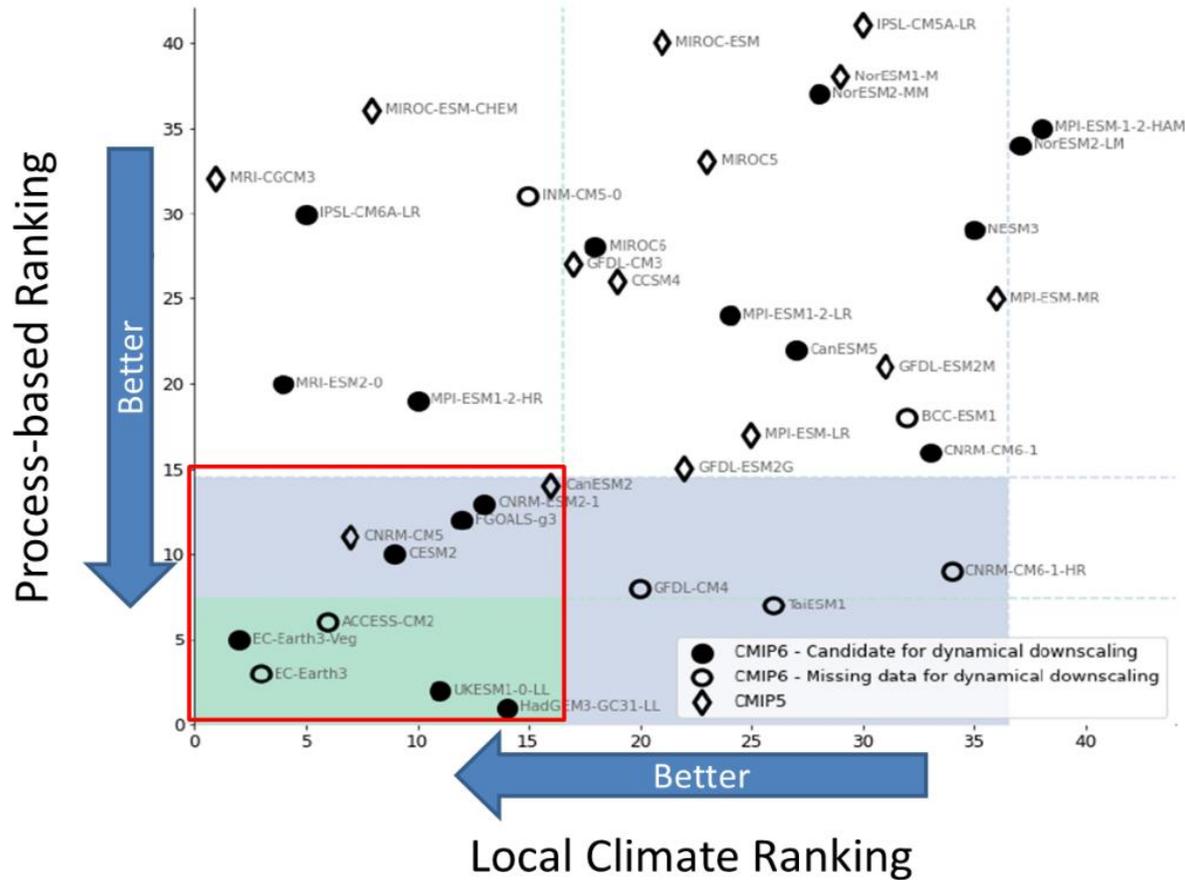


All scenarios have increasing temperature trends.

# Climate Scenario Selection

7 Models and 3 scenarios

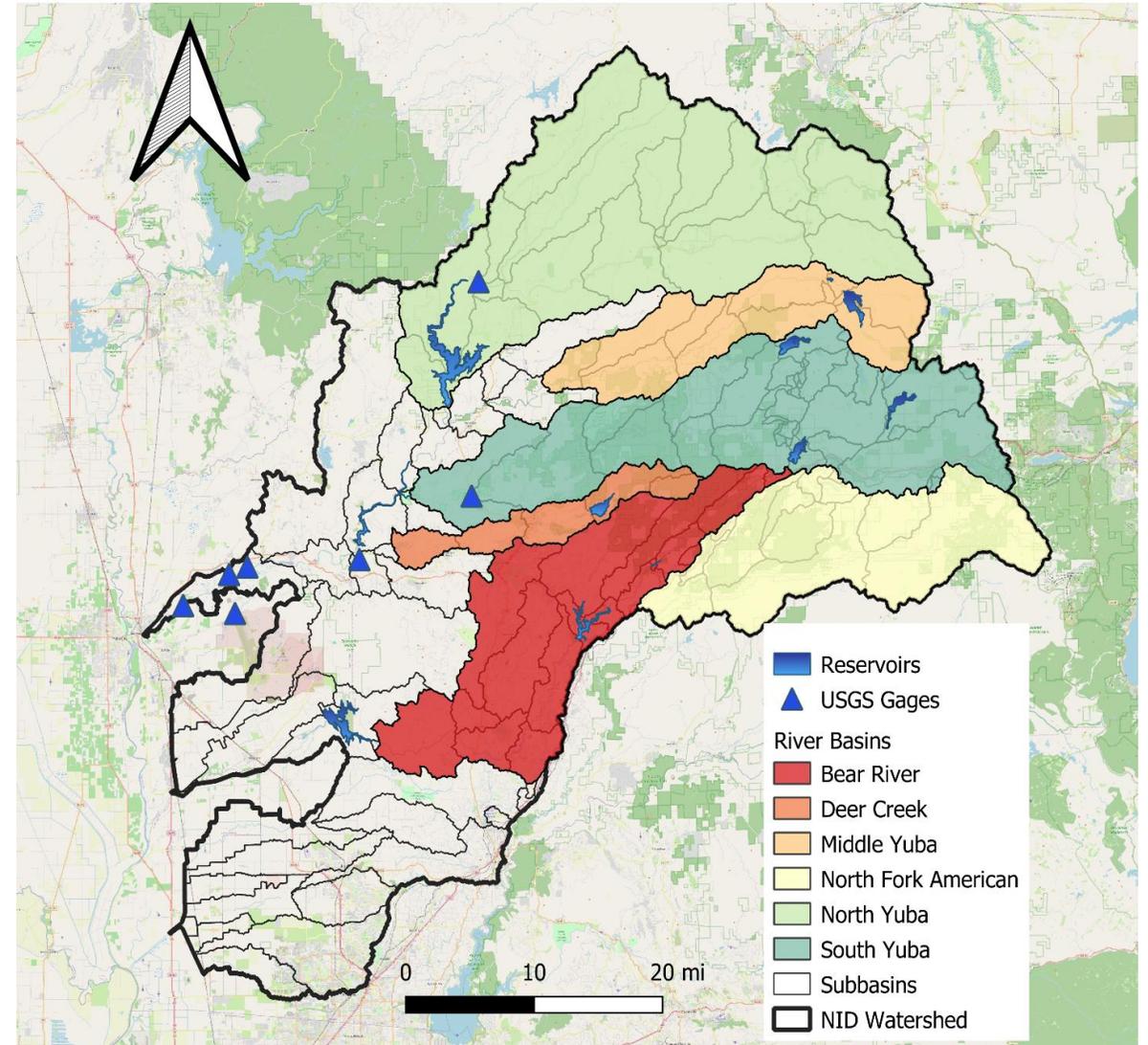
GCMs	Emissions		
	SSP245	SSP370	SSP585
ACCESS-CM2	√	√	√
EC-Earth3	√	√	√
EC-Earth3-Veg	√	√	√
CNRM-ESM2-1	√	√	√
FGOALS-g3	√	√	√
HadGEM3-GC31-LL	√	-	√
CESM2-LENS	-	√	-



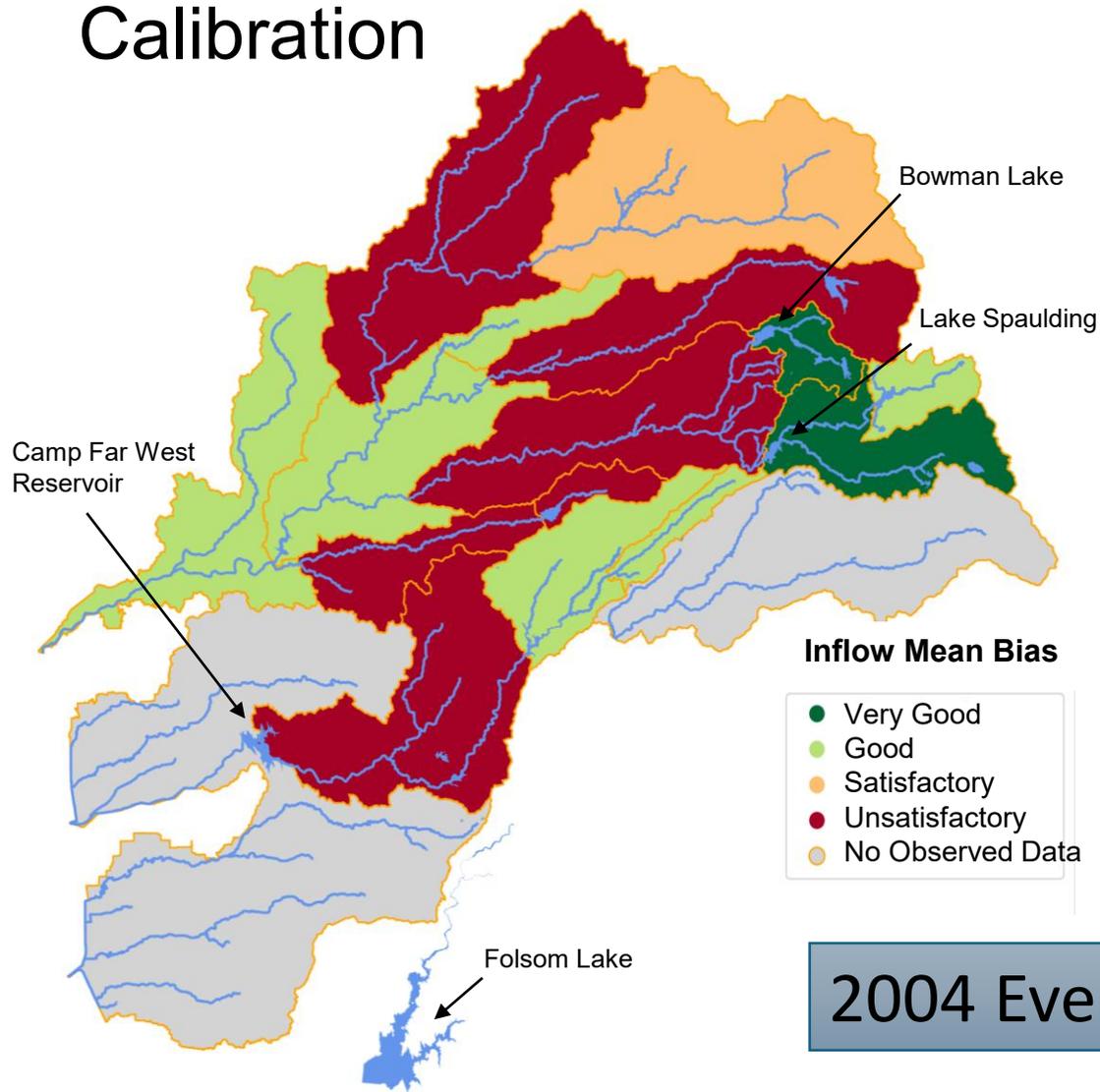
GCM Rankings by Local Climate Metric Performance and Process-Based Metric Performance (Source: Krantz et al. 2021).

# Hydrology and Hydrography

- HEC-HMS Model Development
  - Incorporating key system features
- HEC-HMS Calibration
  - Snow processes
  - Hydrologic components

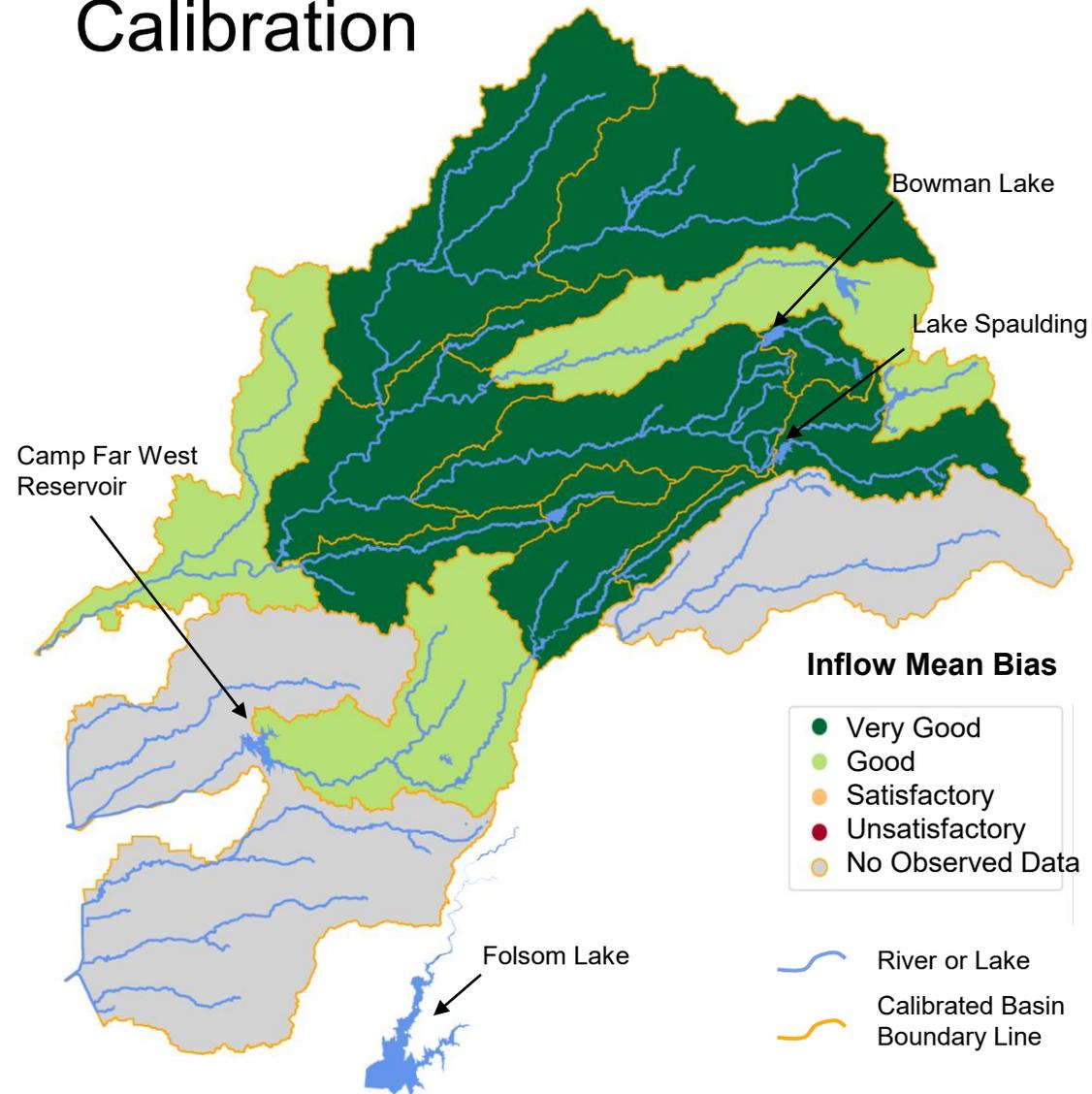


# Before Calibration



2004 Event

# After Calibration



# What is bias? Why should we care?

- Is the NID HEC-HMS biased?
- Are climate models biased?

No Bias



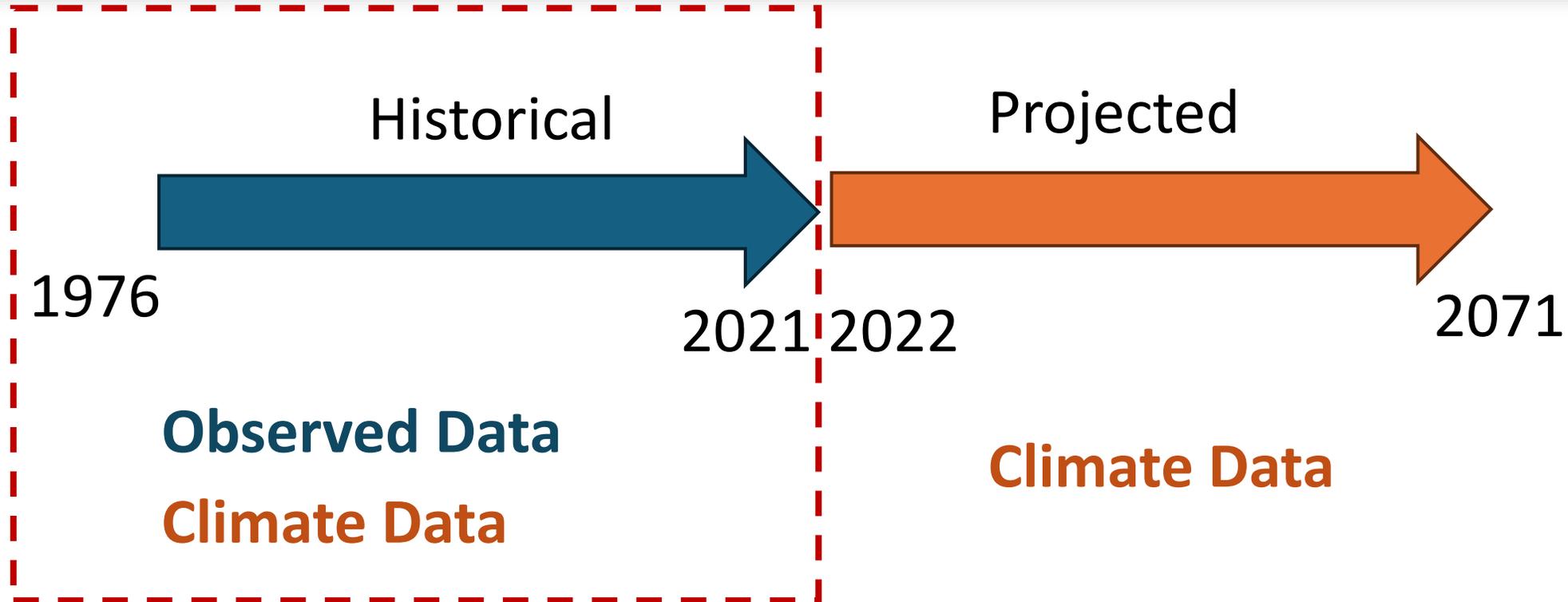
✓ Accuracy ✓ Precision

Biased



✗ Accuracy ✓ Precision

# Climate Change Hydrology



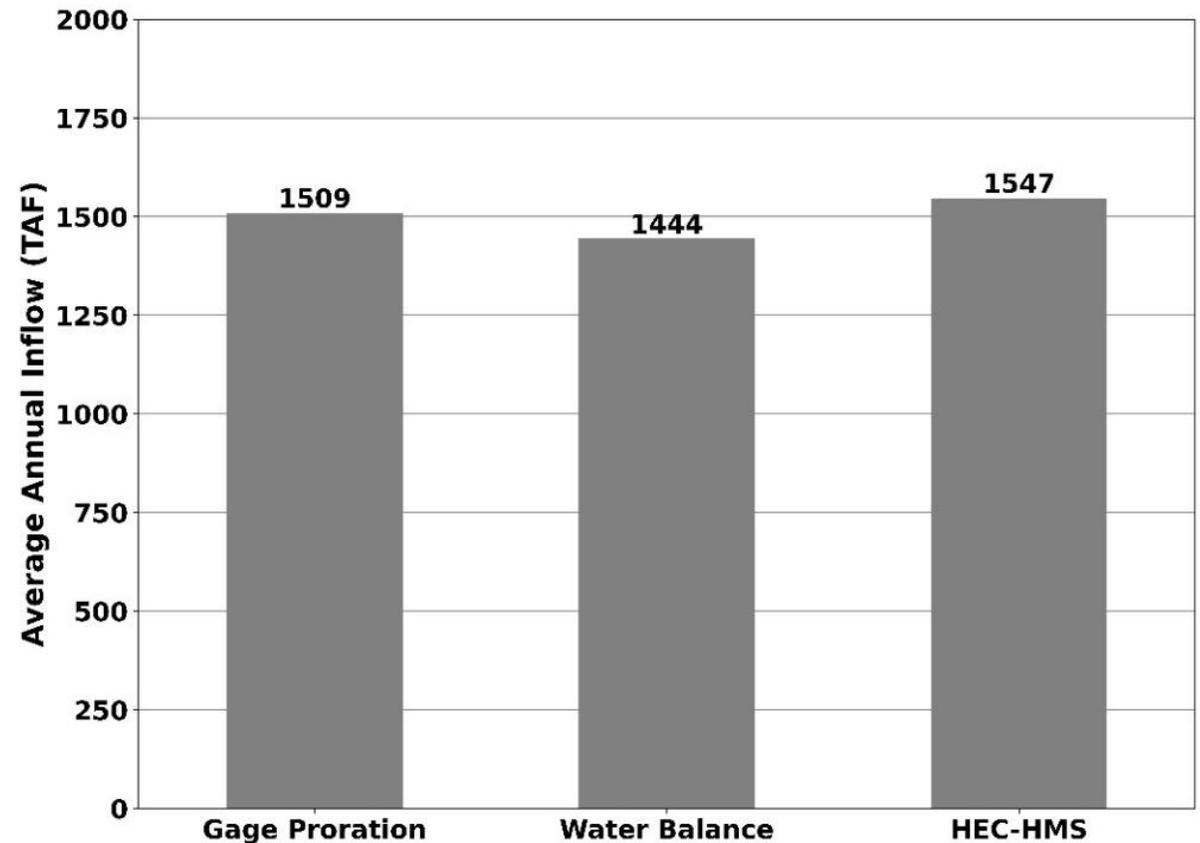
# Is the NID HEC-HMS biased?

- 1. Gage proration-
  - Unimpaired hydrology study by HDR (2020)
- 2. Water balance
  - Measured USGS streamflow at NID downstream locations
  - Estimated annual applied water and losses
- 3. HEC-HMS



✓ Accuracy ✓ Precision

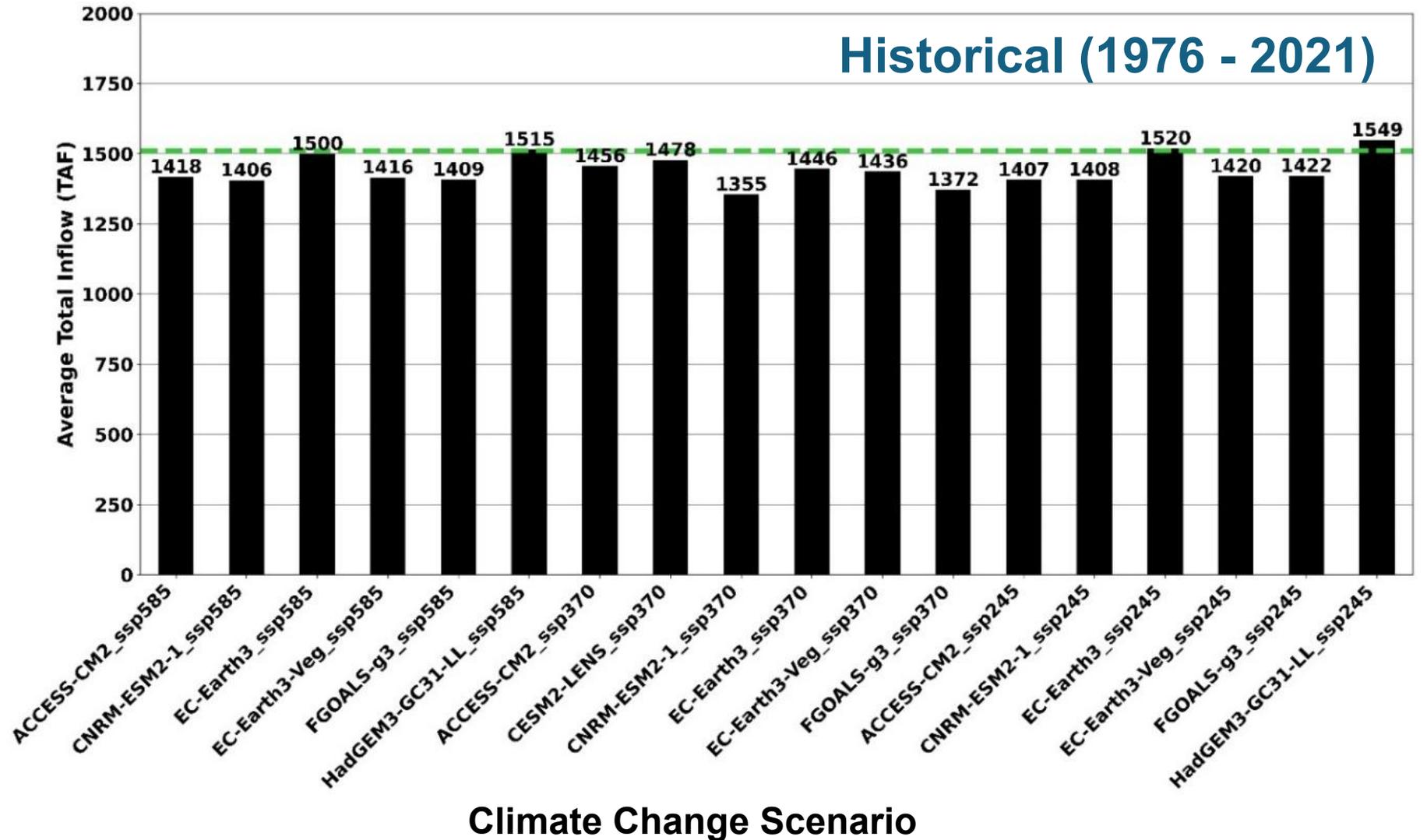
## Historical (1976 - 2021)



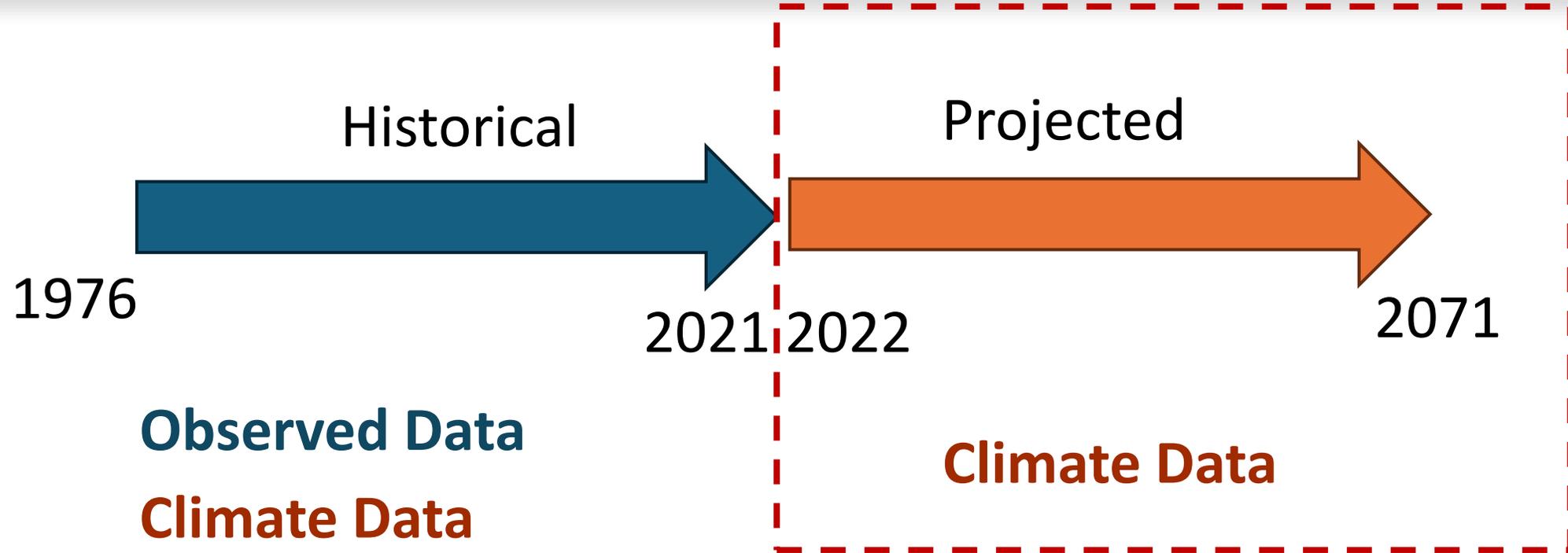
# Are climate models biased?



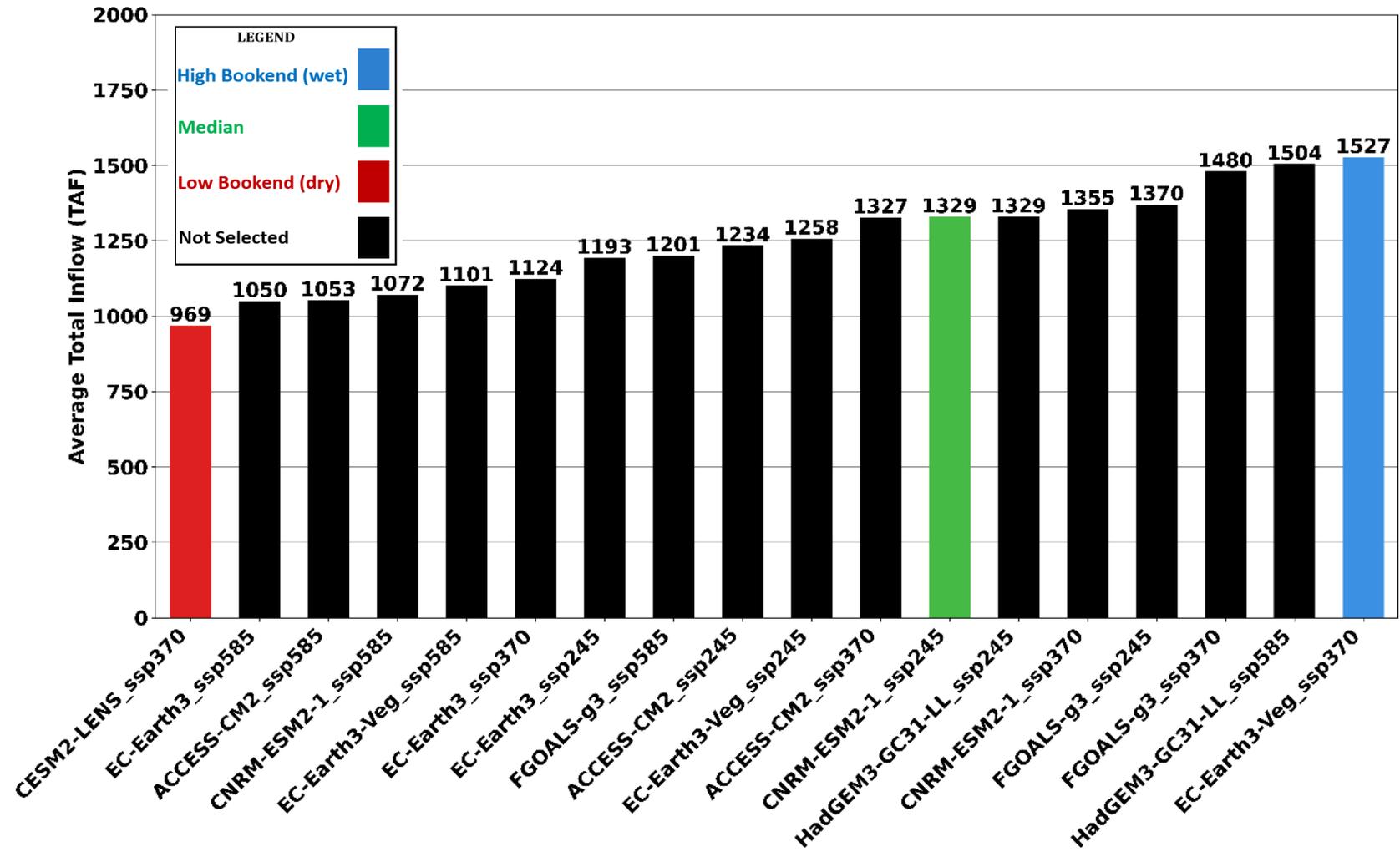
✓ Accuracy ✓ Precision



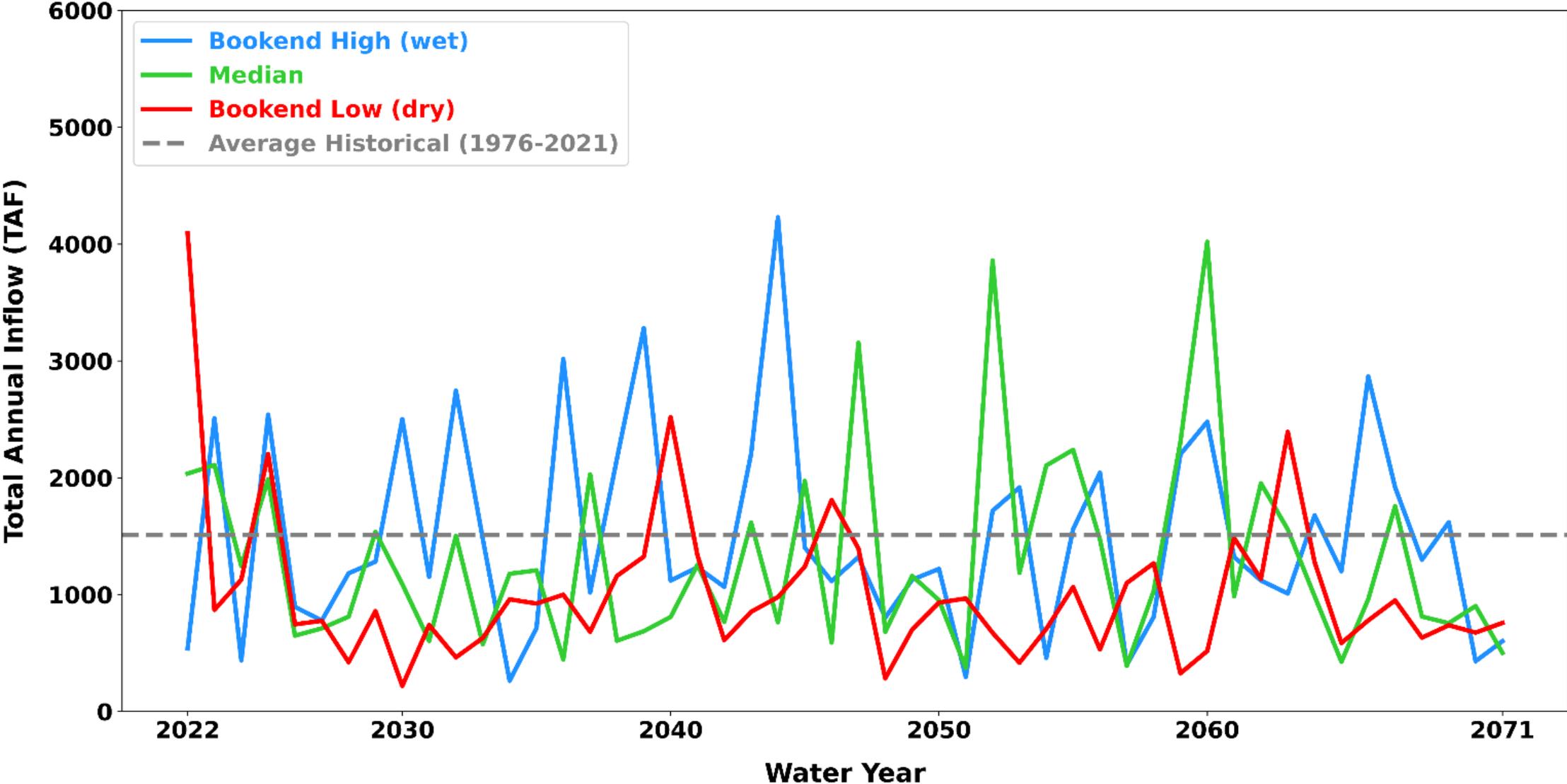
# Climate Change Hydrology



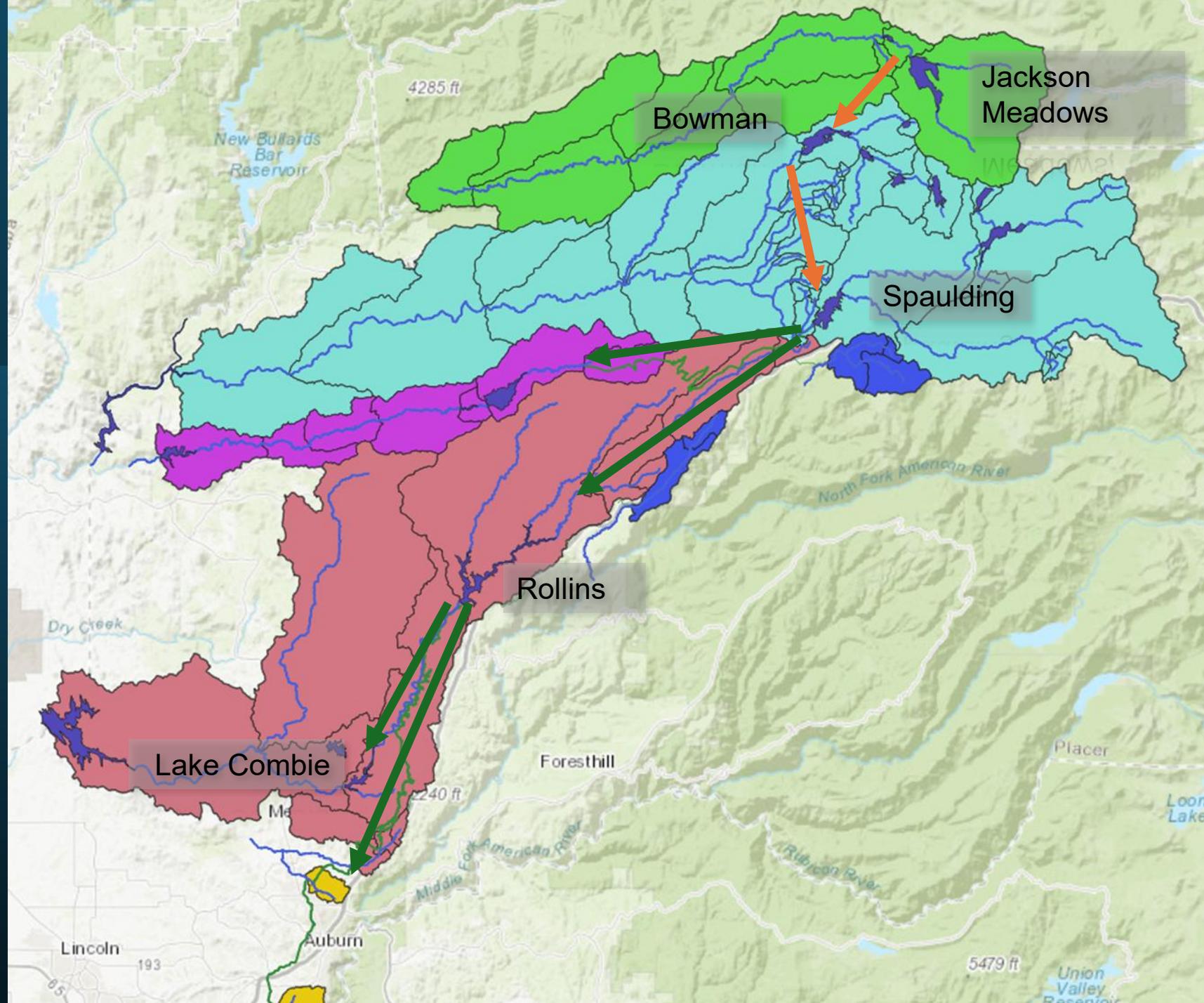
# Projected Hydrology



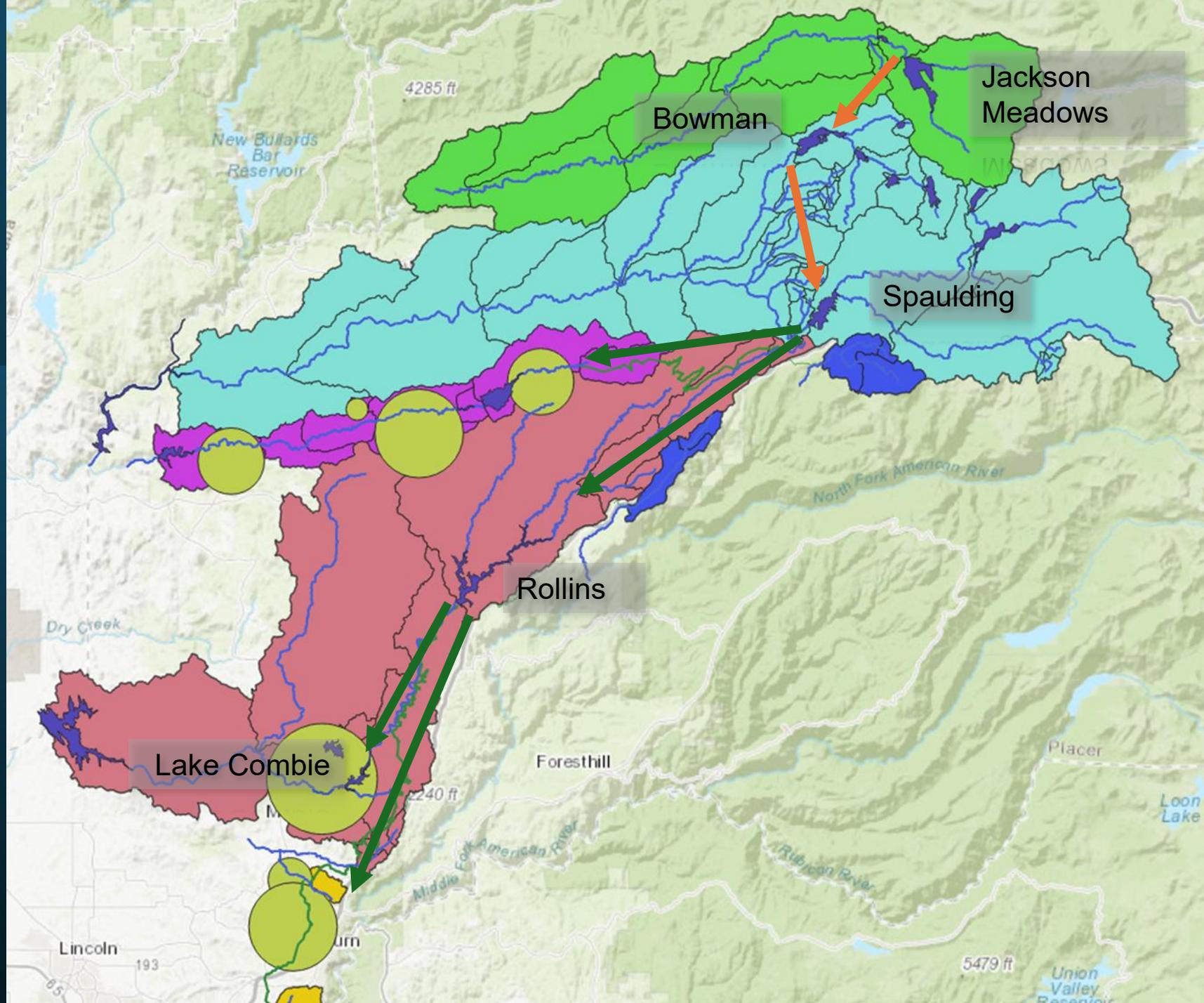
# Representative Scenarios



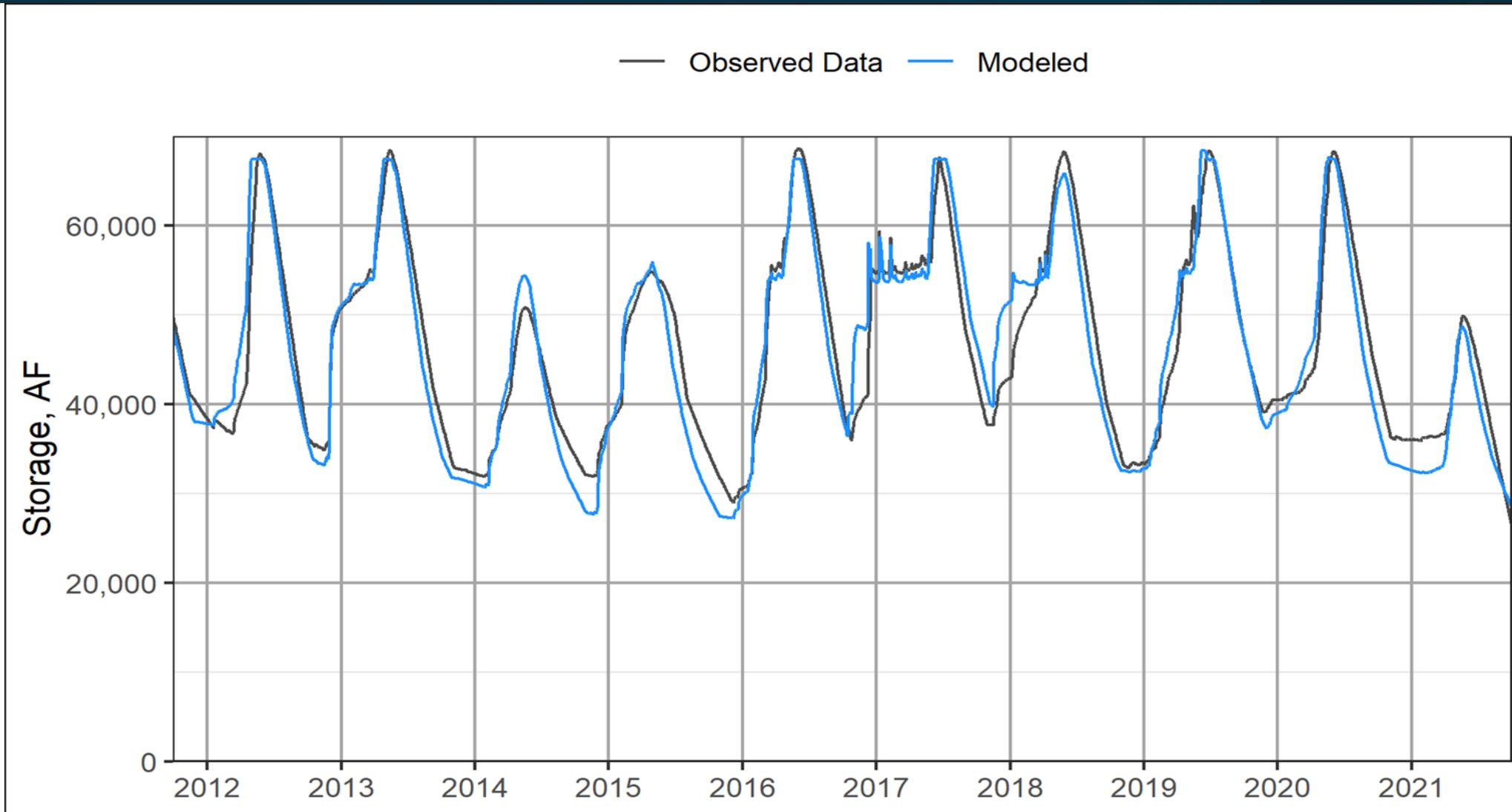
# Plan For Water Operations Model



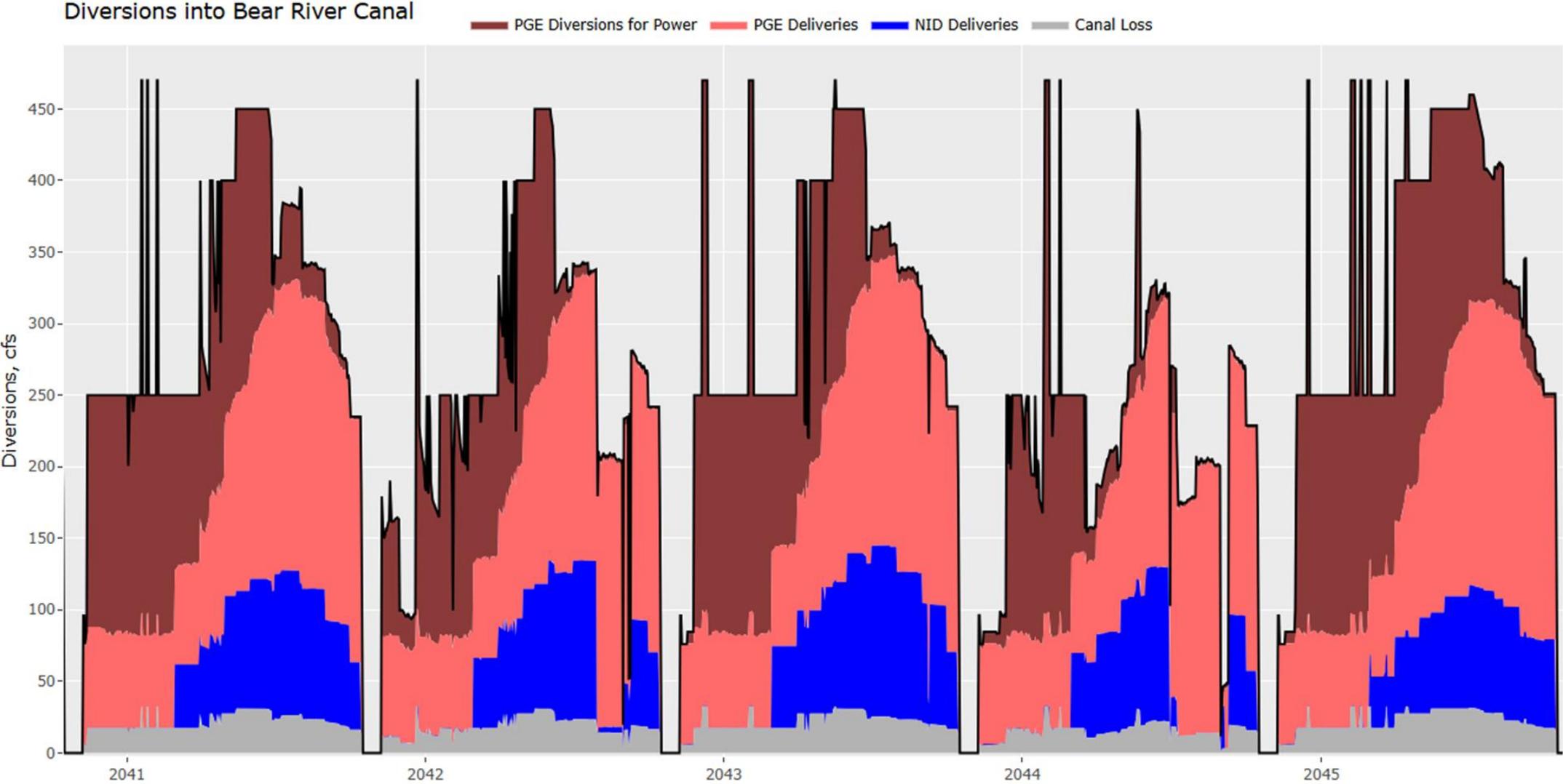
# Plan For Water Operations Model



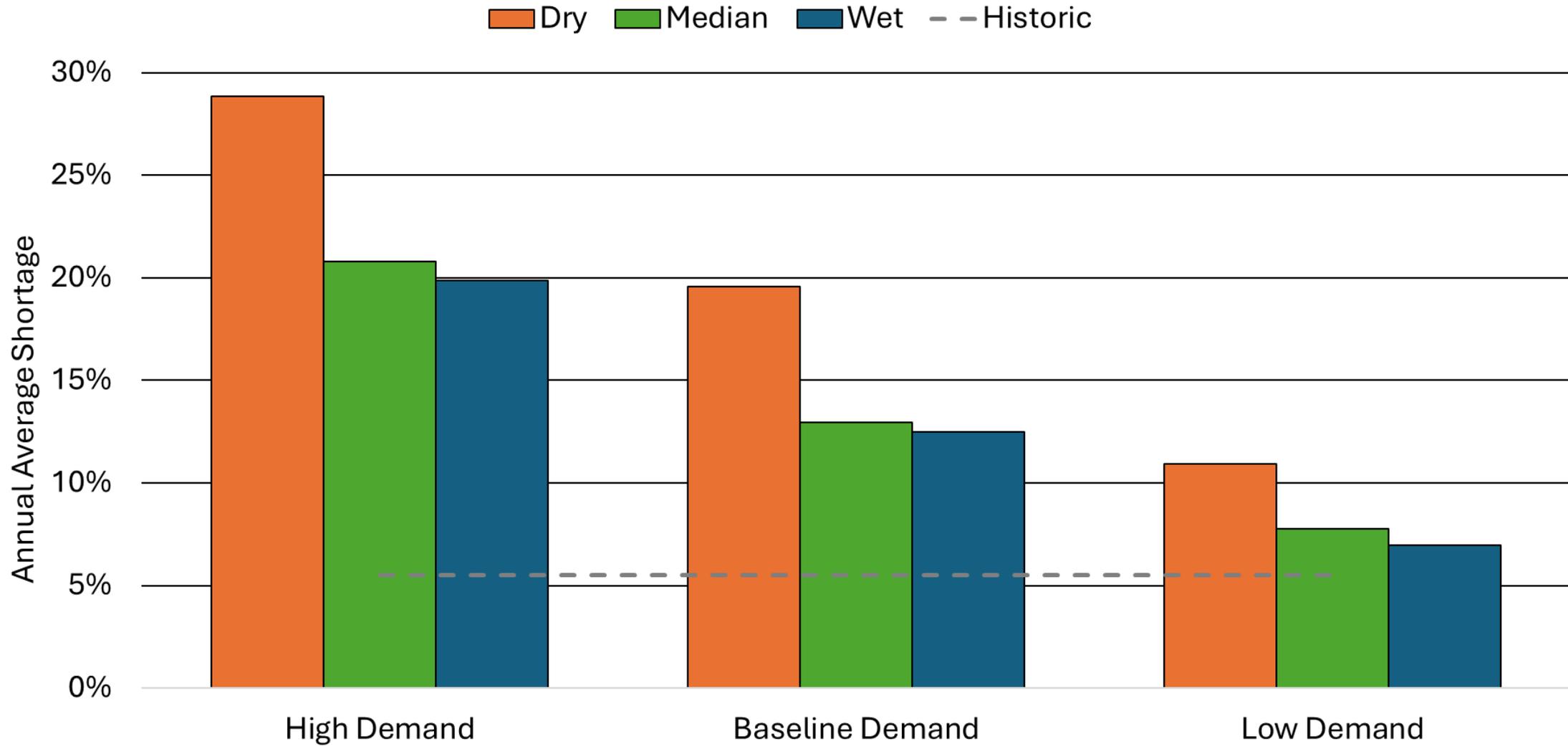
# Model Validation



# Water Accounting



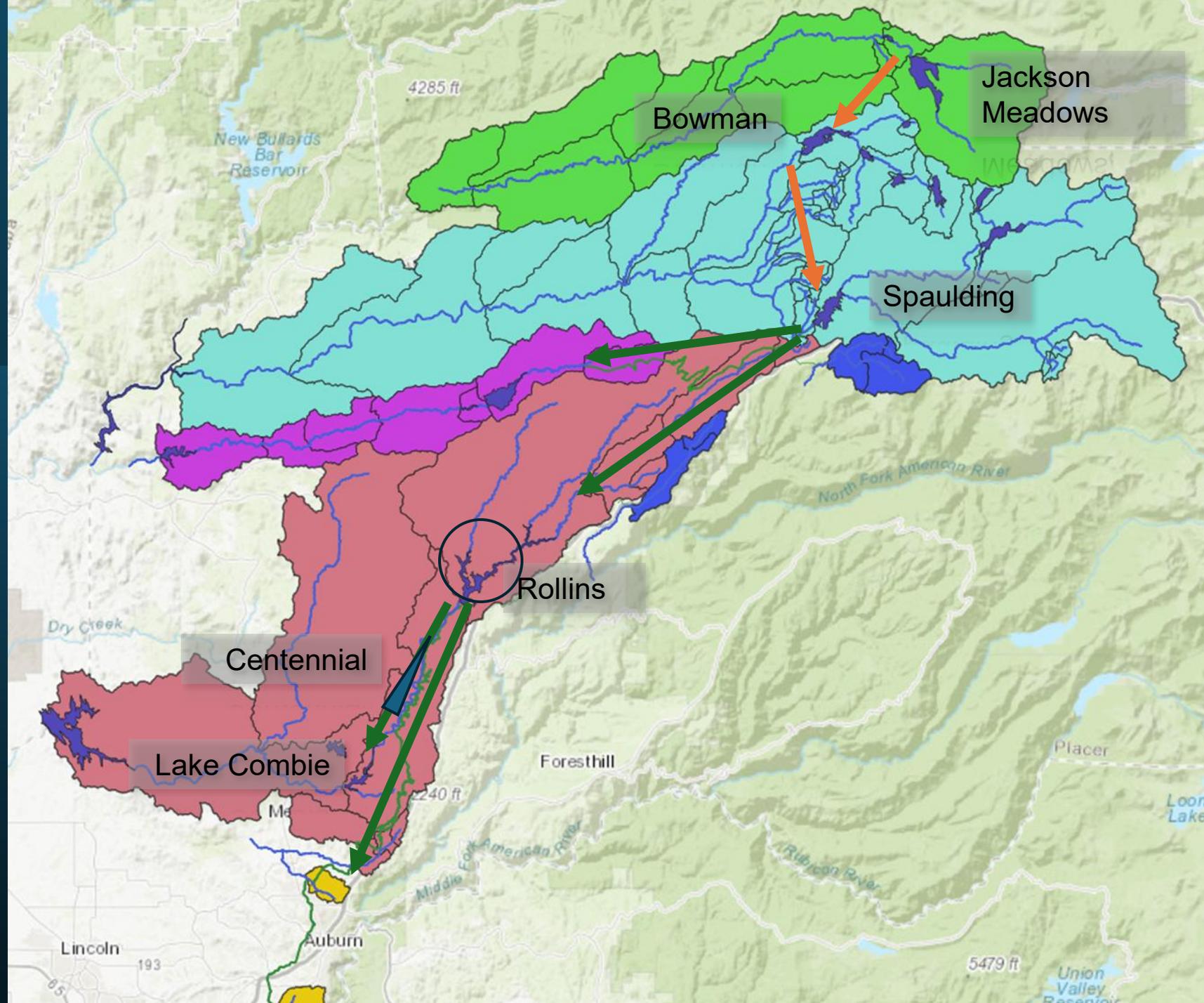
# Demand Shortages



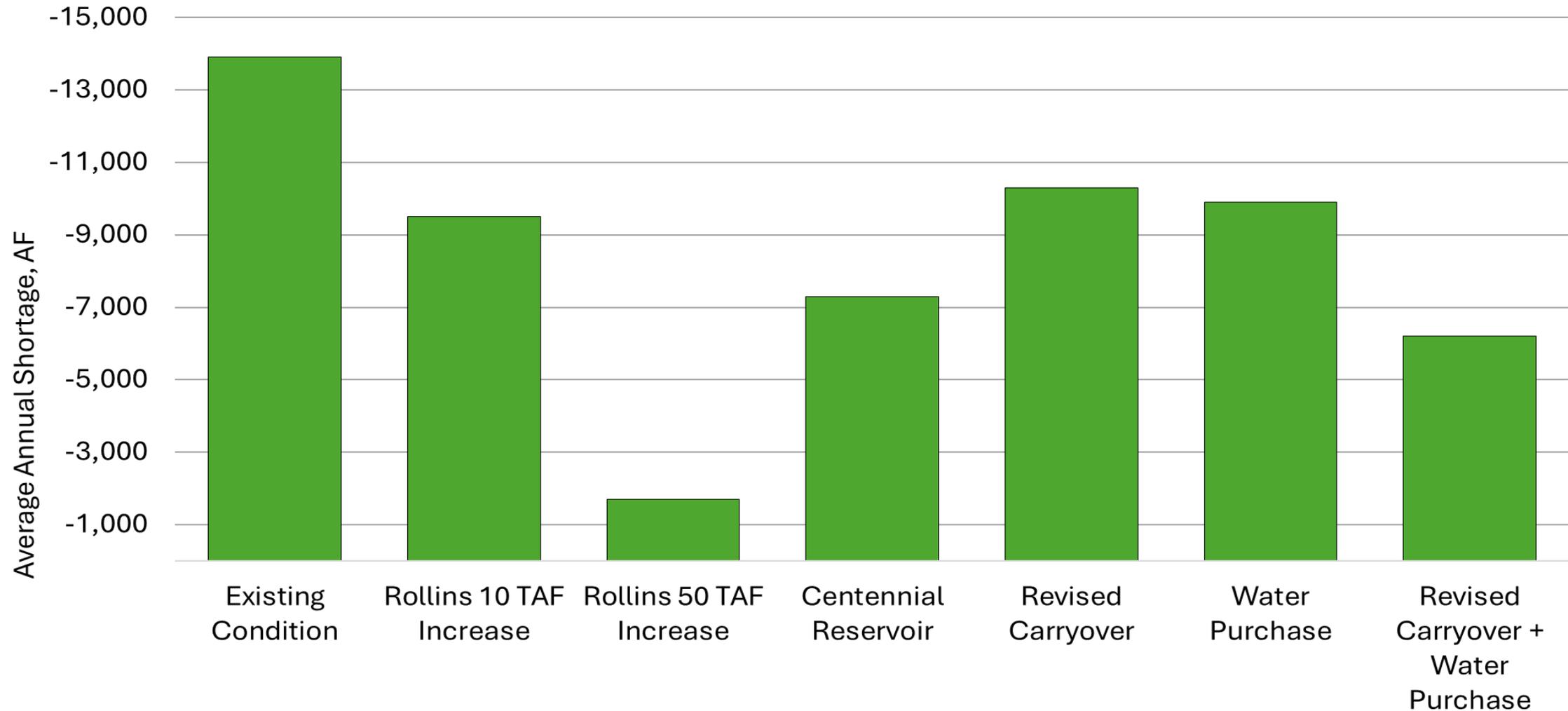
# Potential Strategies

- Increase storage
  - Rollins Dam Raise (10 TAF)
  - Rollins Dam Raise (50 TAF)
  - Build Centennial Reservoir (95 TAF)
- Purchase water from PG&E
- Revised carryover storage targets

# Plan For Water Operations Model



# Resulting Demand Shortages – Median Scenario



# Results

- Water Right Application for Centennial will be withdrawn
- Plans for Rollins Reservoir Dam raise

# Thank you for your Attention!

## Any Questions?

Contacts

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