



— BUREAU OF —
RECLAMATION

Colorado River Basin Hydrology Update

Colorado River Water Users Association
Annual Conference

December 15, 2021

Colorado River Drought



Lake Powell near Glen Canyon Dam



Lake Mead near Hoover Dam

- Lowest 22-year inflow period (2000–2021) on record
- Water year 2021 was the second lowest Lake Powell inflow on record
- Lake Powell reached historically low level in July 2021
- Lake Mead reached historically low level in June 2021



Colorado River Basin Storage

as of December 14, 2021

Reservoir	Percent Full	Storage (maf)	Elevation (feet)
Lake Powell	28%	6.89	3,540.0
Lake Mead	34%	8.84	1,065.4
Total System Storage	37%	22.2	NA

Total system storage was 46% of capacity, or 27.7 maf in storage, at this time last year



Lake Powell & Lake Mead Operational Table

Operating Determinations for Water Year/Calendar Year 2022

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹
3,700	Equalization Tier Equalize, avoid spills or release 8.23 maf	24.3	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	Upper Elevation Balancing Tier³ Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	15.5 - 19.3 (2008-2026)	1,200 (approx.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	22.9 (approx.) ²
3,575			1,145	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	15.9
	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	9.5	1,105	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	11.9
			1,075	Shortage Condition Deliver 7.167 ⁴ maf	9.4
3,535.40 feet January 1, 2022 Projection			1,050	Shortage Condition Deliver 7.083 ⁵ maf	7.5
	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	5.9	1,025	Shortage Condition Deliver 7.0 ⁶ maf Further measures may be undertaken ⁷	5.8
3,490			1,000		4.3
3,370			895		0

1,065.85 feet
January 1, 2022 Projection

Diagram not to scale

¹ Acronym for million acre-feet

² This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

³ Subject to April adjustments which may result in a release according to the Equalization Tier

⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

⁵ Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada

⁶ Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

⁷ Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

¹ Lake Powell and Lake Mead operating determinations are based on August 2021 24-Month Study projections consistent with the 2007 Interim Guidelines and 2019 Drought Contingency Plans. These determinations will be documented in the 2022 Annual Operating Plan for Colorado River Reservoirs.



Shortage Reductions and Water Savings Contributions
Under the 2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan (DCP)*,
and Binational Water Scarcity Contingency Plan
(Volumes in thousand acre-feet)

Lake Mead Elevations (in feet)	2007 Interim Guidelines Shortage Reductions (U.S.)		Minute 323 Delivery Reductions (Mexico)	Total Combined Shortage Reductions (U.S. and Mexico)	DCP Water Savings Contributions (U.S.)			Binational Water Scarcity Contingency Plan Water Savings (Mexico)	Combined Volumes of Shortage Reductions and Water Savings Contributions by Lower Basin State and by Country (U.S. and Mexico)					Total Combined Volumes (U.S. and Mexico)
	AZ	NV	Mexico	<i>Lower Basin States + Mexico</i>	AZ	NV	CA	Mexico	AZ Total	NV Total	CA Total	<i>Lower Basin States Total</i>	<i>Mexico Total</i>	<i>Lower Basin States + Mexico</i>
1,090 - >1,075	0	0	0	0	192	8	0	41	192	8	0	200	41	241
1,075 - >1050	320	13	50	383	192	8	0	30	512	21	0	533	80	613
1,050 - >1,045	400	17	70	487	192	8	0	34	592	25	0	617	104	721
1,045 - >1,040	400	17	70	487	240	10	200	76	640	27	200	867	146	1,013
1,040 - >1,035	400	17	70	487	240	10	250	84	640	27	250	917	154	1,071
1,035 - >1,030	400	17	70	487	240	10	300	92	640	27	300	967	162	1,129
1,030 - 1,025	400	17	70	487	240	10	350	101	640	27	350	1,017	171	1,188
<1,025	480	20	125	625	240	10	350	150	720	30	350	1,100	275	1,375

*Under the Lower Basin DCP, the United States will take affirmative actions to create or conserve 100,000 acre-feet or more of Colorado River system water on an annual basis to contribute to conservation of water supplies in Lake Mead and other Colorado River reservoirs in the Lower Basin. All actions taken by the United States shall be subject to applicable federal law, including availability of appropriations.

Lake Mead
Calendar Year
2022
Operating
Condition



Water Year 2022 Snowpack and Precipitation¹ as of December 13, 2021

Colorado River Basin above Lake Powell

Water Year 2022²

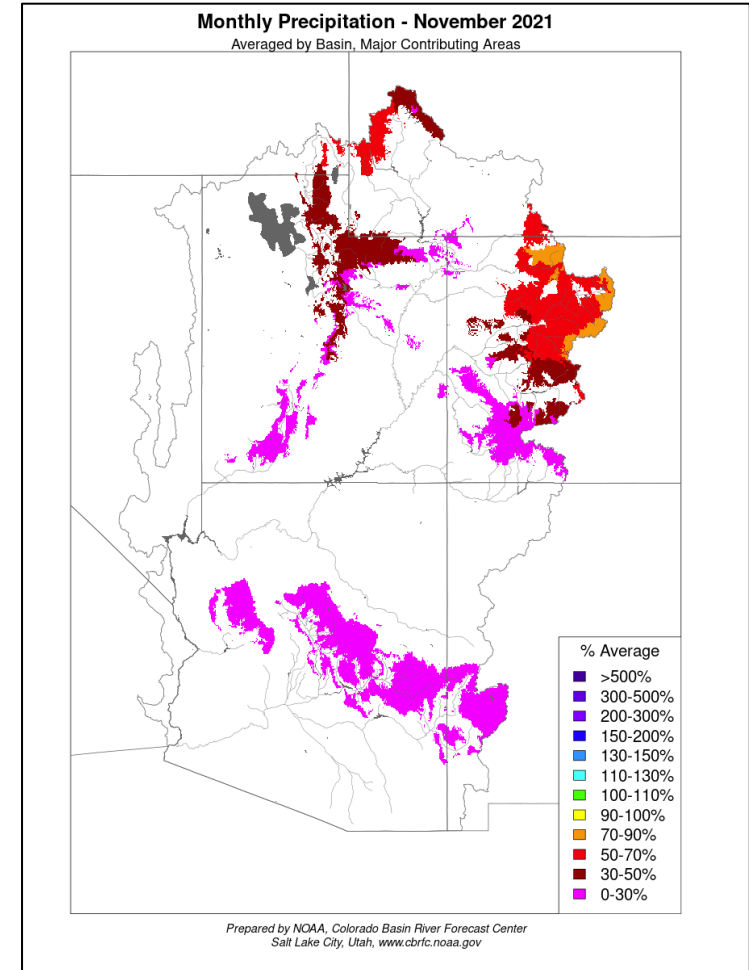
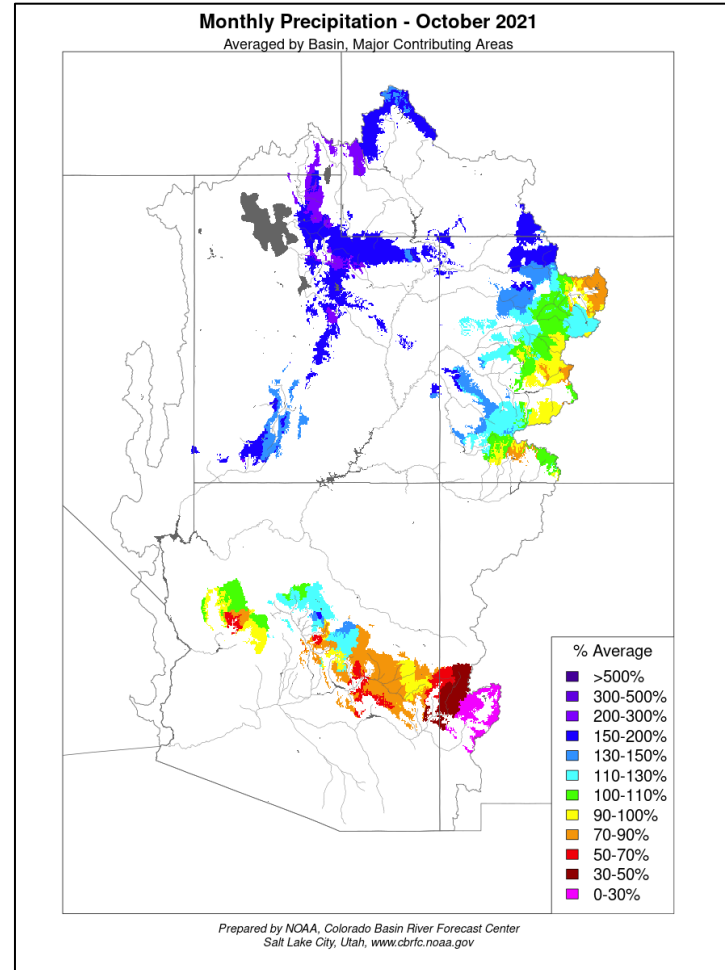
Precipitation

(year-to-date)

95% of average³

Current Snowpack

73% of median³



¹Percent of normal precipitation is based on an arithmetic mean, or average; percent of normal snowpack is based on the median value for a given date.

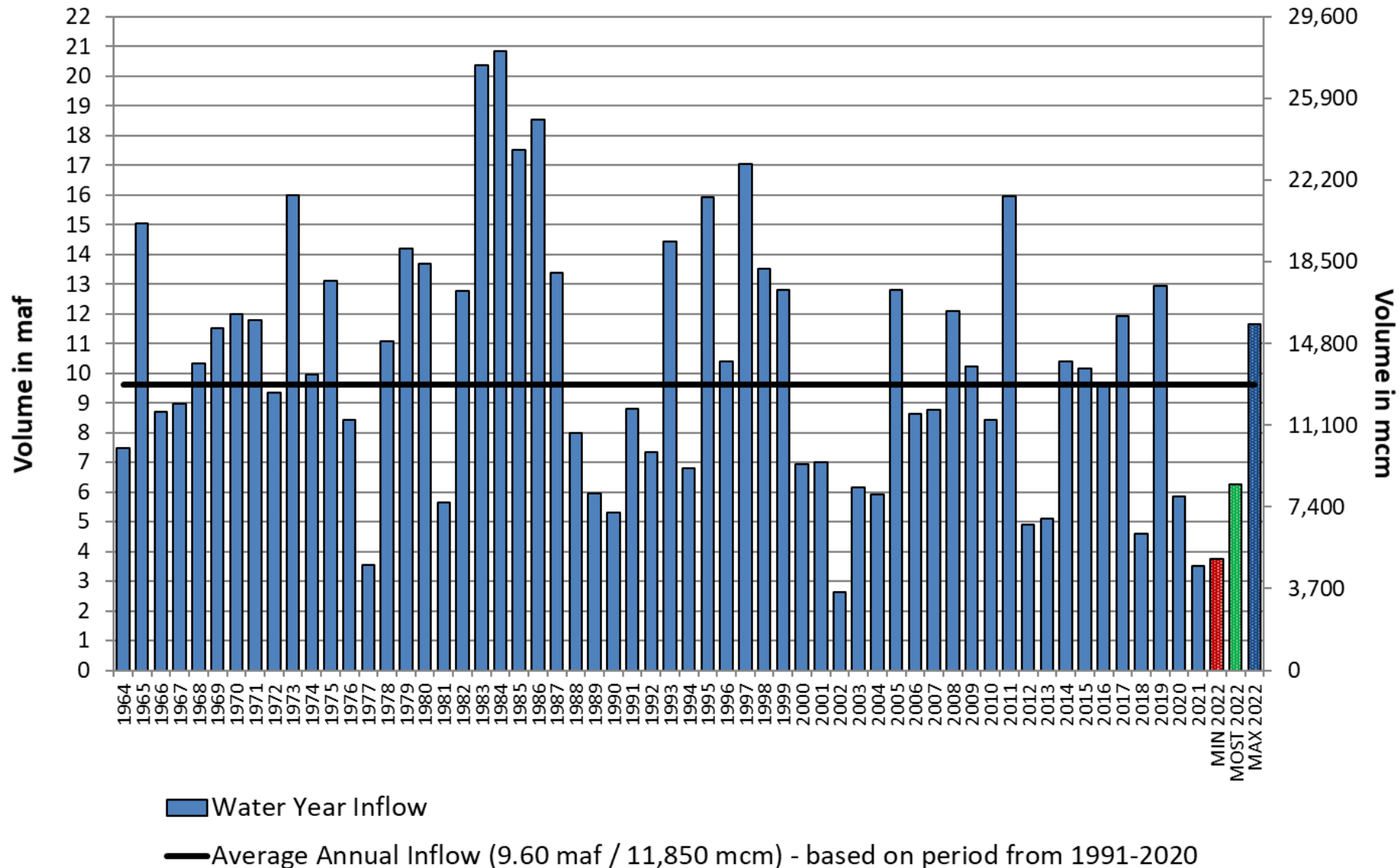
²Water Year 2022 statistics are based on the 30-year period of record from 1991-2020.

³Precipitation and snowpack values may vary significantly from week-to-week this early in the water year.



Lake Powell Unregulated Inflow

Water Years 1964 through 2022



Unregulated Inflow for Water Year 2021

Observed:

- 3.50 maf
- 32% of average*

*Percent of average based on period of from 1981-2010

Unregulated Inflow Forecasts for Water Year 2022 as of December 1, 2021

Min Probable (10th-percentile):

- 3.76 maf
- 33% of average**

Most Probable (median):

- 6.27 maf
- 65% of average**

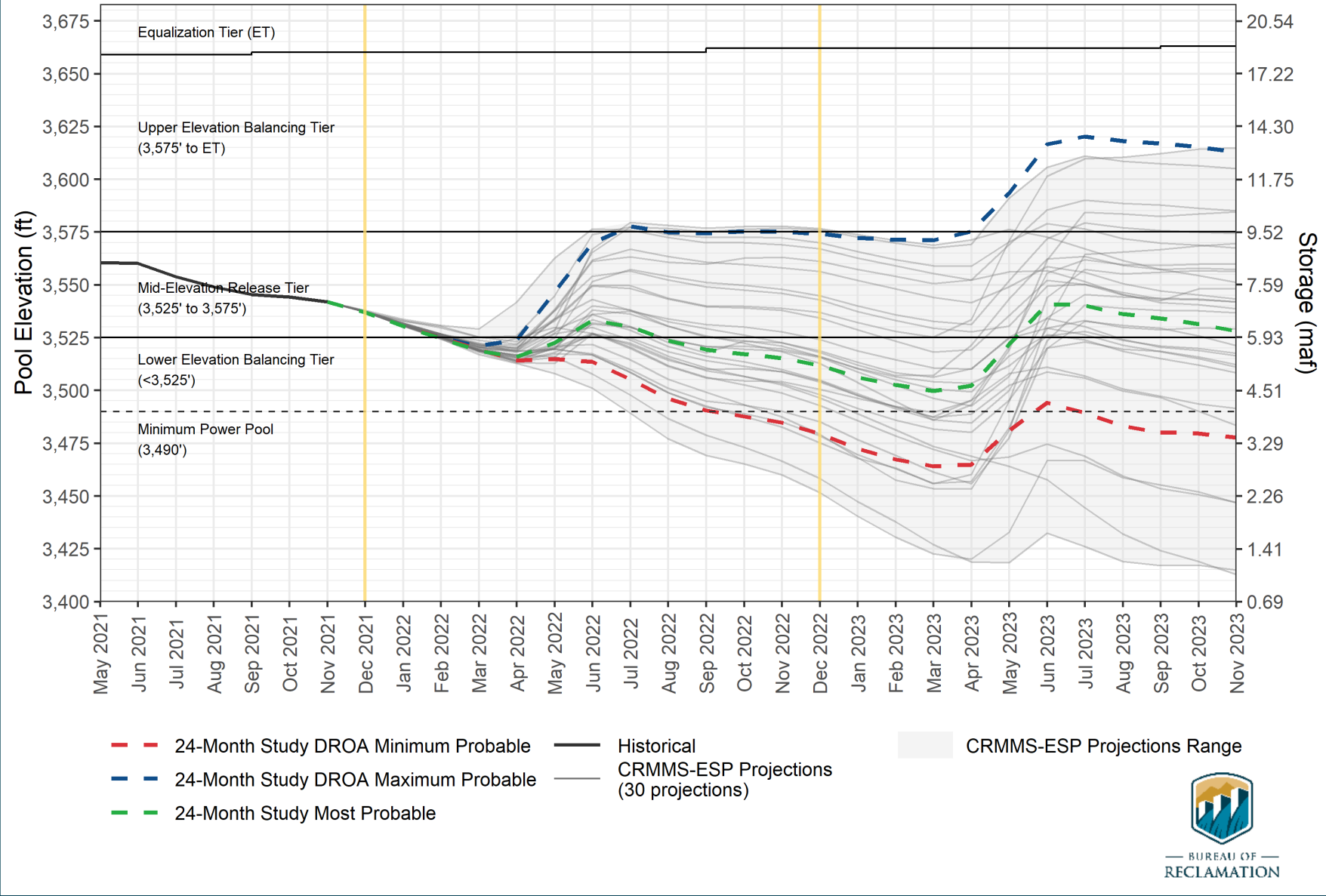
Max Probable (90th-percentile):

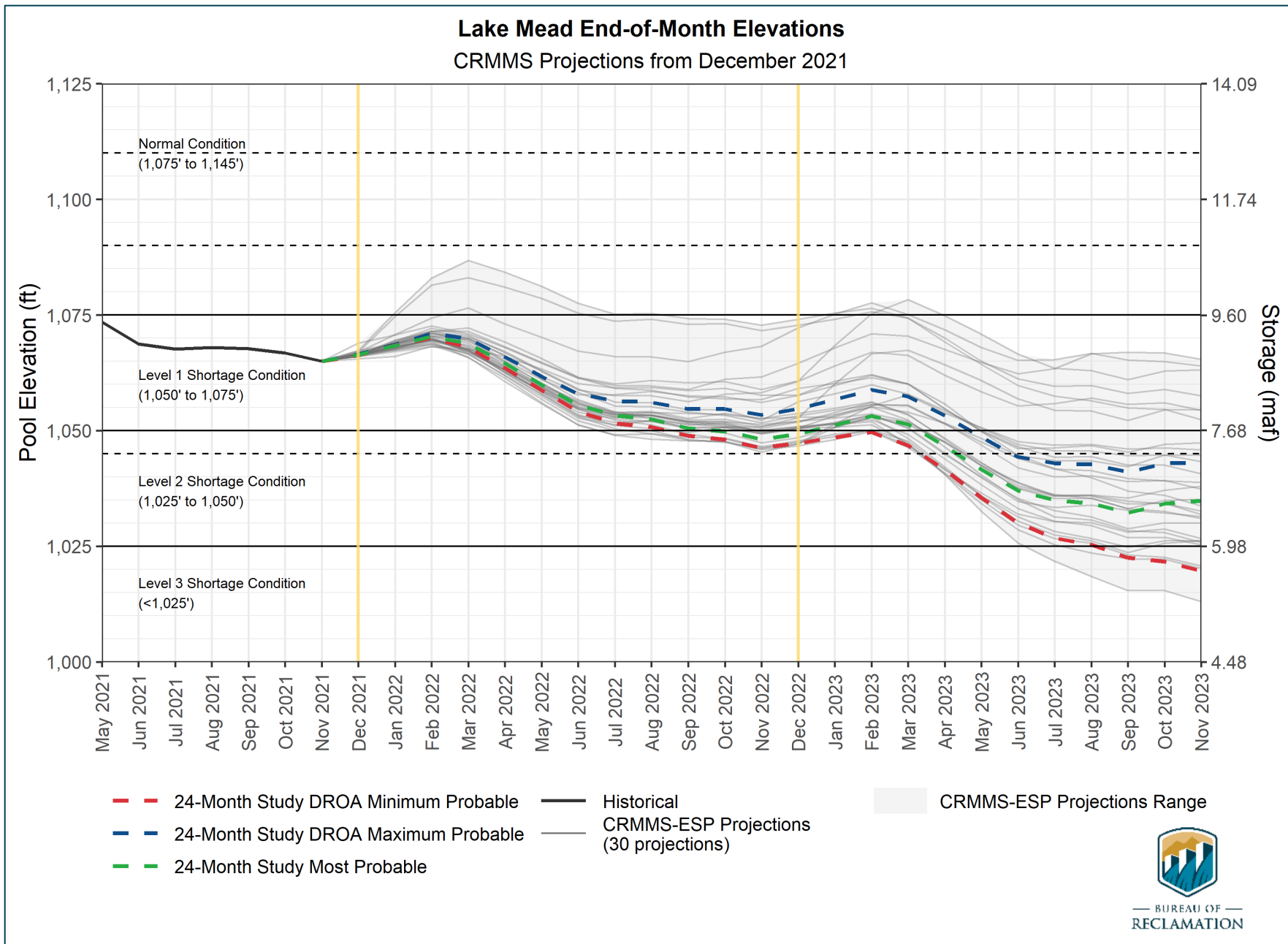
- 11.66 maf
- 121% of average**

**Percent of average based on period from 1991-2020



Lake Powell End-of-Month Elevations CRMMS Projections from December 2021





Summary

- Drought continues through 22nd year
- Large reservoirs of Lake Powell and Lake Mead at historically low levels
- Colorado River Basin is facing unprecedented operational challenges due to low runoff and reservoir conditions
- While it is still early in the season, winter of 2021-22 projections currently showing very low runoff
- Need for additional actions to avoid critical elevations is clear



For more information:

<https://www.usbr.gov/uc/water/index.html>

<https://www.usbr.gov/lc/riverops.html>



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