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# Glen Canyon Monthly Operations Call

## Basin Hydrology and Operations

March 18, 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.”

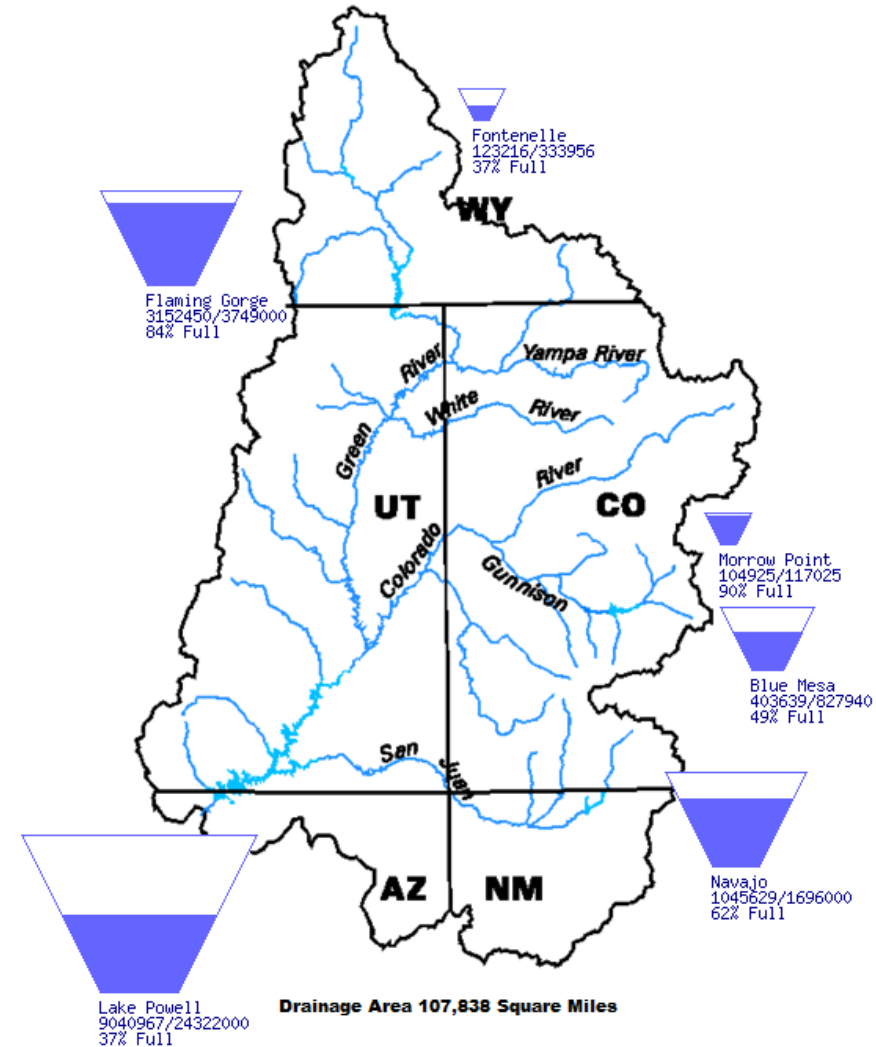


# Upper Basin Storage (as of March 15, 2021)

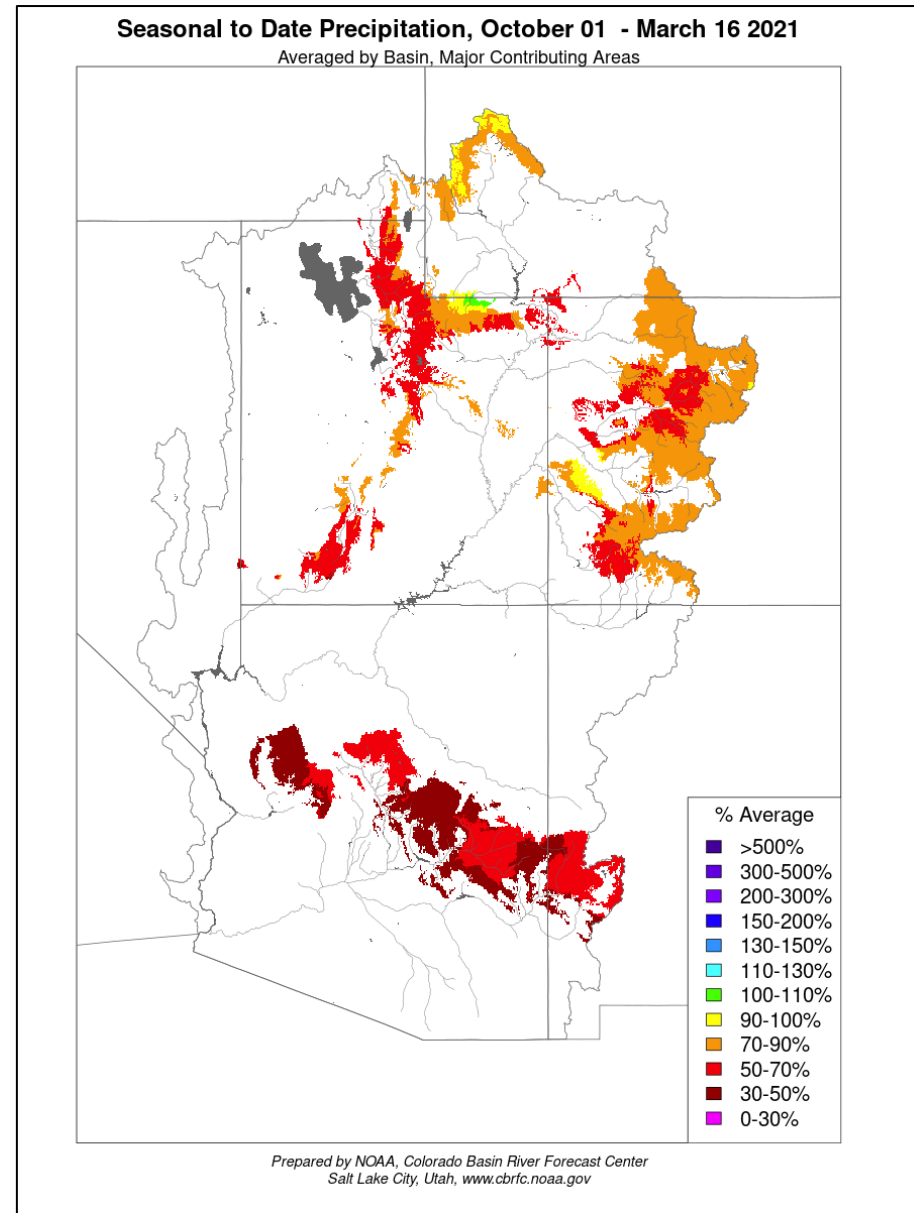
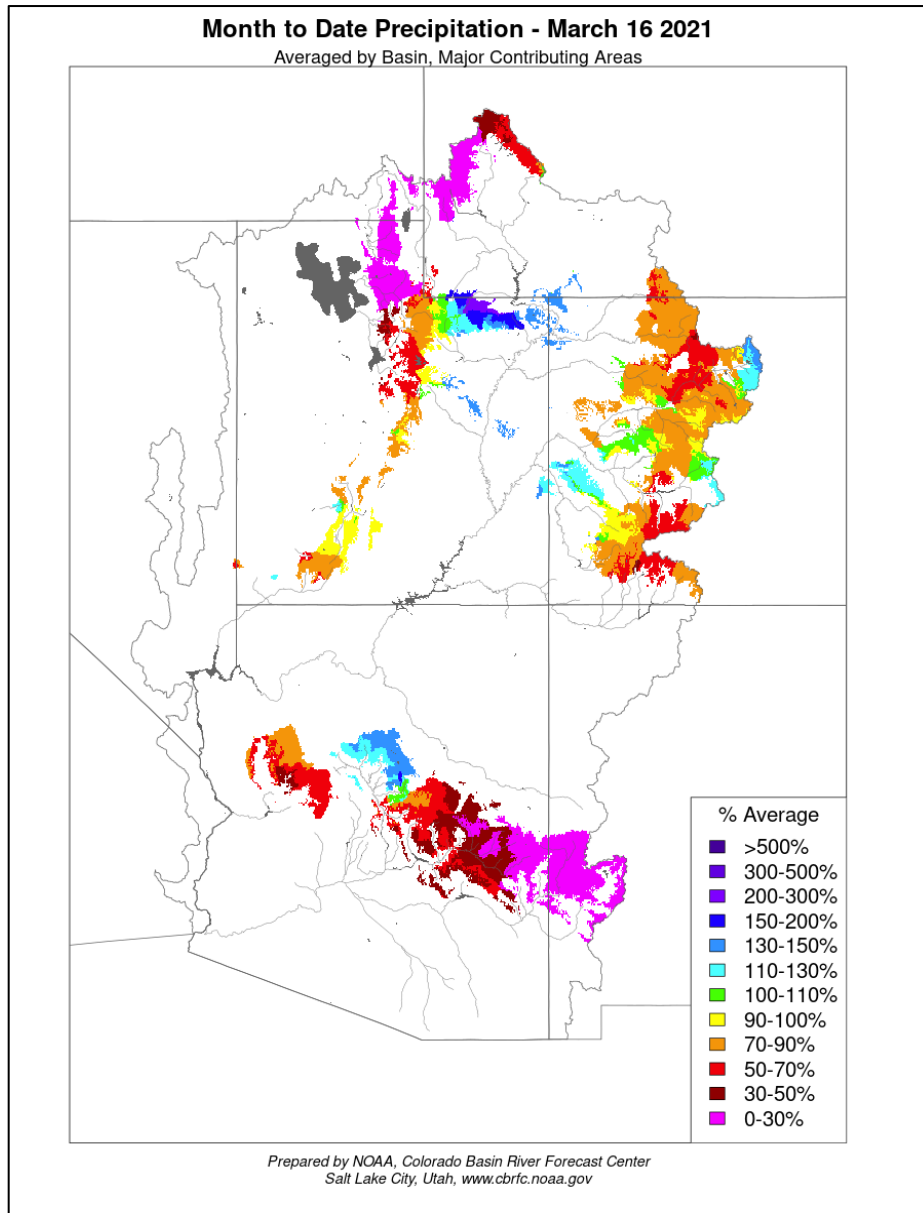
Data Current as of:  
03/14/2021

## Upper Colorado River Drainage Basin

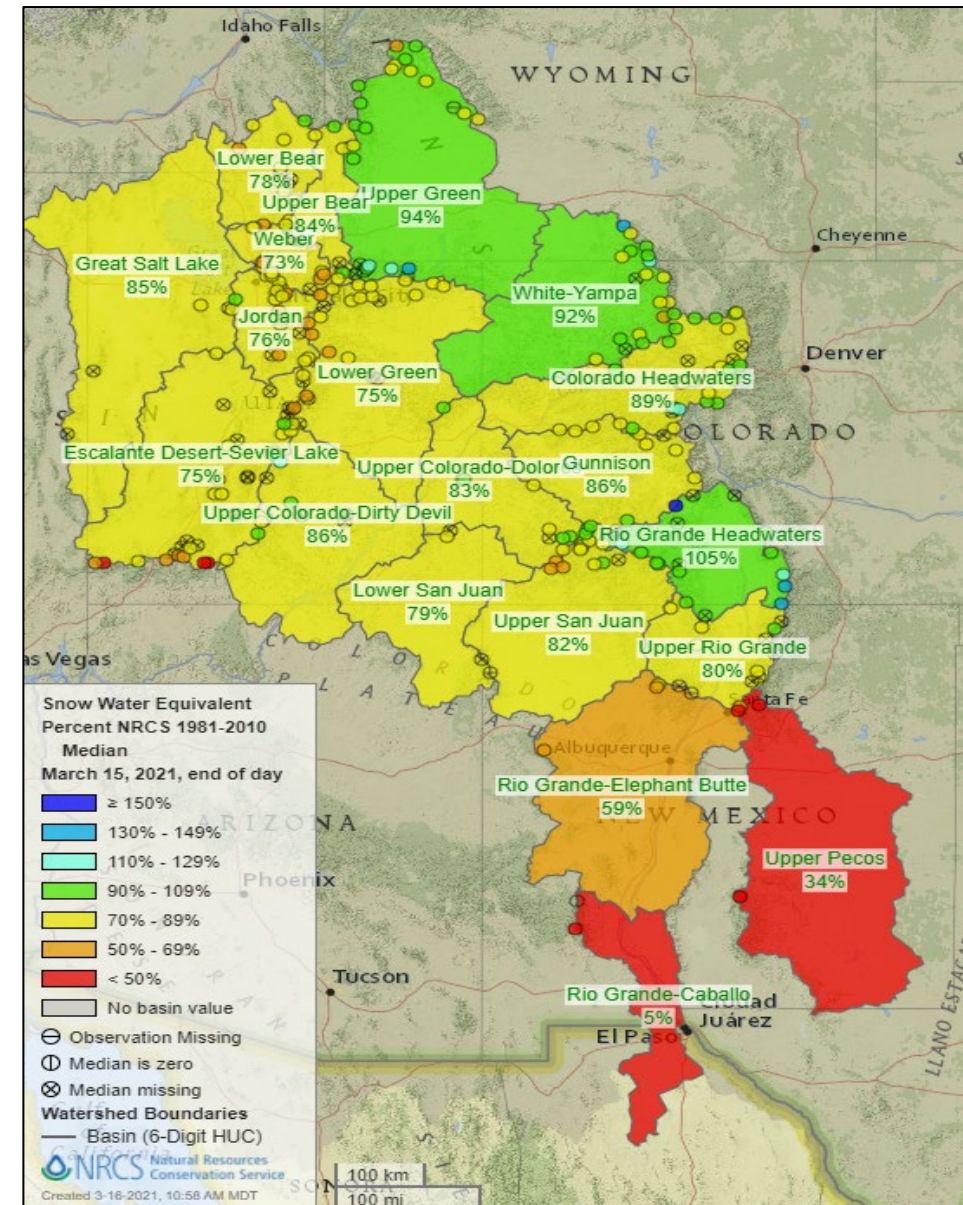
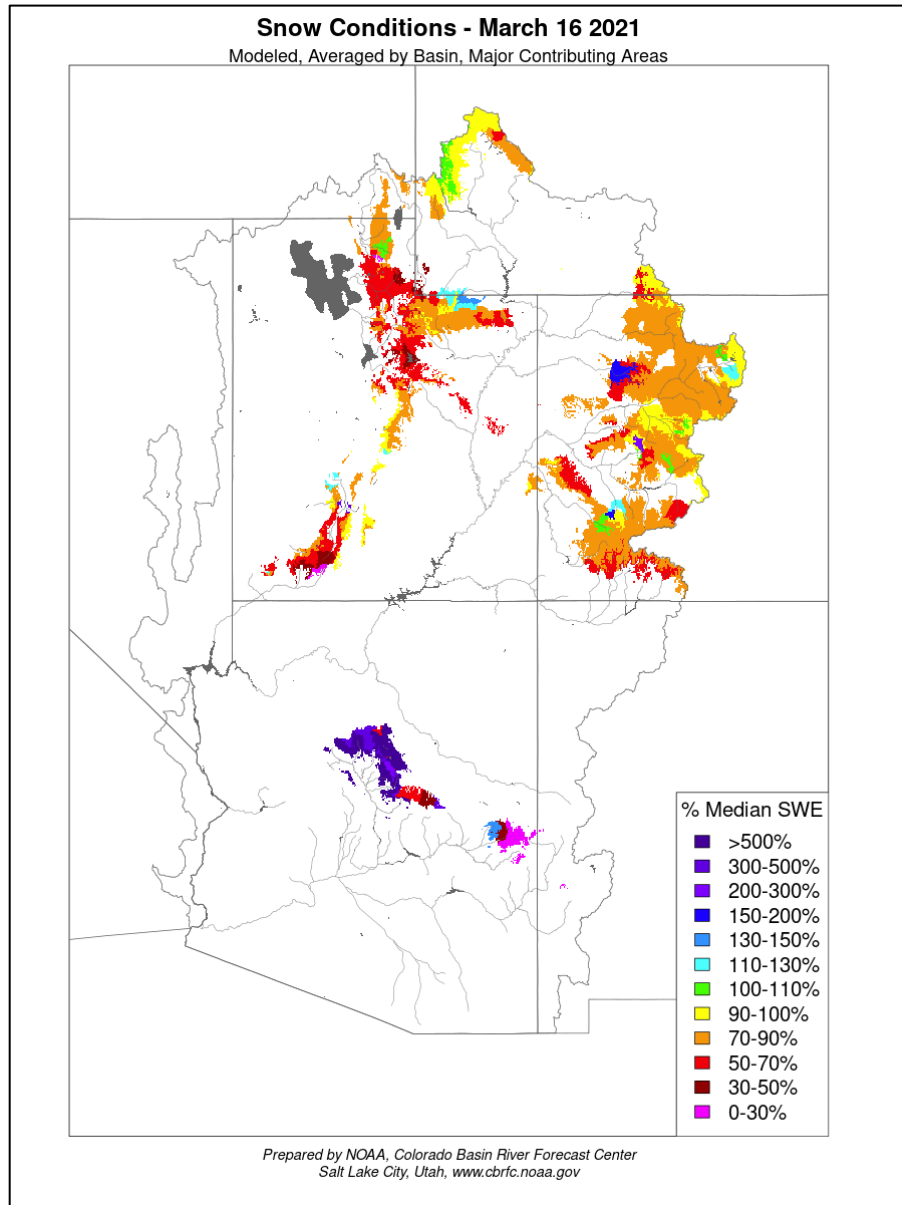
Reservoir	Percent Current Live Storage	Current Live Storage (maf)	Live Storage Capacity (maf)	Elevation (feet)
Fontenelle	37	.123	.334	6472.49
Flaming Gorge	84	3.15	3.75	6,024.81
Blue Mesa	49	0.404	.828	7,465.80
Navajo	62	1.05	1.70	6,033.63
Lake Powell	38	9.04	24.32	3,569.21
UC System Storage	45	13.9	31.09	



# Seasonal and Monthly Precipitation



# Seasonal Snow Conditions and Basin SWE



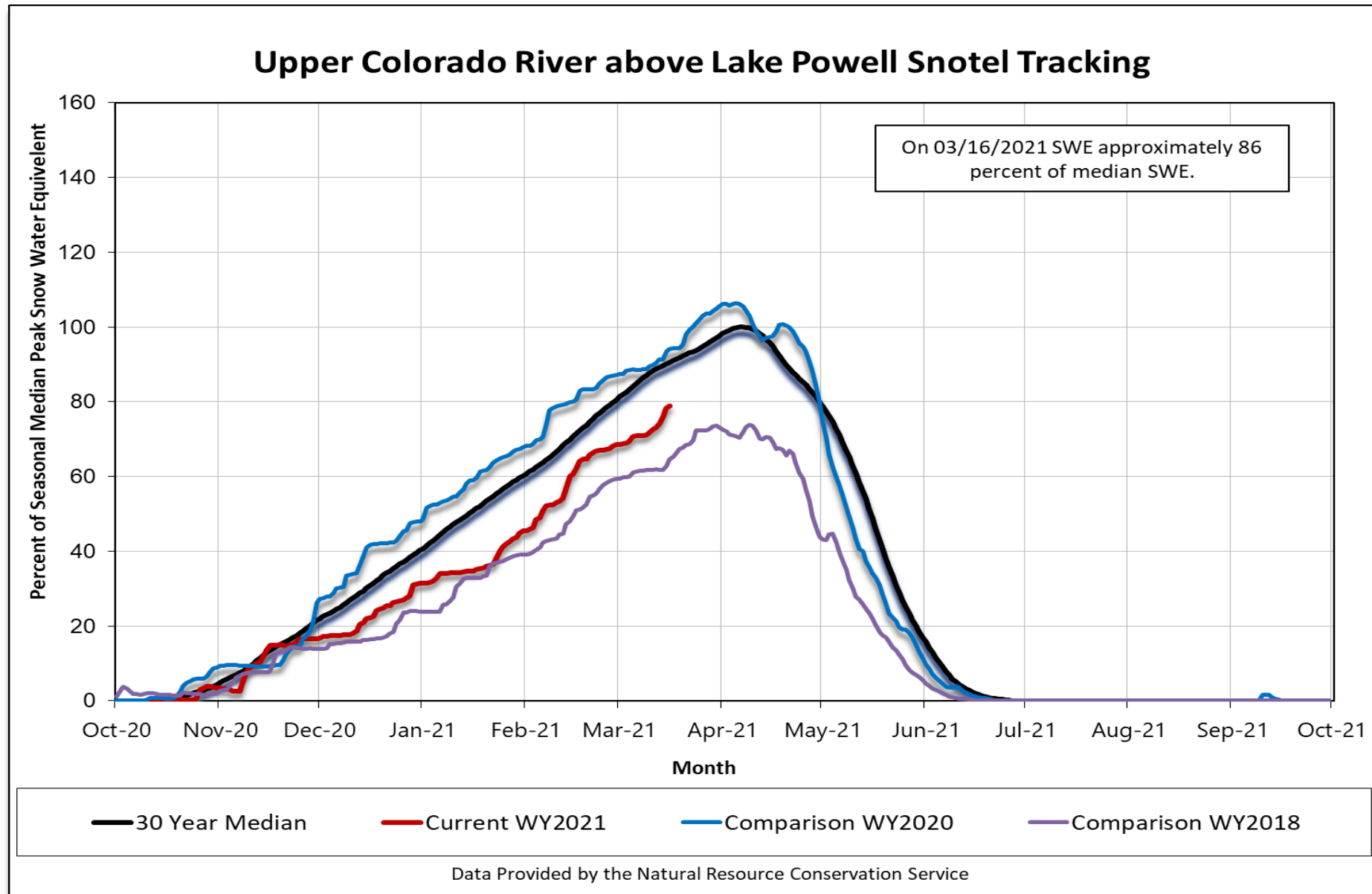


# Upper Colorado Basin

## Projected Operations for Water Year 2021 Based on March 2021 Modeling



# Current Snow Water Equivalent (as of March 15, 2021)



# Most Probable Spring and WY2021 Forecast

April – July 2021  
Forecasted Unregulated Inflow  
as of March 2, 2021

Reservoir	Unregulated Inflow (kaf)	Percent of Average <sup>1</sup>
Fontenelle	480	66
Flaming Gorge	555	57
Blue Mesa	460	68
Navajo	415	56
Powell	3,400	47

Water Year 2021  
Forecasted Unregulated Inflow  
as of March 2, 2021

Reservoir	Unregulated Inflow (kaf)	Percent of Average <sup>1</sup>
Fontenelle	755	70
Flaming Gorge	865	59
Blue Mesa	669	70
Navajo	567	53
Powell	5,130	47

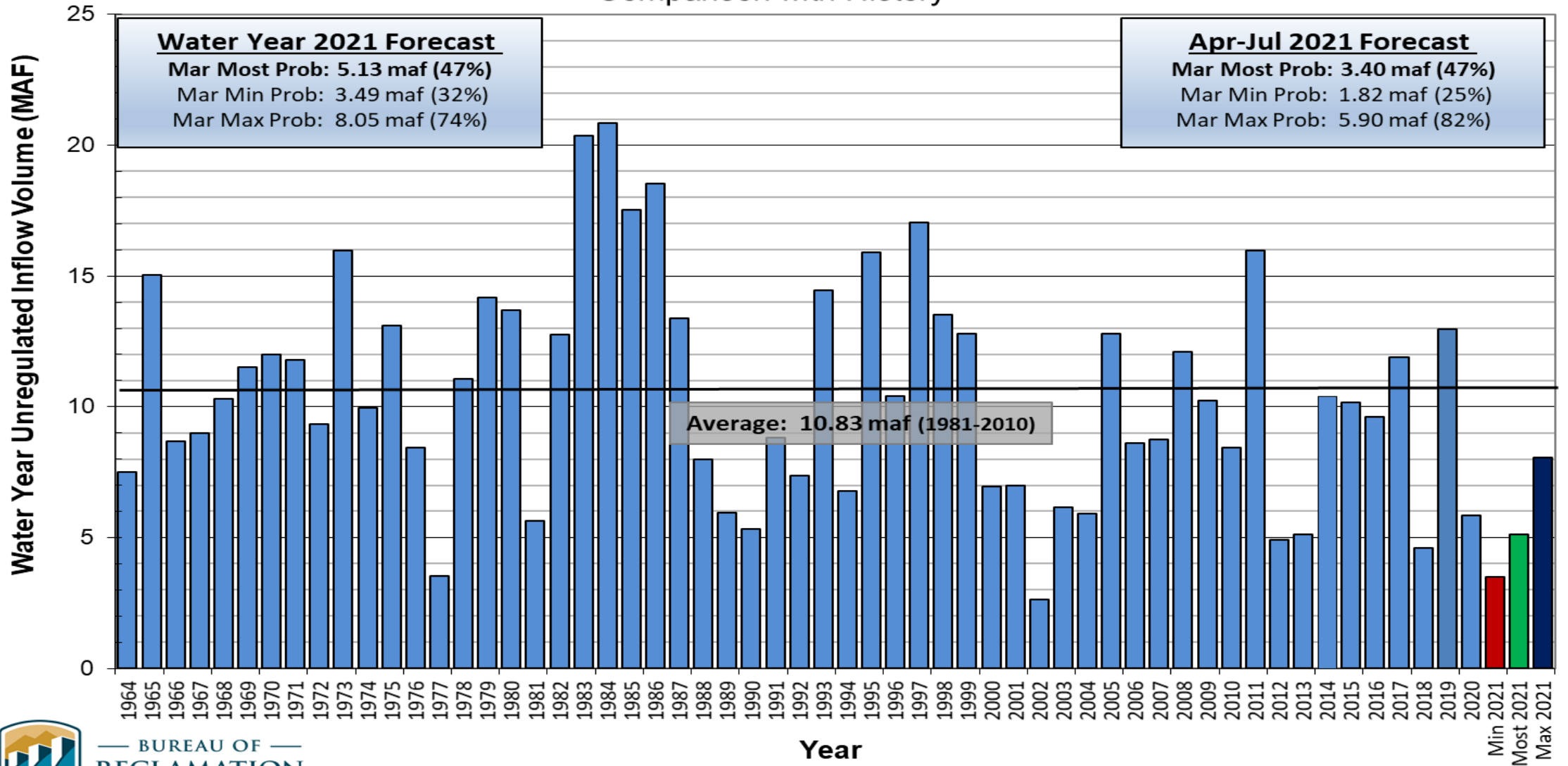




# Lake Powell Unregulated Inflow

## Water Year 2021 Forecast *(issued March 2)*

### Comparison with History



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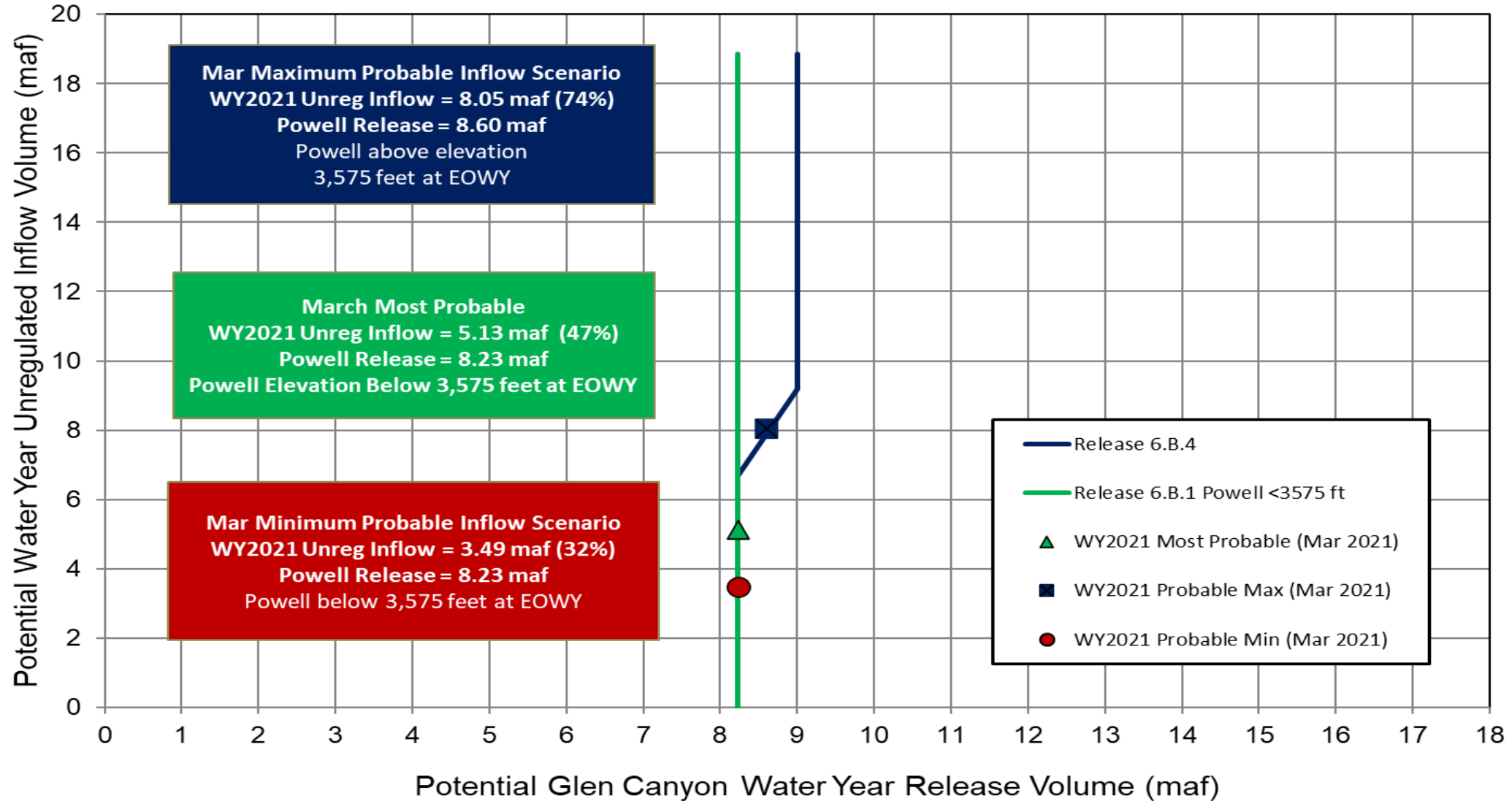
# Drought Operations

- The January 2021 Minimum Probable 24 Month Study (24-MS) run projected 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

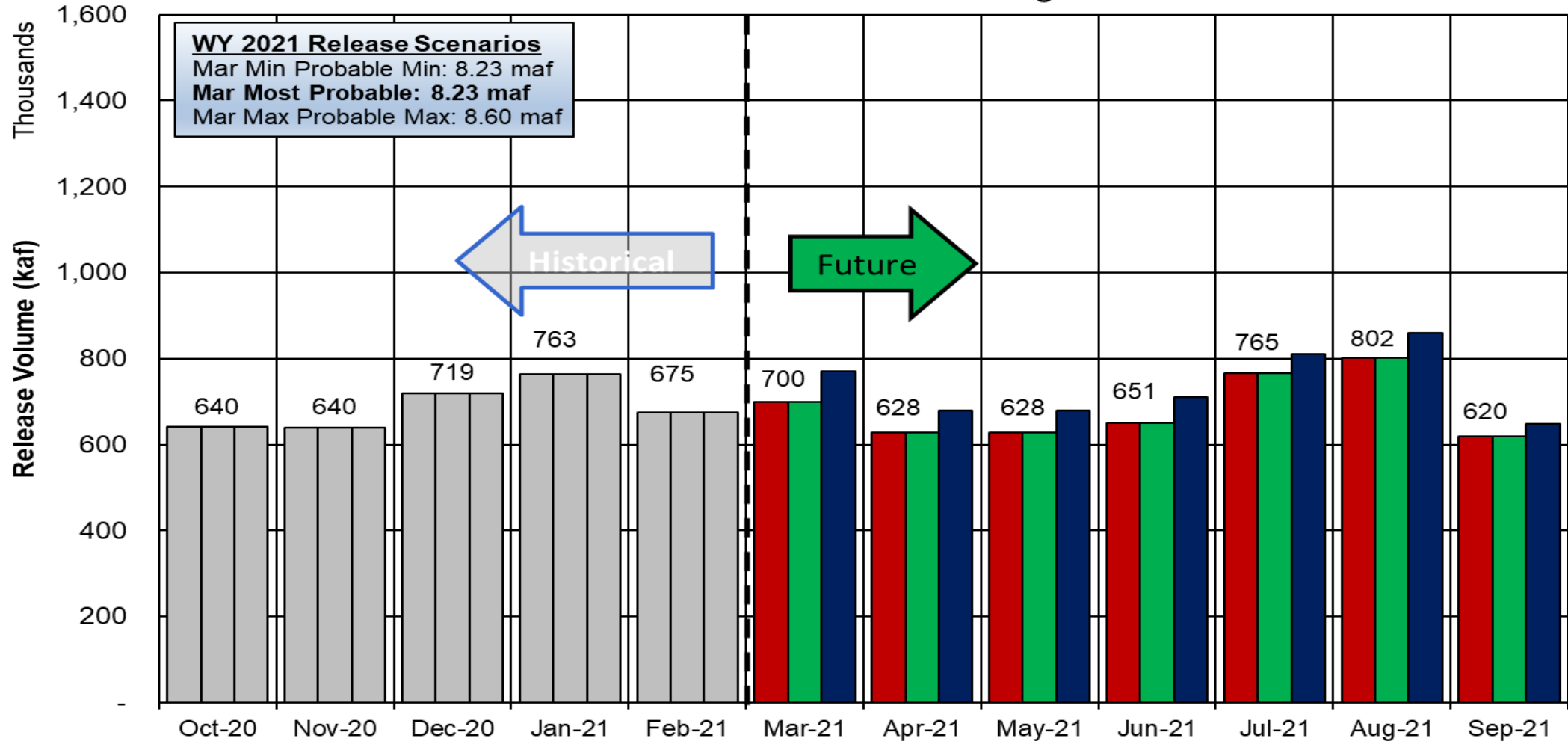
Water Year 2021 Release Volume as a Function of Upper Elevation Balancing Tier based on March 2021 24-Month Study Conditions



# Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2021

Based on March 2021 Modeling



■ Mar Min Probable

■ March Most Probable

■ March Max Probable



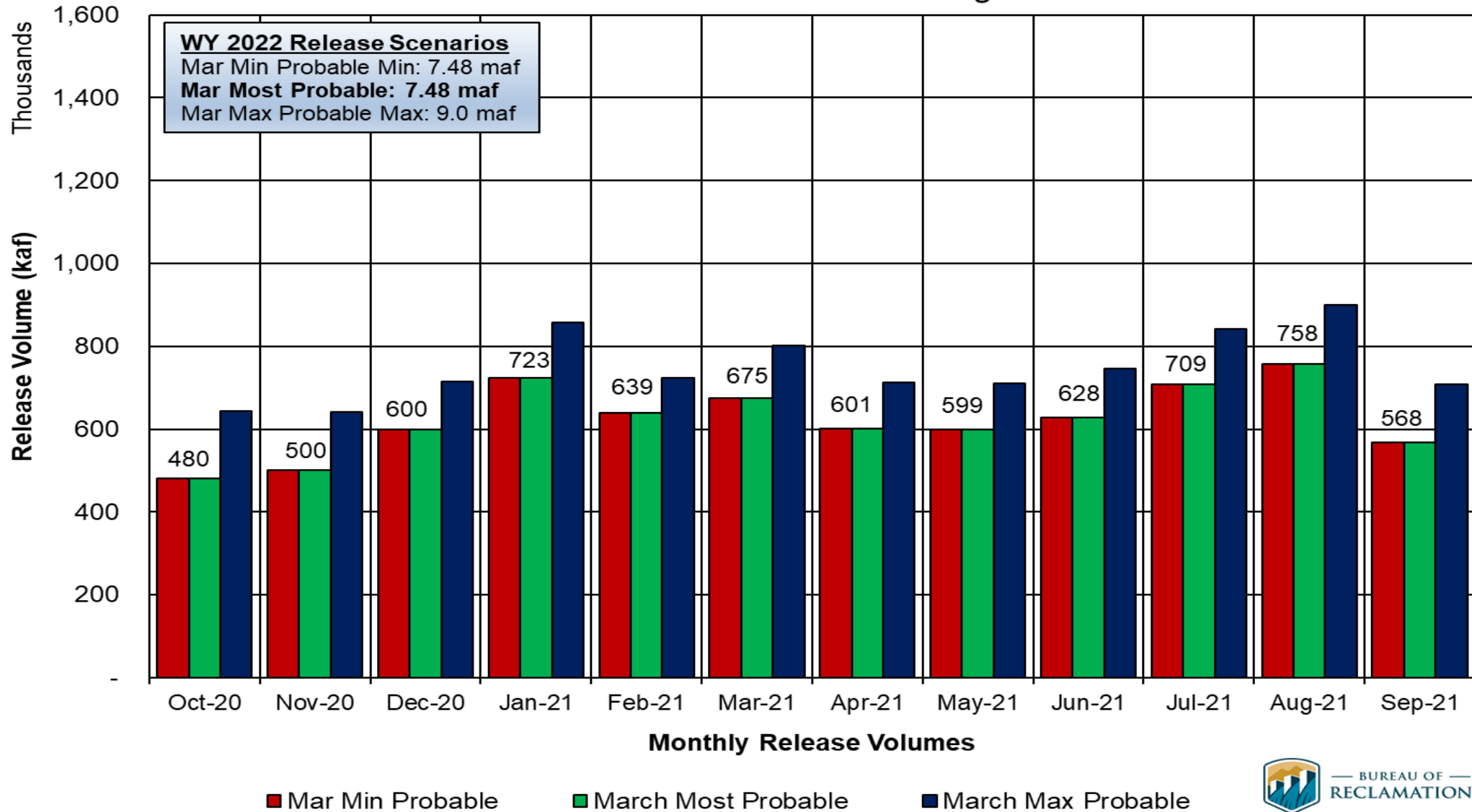
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# Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2022

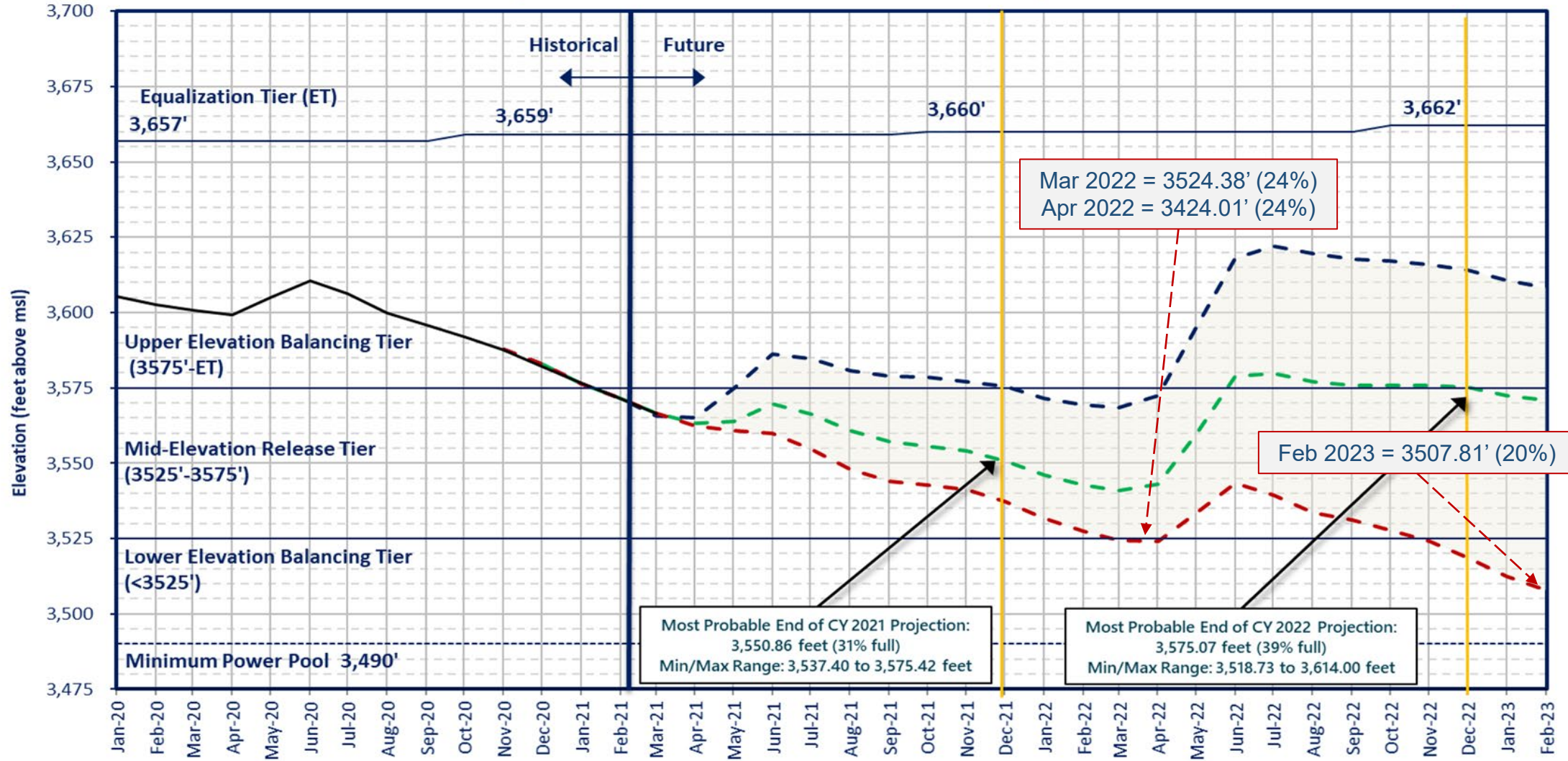
Based on March 2021 Modeling





# Lake Powell End of Month Elevations

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



- — Mar 2021 Most Probable - Lake Powell release of 8.23 maf in WY2021 and 7.48 maf in WY2022
- - - Mar 2021 Max Probable - Lake Powell release of 8.60 maf in WY2021 and 9.0 maf in WY2022
- - - Mar 2021 Min Probable - Lake Powell release of 8.23 maf in WY2021, 7.48 maf and in WY2022
- Historical Elevations

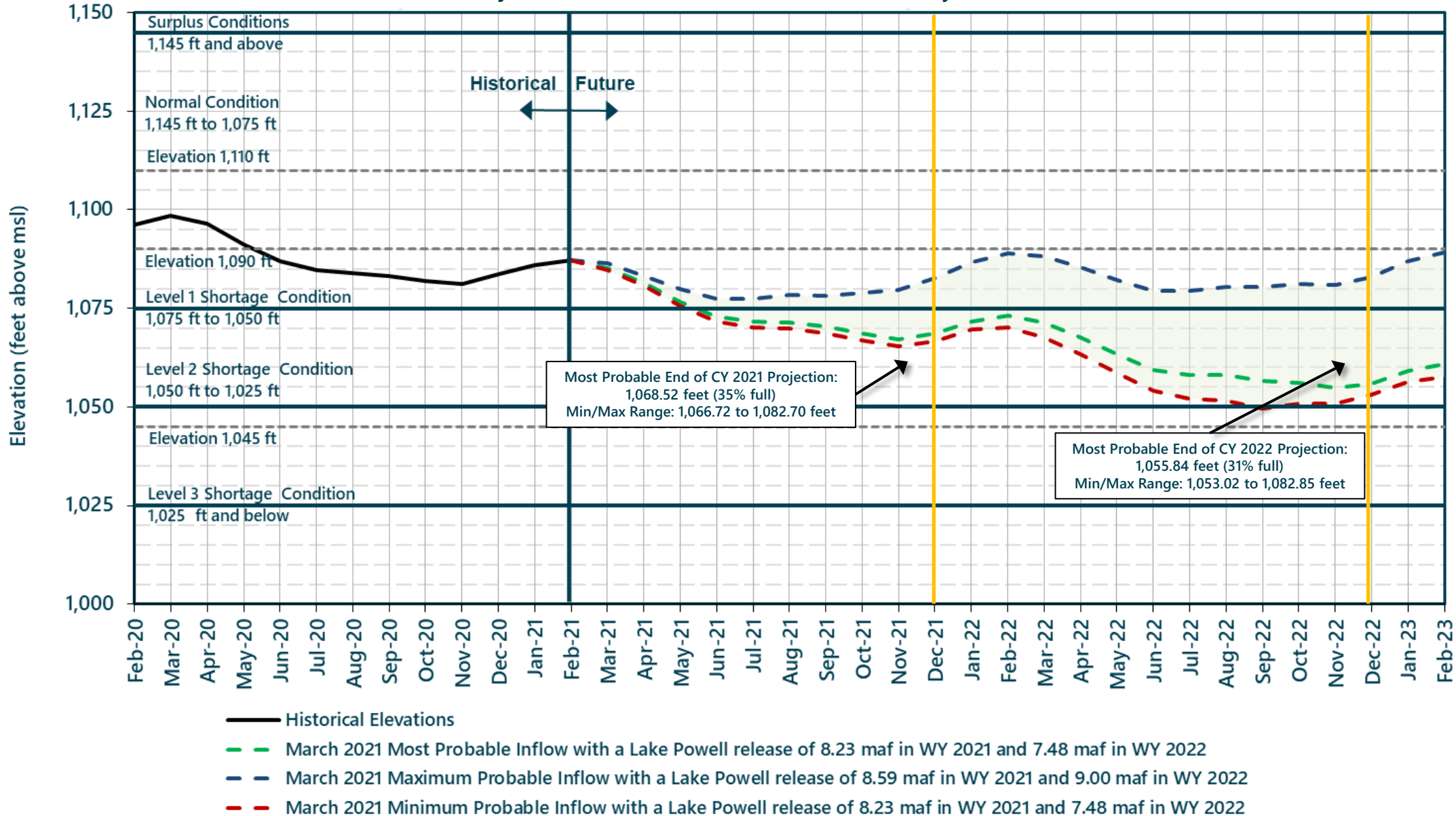


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# Lake Mead End of Month Elevations

Projections from the March 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]											[Outage]	
2	[Outage]											[Outage]	
3	[Outage]											[Outage]	
4	[Outage]											[Outage]	
5		[Outage]						[Outage]					
6		[Outage]											
7	[Outage]						[Outage]						
8							[Outage]						
Units Available	5	5/4	6	6	6	6/4	4	5	6	6	6	4	
Capacity (cfs)	16,400	16,400/ 12,200	19,800	19,600	19,500	19,400 (20,150) <sup>4</sup>	12,200	15,700	19,400	19,500	19,200	12,100	MAR MOST <sup>3</sup>
Capacity (kaf/month)	1,040	1,140	1,250	1,220	1,080	80022	930	1,050	1,160	1,190	1,180	1,010	MAR MOST
Max (kaf) <sup>2</sup>	640	640	720	763	675	770	680	680	710	810	860	648	8.60
Most (kaf) <sup>1</sup>	640	640	720	763	675	700	628	628	651	765	800	620	8.23
Min (kaf) <sup>2</sup>	640	640	720	763	675	700	628	628	651	765	800	620	8.23
										(updated 03-17-2021)			

- 1 Projected release, based on March 2021 Most Probable Inflow Projections and 24-Month Study model runs.
- 2 Projected release, based on March 2021 DROA 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

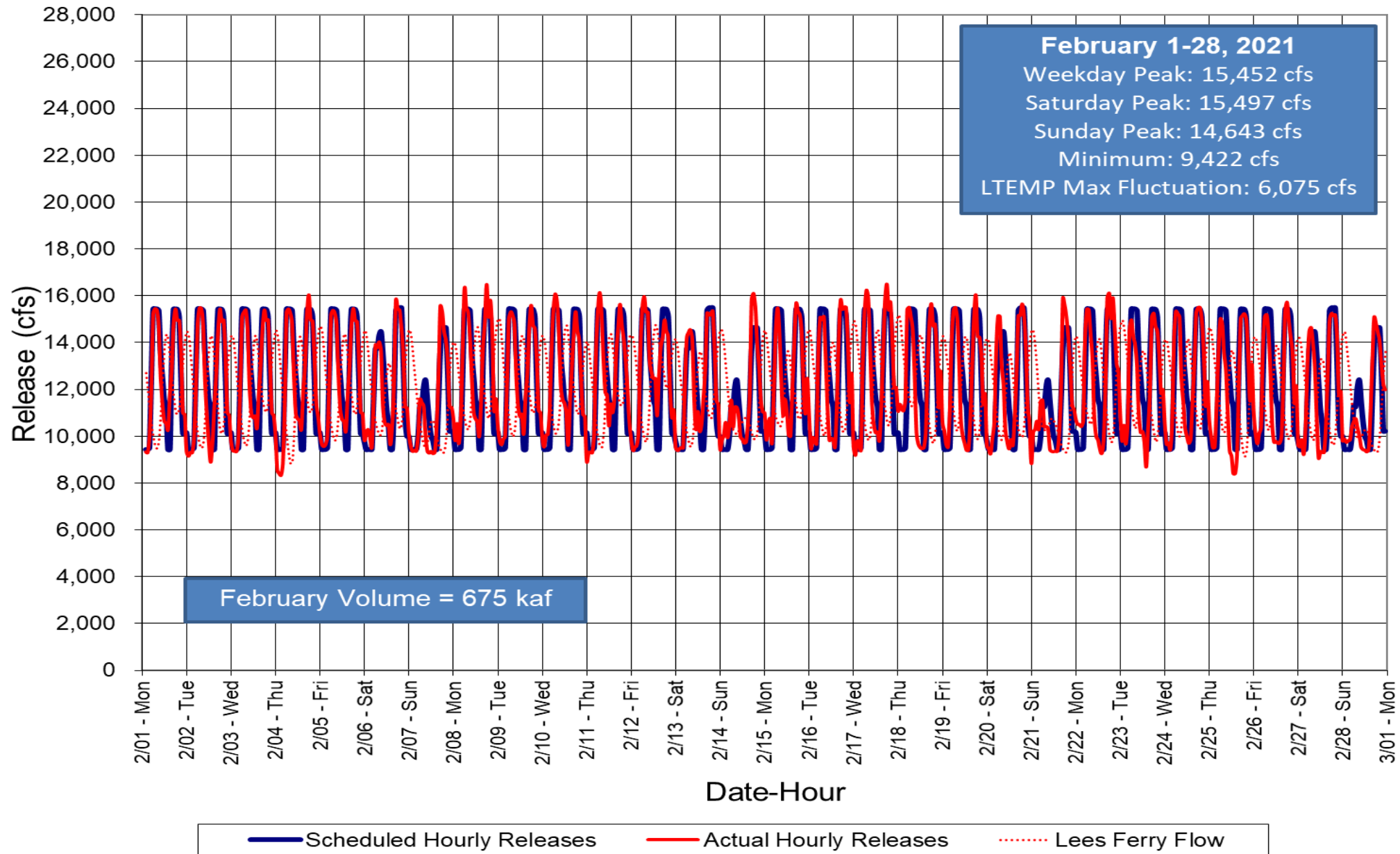
Unit Number	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	
1													
2													
3													
4													
5													
6													
7													
8													
Units Available	4/6	6/5	5/6	6/4	4	6	6	5	6	6	8	6	
Capacity (cfs)	12,000	15,500	15,400	11,800	11,800	18,600	18,600	15,600	19,700	19,700	26,800	19,500	MAR MOST <sup>3</sup>
Capacity (kaf/month)	960	1,020	1,090	1,140	720	1,140	1,110	1,000	1,170	1,210	1,650	1,200	MAR MOST
Max (kaf) <sup>2</sup>	643	642	715	857	724	801	713	710	745	842	900	708	9.0
Most (kaf) <sup>1</sup>	480	500	600	723	639	675	601	599	628	709	758	568	7.48
Min (kaf) <sup>2</sup>	480	500	600	723	639	675	601	599	628	709	758	548	7.48
											(updated 03-17-2021)		

- 1 Projected release, based on March 2021 Most Probable Inflow Projections and 24-Month Study model runs.
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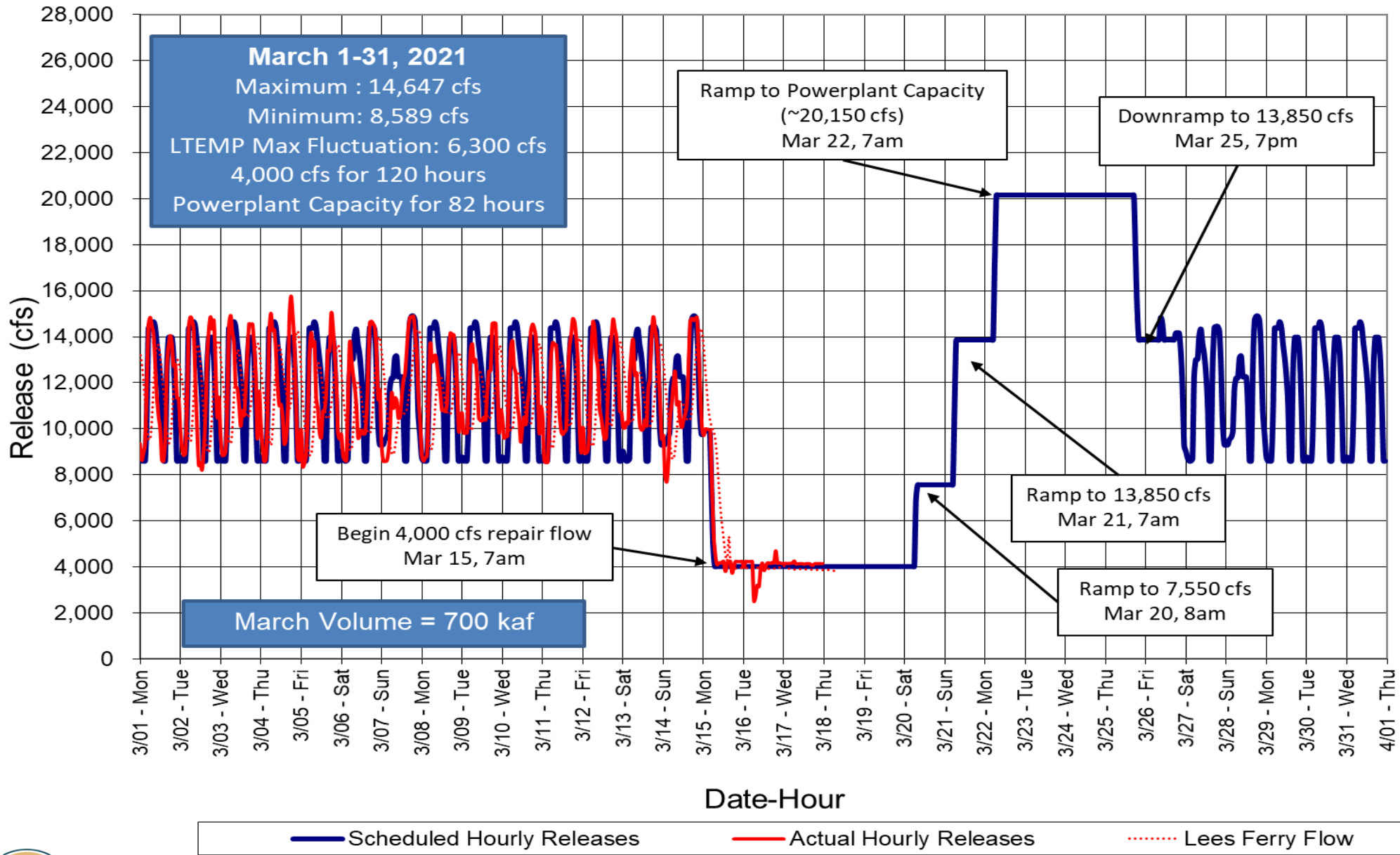


# Glen Canyon Dam Hourly Release Pattern February 2021





# Glen Canyon Dam Hourly Release Pattern March 2021

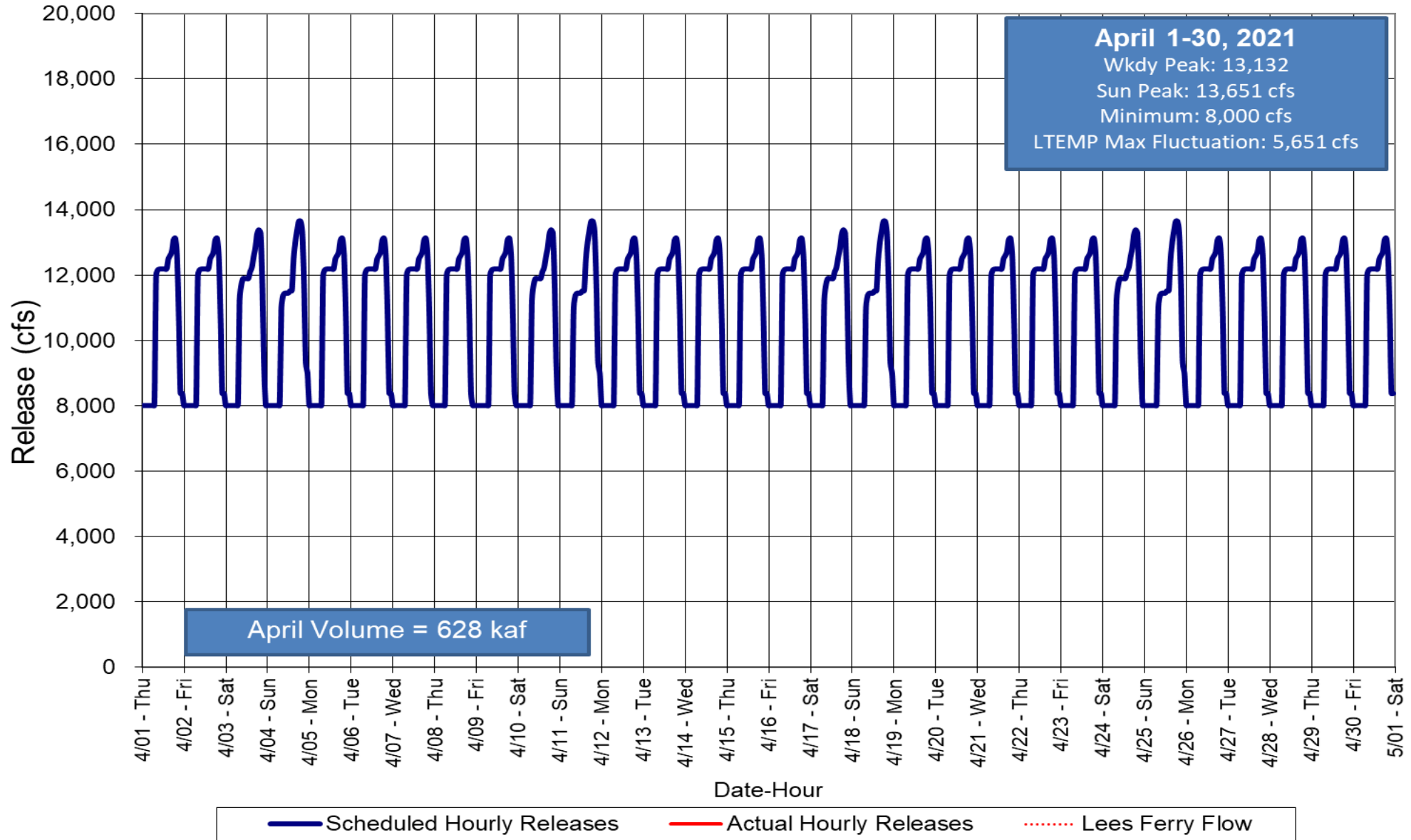




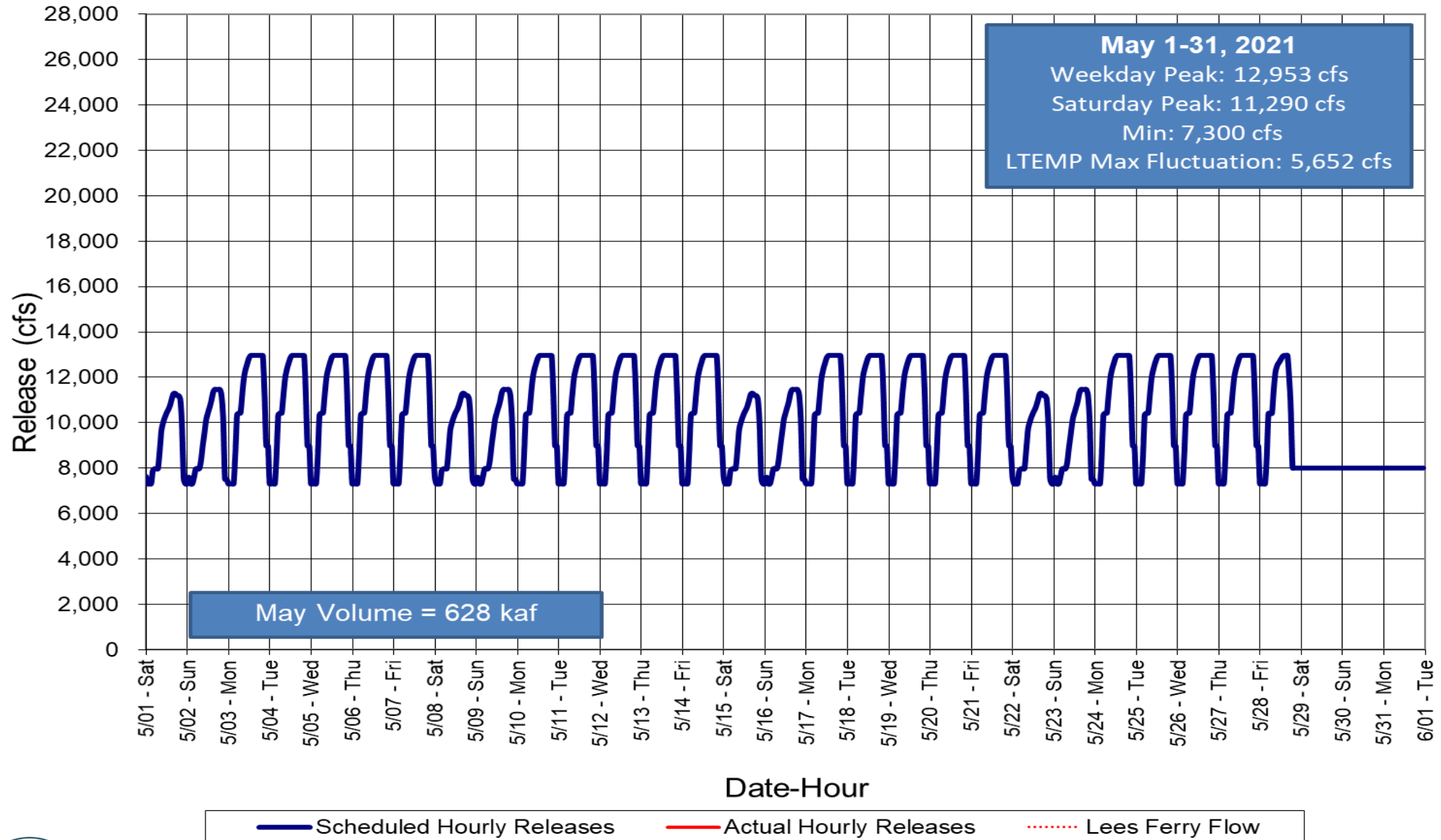




# Glen Canyon Dam Hourly Release Pattern April 2021



# Glen Canyon Dam Hourly Release Pattern May 2021

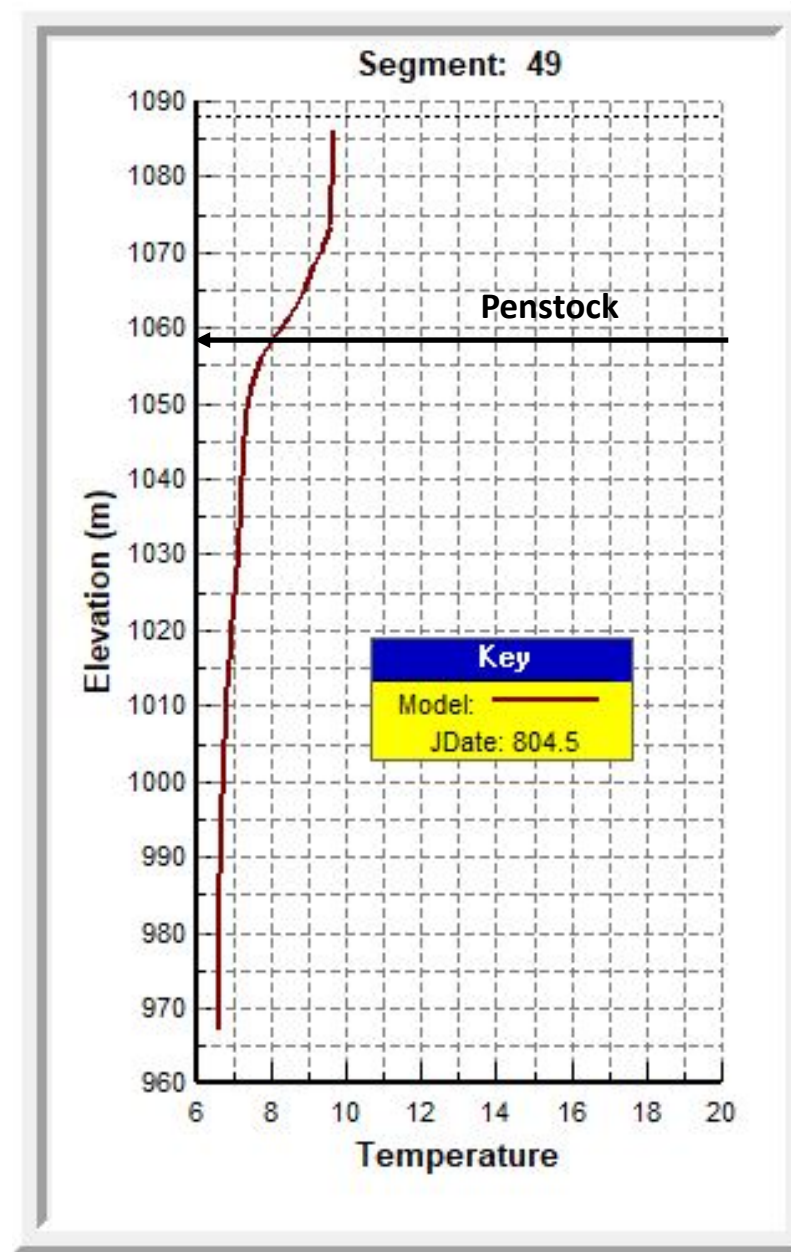




# Water Quality

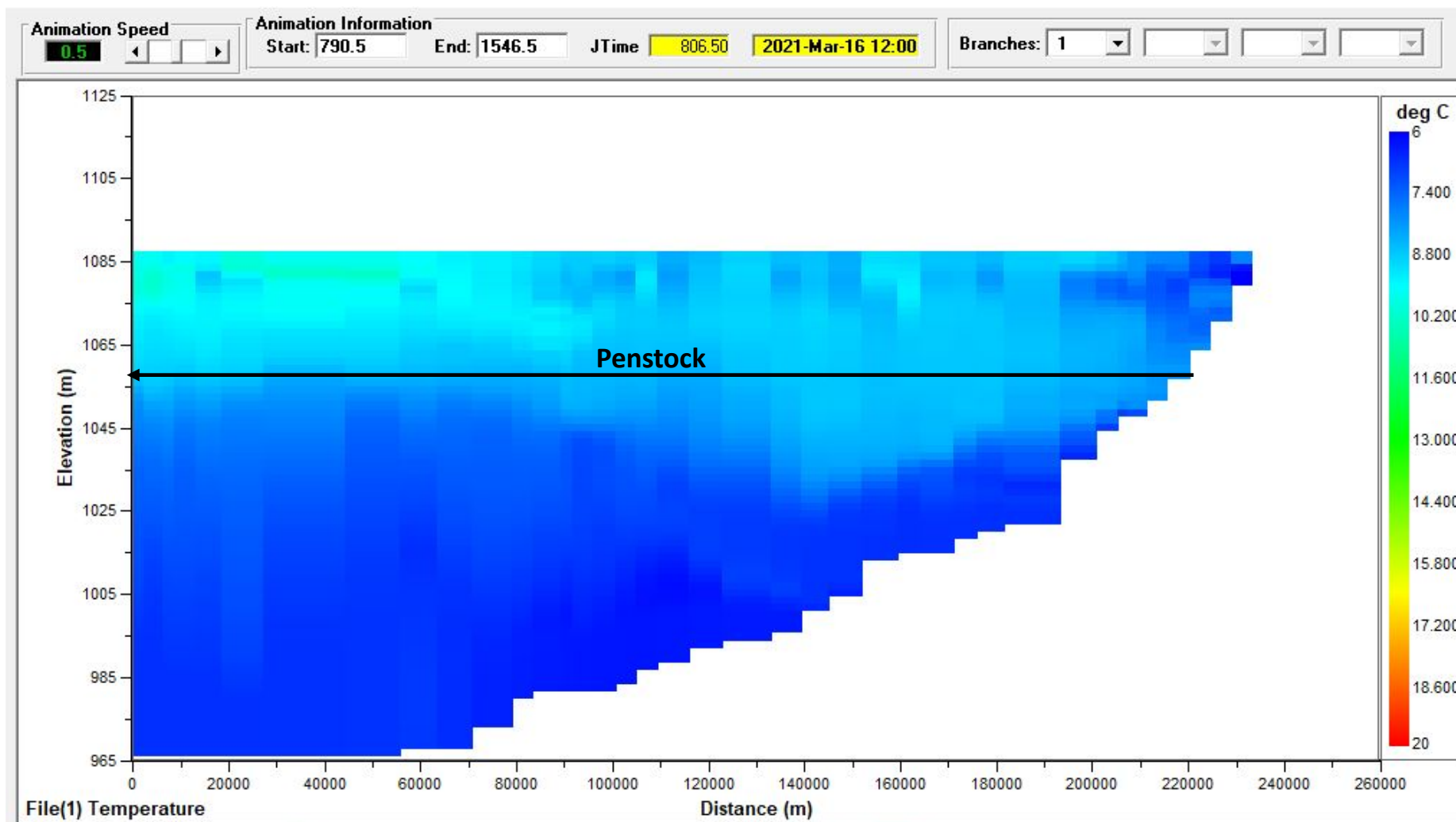


Temperature Profile of Lake Powell near Glen Canyon Dam  
3/14/2021

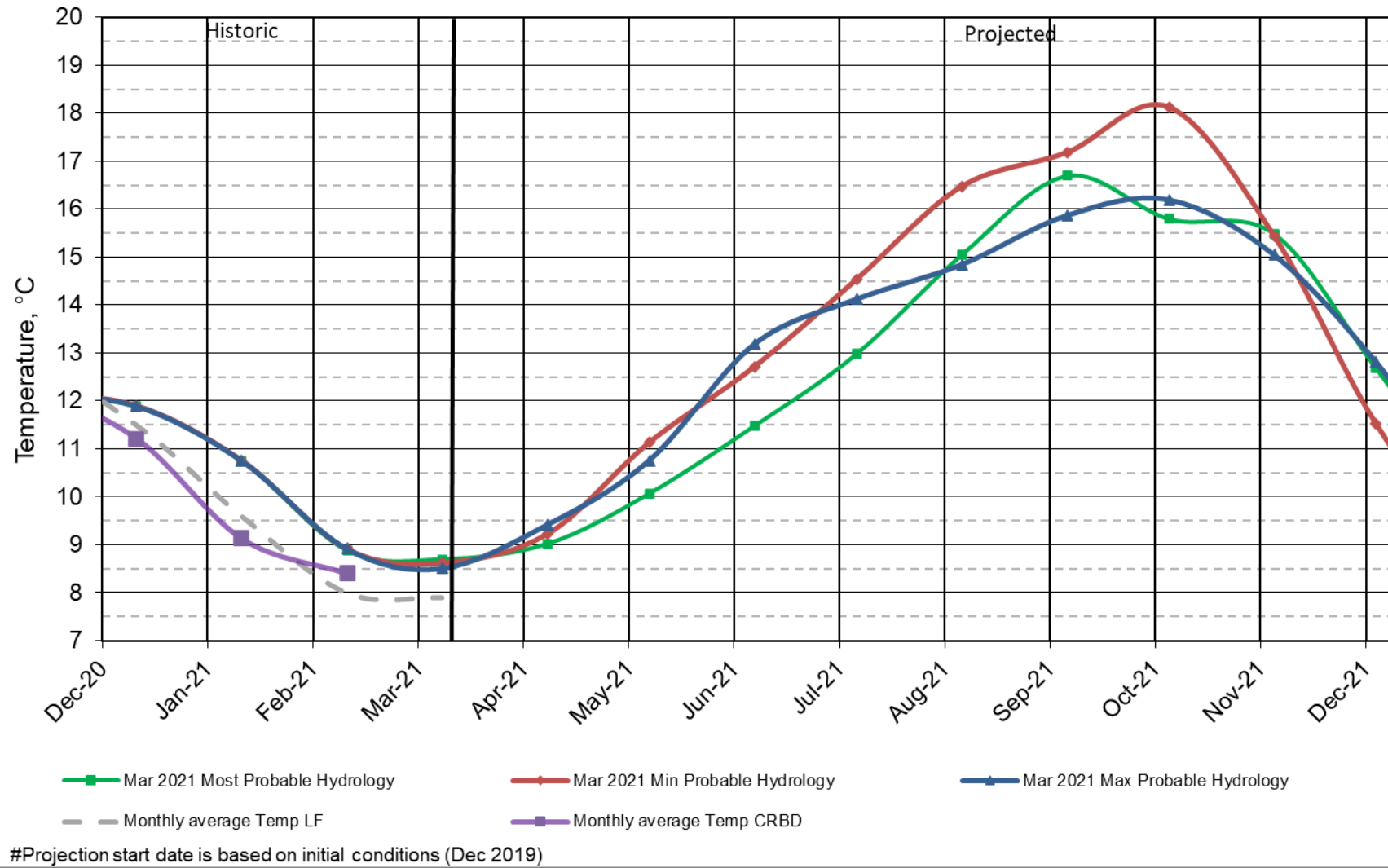


# Cross Sectional Temperature Profile of Lake Powell

3/16/2021

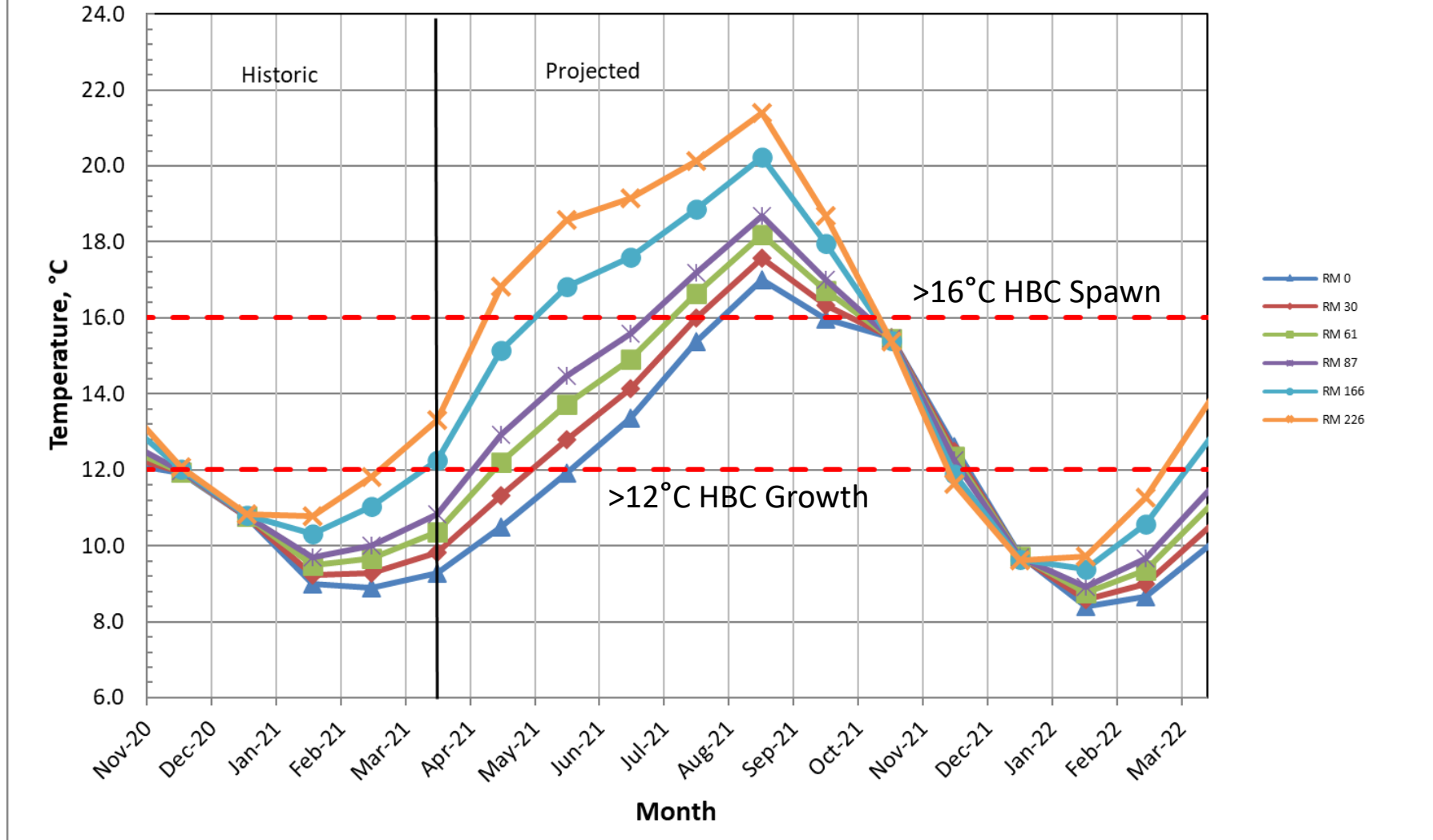


## Lake Powell Release Temperature Projected Temperature based on March 2021 Forecast



# Colorado River, Grand Canyon Water Temperatures

Projections based on Mar. 2021, Most Probable Hydrology





# Questions/Discussion



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