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Glen Canyon Monthly Operations Call

Basin Hydrology and Operations

January 22, 2025

Background

This briefing is being provided consistent with the provision in Attachment B - Section 1.1 of the LTEMP ROD which states:

“Annually, Reclamation will develop a hydrograph based on the characteristics above. Reclamation will seek consensus on the annual hydrograph through monthly operational coordination calls with governmental entities, and regular meetings of the GCDAMP Technical Working Group (TWG) and AMWG.

Reclamation will conduct monthly Glen Canyon Dam operational coordination meetings or calls with the DOI bureaus (USGS, NPS, FWS, and BIA), WAPA, and representatives from the Basin States and UCRC. The purpose of these meetings or calls is for the participants to share and seek information on Glen Canyon Dam operations. One liaison from each Basin State and from the UCRC may participate in the monthly operational coordination meetings or calls.”

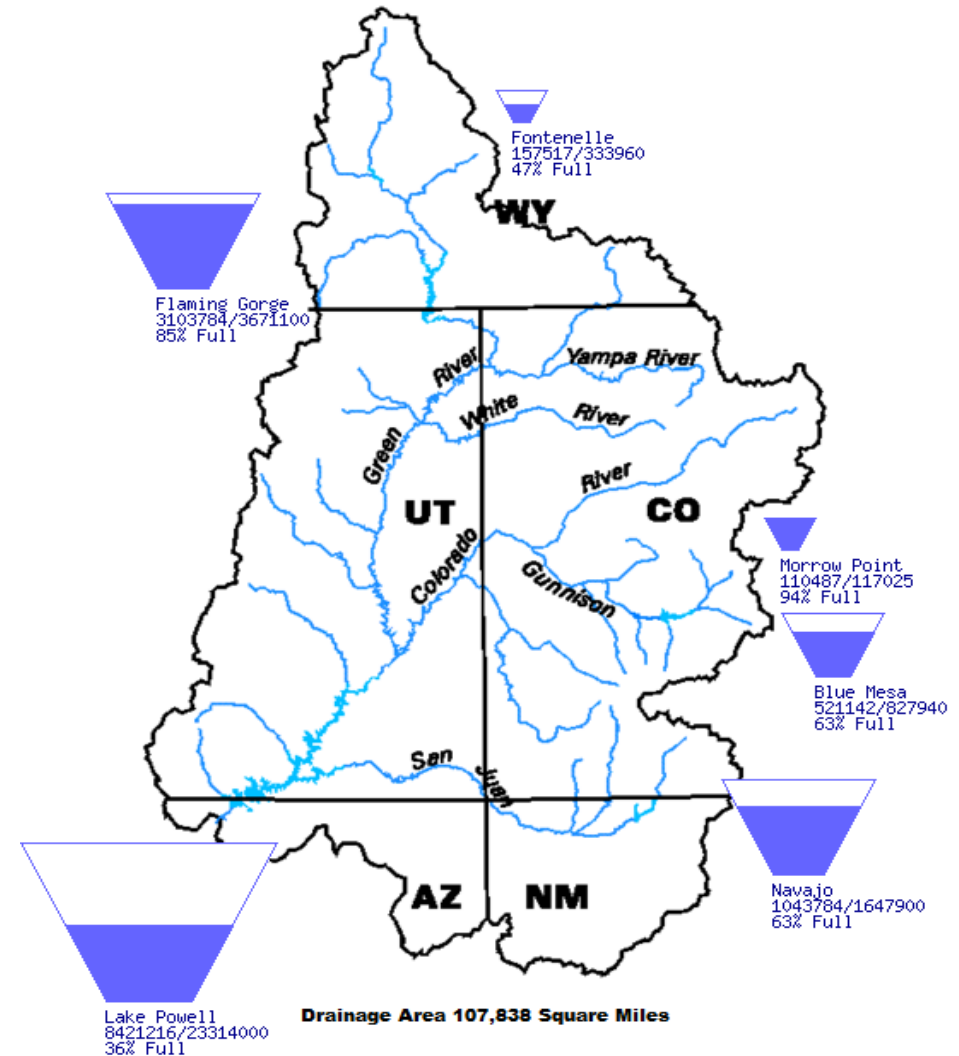


Upper Basin Storage (as of January 21, 2025)

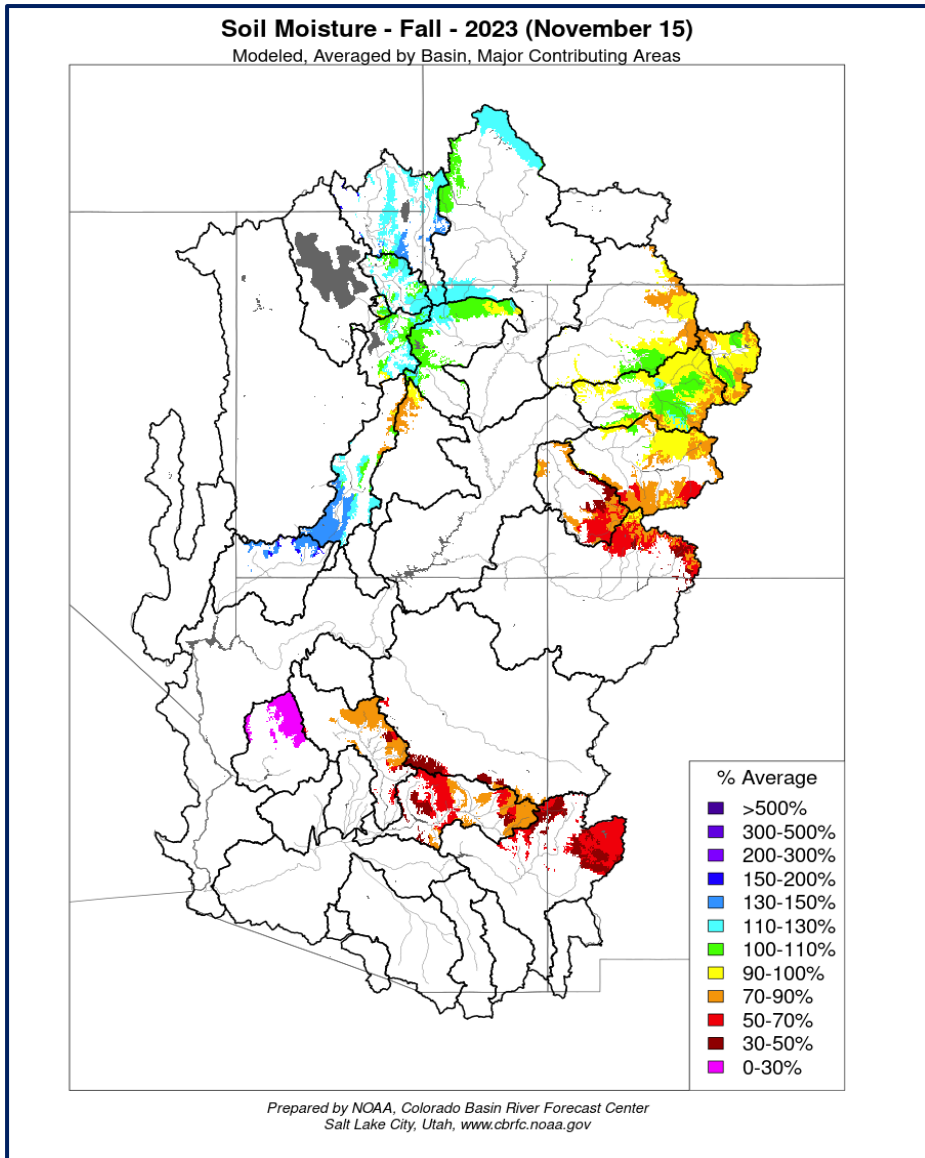
Data Current as of:
01/20/2025

Reservoir	Percent Current Live Storage	Current Live Storage (maf)	Live Storage Capacity (maf)	Elevation (feet)
Fontenelle	47	0.16	0.33	6,479.62
Flaming Gorge	85	3.10	3.67	6,025.56
Blue Mesa	63	0.52	0.83	7,482.55
Navajo	63	1.04	1.65	6,038.30
Lake Powell	36	8.40	23.31	3,568.47
UC System Storage	44	13.35	29.79	
Total System Storage	42	24.37	58.48	

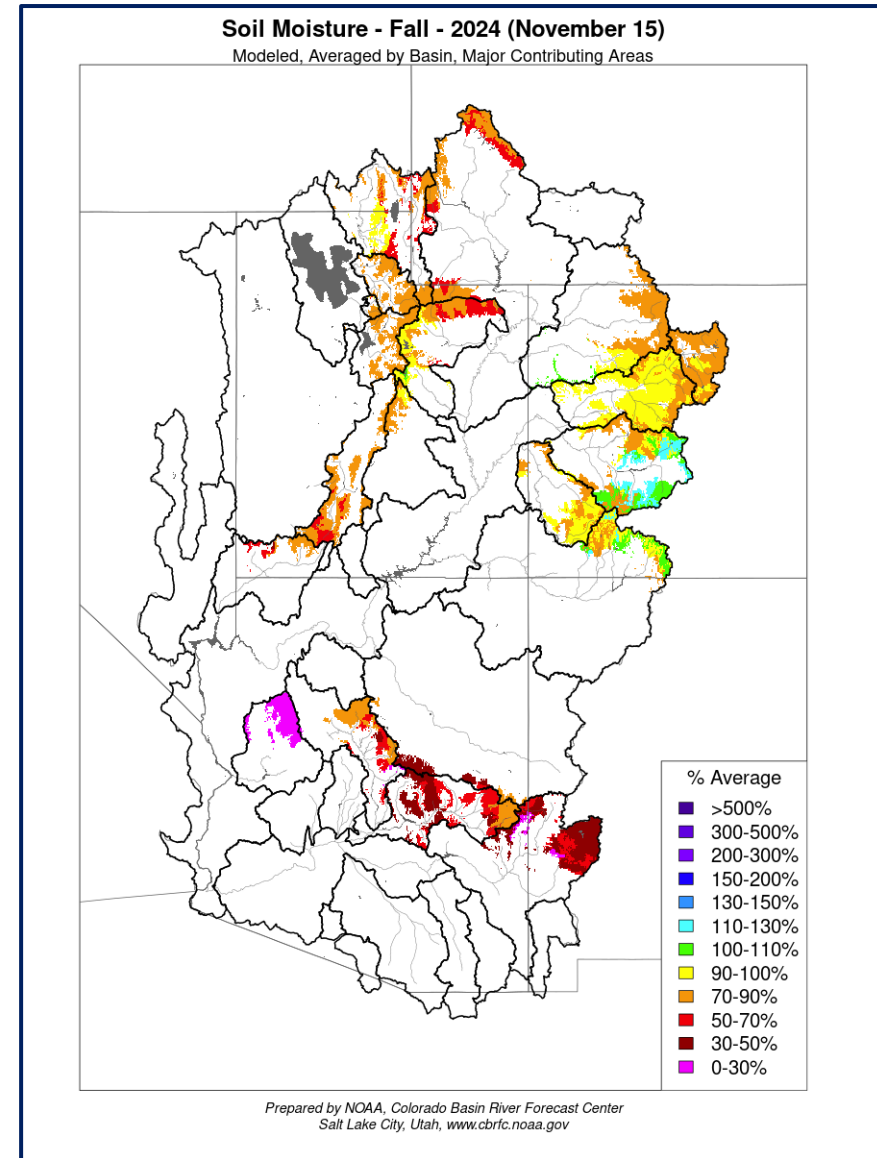
Upper Colorado River Drainage Basin



2023 Fall Soil Moisture

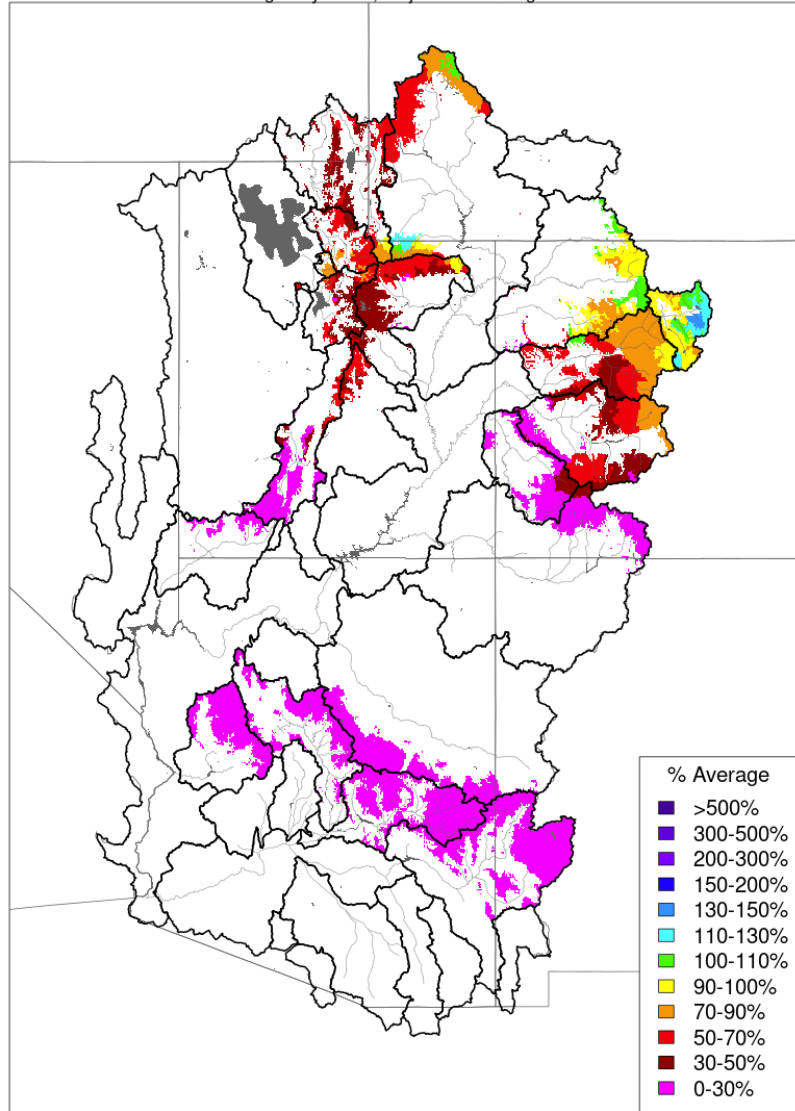


2024 Fall Soil Moisture



Month to Date Precipitation - January 22 2025

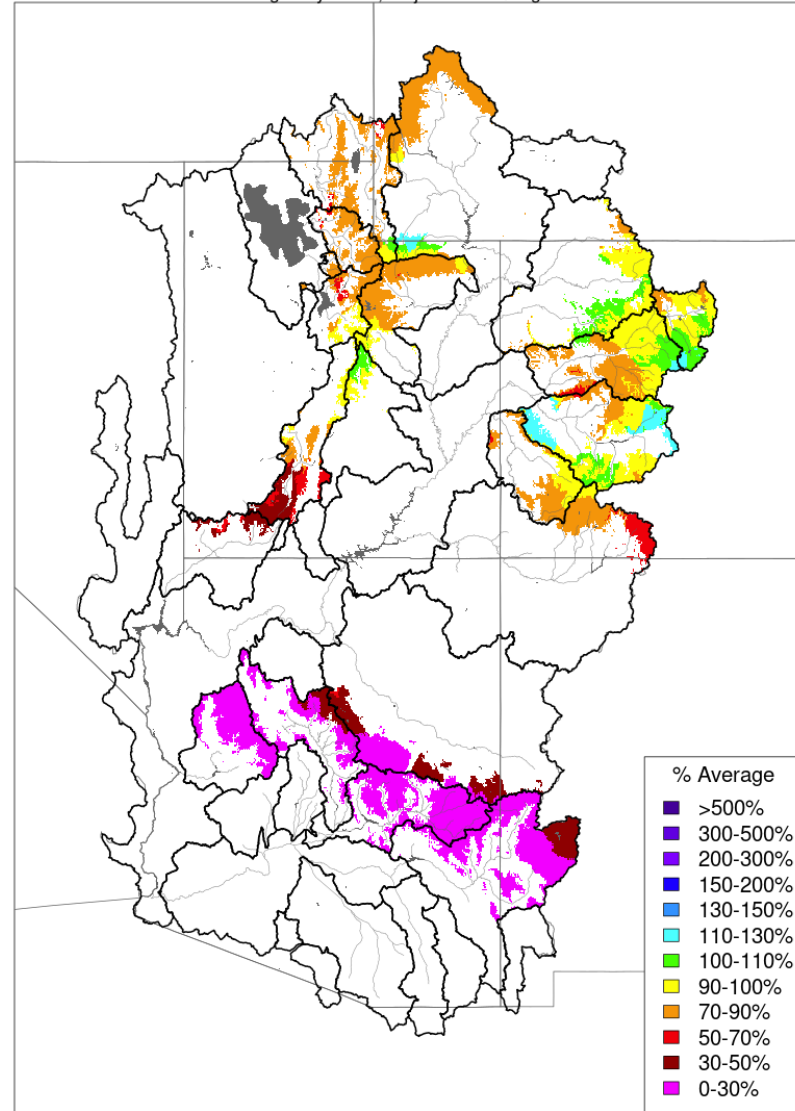
Averaged by Basin, Major Contributing Areas



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Water Year to Date Precipitation, October 01 - January 22 2025

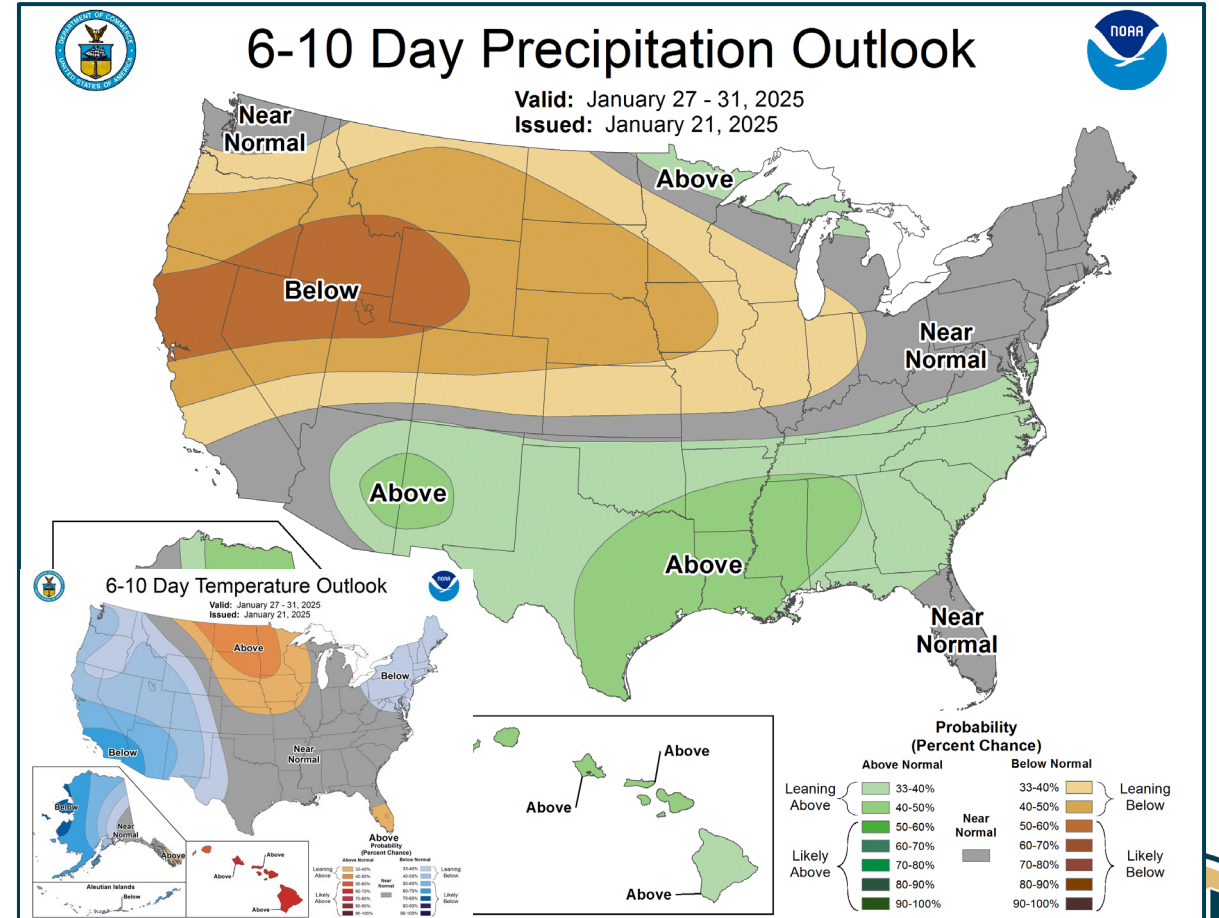
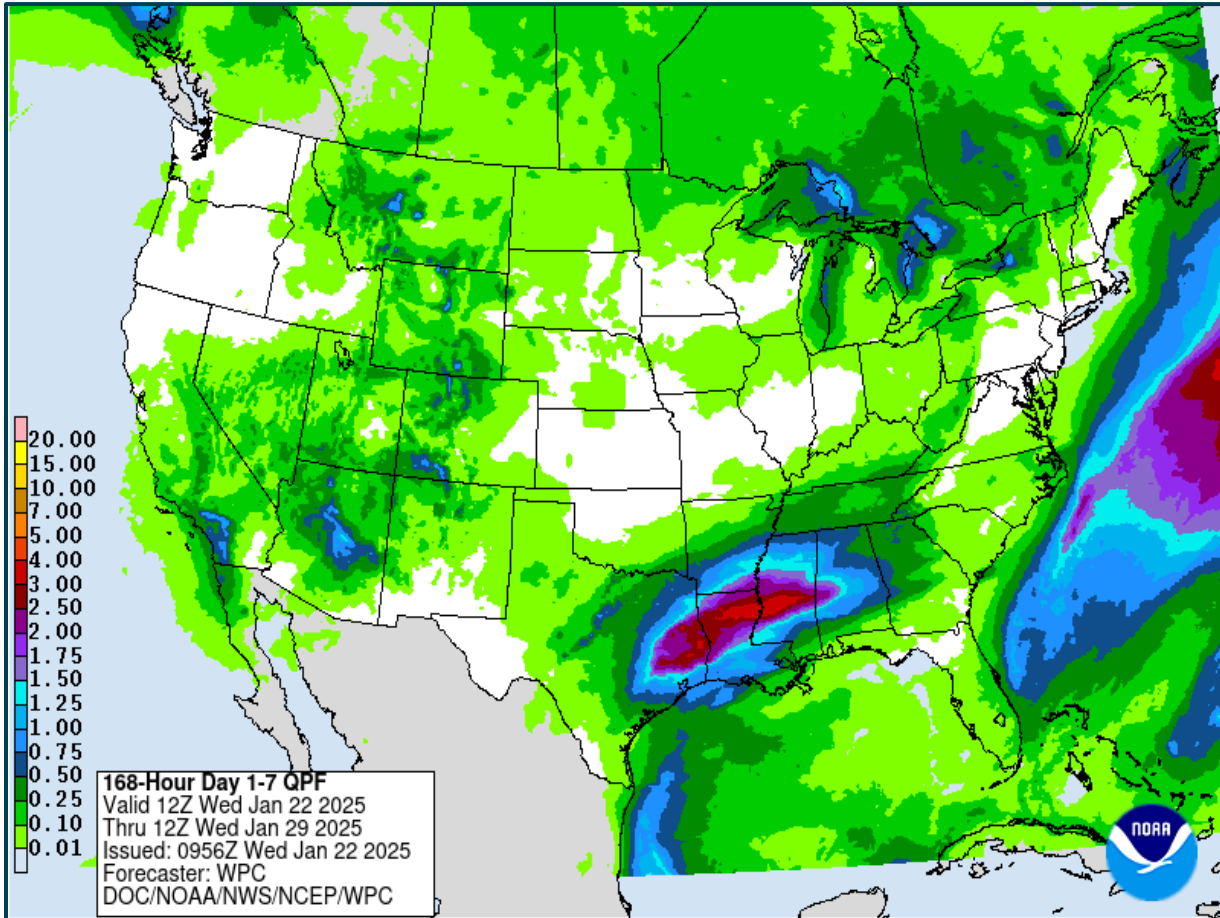
Averaged by Basin, Major Contributing Areas



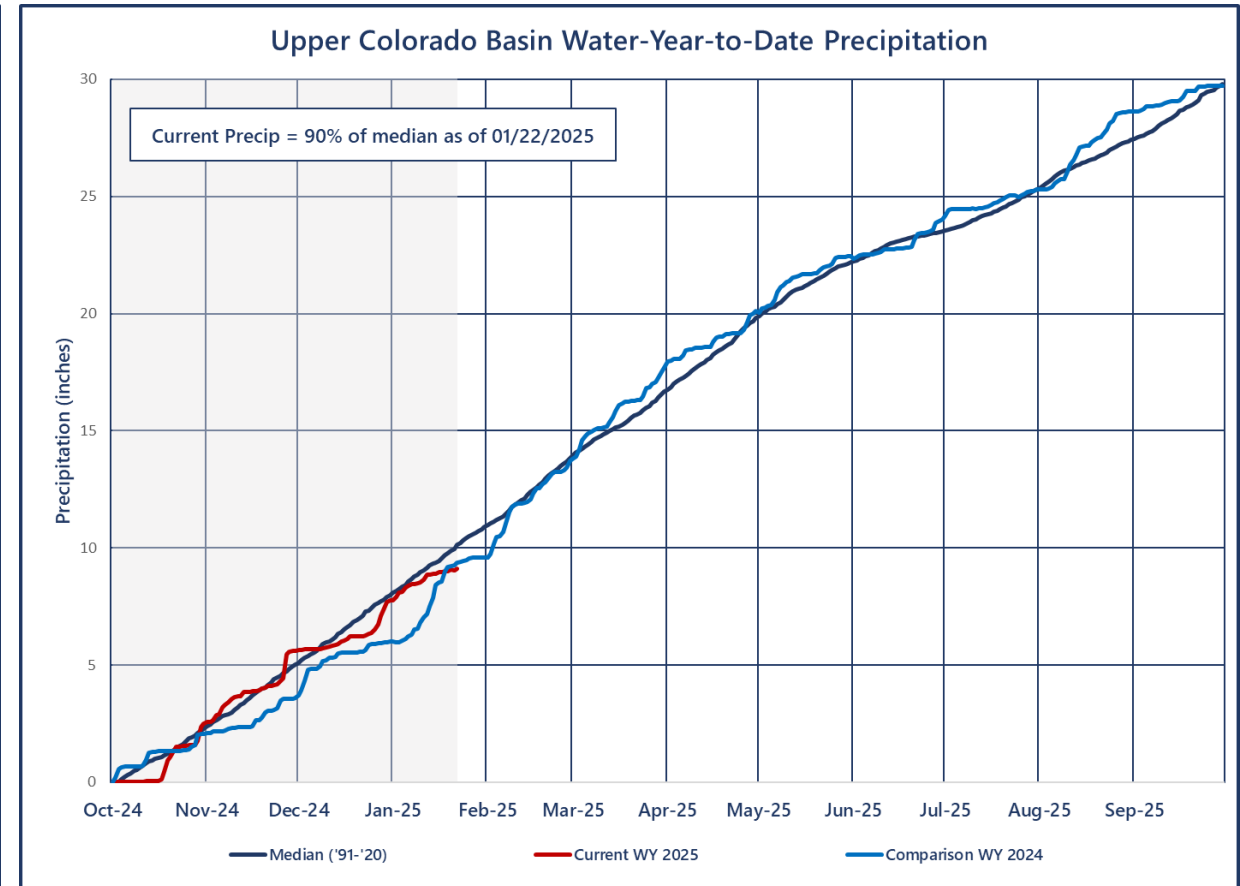
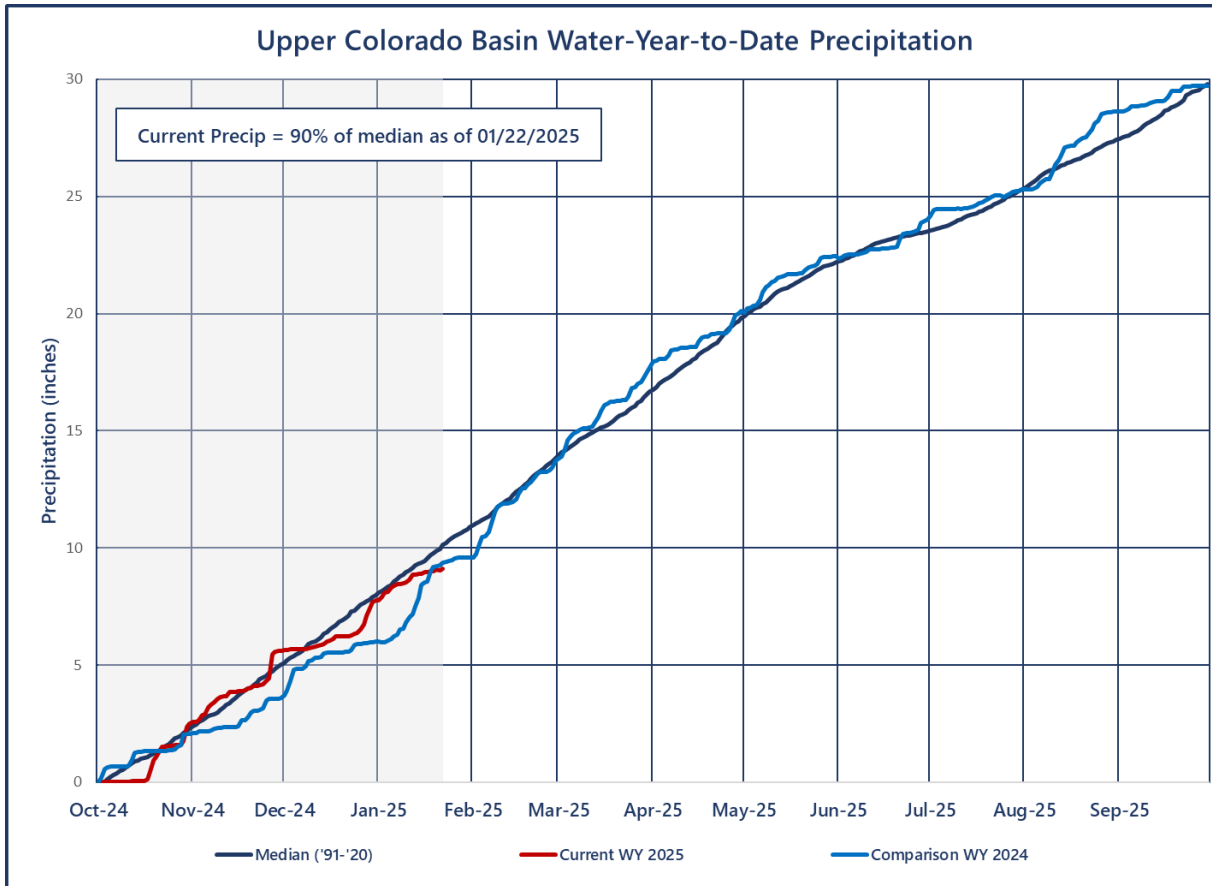
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov



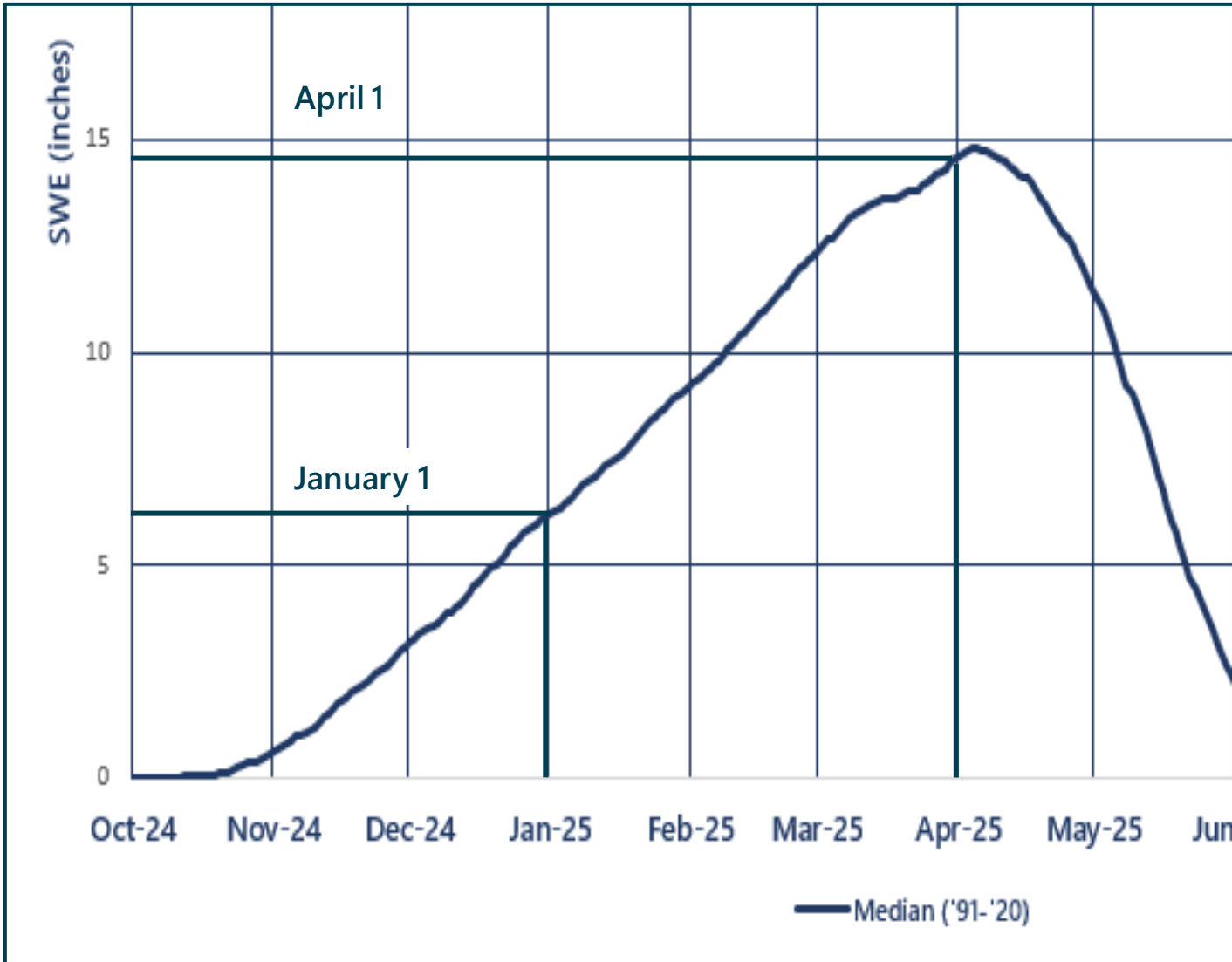
Weather Prediction Center and Climate Prediction Center Precipitation Forecasts



Upper Colorado SWE and Precipitation



Forecast Development



January 1st Forecast

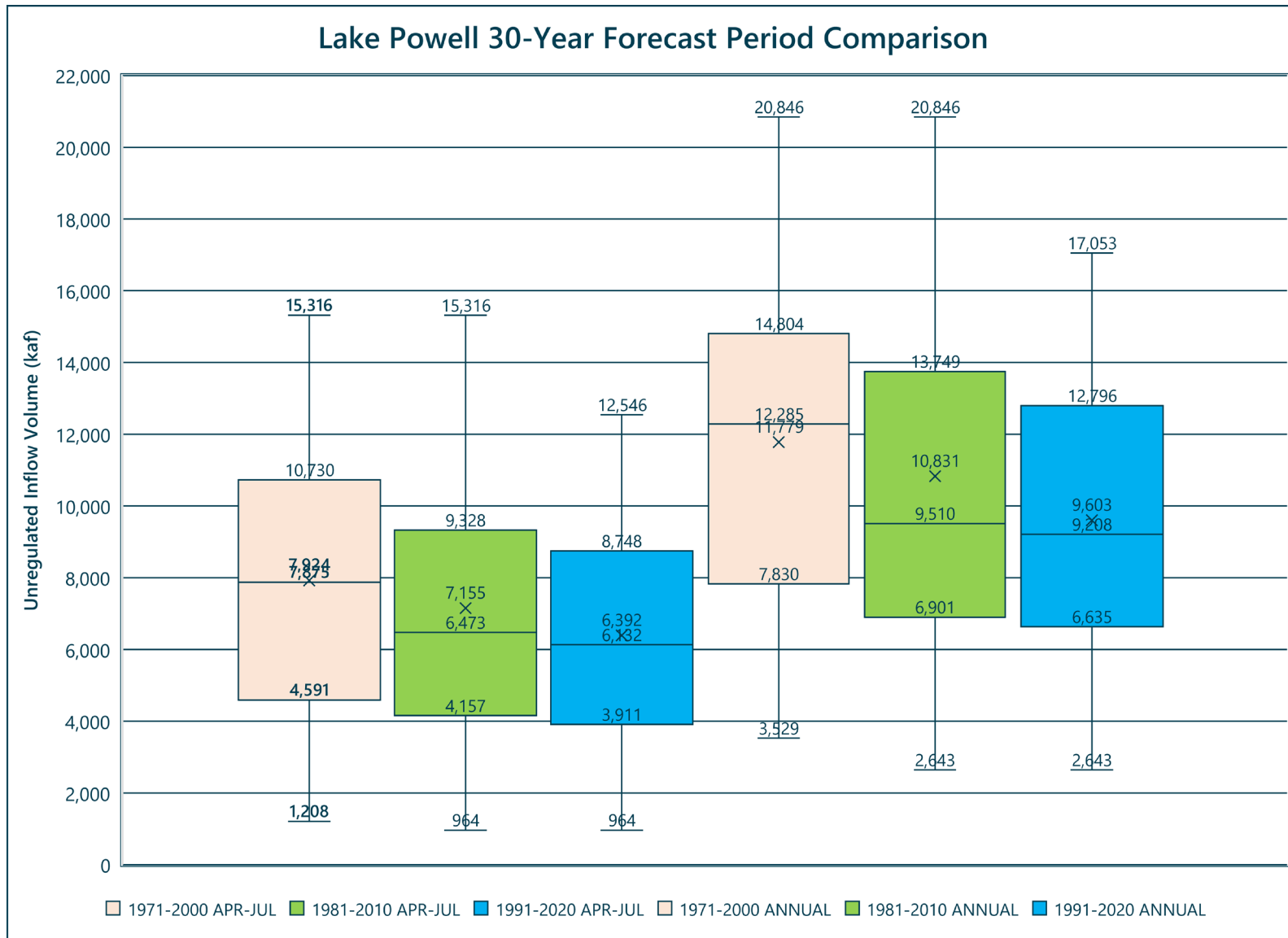
- **What we know:**
 - About 40% snowpack accumulation
 - Fall Soil Moisture conditions
- **What we don't know:**
 - Jan-May weather
 - About 60% of the snowpack accumulation

April 1st Forecast

- **What we know:**
 - About 98% of the snowpack accumulation
 - Dec-March weather
- **What we don't know:**
 - April-May weather
 - Snowmelt pattern

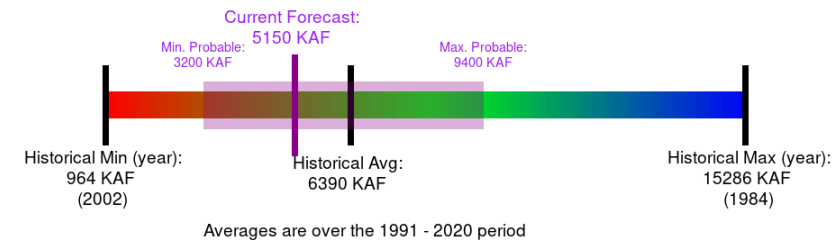
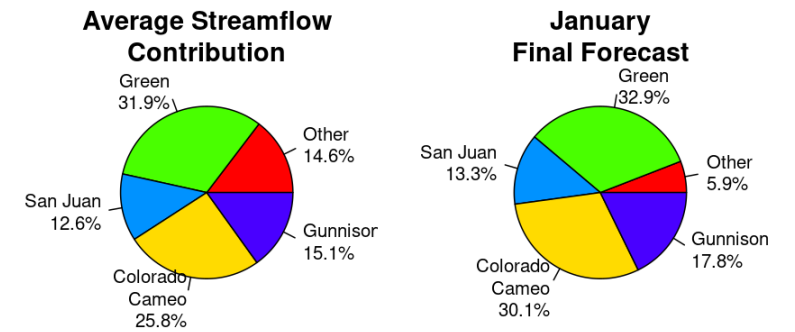


Forecast Information



April - July Unregulated Inflow into Lake Powell

As of 2025-01-01



Most Probable January Forecast Water Year 2025

April – July 2025
Forecasted Unregulated Inflow
as of January 6, 2025

Reservoir	Inflow (kaf)	Change from Dec	Percent of Avg ¹
Fontenelle	540	+30	73
Flaming Gorge	665	+25	69
Blue Mesa	600	-92	94
Navajo	490	-132	78
Powell	5,150	-755	81

Jan Midmonth = 4,850 kaf (76% of avg)

Water Year 2025
Unregulated Inflow Forecast
as of January 6, 2025

Reservoir	Inflow (kaf)	Change from Dec	Percent of Avg ¹
Fontenelle	813	+36	76
Flaming Gorge	1,023	+29	73
Blue Mesa	869	-88	96
Navajo	687	-161	75
Powell	7,829	-891	82

Jan Midmonth = 7,499 kaf (78% of avg)

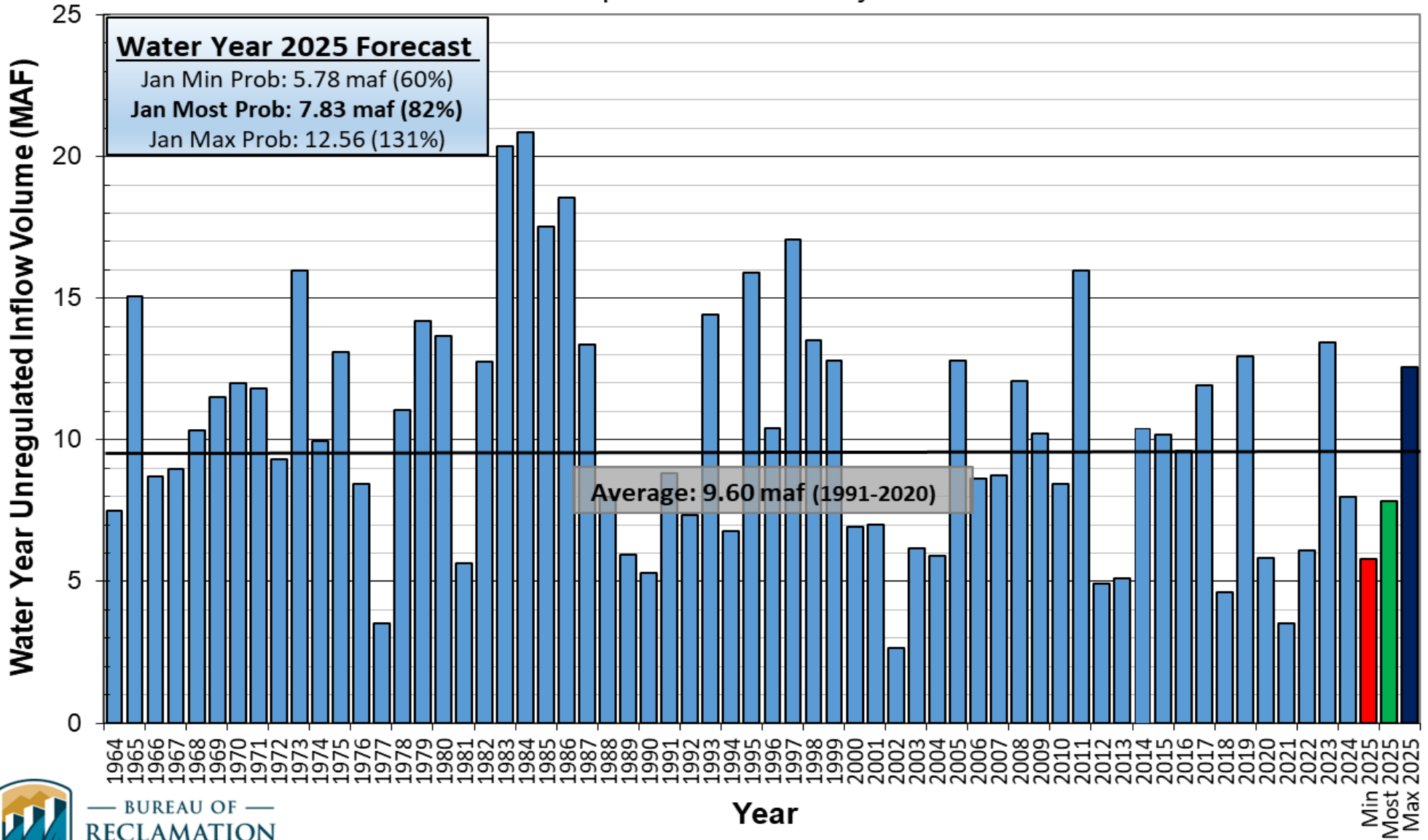
¹Averages are based on the 1991 through 2020 period of record.



Lake Powell Unregulated Inflow

Water Year 2025 Forecast *(issued January 6)*

Comparison with History



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Year





Upper Colorado Basin

Hydrology and Operations
Projections Based on January
2025 24-Month Study



Upper Basin Reservoir Operations

Water Year 2025

- Lake Powell will be operated consistent with the 2007 Interim Guidelines, the Upper Basin Drought Response Operations Agreement and Upper Basin Records of Decision
- Lake Powell WY 2025 will operate in the Mid-Elevation Release Tier where Lake Powell will release 7.48 maf
- Includes the Supplemental Environmental Impact Statement for Near-term Colorado River Operations Record of Decision (2024 Near-term SEIS, signed May 6, 2024)
<https://www.usbr.gov/ColoradoRiverBasin/interimguidelines/seis/index.html>
- July operations and 24-Month Study will include Glen Canyon Dam Long-Term Experimental and Management Plan Final Supplemental Environmental Impact Statement (2024 LTEMP SEIS ROD, signed July 3, 2024) <https://www.usbr.gov/uc/DocLibrary/EnvironmentalImpactStatements/GlenCanyonDamLong-TermExperimentalManagementPlan/20240703-GCDLTEMP-FinalSEIS-RecordofDecision-508-AMWD.pdf>
- Reclamation will also ensure all appropriate consultation with Basin Tribes, the Republic of Mexico, other federal agencies, water users and non-governmental organizations with respect to implementation of these monthly and annual operations.

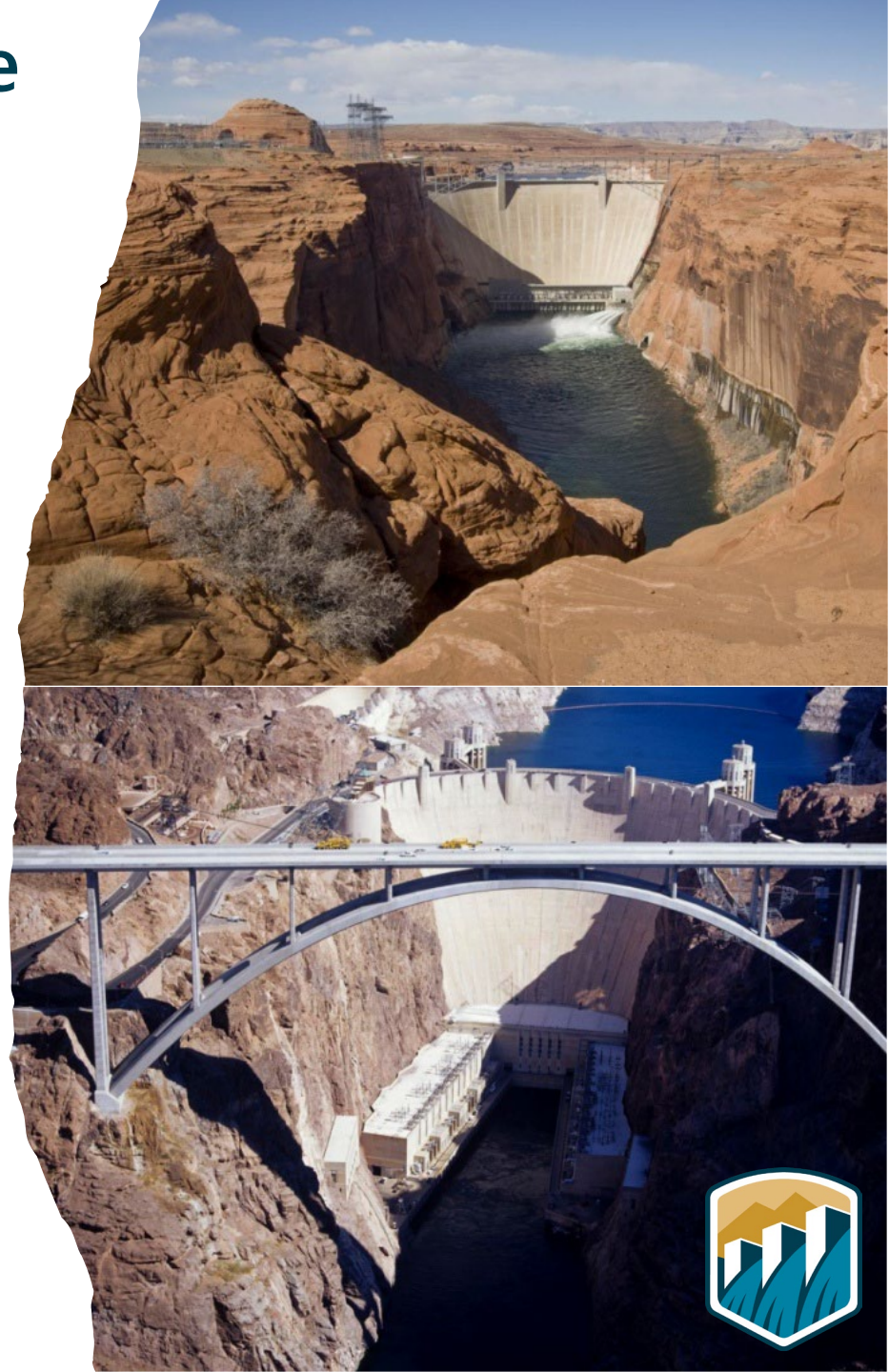


Lake Powell & Lake Mead Operational Table

Lake Powell Operational Tier Determination Run (aka "Exhibit Run")
with an 8.23 maf Release¹

Lake Powell		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf)
3,700	Equalization Tier Equalize, avoid spills, or release 8.23 maf	23.31
3,636-3,666 (2008-2026)	Upper Elevation Balancing Tier Release 8.23 maf	14.65-18.36 (2008-2026)
	If Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	
3,575		8.90
3,568.99 ft Jan 1, 2025 Projection	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet; release 8.23 maf	
	If any minimum probable Lake Powell elevation projection shows Lake Powell < 3,500 feet, begin planning to reduce releases to no less than 6.0 maf	
3,525		5.55
	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	
	If any minimum probable Lake Powell elevation projection shows Lake Powell < 3,500 feet, begin planning to reduce releases to no less than 6.0 maf	
3,500		4.22
	The Secretary reserves the right to operate Reclamation facilities to protect the Colorado River system if hydrologic conditions require such action as described in Sections 6 and 7(D) in the 2007 Interim Guidelines ROD	
3,370		0

Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf)
1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	26.18
1,200 (approx.)	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	23.14 (approx.)
1,145	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	16.18
1,075		8.60
	Shortage Condition Deliver 7.167 maf	1,062.32 ft Jan 1, 2025 Projection
1,050		
	Shortage Condition Deliver 7.083 maf	
1,025		5.98
	Shortage Condition Deliver 7.0 maf	
1,000	Further measures may be undertaken	4.48
895		0

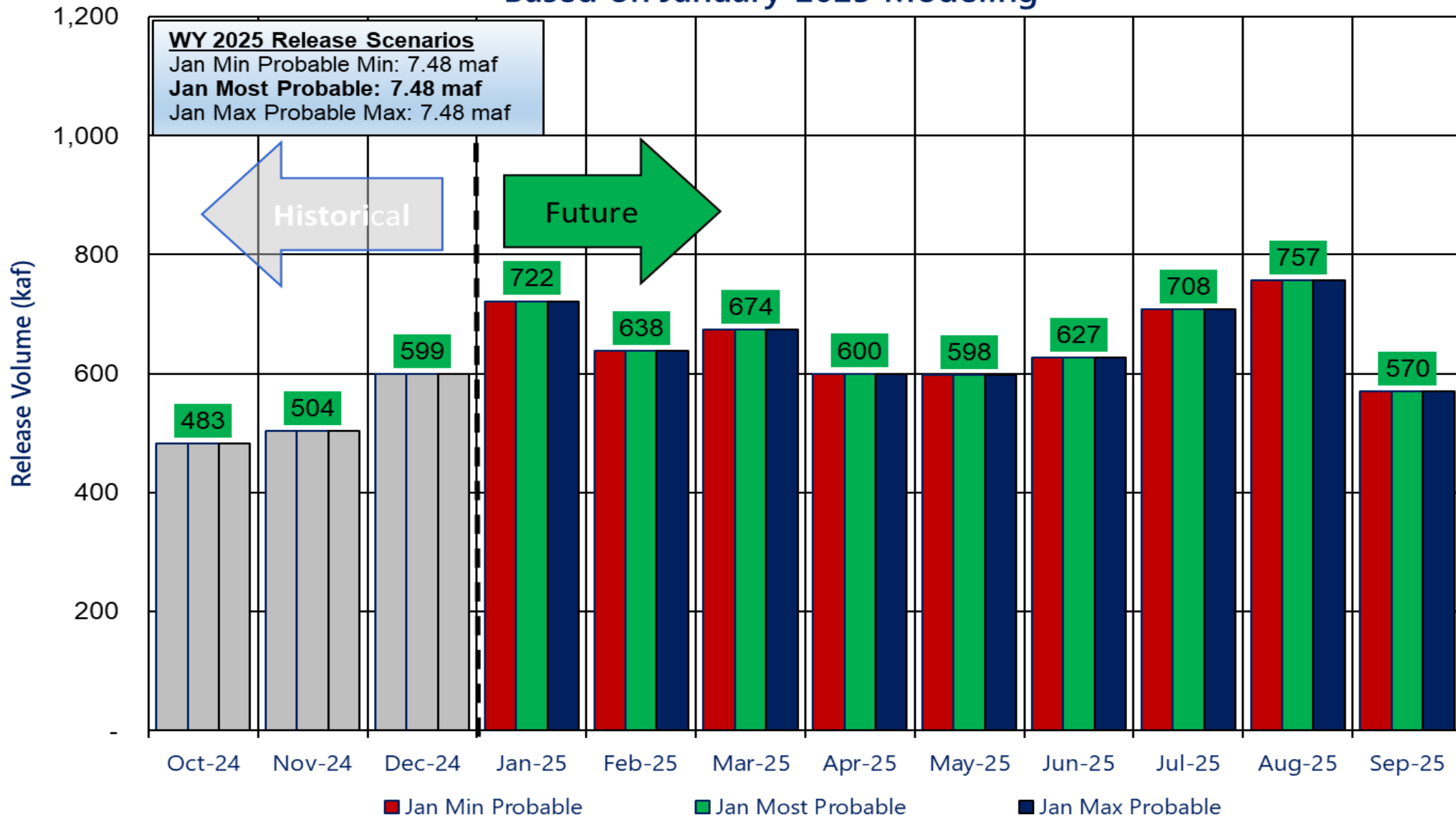


¹ Lake Powell and Lake Mead operational tier determinations will be documented in the draft 2025 AOP.

Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2025

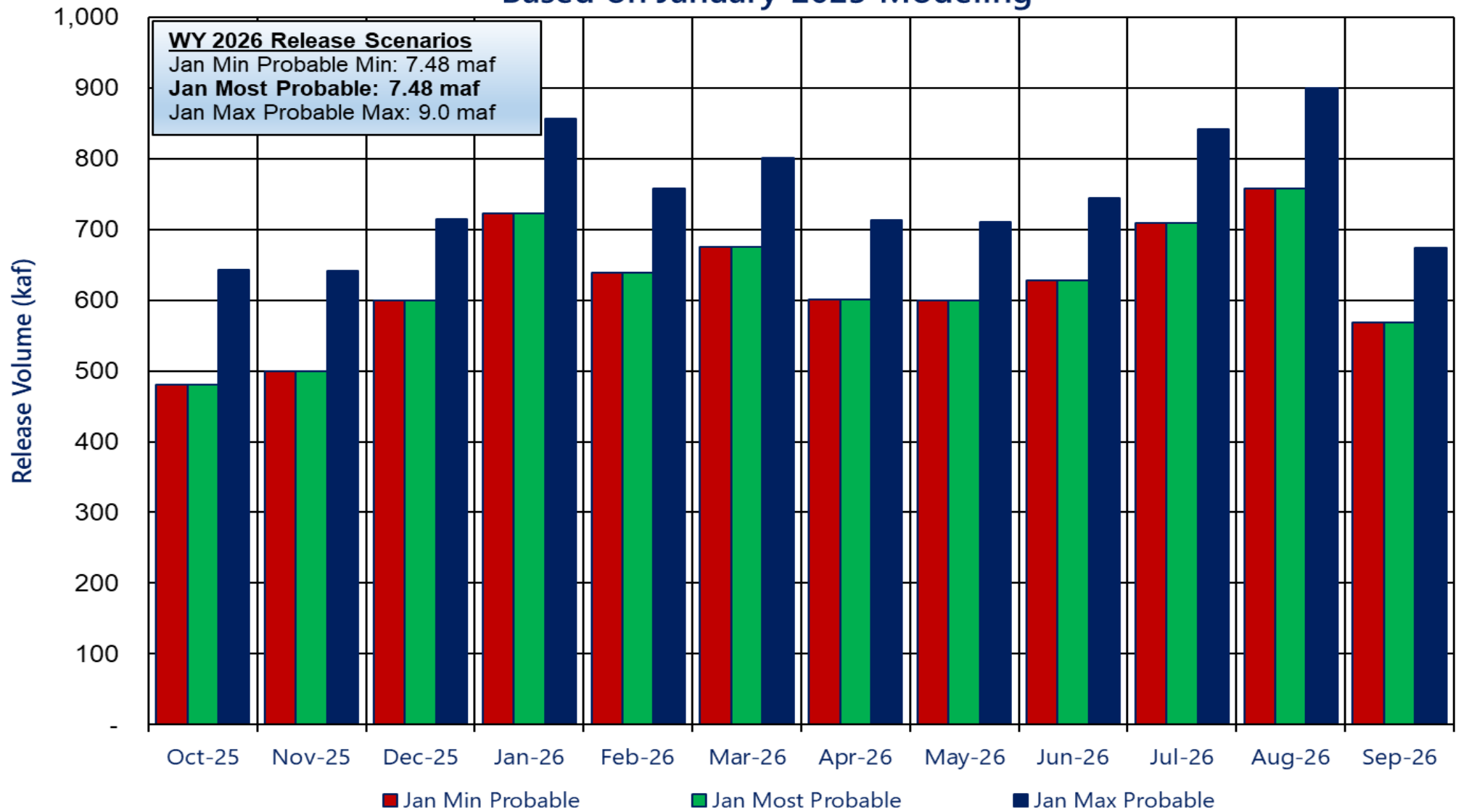
Based on January 2025 Modeling






Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2026

Based on January 2025 Modeling



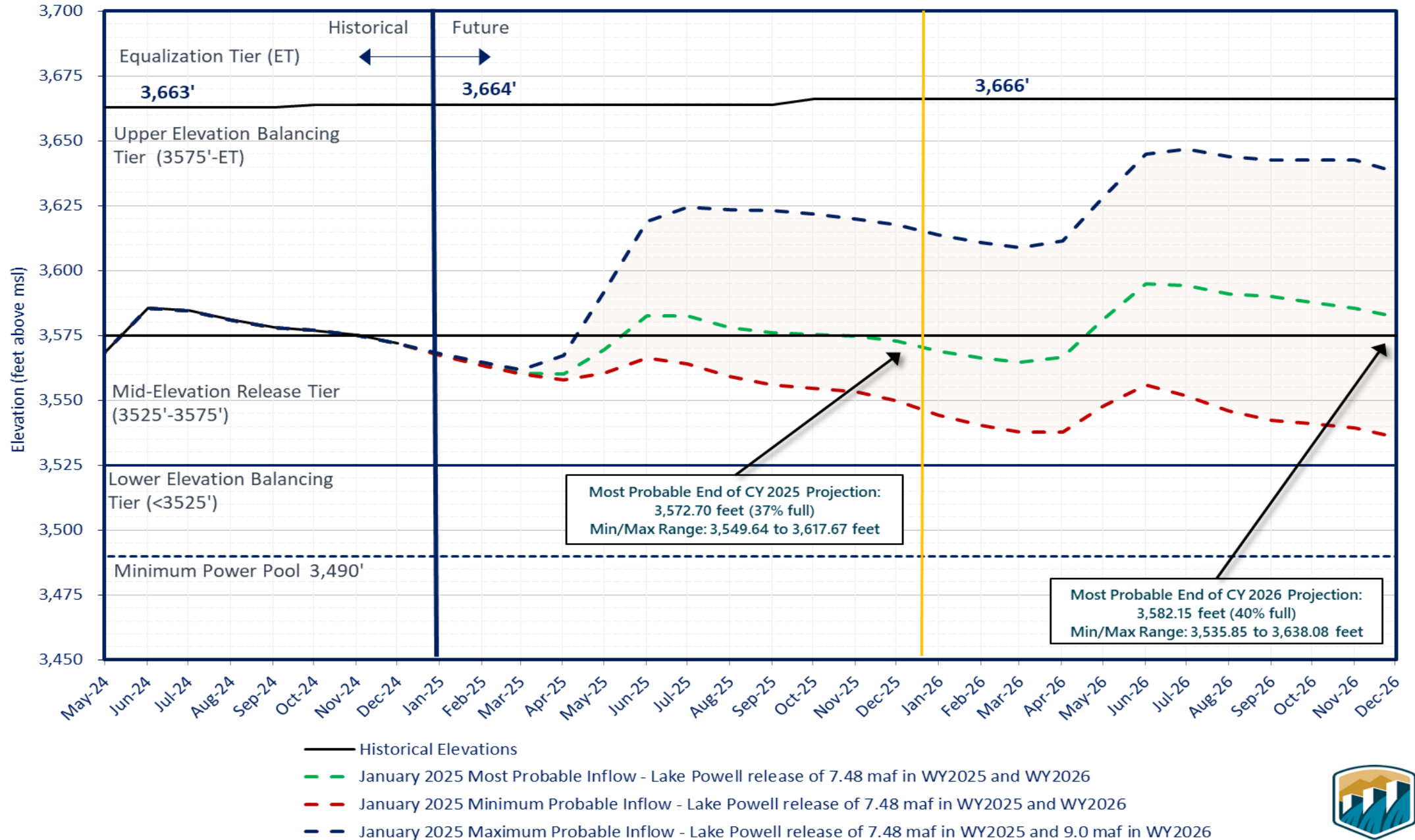
Reclamation Operational Modeling Model Comparison

	Colorado River Mid-term Modeling System (CRMMS)		CRSS
	24-Month Study Mode (Manual Mode)	Ensemble Mode (Rule-based Mode)	
Primary Use	AOP tier determinations and projections of current conditions	Risk-based operational planning and analysis	Long-term planning, comparison of alternatives
Simulated Reservoir Operations	Operations input manually	Rule-driven operations	
Probabilistic or Deterministic	Deterministic – single hydrologic trace	Deterministic OR Probabilistic 30 (or more) hydrologic traces	Probabilistic – 100+ traces
Time Horizon (years)			
Upper Basin Inflow	Unregulated forecast, 1 trace	Unregulated ESP forecast, 30 traces	Natural flow; historical, paleo, or climate change hydrology
Upper Basin Demands	Implicit, in unregulated inflow forecast		Explicit, 2016 UCRC assumptions
Lower Basin Demands	Official approved or operational		Developed with LB users

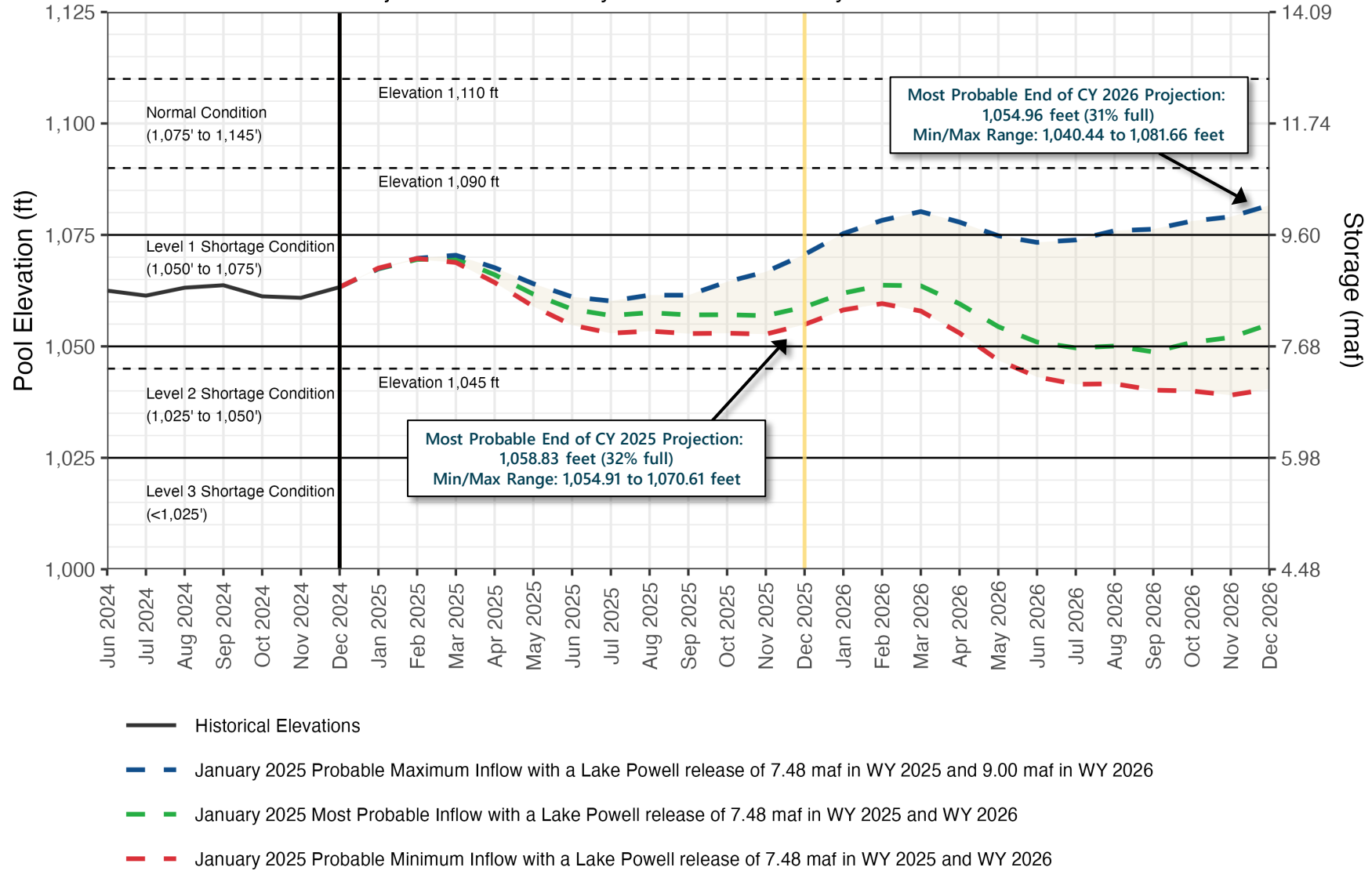


Lake Powell End of Month Elevations

Projections from the January 2025 24-Month Study Inflow Scenarios



Lake Mead End-of-Month Elevations Projections from January 2025 24-Month Study Inflow Scenarios





Upper Colorado Basin

Hydropower Maintenance



Glen Canyon Dam Power Plant Unit Outage Schedule for 2025

Unit Number	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Jul 2025	Aug 2025	Sep 2025
1	■	■										■
2	■						■	■				■
3	■	■										
4	■	■	■	■	■	■	■					
5						■	■					
6						■	■					
7				■	■							
8				■	■							
ROW 1	■	■										
ROW 2			■	■	■	■						
ROW 3						■	■	■				
ROW 4								■	■	■		
Units Available	6	6	7	5	5	5	7	7	8	8	8	6
Penstock Capacity (cfs)	19,650	19,700	23,350	16,100	16,100	16,100	23,250	23,250	26,900	26,900	26,900	19,700
Penstock Capacity (kaf/month)	1,200	1,500	1,550	1,360	910	1,020	1,380	1,590	1,600	1,650	1,650	1,180
Max (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568
Most (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568
Min (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568
										(updated 01-22-2025)		

JAN MOST²

JAN MOST

7.48 maf

7.48 maf

7.48 maf

1 Projected release based on January 2025 24MS for the probable most, minimum and maximum 24-Month Study model runs.
 2 Dependent upon availability to shift contingency regulation, which will increase capacity by 30-40MW (3%) at current efficiency.



Glen Canyon Dam Power Plant Unit Outage Schedule for 2026

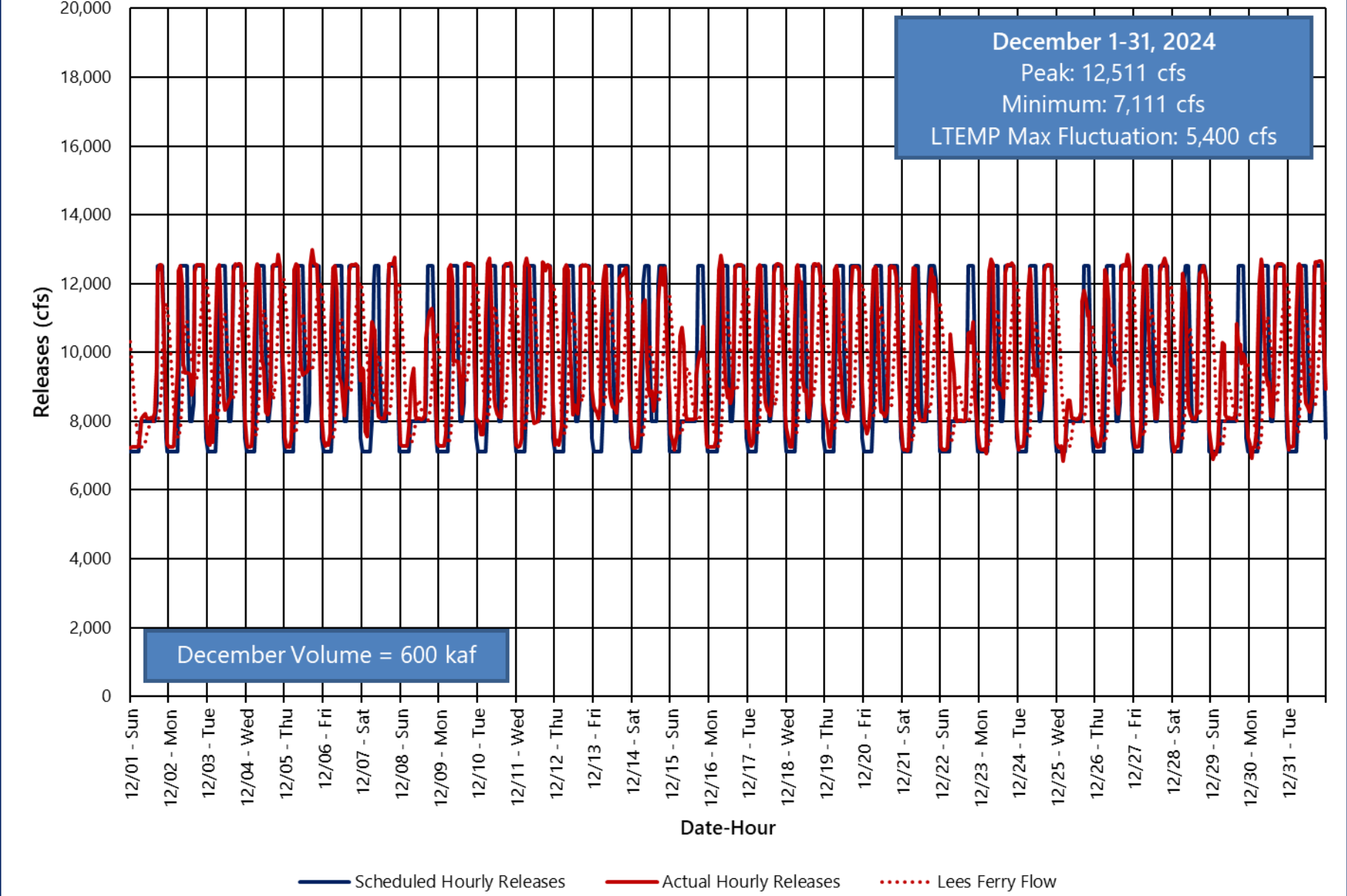
Unit Number	Oct 2025	Nov 2025	Dec 2025	Jan 2026	Feb 2026	Mar 2026	Apr 2026	May 2026	Jun 2026	Jul 2026	Aug 2026	Sep 2026
1												
2												
3												
4												
5												
6												
7												
8												
Units Available	6	8	8	8	6	6	7	7	8	8	8	6
Penstock Capacity (cfs)	19,650	26,900	26,900	26,900	19,700	19,700	23,250	23,250	26,900	26,900	26,900	19,700
Penstock Capacity (kaf/month)	1,250	1,510	1,650	1,570	1,120	1,220	1,440	1,550	1,600	1,650	1,640	1,170
Max (kaf) ¹	643	642	715	857	758	801	713	710	745	842	900	674
Most (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	567
Min (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	567
										(updated 01-22-2025)		

JAN MOST²
 JAN MOST
 9.0 maf
 7.48 maf
 7.48 maf

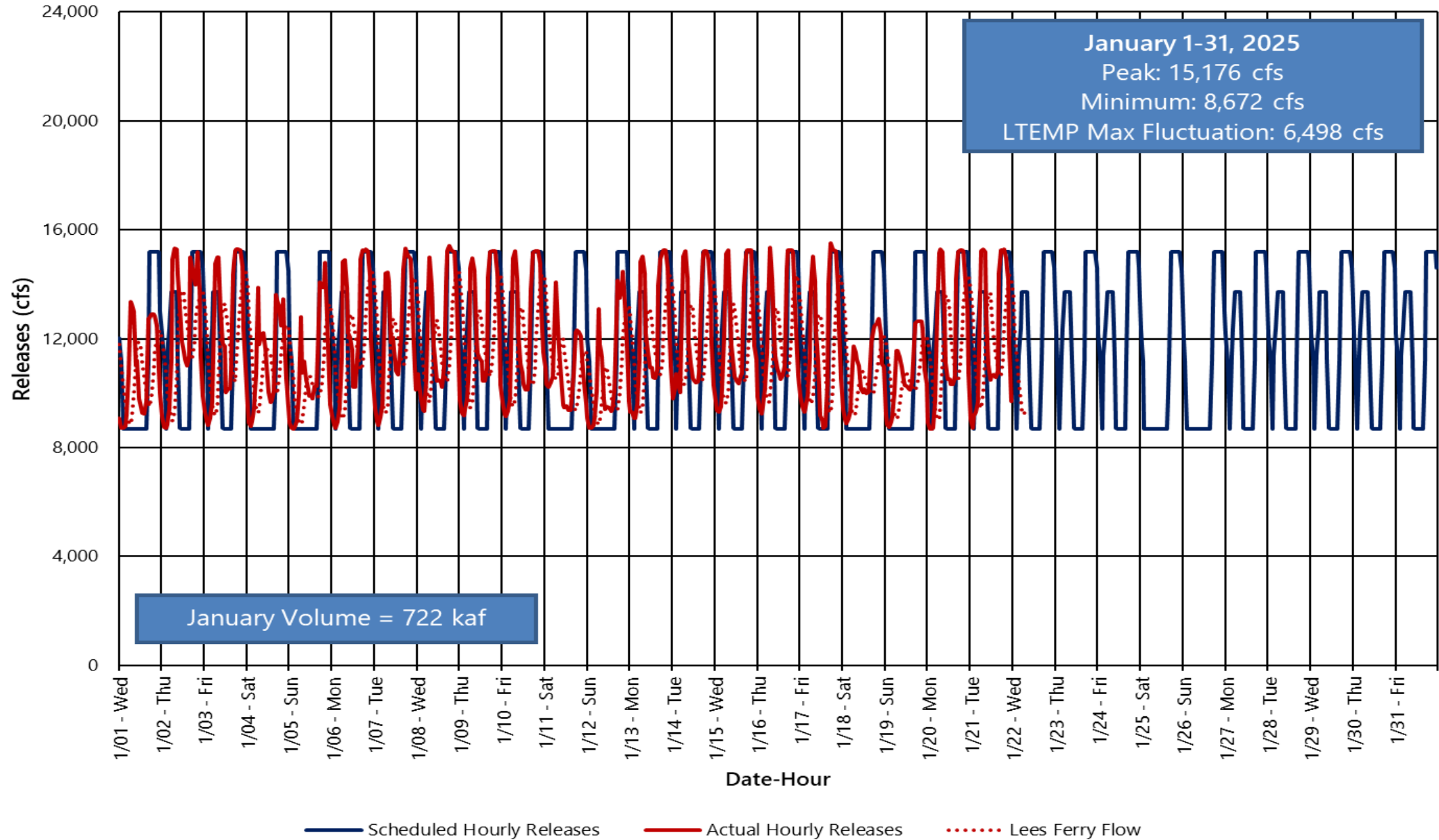
1 Projected release based on January 2025 24MS for the probable most, minimum and the maximum 24-Month Study model runs.
 2 Dependent upon availability to shift contingency regulation, which will increase capacity by 30-40MW (3%) at current efficiency.



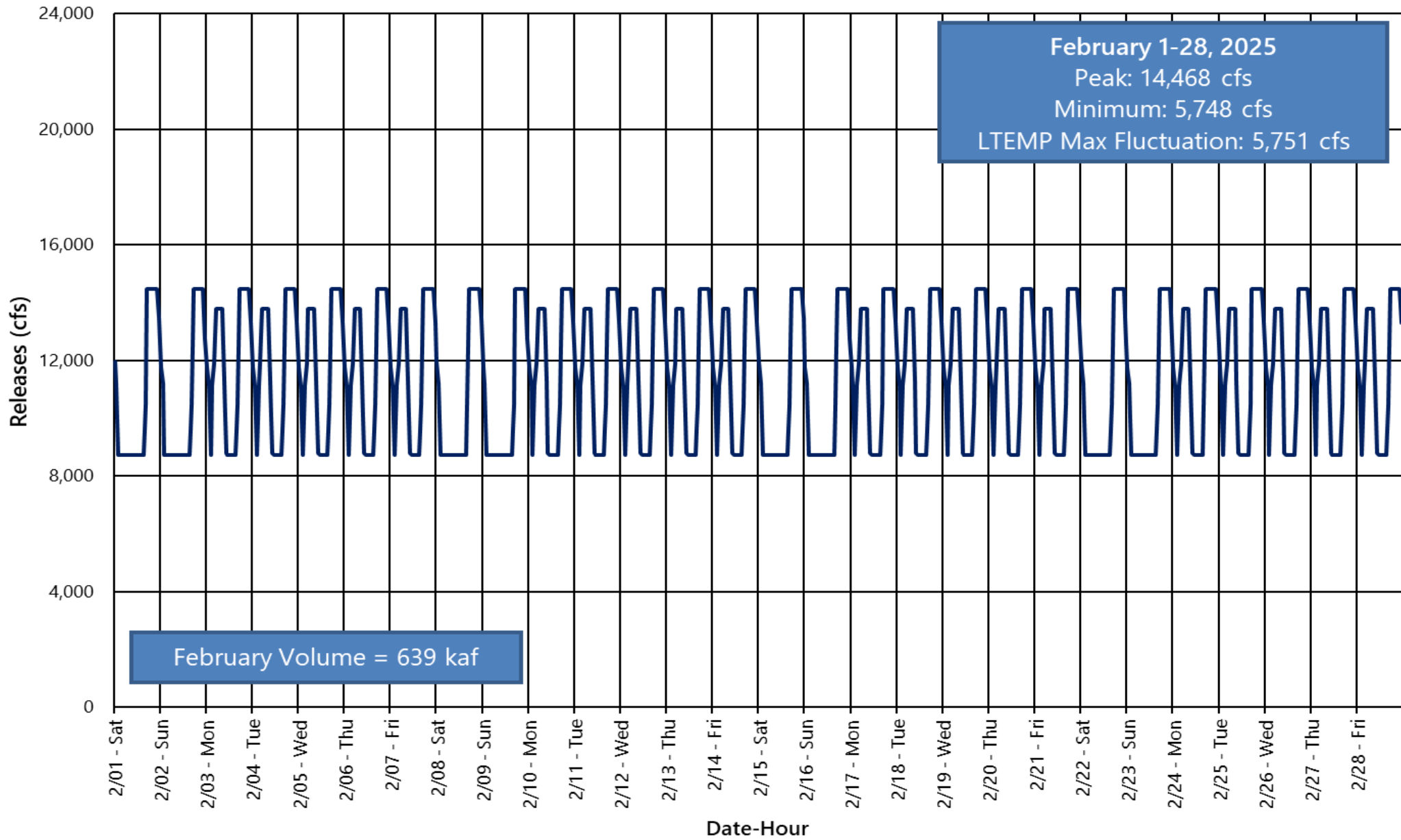
Glen Canyon Dam Hourly Release Pattern - December 2024



Glen Canyon Dam Hourly Release Pattern - January 2025



Glen Canyon Dam Hourly Release Pattern - February 2025



— Scheduled Hourly Releases — Actual Hourly Releases Lees Ferry Flow





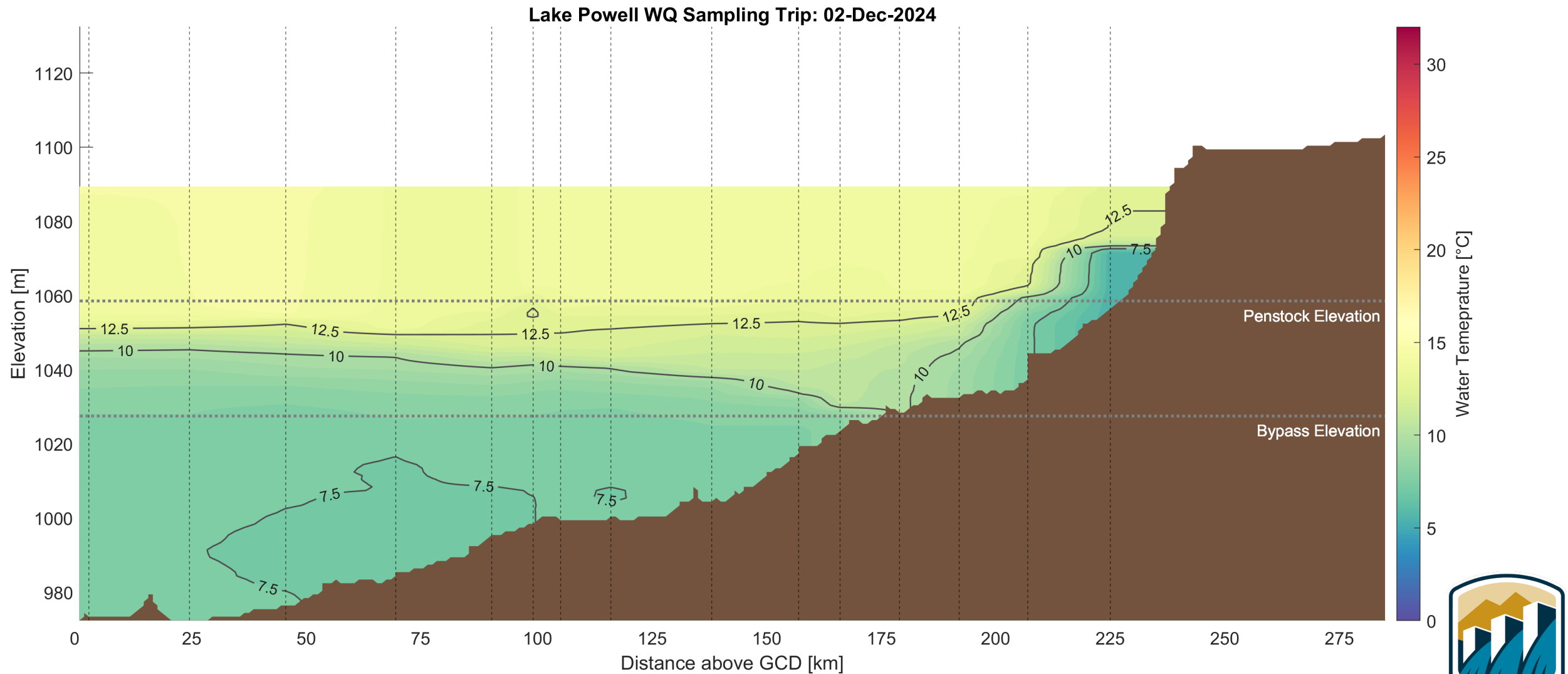
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January 24 Month Study Water Quality Update

01/22/2024

Lake Powell WQ Sampling – December 2025

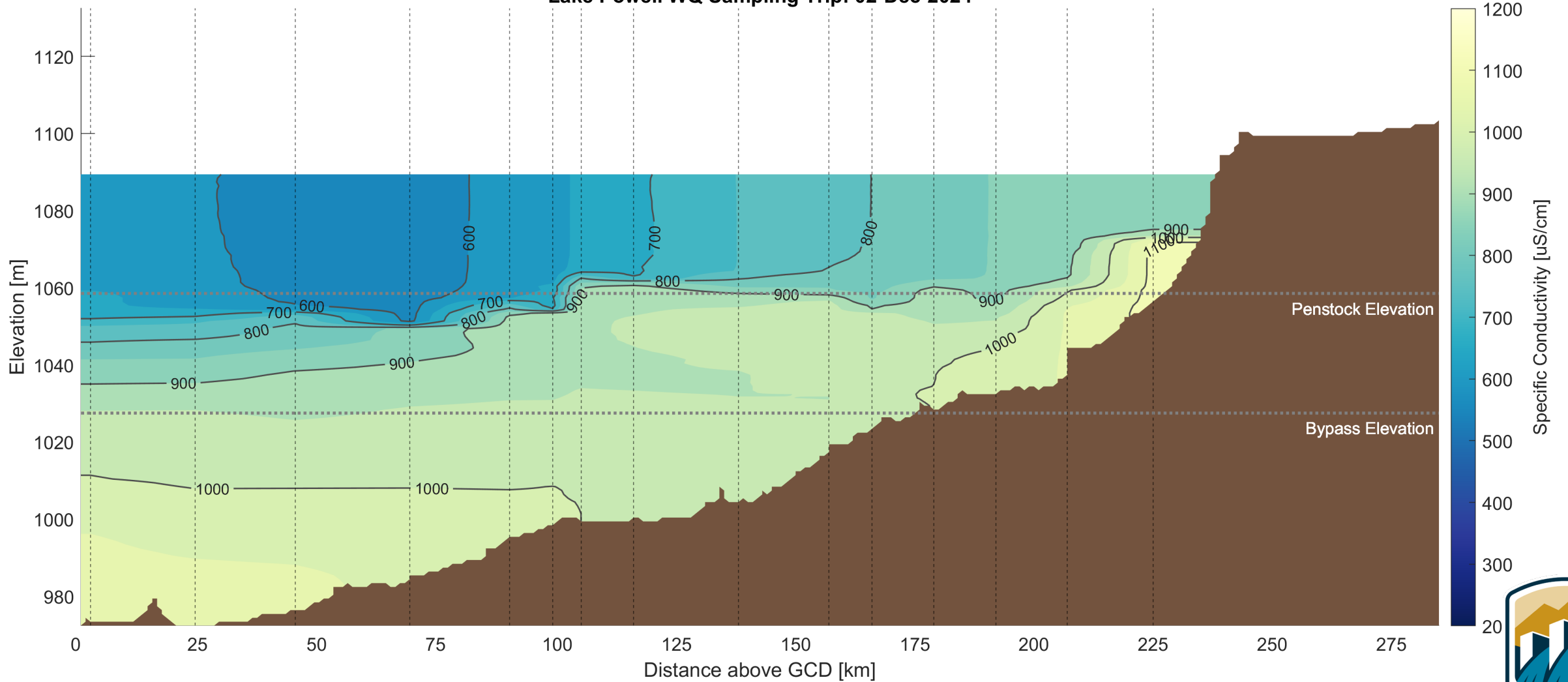
Temperature



Lake Powell WQ Sampling – December 2025

Specific Conductivity

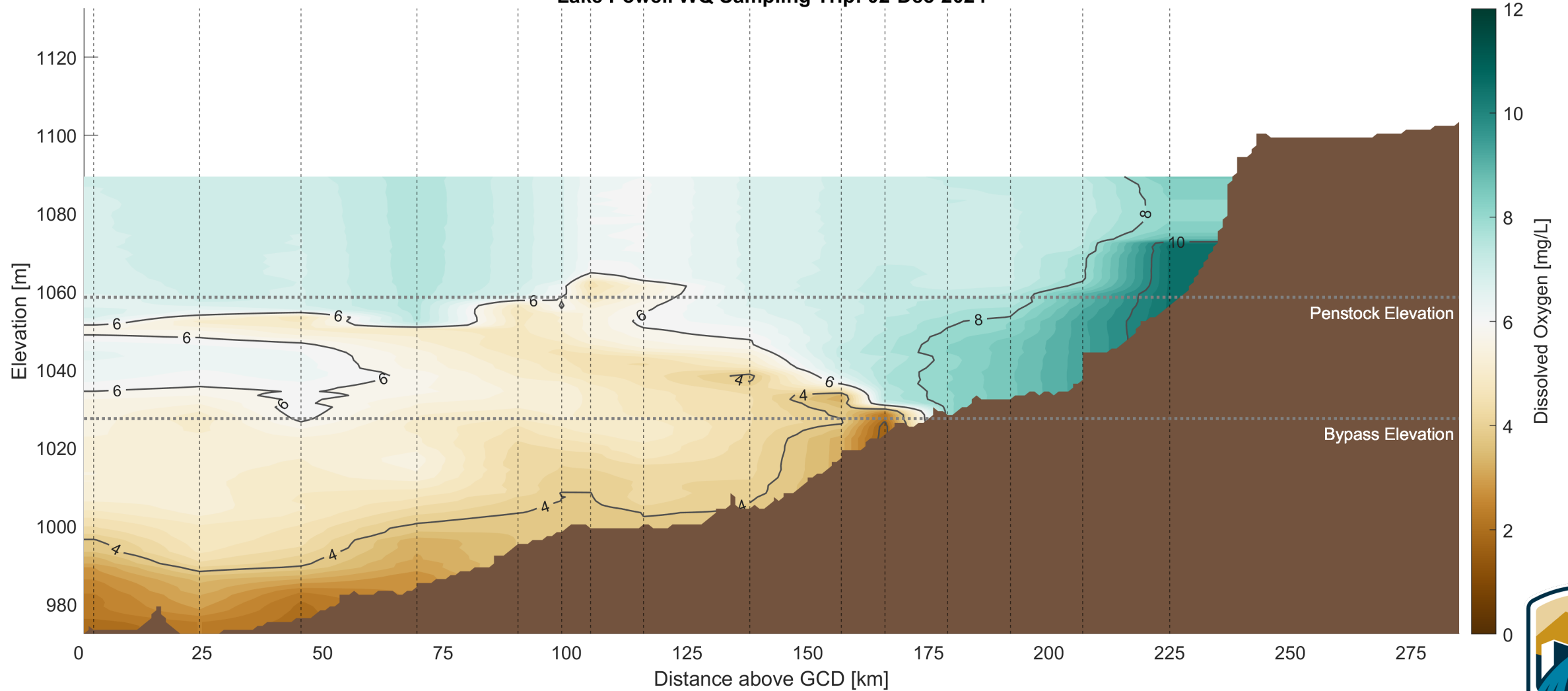
Lake Powell WQ Sampling Trip: 02-Dec-2024



Lake Powell WQ Sampling – December 2025

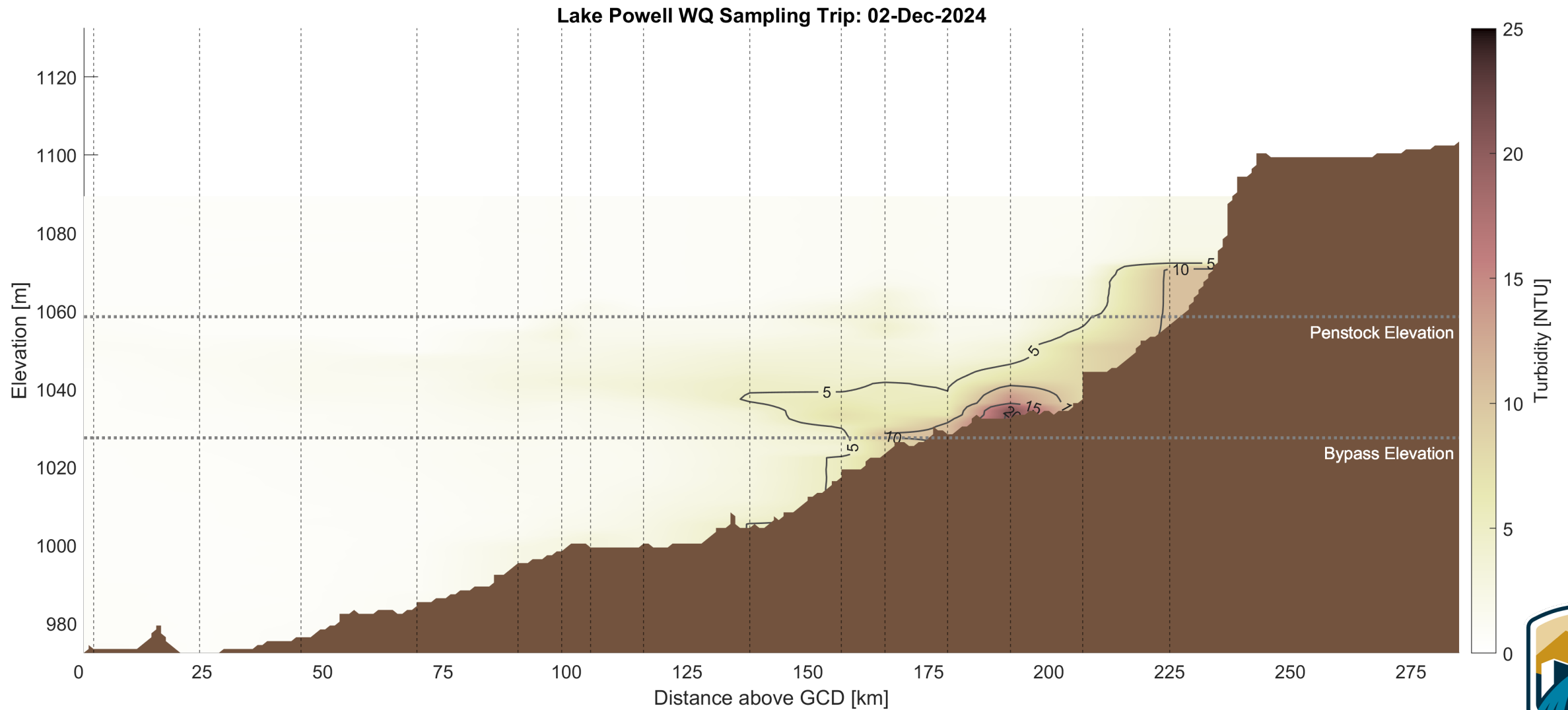
Dissolved Oxygen

Lake Powell WQ Sampling Trip: 02-Dec-2024



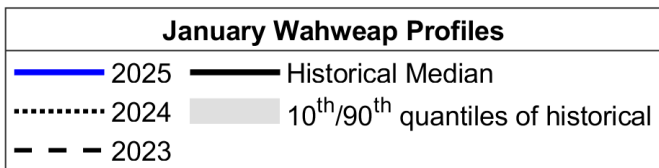
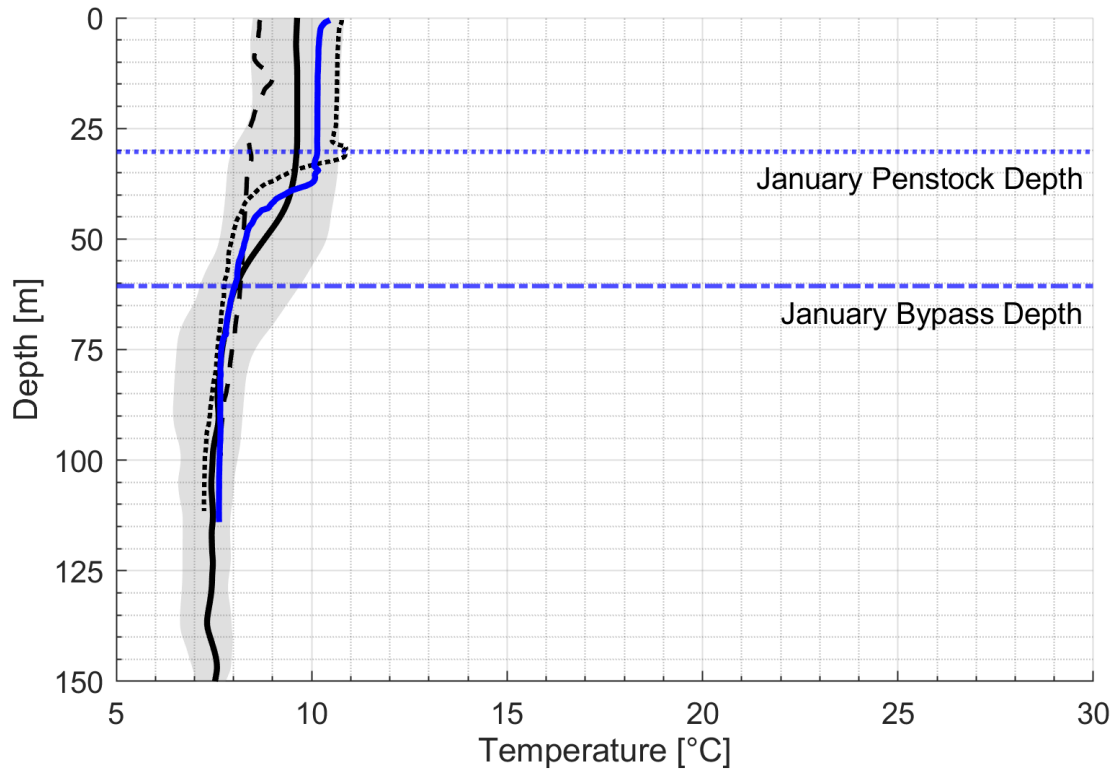
Lake Powell WQ Sampling – December 2025

Turbidity

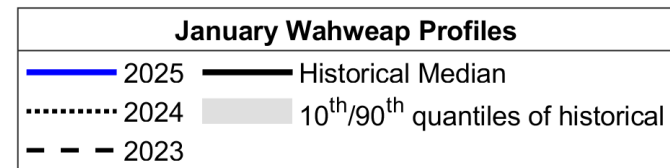
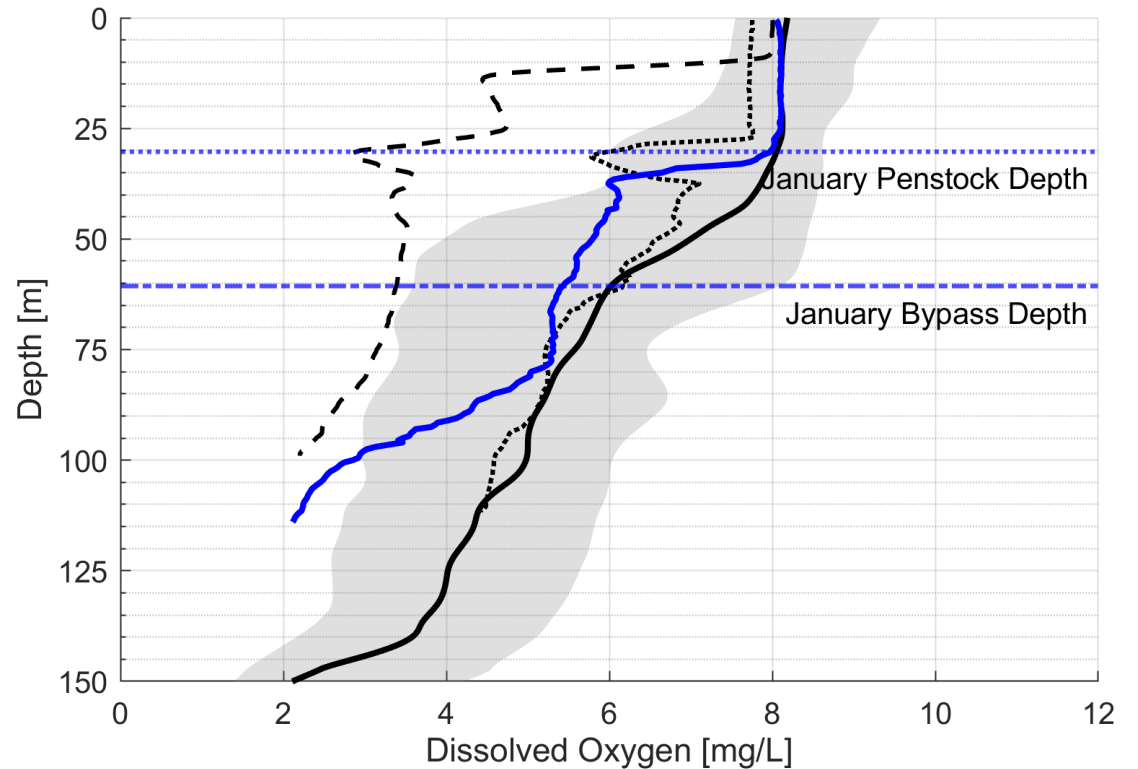


Wahweap Profiles – January

Temperature and Dissolved Oxygen



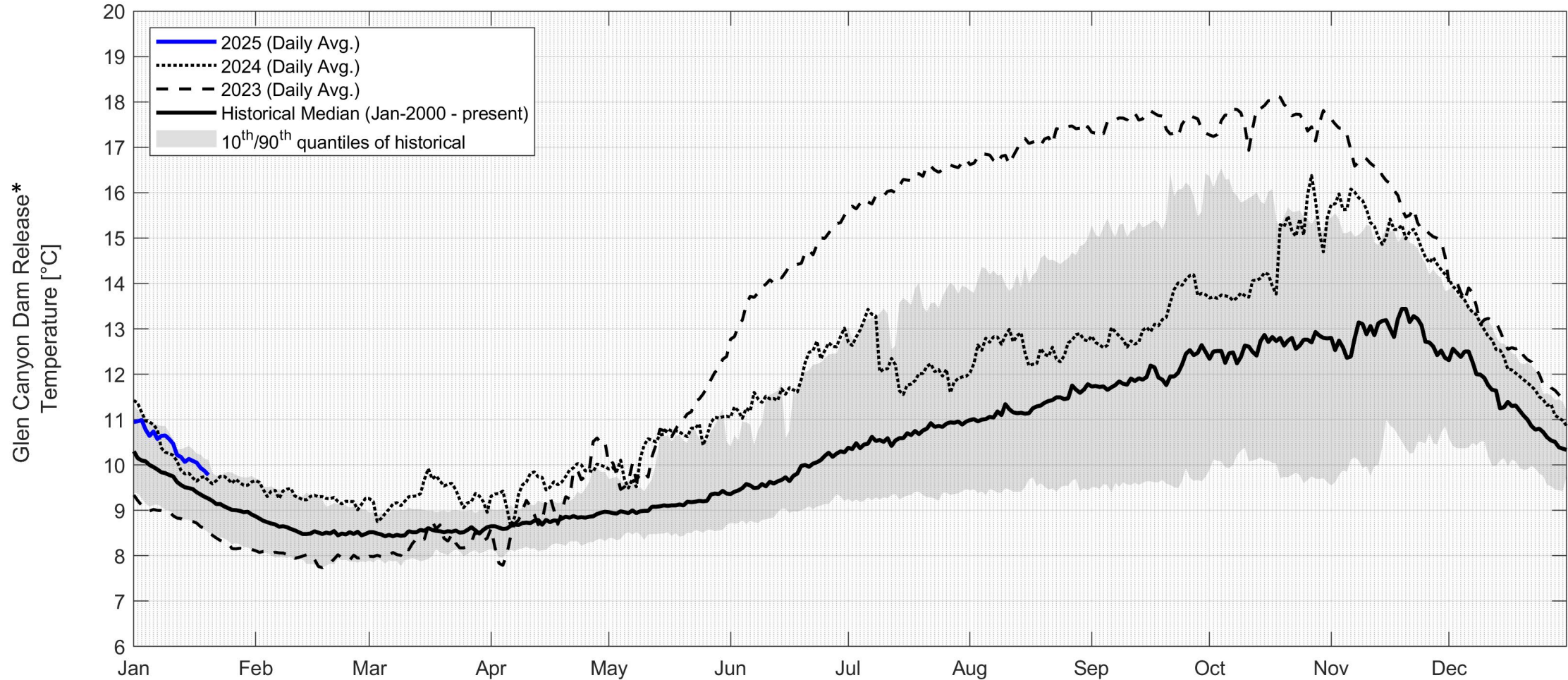
~14.5 C @ Penstock



~7 mg/L @ Penstock



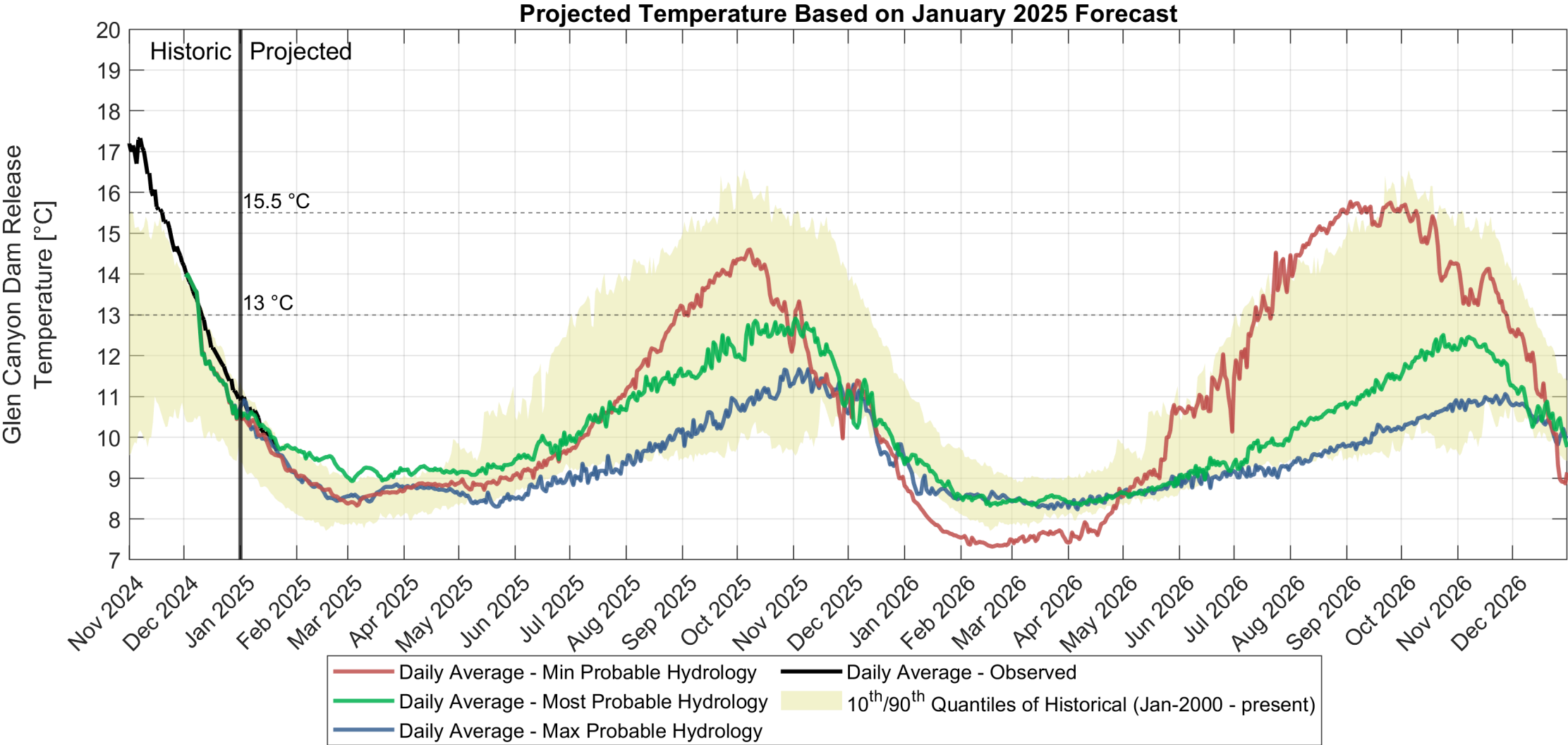
Glen Canyon Dam Release- Temperature



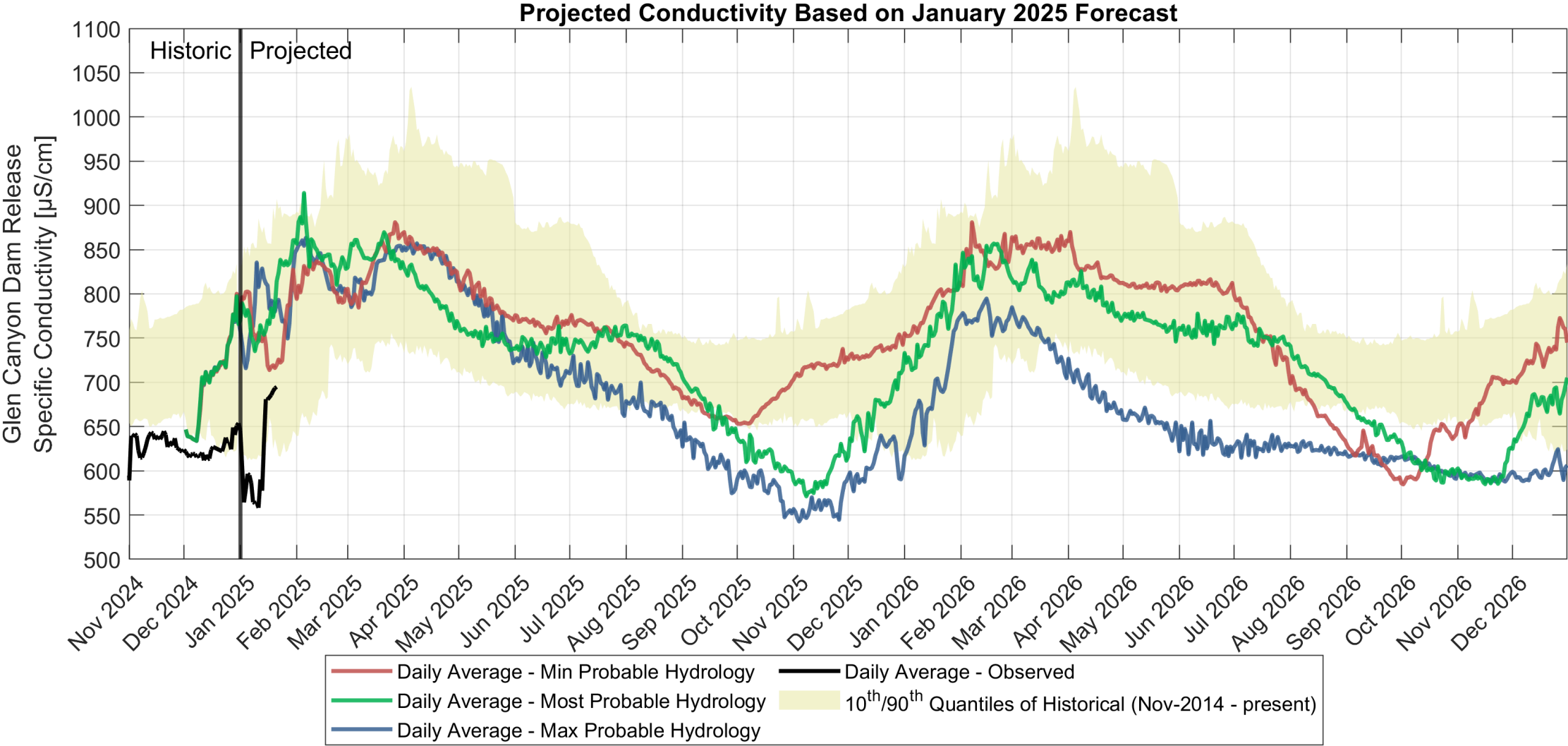
* Credit to USGS for data. Preliminary, not for citation.



CE-QUAL-W2 Modeled Temperature (Dec. 24MS)

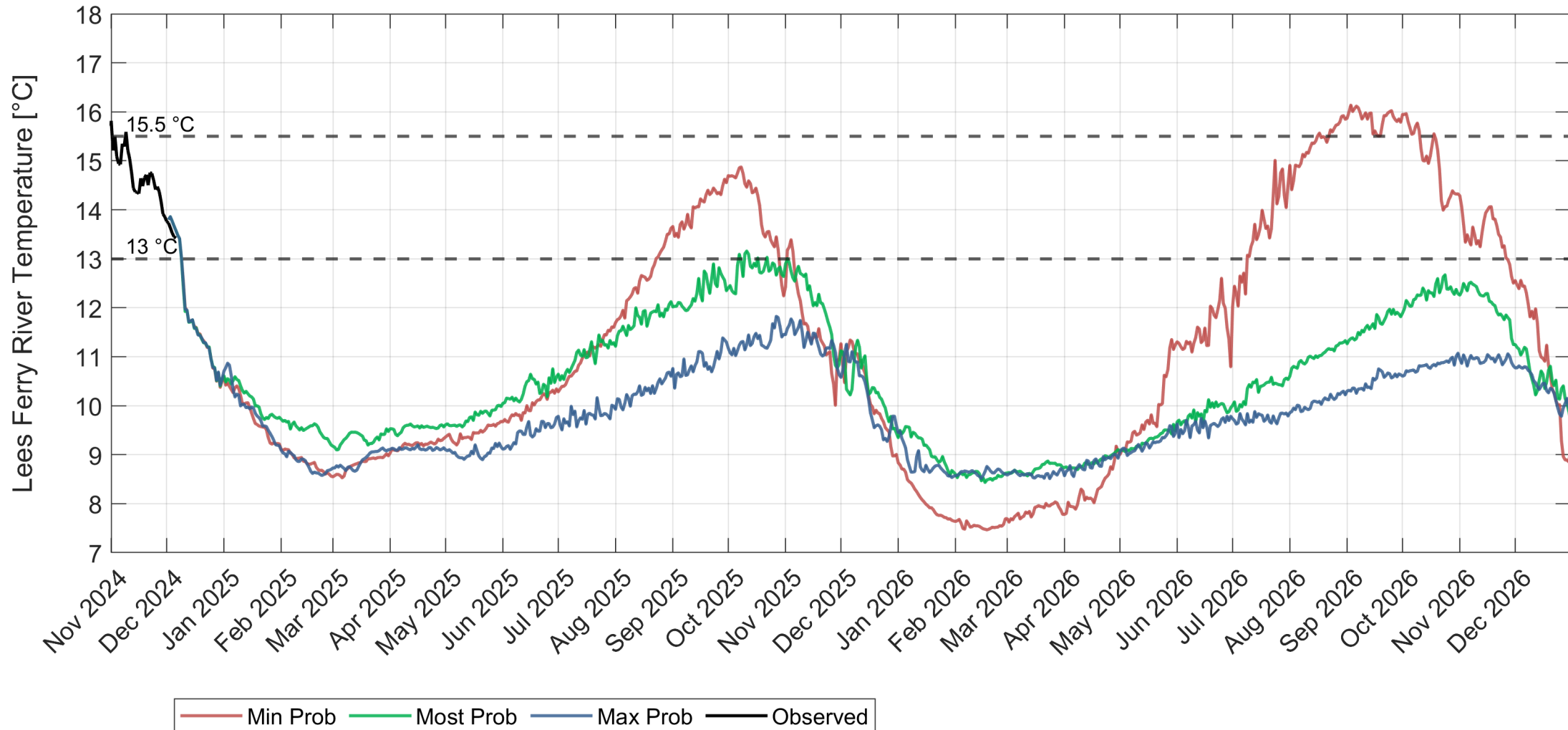


CE-QUAL-W2 Modeled Conductivity (Dec. 24MS)



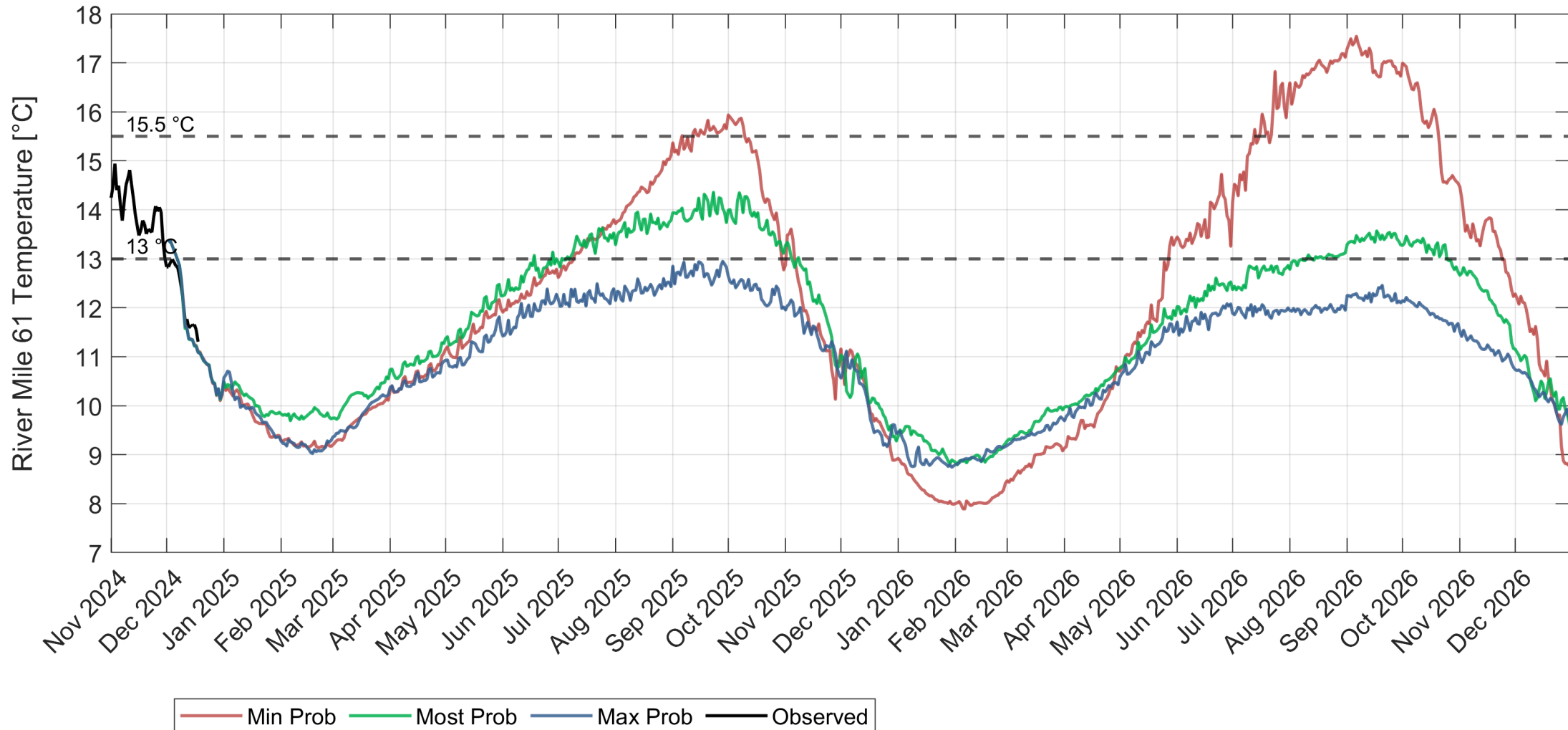
Dibble et al. Grand Canyon Model (Dec. 24MS)

Lees Ferry



Dibble et al. Grand Canyon Model (Dec. 24MS)

River Mile 61



Questions?



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