



**MARIN  
WATER**

# **Strategic Water Supply Assessment**

**BOARD WORKSHOP #4**

**June 14, 2022**



# Workshop Agenda: Strategic Water Supply Assessment

- Project Update
- Scenario Review
- Draft Scenario Results
- Q&A

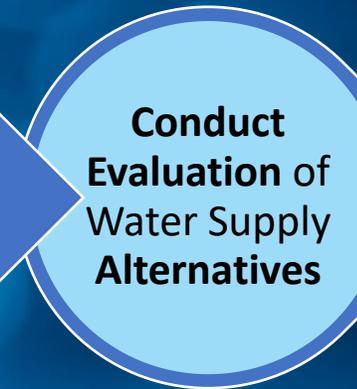
# Project and Process Overview

# Strategic Water Supply Assessment: Key Project Scope Elements

Understanding Current Risks & Establishing Goals



Identifying & Evaluating Alternatives



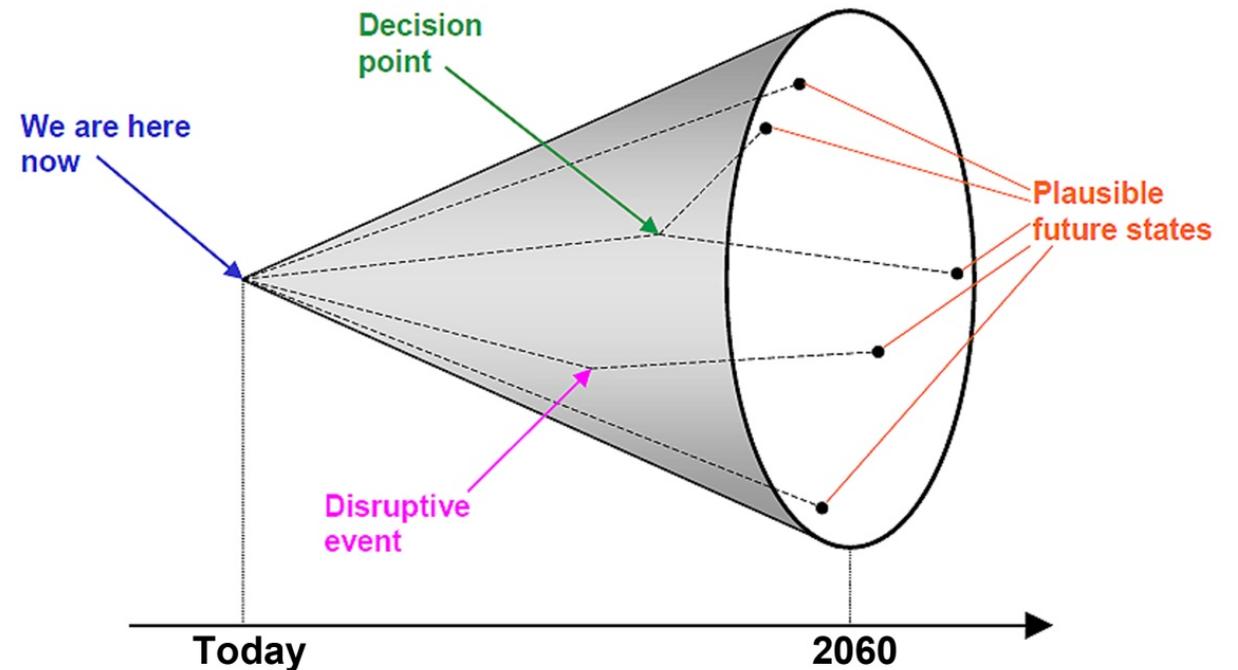
Recommendations & Path Forward



# Baseline Scenarios

# Strategic Water Supply Assessment: Water Supply and Demand Scenarios

- Recognizing that future is uncertain
  - Climate change
  - Drought variability
  - Demands
  - Policies and regulations
- Seeking robust solutions
- Scenarios allow us to explore plausible future conditions and identify promising solutions
  - Historical droughts
  - Climate projections
  - Paleo reconstructions
  - Stress tests



***Scenarios are alternative views of how the future might unfold. Scenarios are not predictions or forecasts of the future***

# Strategic Water Supply Assessment: Scenarios

- Scenarios are intended to capture uncertainty that is NOT in management control for this decision
- Water Supply - Hydroclimate
  - Historical
  - Climate projections
  - Paleoclimate reconstructions
  - Synthetic droughts
- Water Demand
  - Recent trends
  - Population growth and land use
  - Passive levels increasing water use efficiency

# Strategic Water Supply Assessment: Scenarios

- Draft Scenarios – *Explore  
Uncertainties We Don't Control*

Scenario 1 – Current Trends

Scenario 2 – Accelerated Conservation

Scenario 3 – Short and Severe Drought

Scenario 4 – Beyond Drought of Record

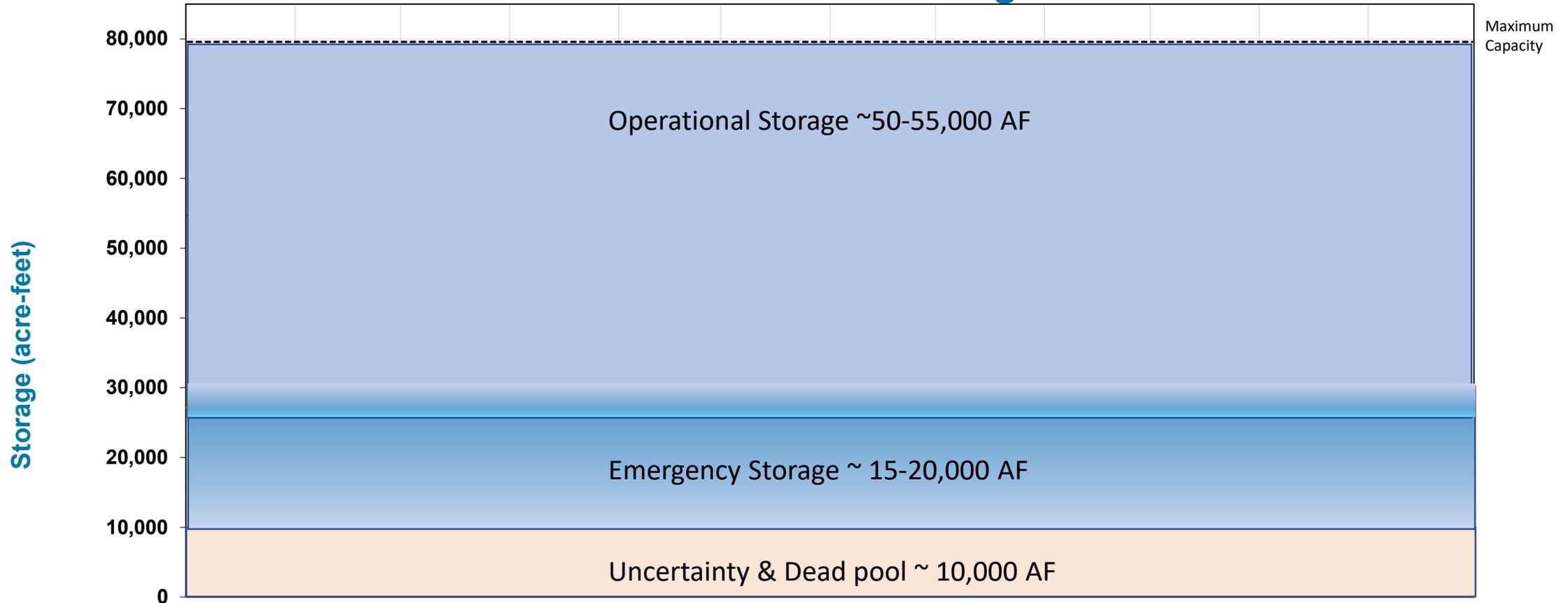
Scenario 5 – Abrupt Disruptions

# Draft Scenario Assumptions

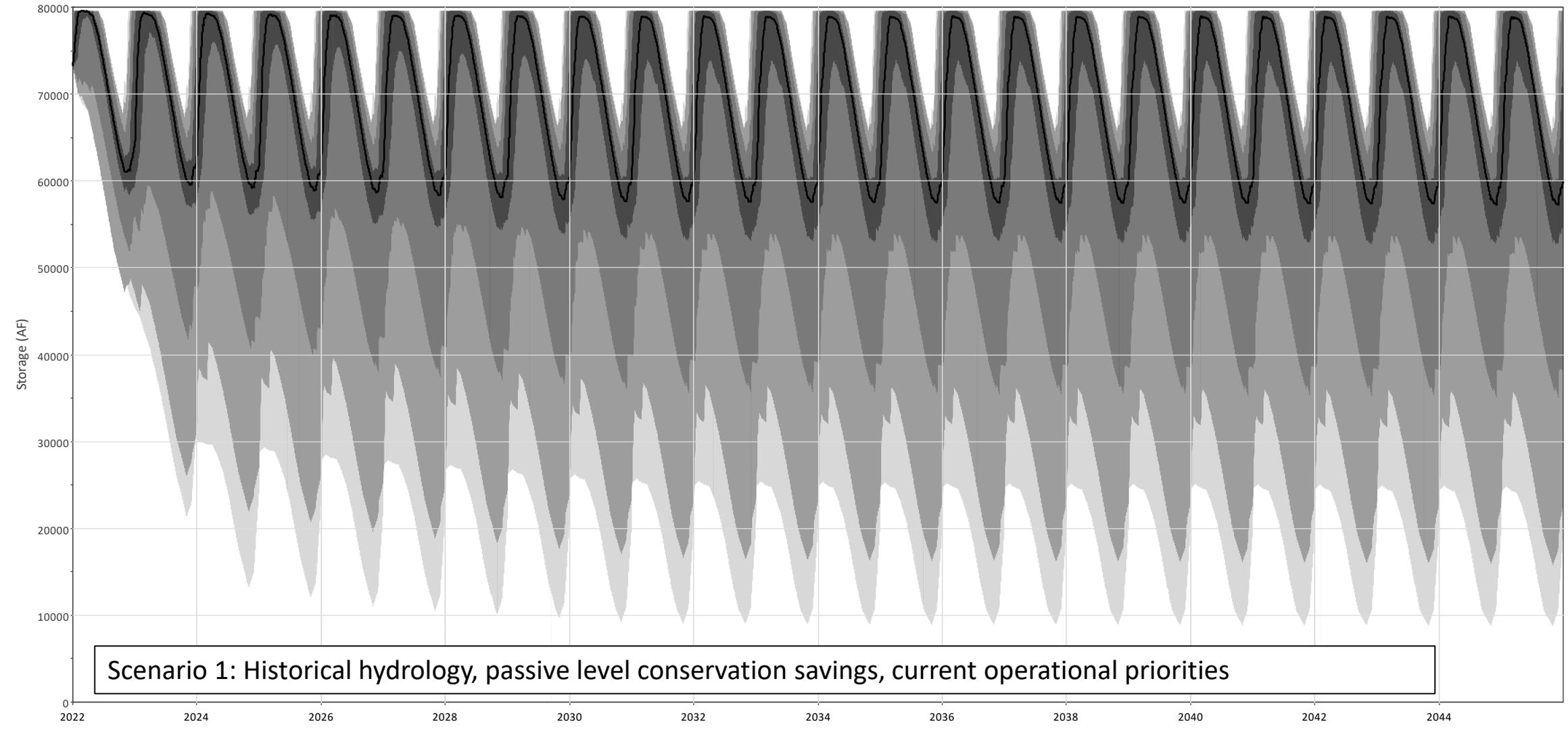
Scenario	Hydroclimate Assumptions	Demand Assumptions	Operational Assumptions
<b>Scenario 1 – Current Trends</b>	Historical observed	Passive-level savings	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 2 – Accelerated Conservation</b>	Historical observed	Passive <u>plus</u> programmatic savings	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 3 – Short and Severe Drought</b>	Severe 4-Yr drought (2020, 2021, 1976, 1977)	Passive <u>plus</u> programmatic savings	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 4 – Beyond Drought of Record</b>	Long-range, extended 6- or 7-Yr drought (based on climate change projections)	Passive <u>plus</u> programmatic savings	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 5 – Abrupt Disruptions</b>	Severe 4-Yr drought (2020, 2021, 1976, 1977); high wildfire likelihood	Passive <u>plus</u> programmatic savings	Operational disruptions due to post-wildfire sediment loads; Treatments plants at reduced capacity (Bon Tempe offline & San Geronimo @ 50% operating capacity for 6 months)

# Strategic Water Supply Assessment: Defining Minimum Acceptable Storage Levels

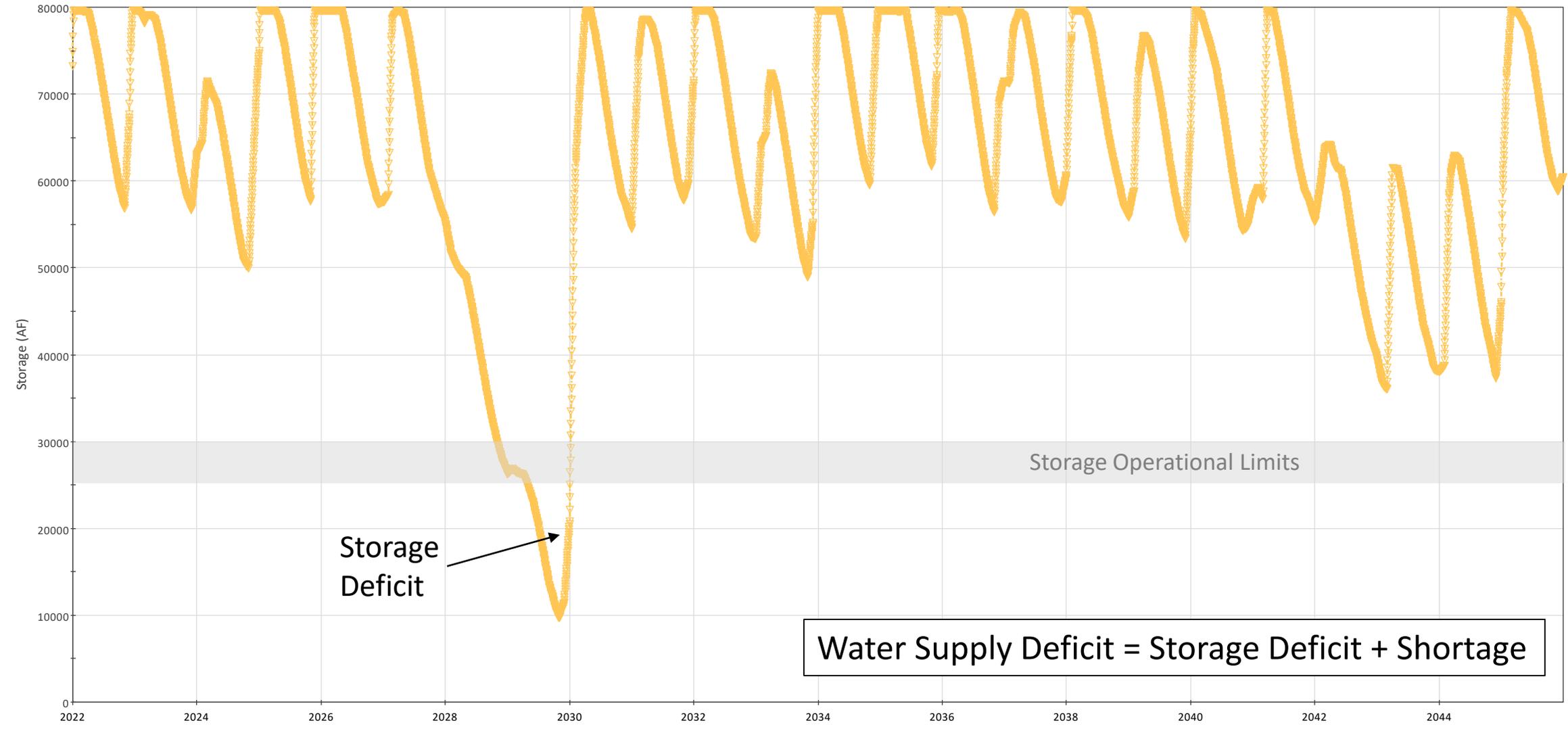
## Total Reservoir Storage



# Total MMWD Reservoir Storage – Scenario 1



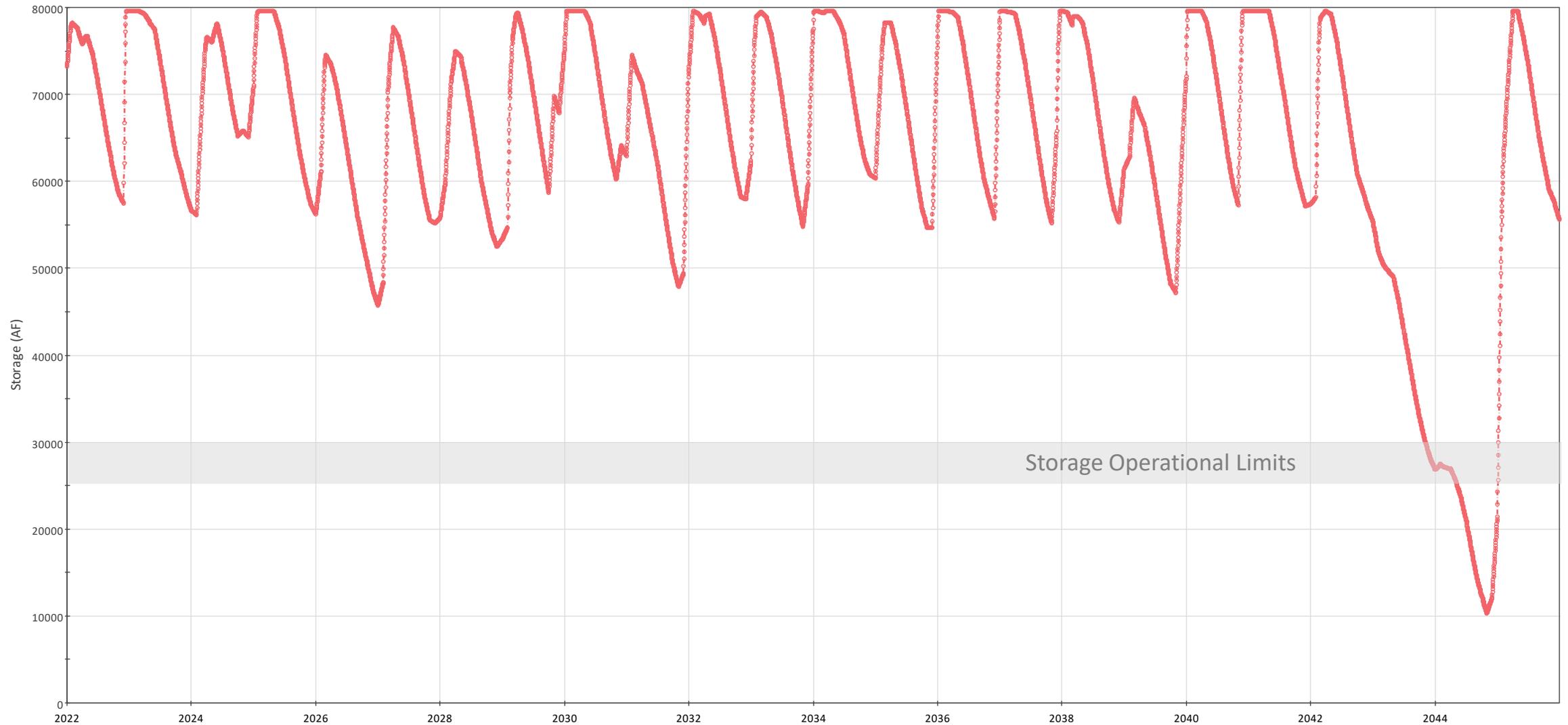
# Total MMWD Reservoir Storage – Scenario 1



$$\text{Water Supply Deficit} = \text{Storage Deficit} + \text{Shortage}$$

**Scenario 1:** Historical hydrology, passive level conservation savings, current operational priorities

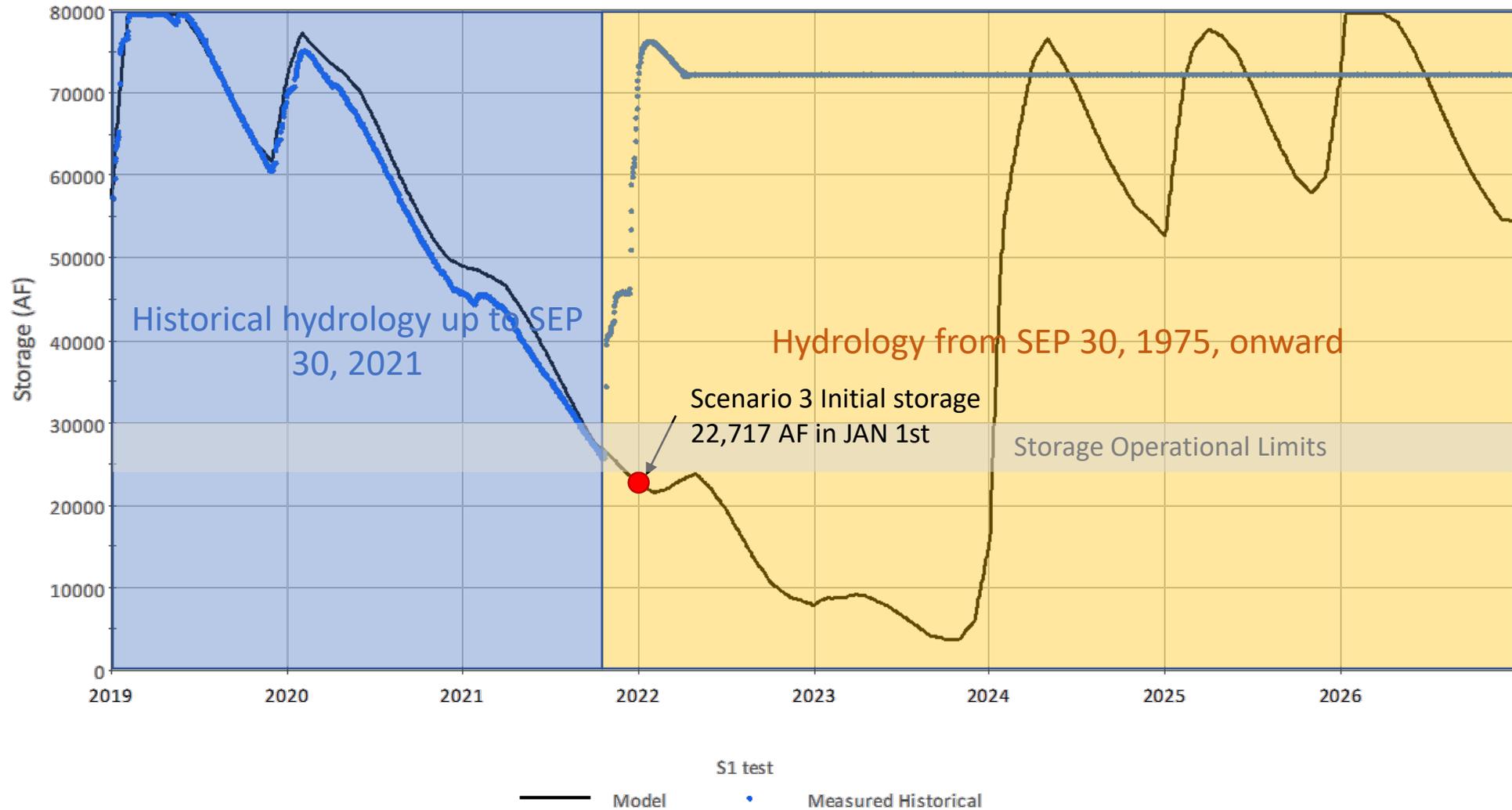
# Total MMWD Reservoir Storage – Scenario 2



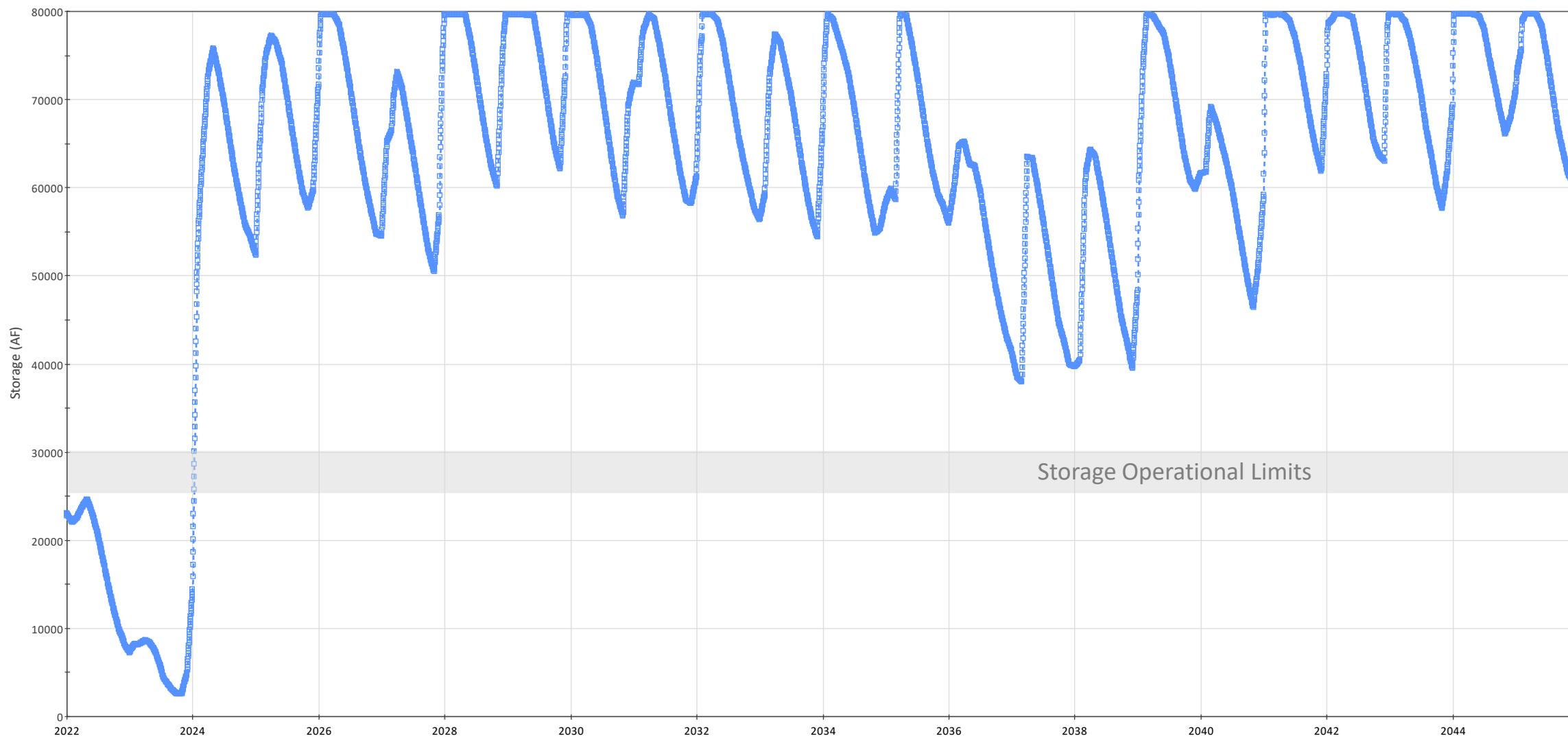
**Scenario 2:** Historical hydrology, passive + programmatic level conservation savings, current operational priorities

# Scenario 3 Assumptions

## Total MMWD Reservoir Storage – Scenario 3

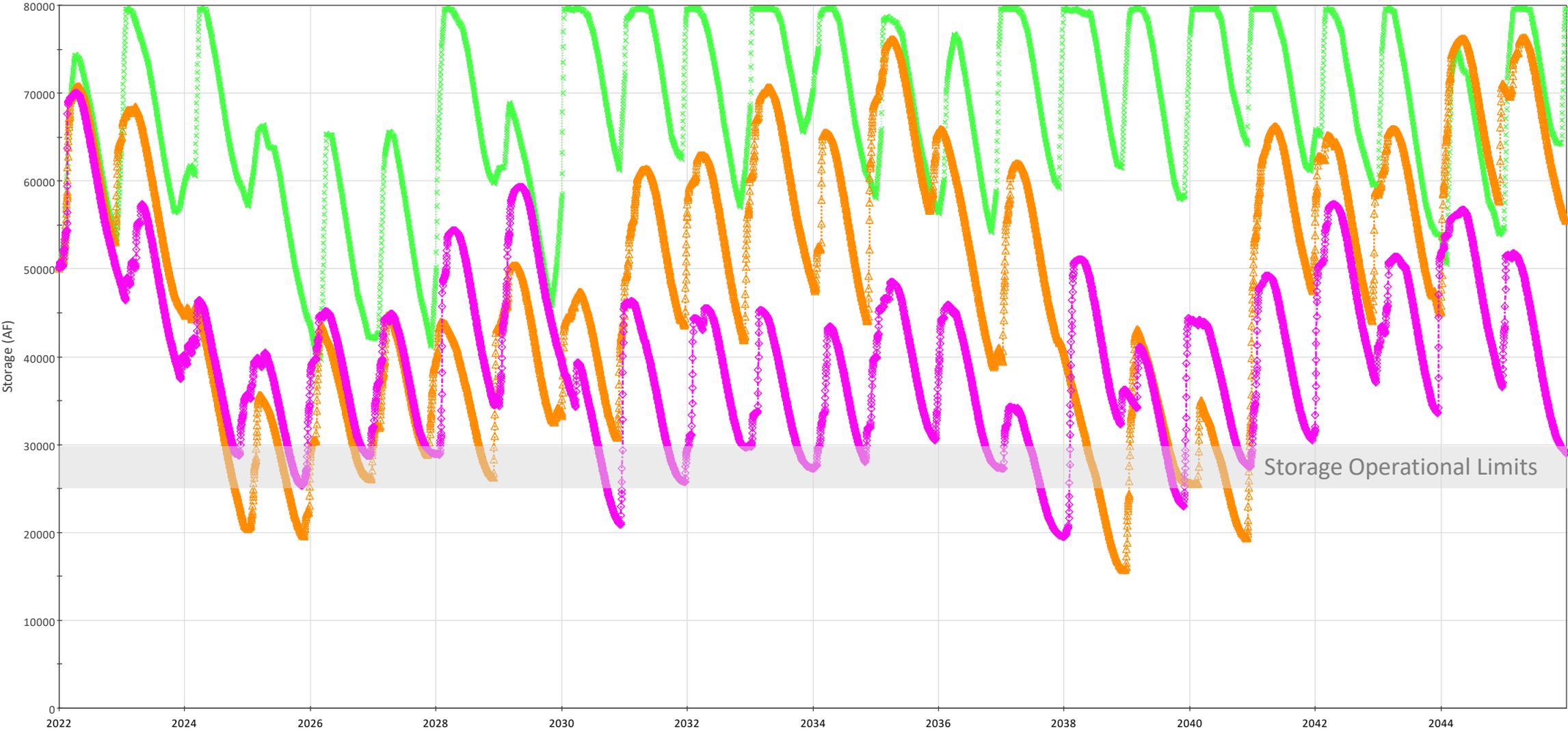


### Total MMWD Reservoir Storage – Scenario 3 Initial Storage 22,717 AF



Scenario 3: Short & severe drought, passive + programmatic level conservation savings, current operational priorities

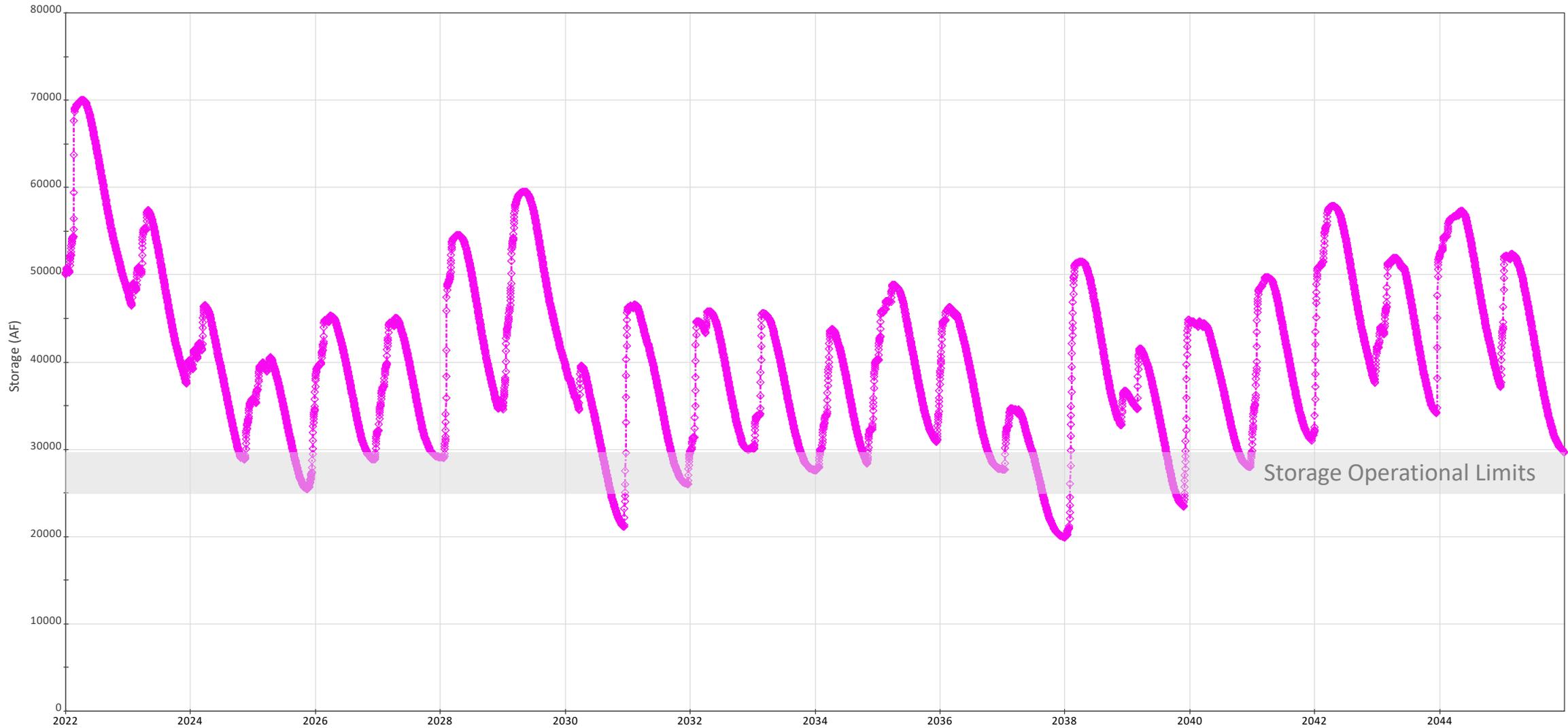
# Total MMWD Reservoir Storage – Scenario 4A, 4B, 4C



Scenario 4: Extended drought, passive + programmatic level conservation savings, current operational priorities

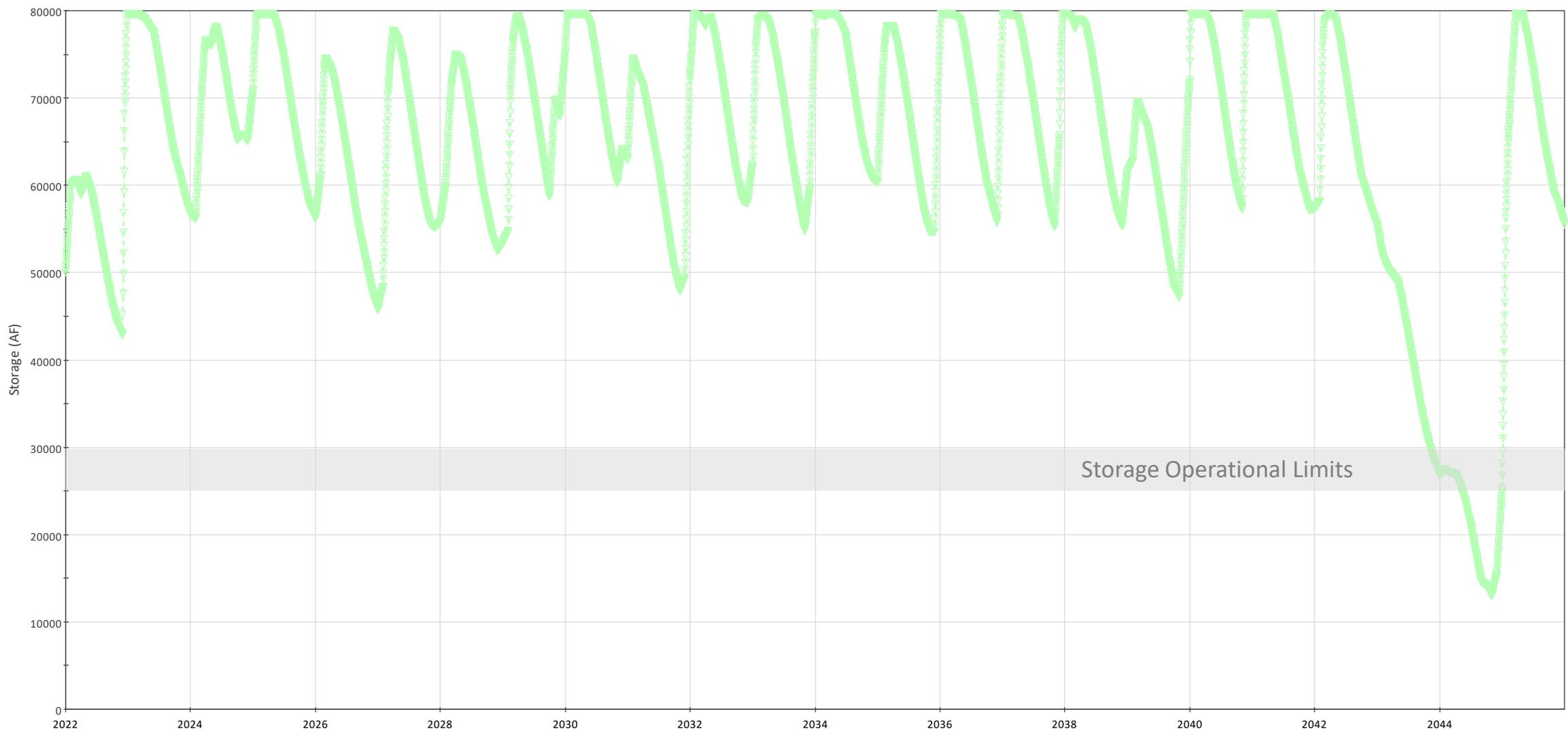
(A) 1987-1992, (B) CCSM\_ES45, (C) HADGEM\_ES85

# Total MMWD Reservoir Storage – Scenario 4C



**Scenario 4C:** Extended drought using HADGEM\_ES85 climate model projection, passive + programmatic level conservation savings, current operational priorities

# Total MMWD Reservoir Storage – Scenario 5



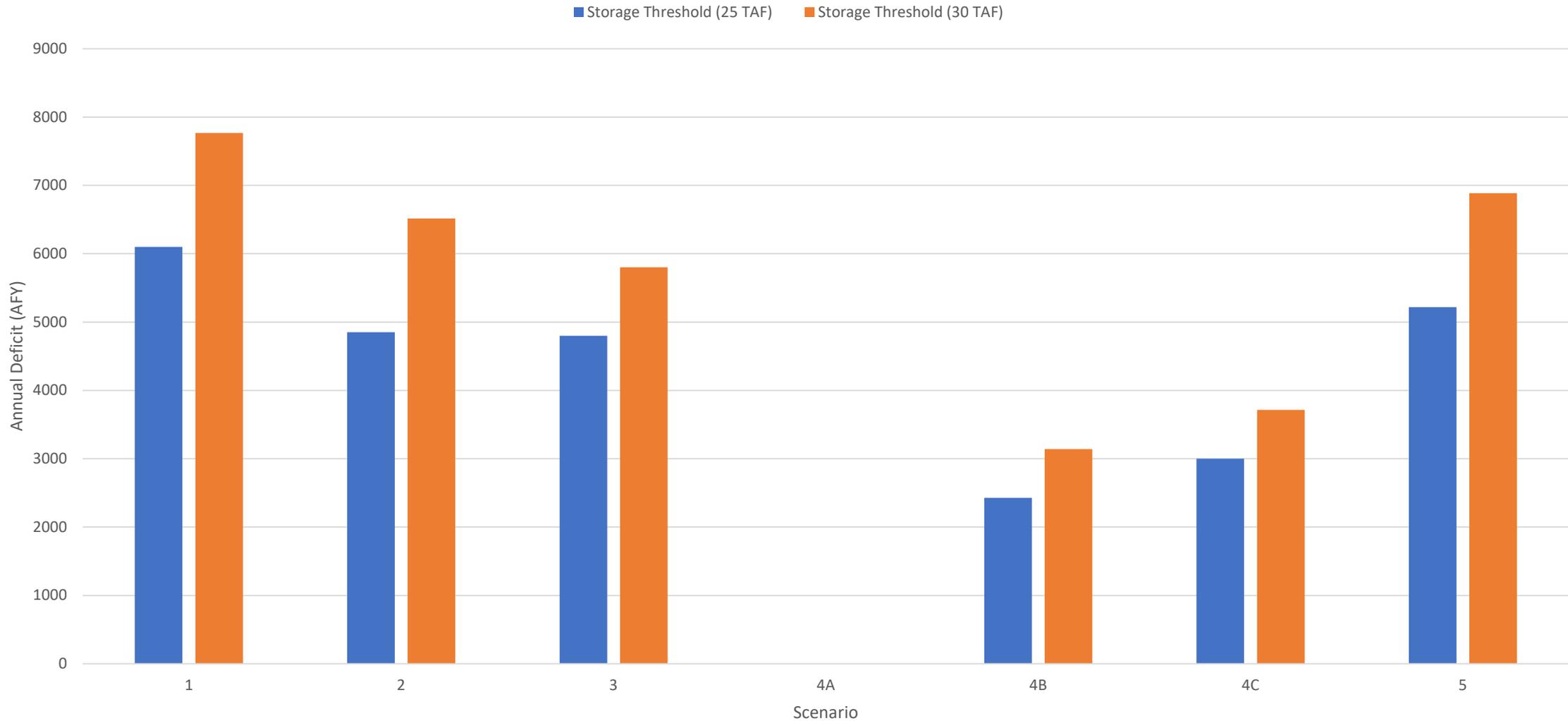
Scenario 5: Short & severe drought, passive + programmatic level conservation savings, current operational priorities

# Draft Potential Water Supply Deficit

Scenario	Max. Deficit Duration	Max. Storage Deficit	Max. Shortage	Annual Deficit (AFY)
<b>Scenario 1 – Current Trends</b>	2 years	16,000 - 21,000 AF (over 2 years)	2,300 AF	9,200 - 11,700 AFY (2 yrs) 6,100 - 7,800 AFY (3 yrs)
<b>Scenario 2 – Accelerated Conservation</b>	2 years	14,000 – 19,000 AF (over 2 years)	550 AF	7,300 – 9,800 AFY (2 yrs) 4,900 – 6,500 AFY (3 yrs)
<b>Scenario 3 – Short and Severe Drought</b>	4 years	22,000 – 27,000 AF (over 2 years)	7,000 AF	5,000 – 6,000 AFY (4 yrs)
<b>Scenario 4 – Beyond Drought of Record</b>	6 years	10,000 – 15,000 AF (multiple years)	7,000 – 15,000 AF	3,000 – 4,000 AFY (6 yrs)
<b>Scenario 5 – Abrupt Disruptions</b>	2 year with assumed 6 months disruption	12,000 – 17,000 AF (over 2 years)	4,000 AF	8,000 - 10,000 AFY (2 yrs) 5,200 – 7,000 AFY (3 yrs)

# Draft Potential Supply Deficit

Draft Scenario Maximum Water Supply Deficits



# Summary of DRAFT Scenarios

- Scenario findings
  - Scenario 1 drought results in the highest short-term deficit
  - Scenario 2 conservation savings reduces the deficit
  - Scenario 3 with four-year drought results in the highest overall deficit
  - Scenario 4 with extended droughts creates a challenge of *persistence*
  - Scenario 5 with reduced treatment capacity results in *diversification* challenge
- Scenarios and modeling to be refined

# Status and Next Steps

# Work in Progress

- Refinement of scenarios and decision support model
- Further development of water supply alternatives
  - alignments, cost, quality, feasibility, etc
- Detailed evaluation criteria

# Schedule

- Proposed Upcoming Board Discussion Focus Areas
  - May
    - May 10 - Demand Management
    - May 24 - Drought Scenarios & Baseline Reliability
  - June
    - June 14 – Scenarios
    - June 28 - Water Supply Alternatives
  - July/August
    - Evaluation Process
    - Roadmap Development
- Public Meetings
  - June 2 – Public Workshop #2
  - August TBD – Public Workshop #3