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Glen Canyon Monthly Operations Call

Basin Hydrology and Operations

February 25, 2021

Background

This briefing is being provided consistent with the provision in 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.”

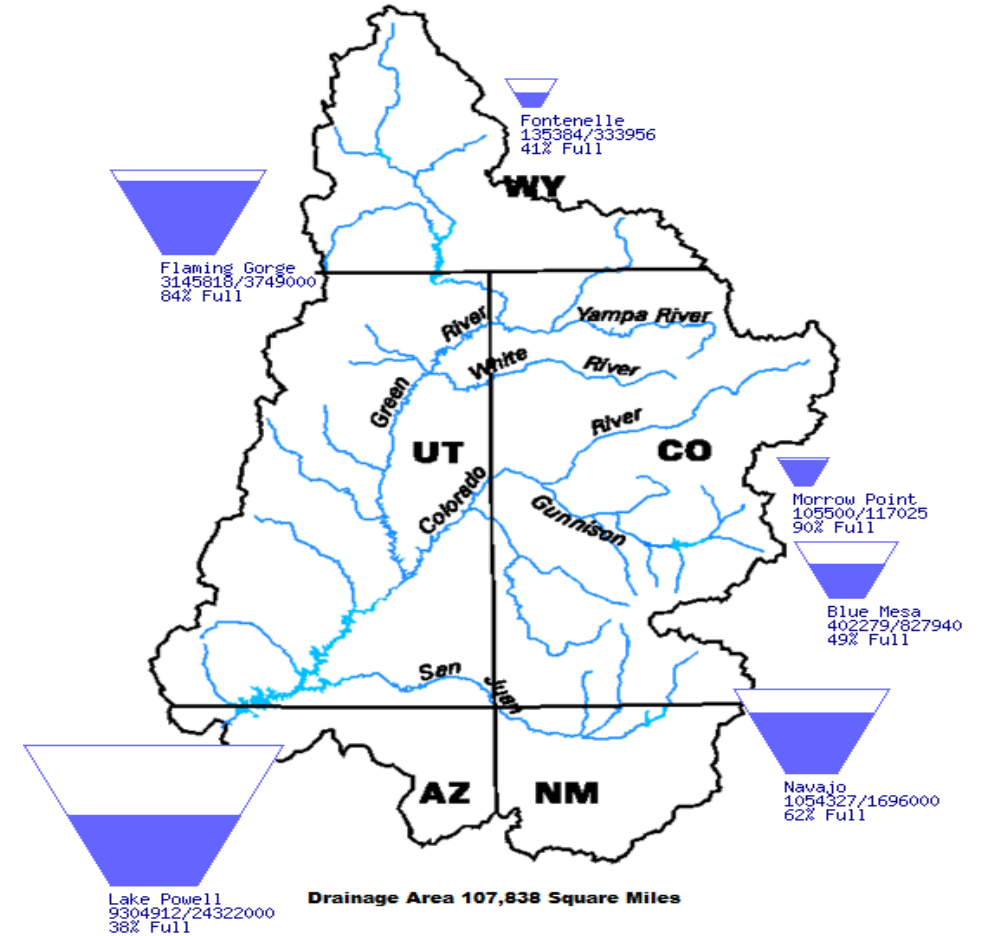


Upper Basin Storage (as of February 23, 2021)

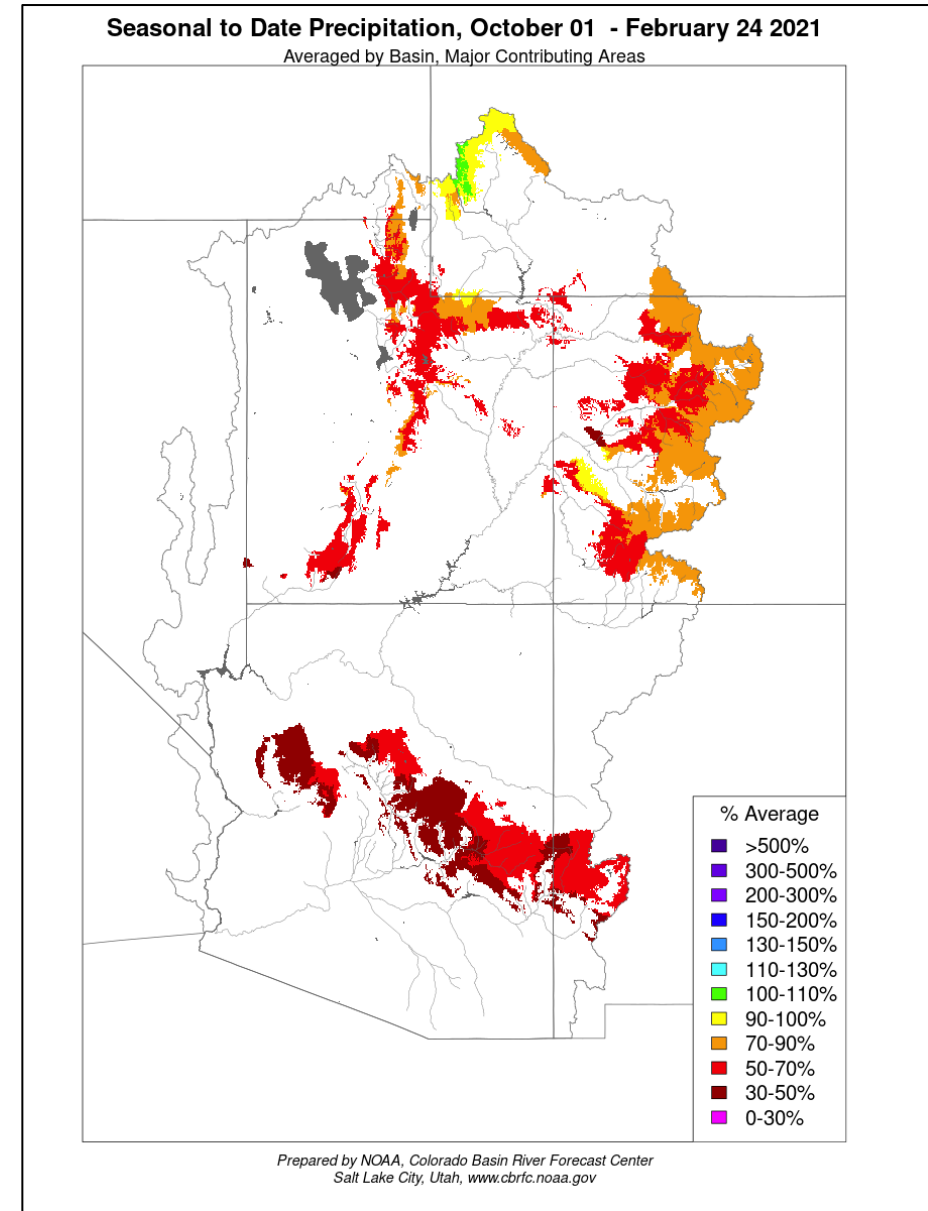
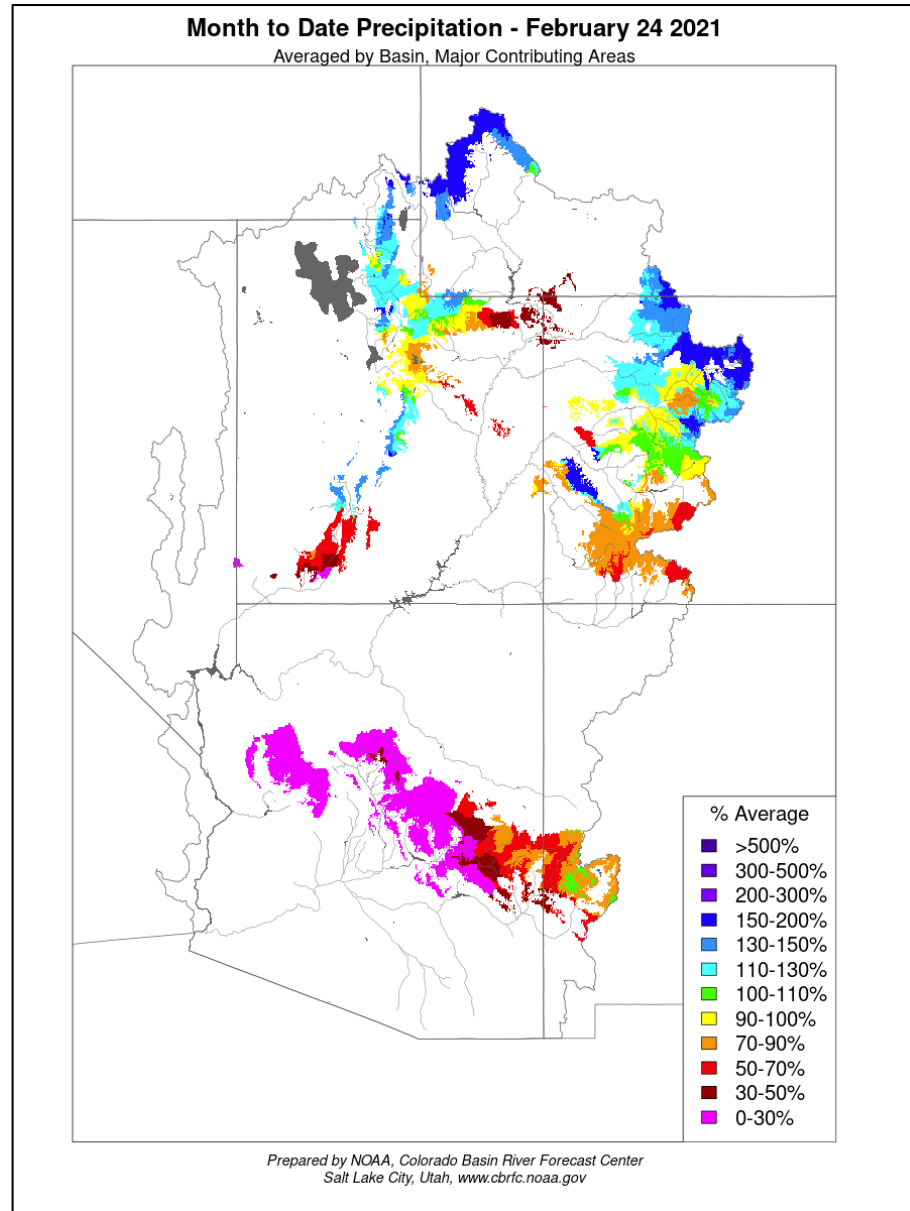
Data Current as of:
02/23/2021

Upper Colorado River Drainage Basin

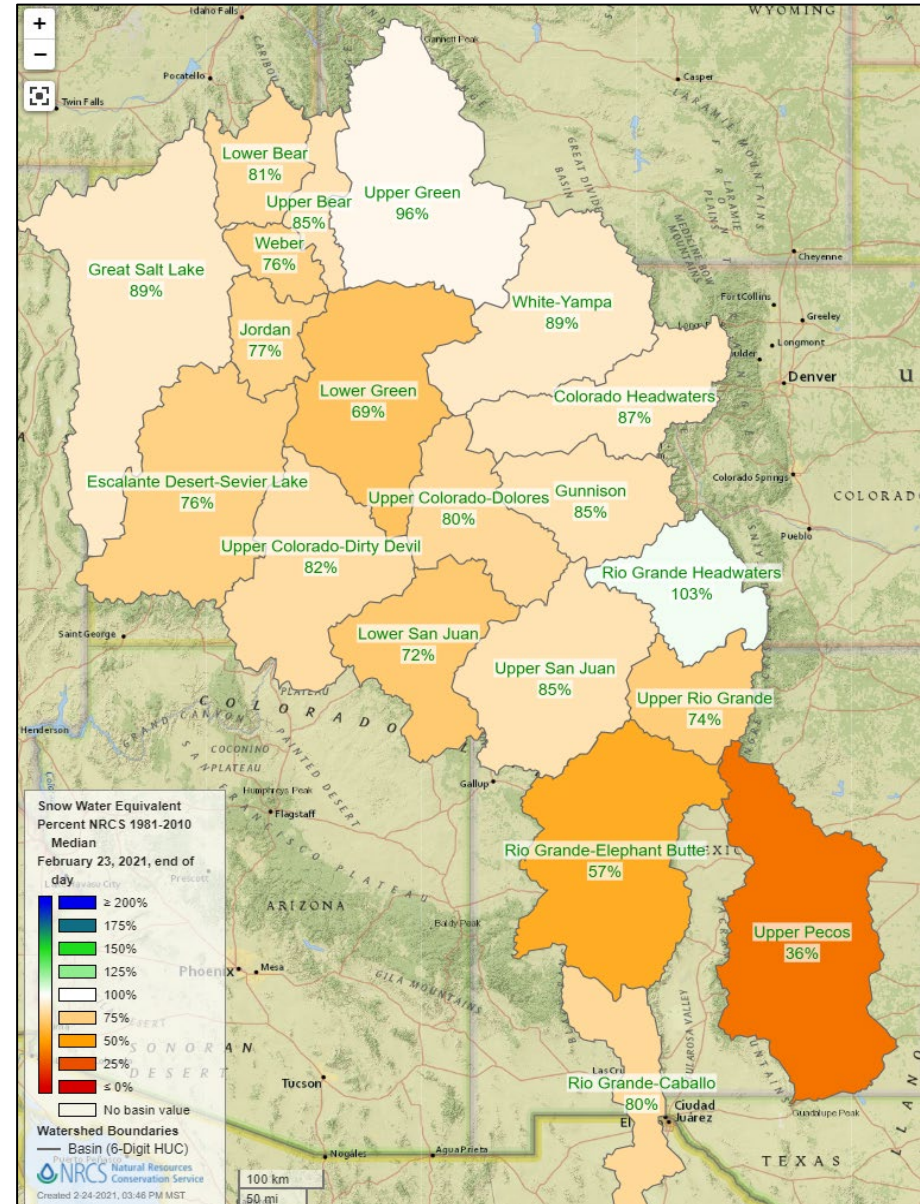
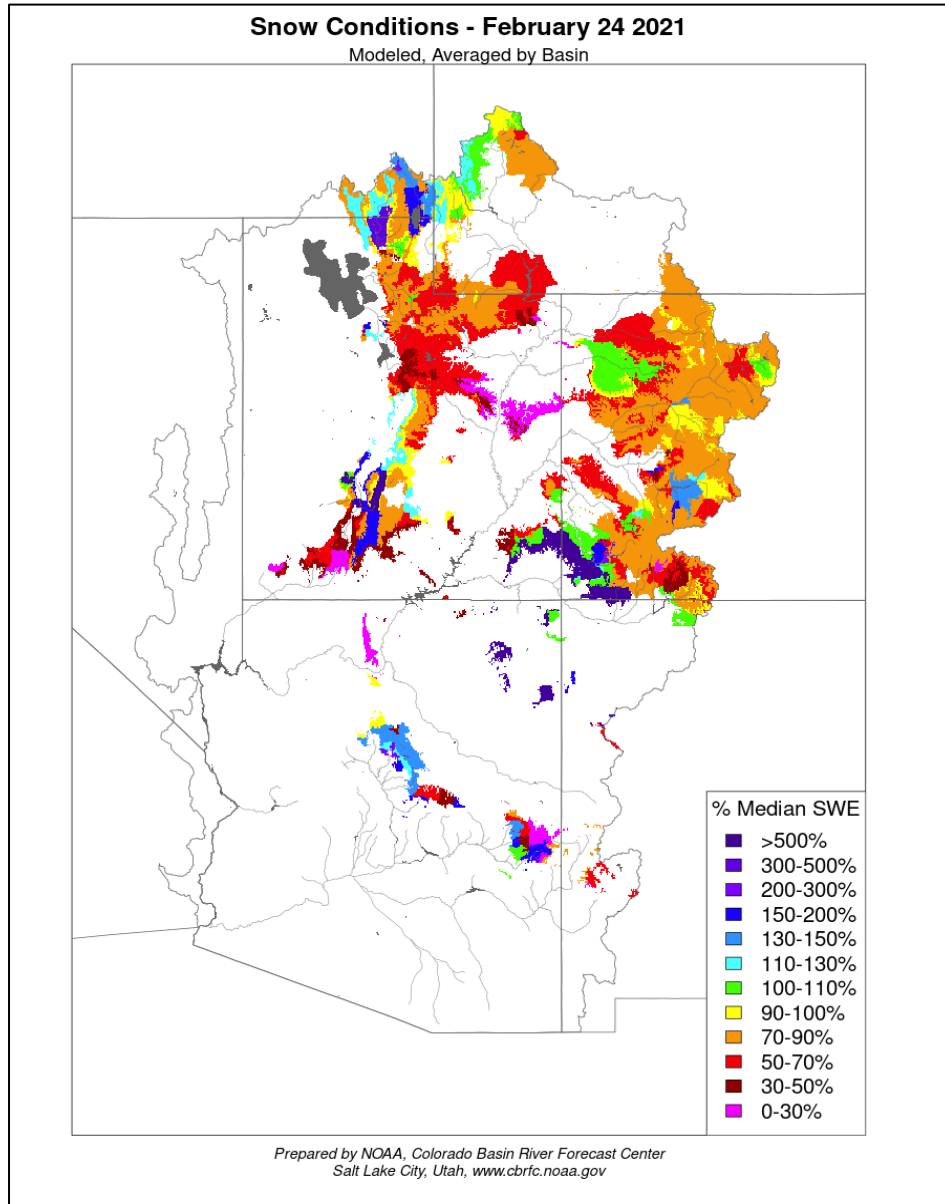
Reservoir	Percent Current Live Storage	Current Live Storage (maf)	Live Storage Capacity (maf)	Elevation (feet)
Fontenelle	41	.135	.334	6475.31
Flaming Gorge	84	3.15	3.75	6,024.61
Blue Mesa	49	0.402	.828	7,465.58
Navajo	62	1.05	1.70	6,034.48
Lake Powell	38	9.32	24.32	3,572.43
UC System Storage	46	14.16	31.09	



Seasonal and Monthly Precipitation



Seasonal Snow Conditions and Basin SWE

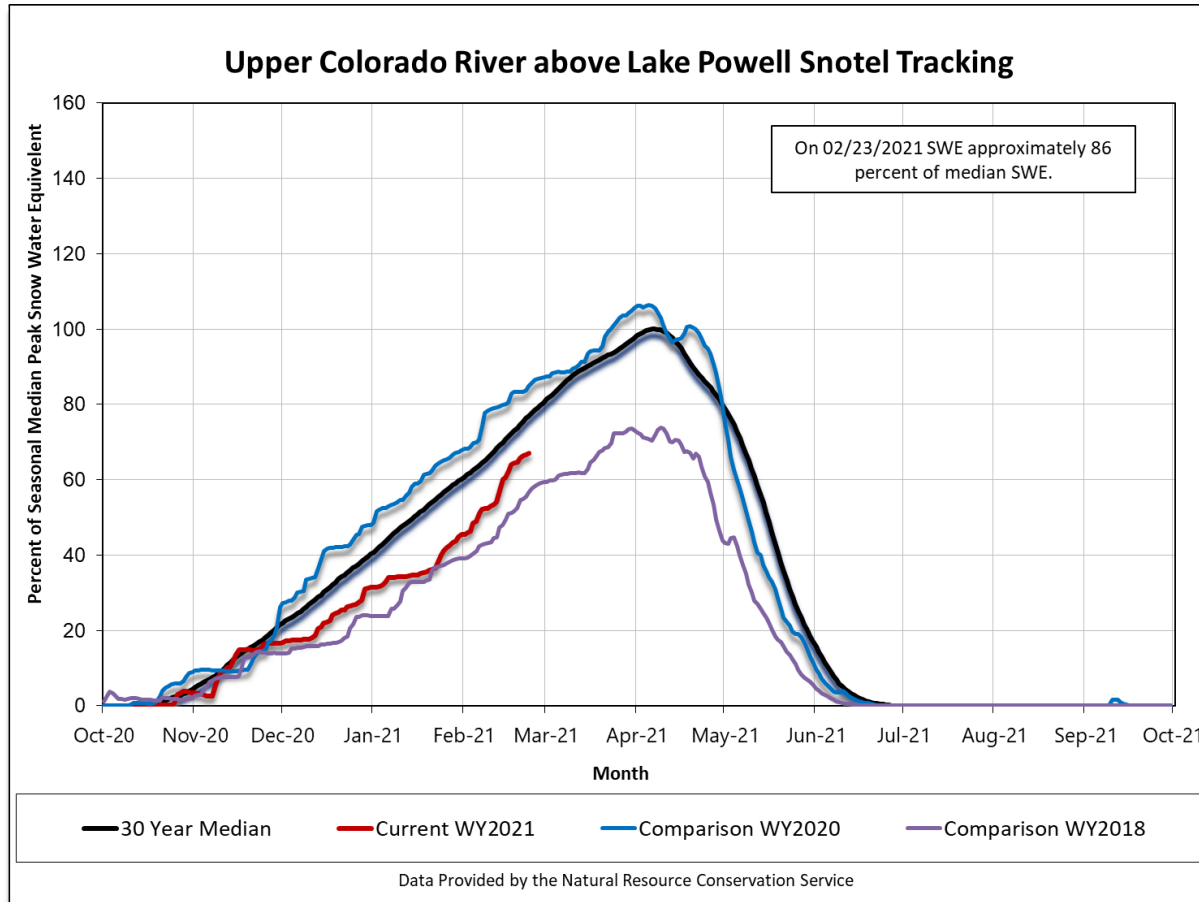


Upper Colorado Basin

Projected Operations
for Water Year 2021
Based on February 2021
Modeling



Current SWE and WY2021 Forecast



Water Year 2021 Forecasted Unregulated Inflow as of February 1, 2021

Reservoir	Unregulated Inflow (kaf)	Percent of Average ¹
Fontenelle	659	64
Flaming Gorge	814	56
Blue Mesa	674	71
Navajo	605	56
Powell	5,149	48

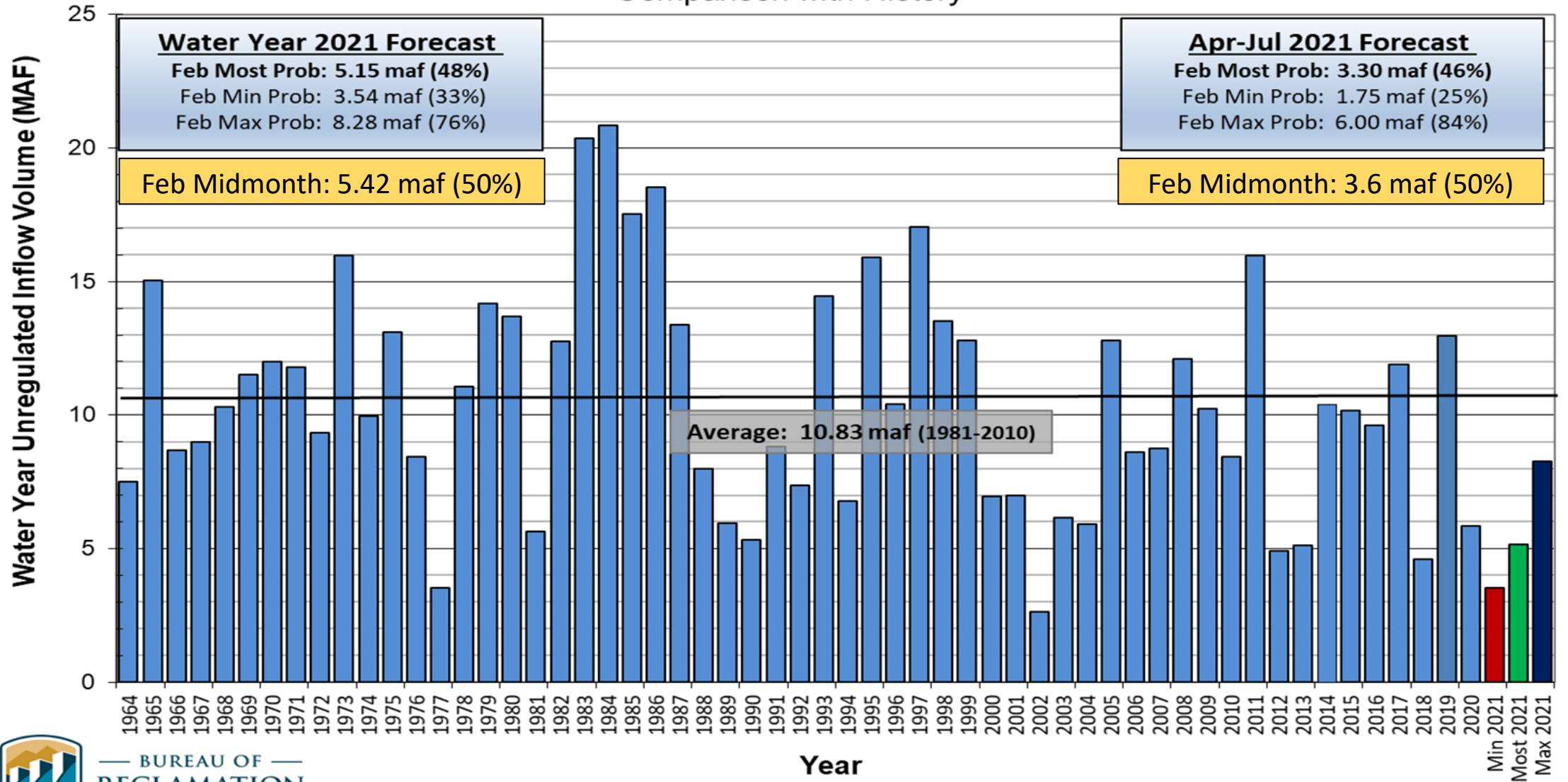
¹ Percent of average based on the period of record from 1981-2010.



Lake Powell Unregulated Inflow

Water Year 2021 Forecast *(issued February 4)*

Comparison with History



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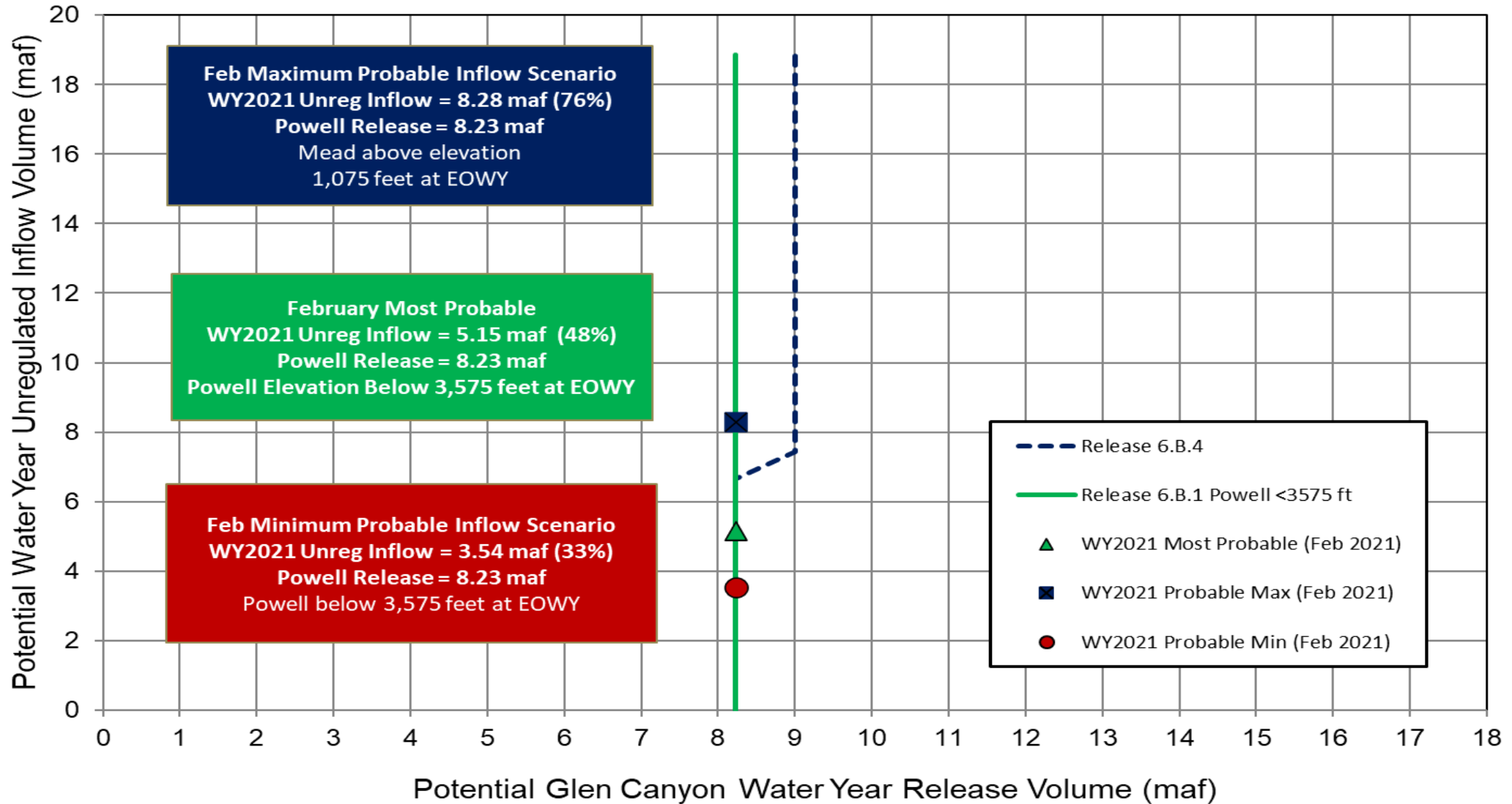
Drought Operations

- The January and February 2021 Minimum Probable 24 Month Study (24-MS) runs project Powell to fall below 3525 feet in 2022.
- The Basin States, UCRC, WAPA, NPS & FWS were notified of these projections.
- Model results *do not* initiate immediate operational changes to Reclamation facilities.
- Model results *do* initiate enhanced monitoring and coordination under the DROA.
- Model results *do* initiate monthly analysis of min/most/max with the parties specified in the DROA.
- The DROA enhanced monitoring and coordination will continue until either:
 - (i) The minimum probable projected elevation remains above 3525' for 24 months; or
 - (ii) the process moves to the next step when the Most Probable 24-MS projects Powell elevations below 3,525 feet and a specific Drought Response Operations Plan is developed. (Section II.A.4.b)



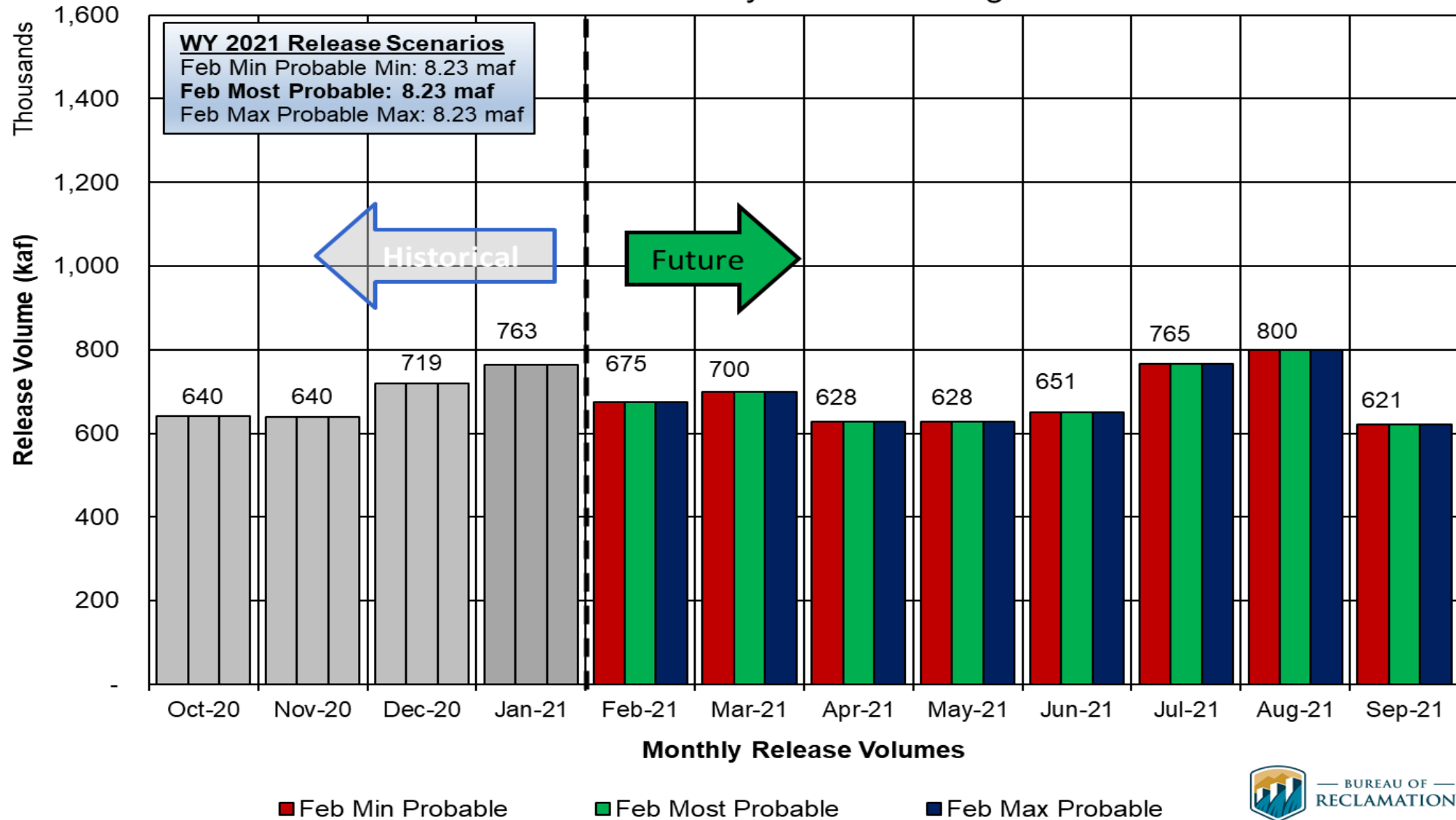
Lake Powell Release Scenarios under Section 6.B

Water Year 2021 Release Volume as a Function of Upper Elevation Balancing Tier
based on February 2021 24-Month Study Conditions



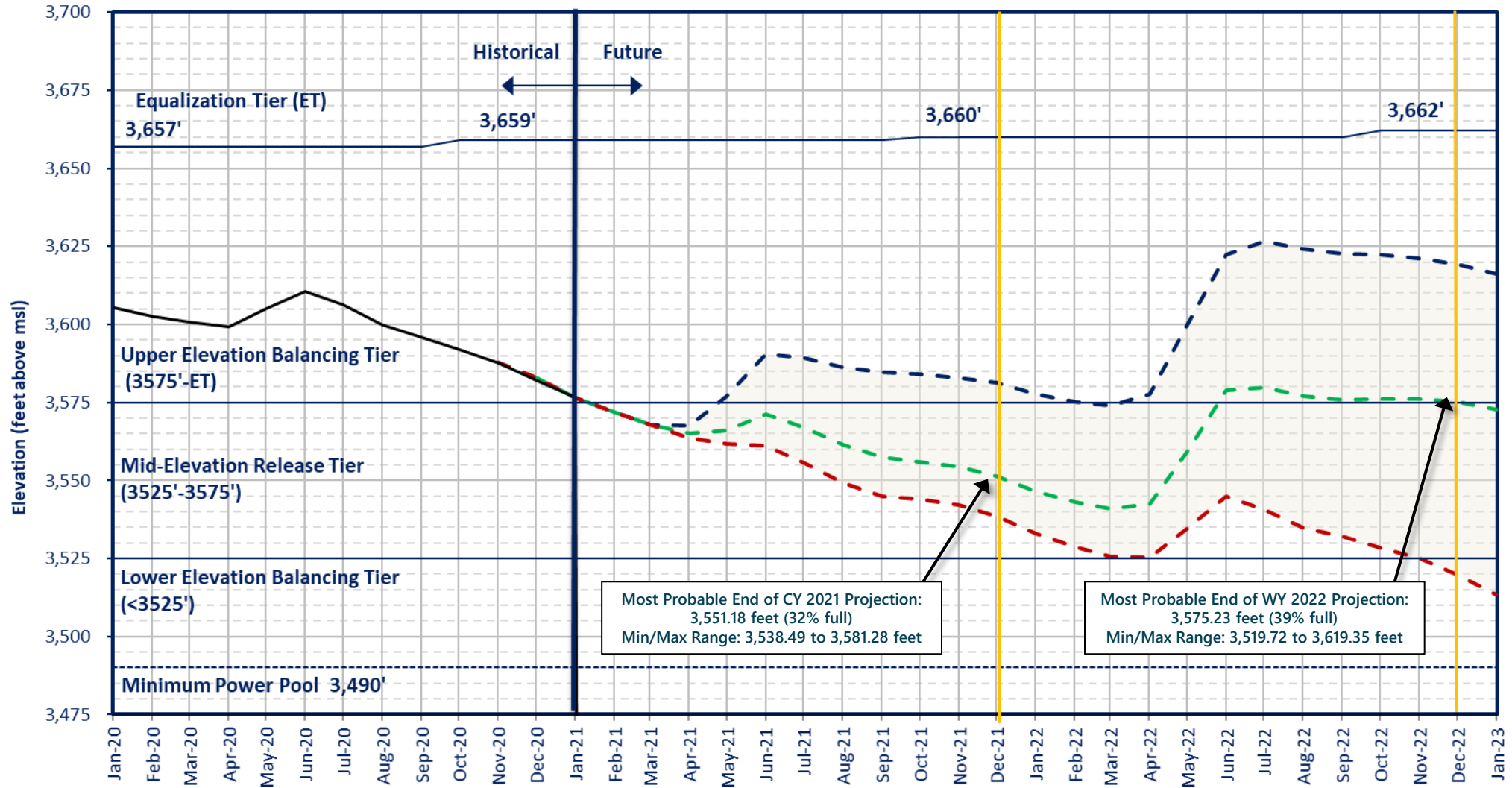
Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2021
Based on February 2021 Modeling



Lake Powell End of Month Elevations

Historical and Projected based on February 2021 24-Month Study Inflow Scenarios



- Feb 2021 Most Probable - Lake Powell release of 8.23 maf in WY2021, 7.48 maf in WY2022 and 7.48 maf in WY2023
- Feb 2021 Max Probable - Lake Powell release of 8.23 maf in WY2021, 9.0 maf in WY2022 and 9.0 maf in WY2023
- Feb 2021 Min Probable - Lake Powell release of 8.23 maf in WY2021, 7.48 maf in WY2022, and 8.15 maf in WY2023
- Historical Elevations

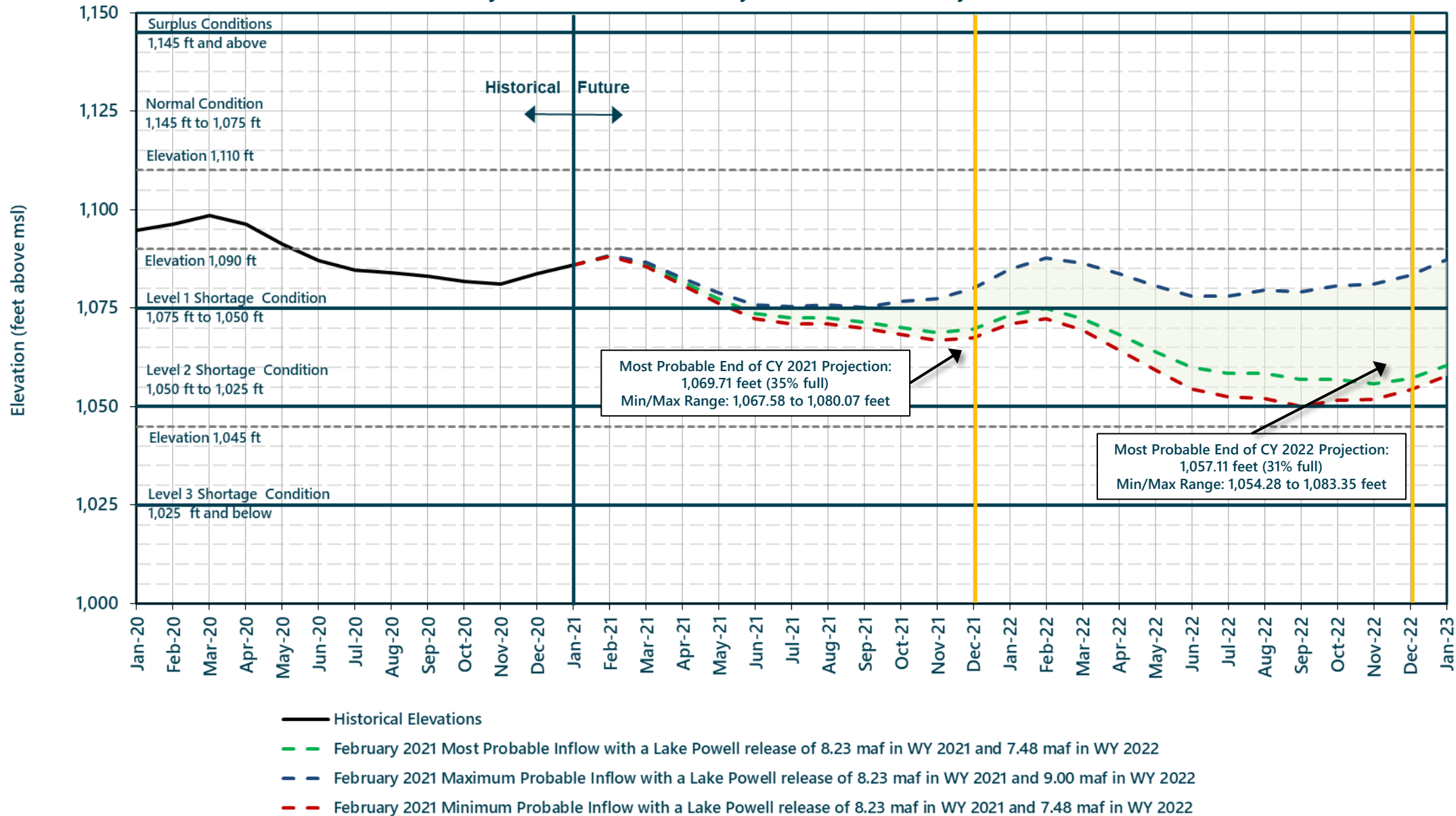


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Lake Mead End of Month Elevations

Projections from the February 2021 24-Month Study Inflow Scenarios



Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2021

Unit Number	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
1	[Outage]											
2	[Outage]											
3	[Outage]											
4	[Outage]											
5		[Outage]						[Outage]				
6		[Outage]										
7	[Outage]							[Outage]				
8								[Outage]				
Units Available	5	5/4	6	6	6	6	6	5	6	6	6/8	8/6
Capacity (cfs)	16,400	16,400/ 12,200	19,800	19,600	19,500	19,400 (20,150) ⁴	19,300	15,800	19,500	19,400	19,200	19,100
Capacity (kaf/month)	1,040	1,140	1,250	1,220	1,080	1,190	1,190	1,050	1,160	1,190	1,330	1,400
Max (kaf) ²	640	640	720	763	675	700	628	628	651	765	800	620
Most (kaf) ¹	640	640	720	763	675	700	628	628	651	765	800	620
Min (kaf) ²	640	640	720	760	680	710	640	630	660	750	800	600

FEB MOST³
FEB MOST
8.23
8.23
8.23

(updated 02-24-2021)

- 1 Projected release, based on January 2021 Most Probable Inflow Projections and 24-Month Study model runs.
- 2 Projected release, based on January 2021 Min and Max Probable Inflow Projections and 24-Month Study model runs.
- 3 Dependent upon availability to shift contingency reserves, which will increase capacity by 30-40MW (3%) at current efficiency.
- 4 Increased capacity available from shifting contingency reserves for Spring Disturbance Flow.



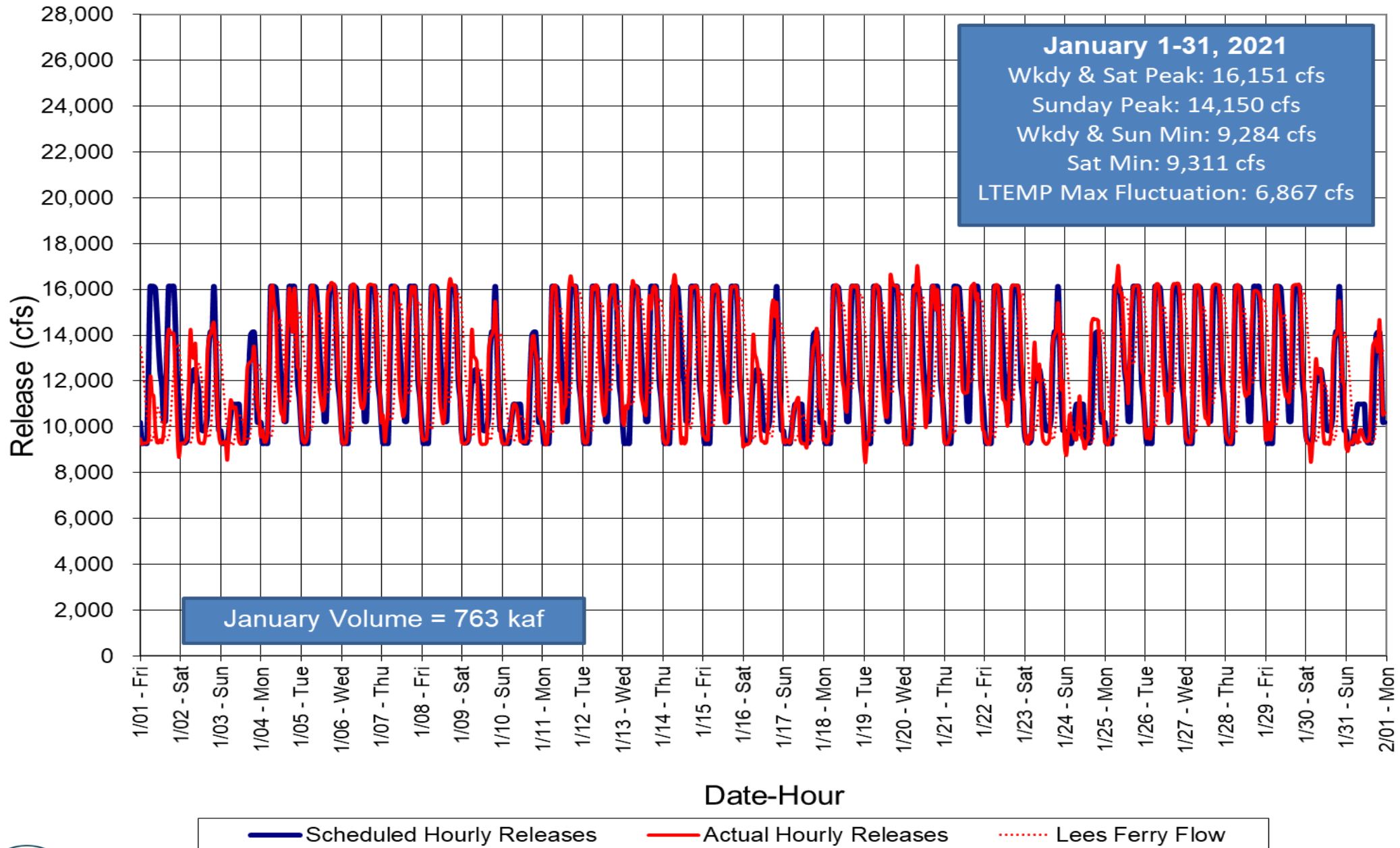
Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2022

Unit Number	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	
1	■											■	
2	■											■	
3		■											
4		■						■					
5									■				
6									■				
7		■			■								
8					■								
Units Available	6	6/5	5/6	6	4	6	8	7	6	6	6	4	
Capacity (cfs)	19,100	19,000/ 15,500	15,400/ 18,900	18,900	11,800/ 18,600	18,600	25,500	22,700	19,700	19,700	19,600	12,400	FEB MOST ³
Capacity (kaf/month)	1,160	1,020	1,090	1,140	720	1,220	1,520	1,430	1,240	1,210	1,210	790	FEB MOST
Max (kaf) ²	643	642	715	857	758	801	713	710	745	842	900	674	9.0
Most (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568	7.48
Min (kaf) ²	480	500	600	723	639	675	601	599	628	709	758	548	7.48
										(updated 02-24-2021)			

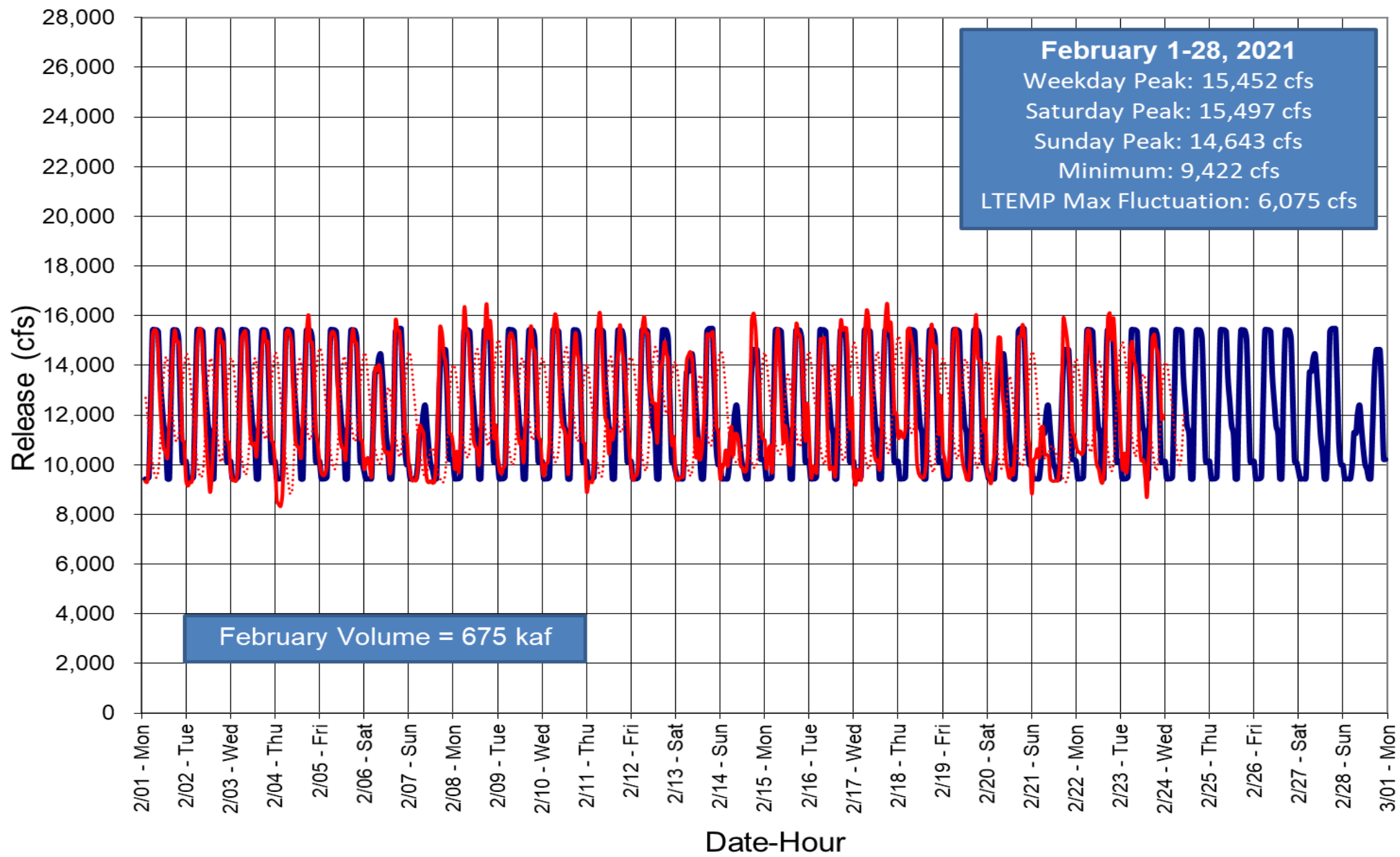
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- 2 Projected release, based on January 2021 Min and Max Probable Inflow Projections and 24-Month Study model runs.
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Glen Canyon Dam Hourly Release Pattern January 2021



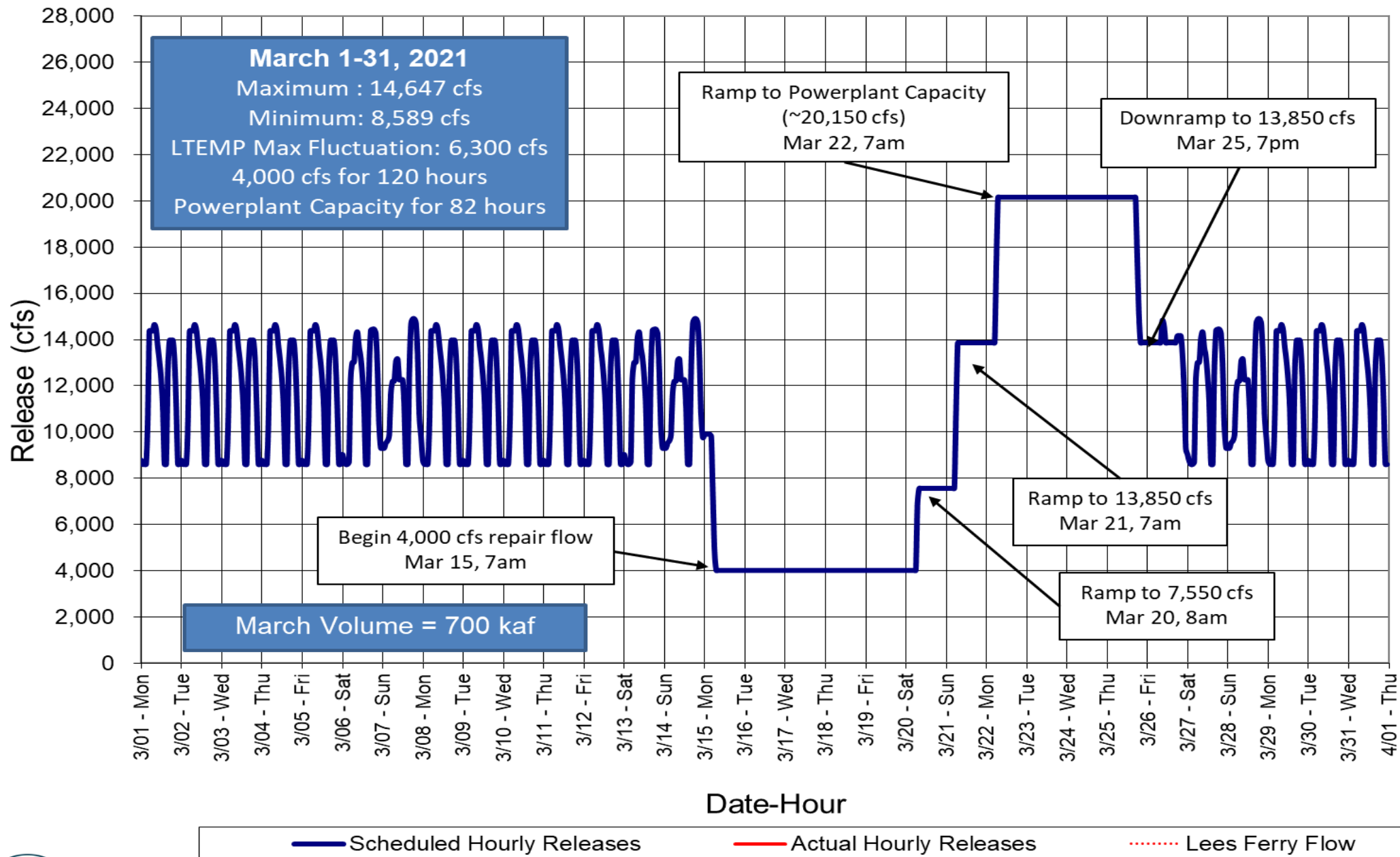
Glen Canyon Dam Hourly Release Pattern February 2021



— Scheduled Hourly Releases
 — Actual Hourly Releases
 ⋯ Lees Ferry Flow



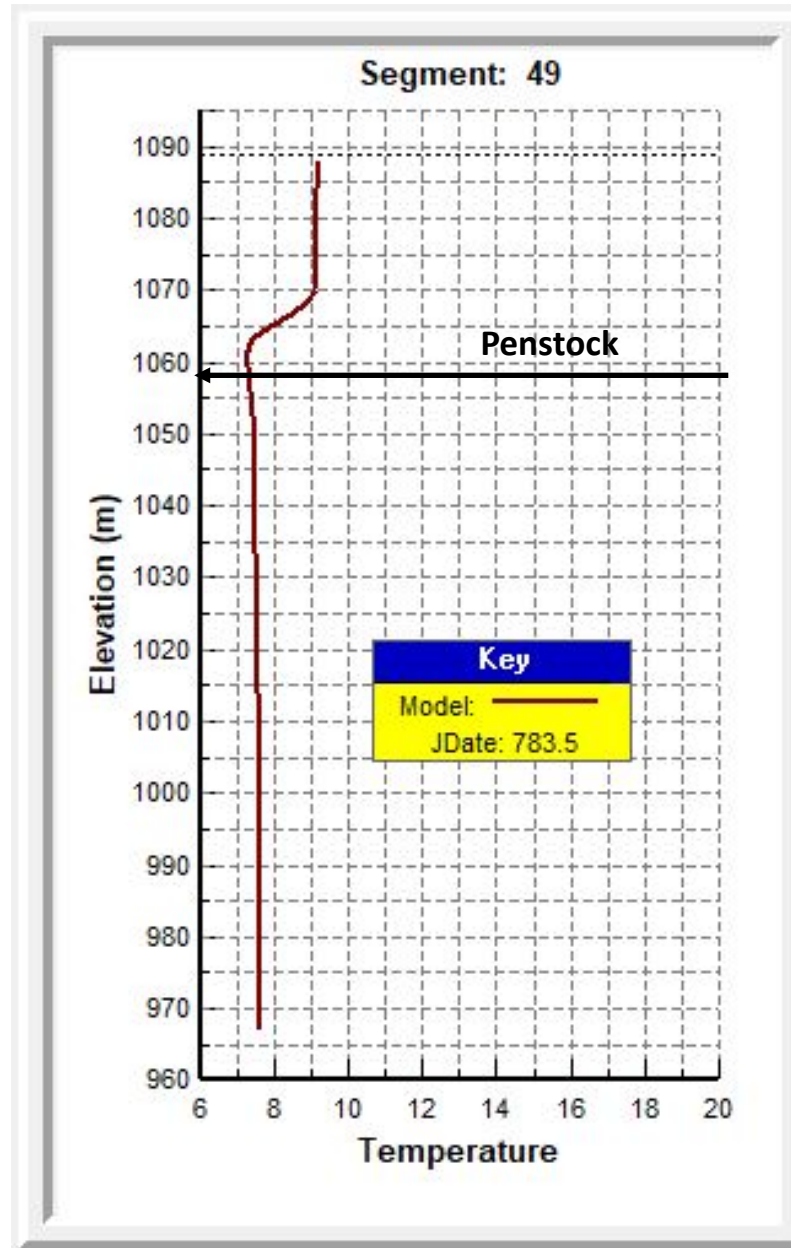
Glen Canyon Dam Hourly Release Pattern March 2021



Water Quality

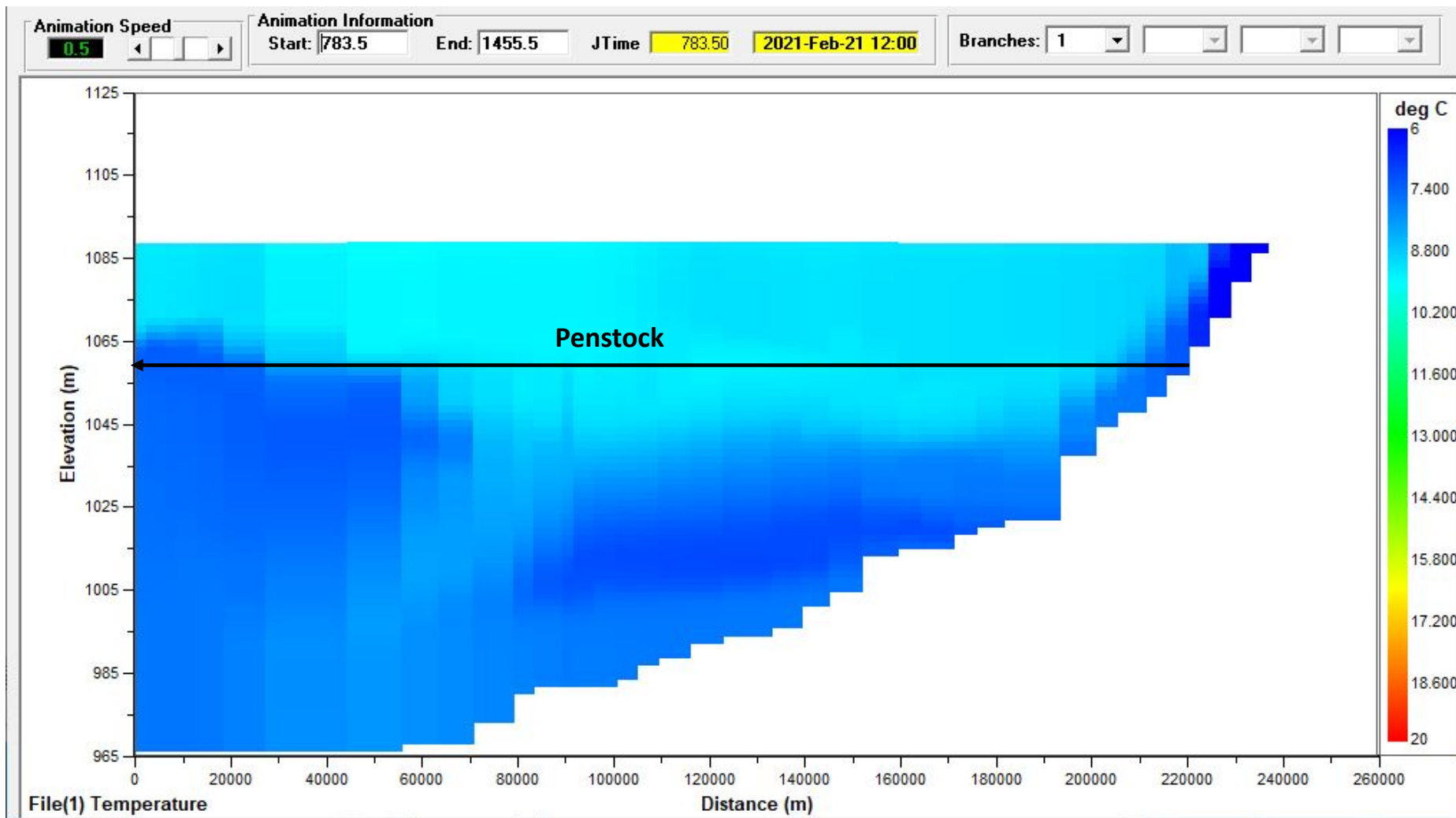


Temperature Profile of Lake Powell near Glen Canyon Dam 2/21/2021

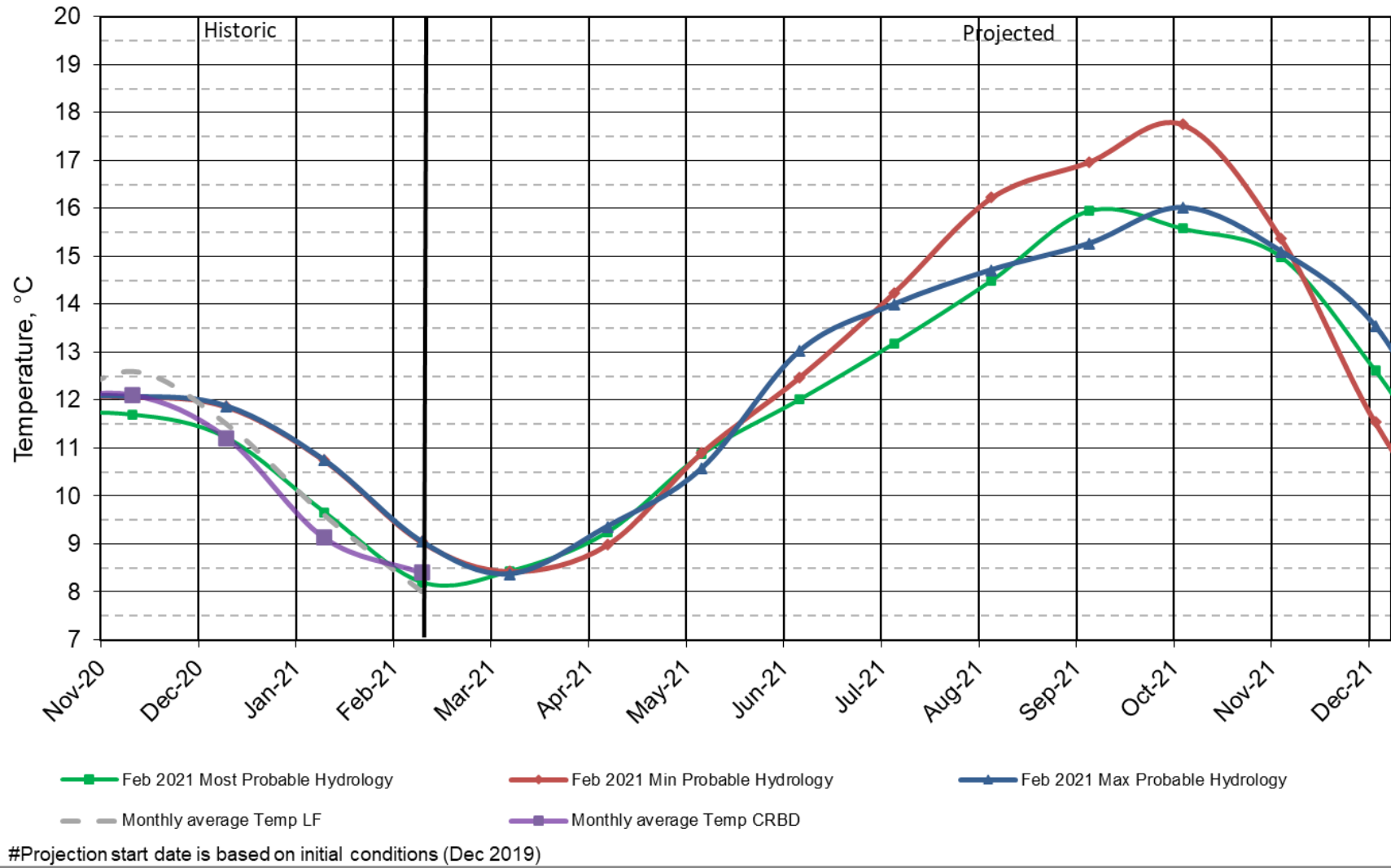


Cross Sectional Temperature Profile of Lake Powell

2/21/2021

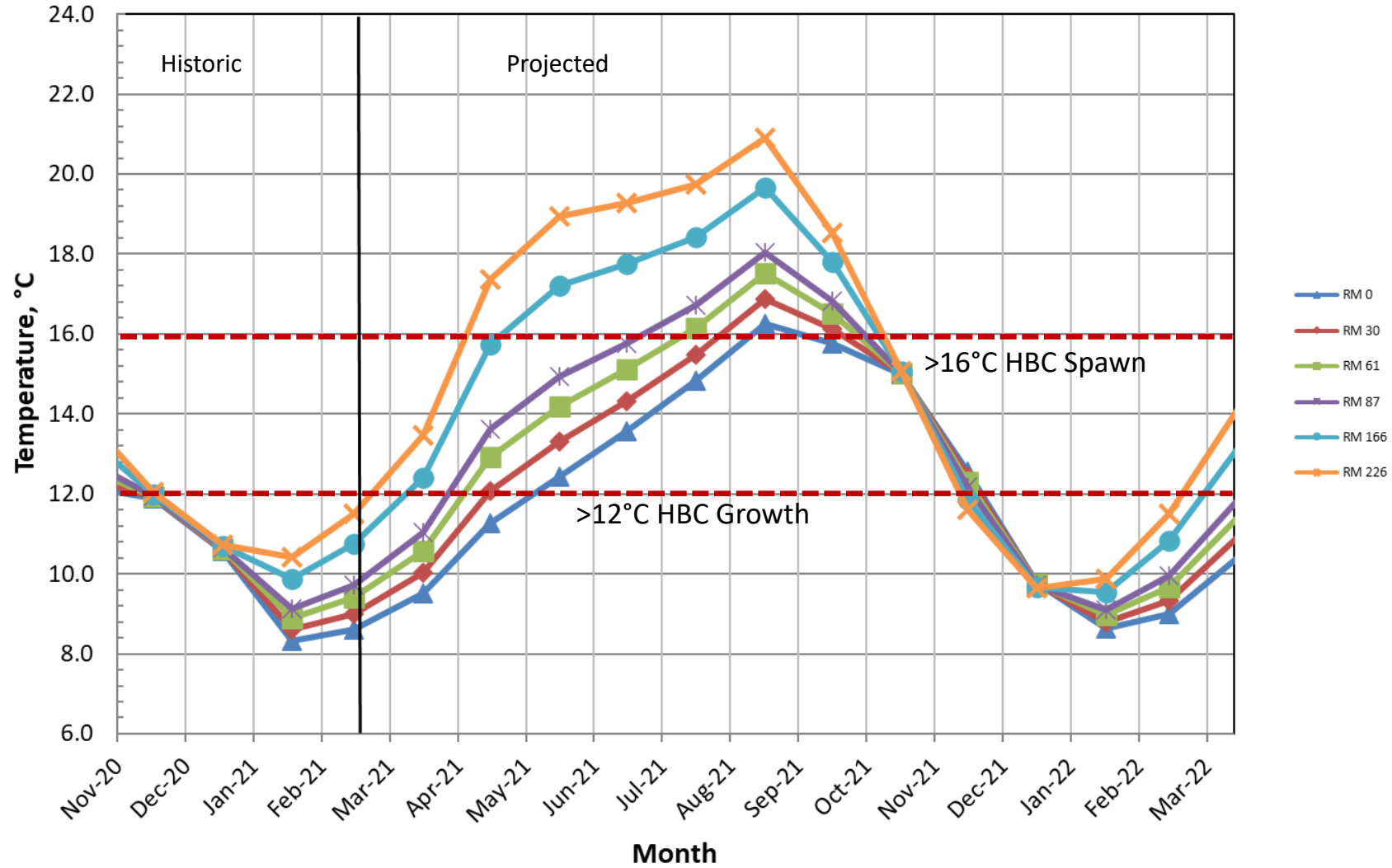


Lake Powell Release Temperature Projected Temperature based on Feb 2021 Forecast

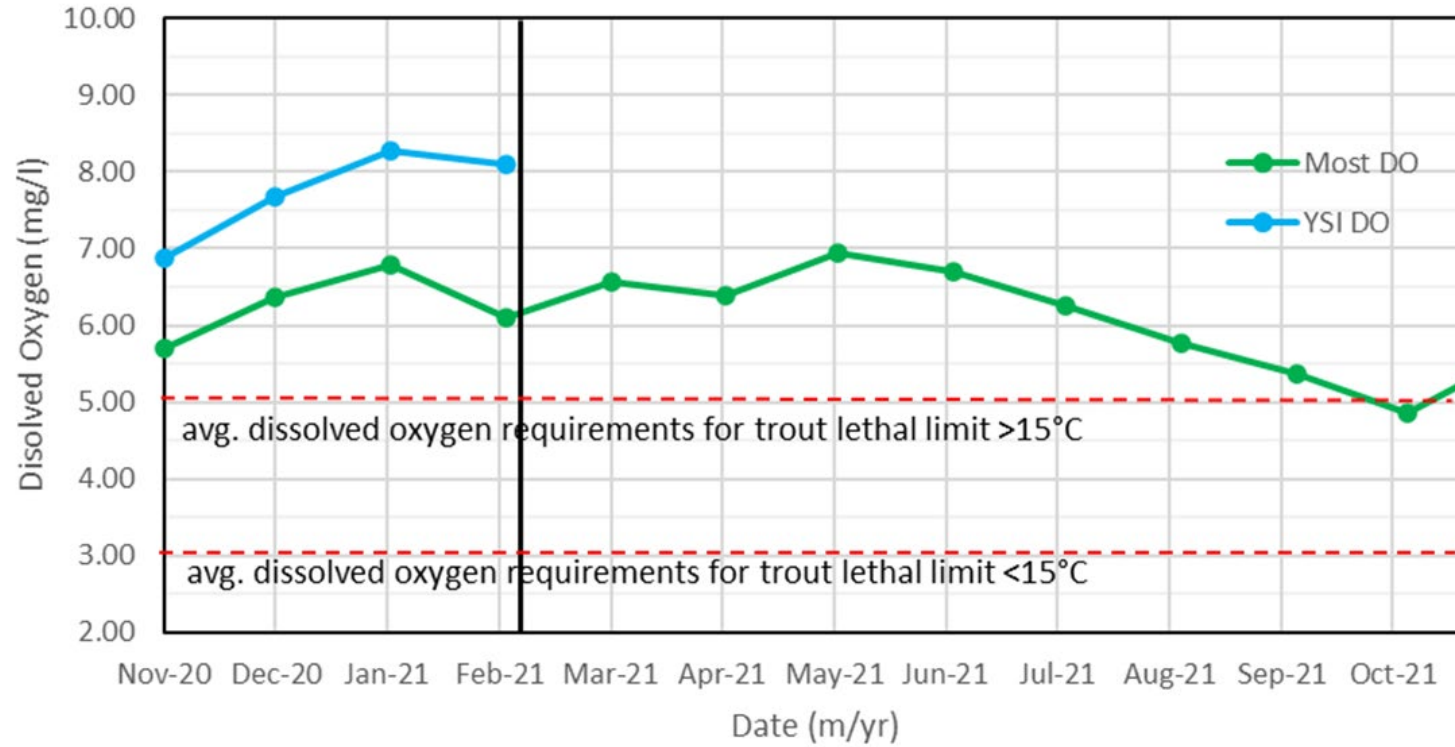


Colorado River, Grand Canyon Water Temperatures

Projections based on Feb. 2021, Most Probable Hydrology



DO Concentration Feb. Most-probable @ GCD



Questions/Discussion



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