



COLORADO

**Colorado Water
Conservation Board**

Department of Natural Resources

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TO: Colorado Water Conservation Board Members

FROM: Amy Ostdiek, Michelle Garrison, and Brian Macpherson

DATE: November 15, 2023

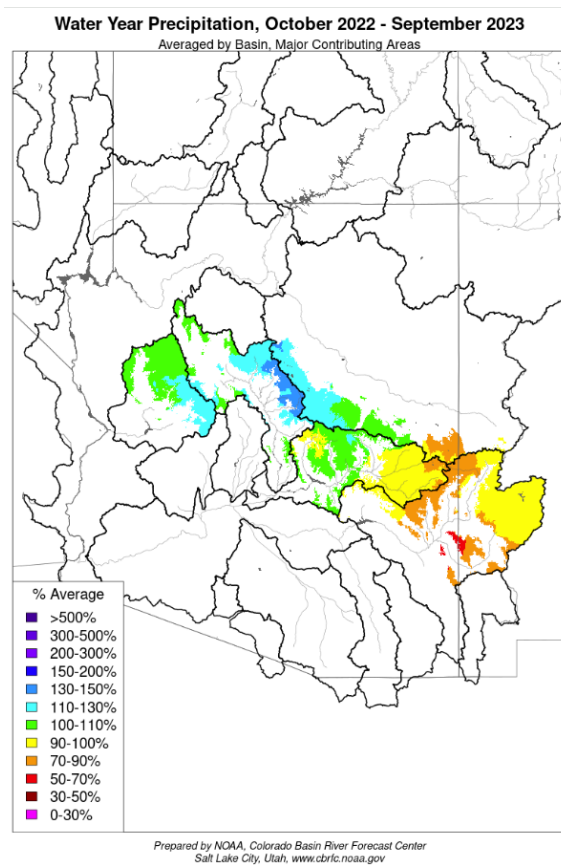
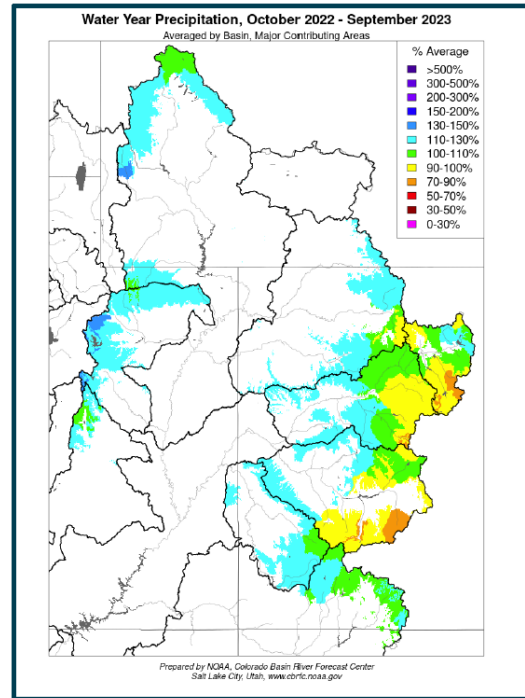
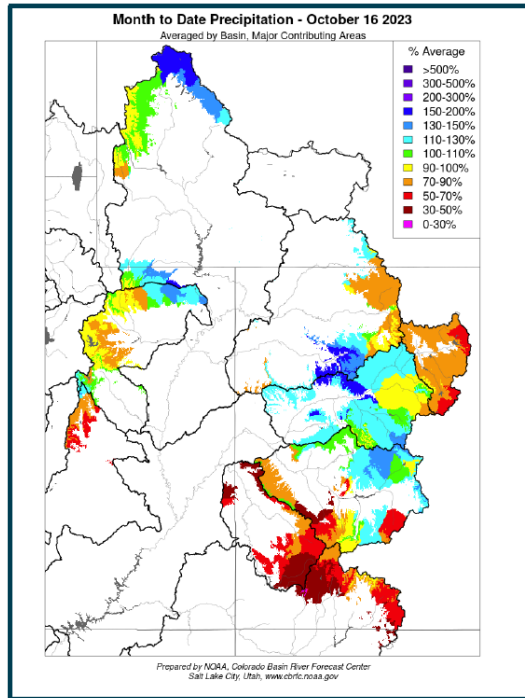
SUBJECT: Agenda Item 11: Colorado River Hydrology and Other Updates

This is an informational item with no board action requested.

1. Hydrology and operations update

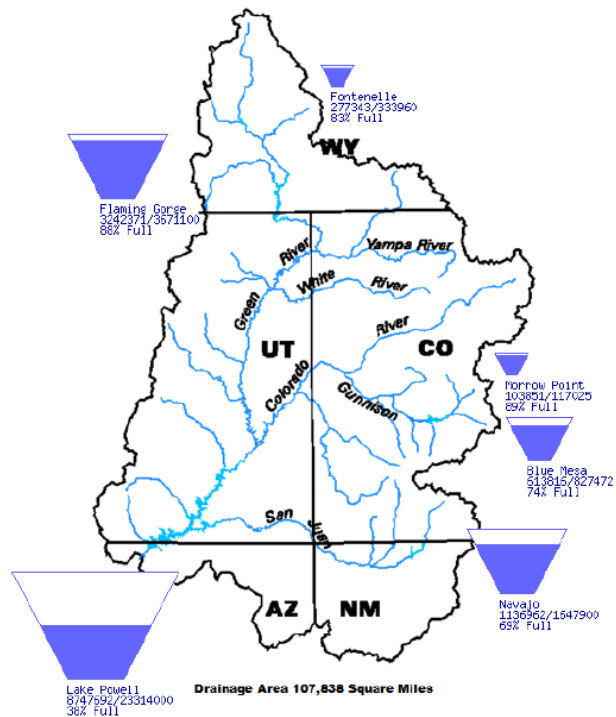
Streamflow for Water Years 2021 and 2022 was well below average throughout the basin, placing significant strain on basin storage and on water users in the Upper Basin. WY 2023 precipitation has been slightly above average. Snowpack was well above average throughout most of the Upper Basin and areas of the Lower Basin. Spring runoff was above average throughout most of the basin, with drier conditions in a few headwater areas. Summer conditions were drier than normal in portions of the basin. Drought and reservoir storage conditions have improved; however, long-term impacts from depleted storage are expected to continue, as indicated in current forecasts for reservoir operations.

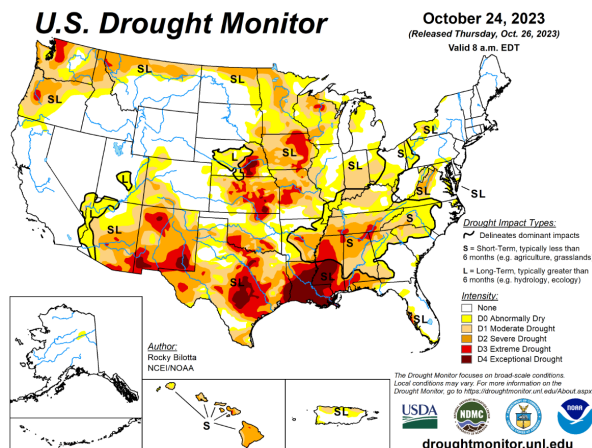
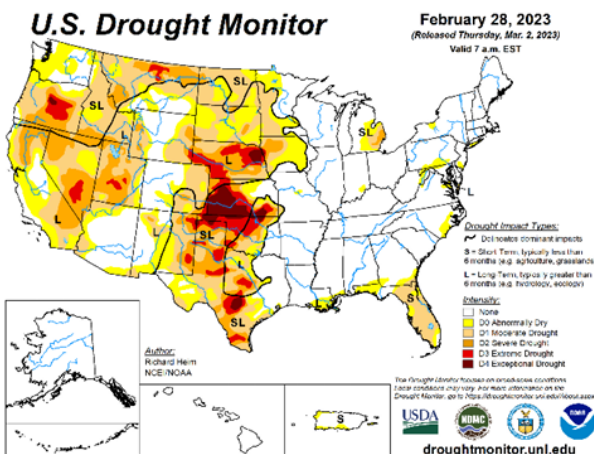
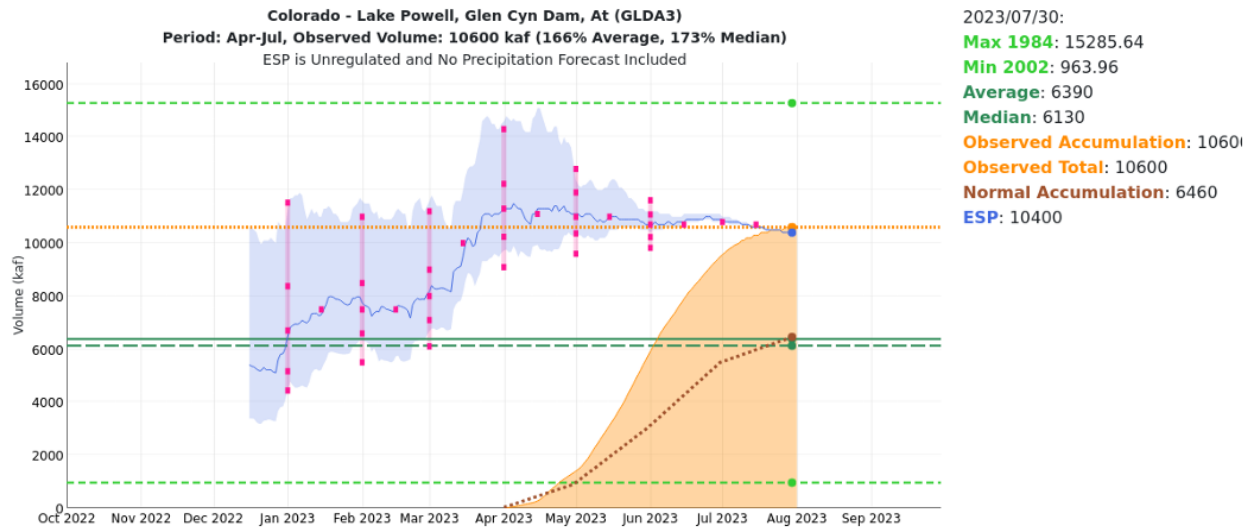




Data Current as of:
10/15/2023

Upper Colorado River Drainage Basin



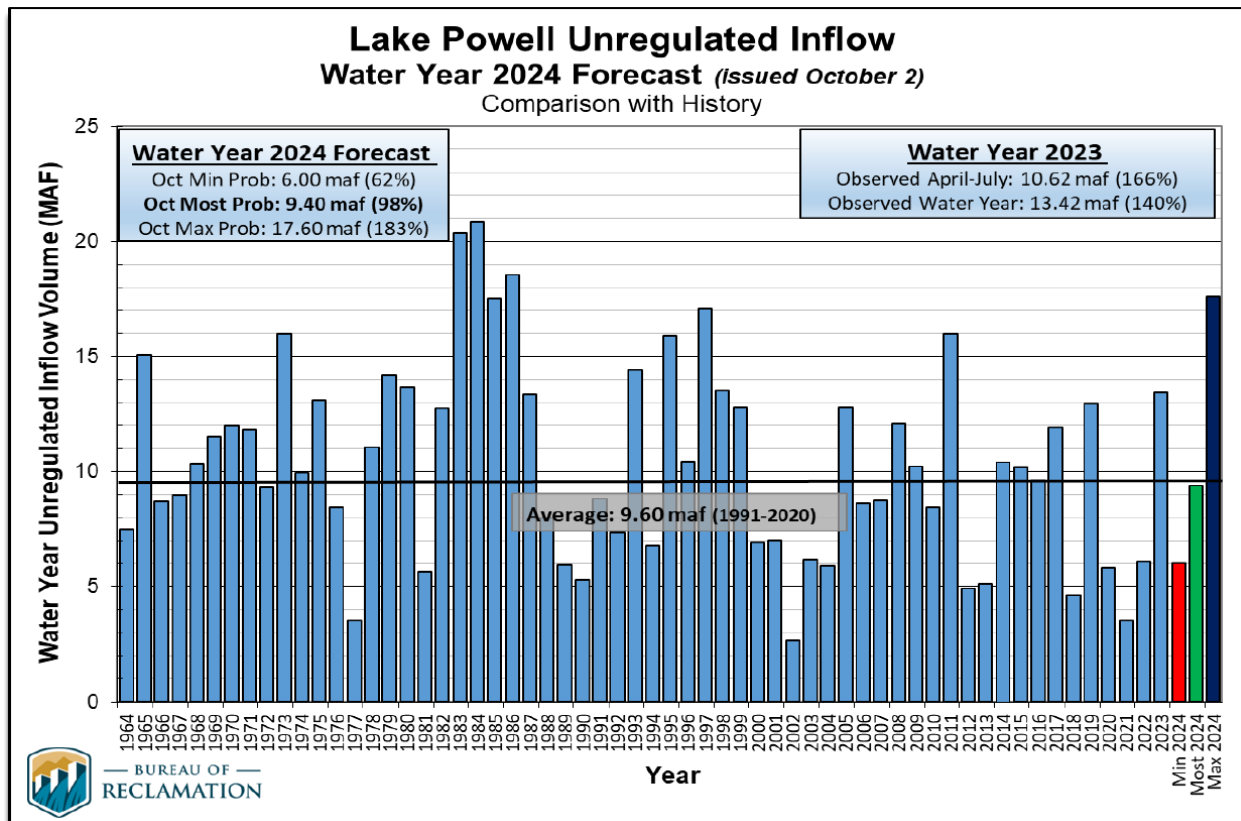


Lake Powell was scheduled to release 7.48 MAF in WY 2022, as determined by Reclamation's August 2021 24-Month Study. Projected Lake Powell elevations triggered planning activities pursuant to the Upper Basin Drought Contingency Plan (DCP). The Drought Response Operations Plan for May 2022 through April 2023 described a planned release of an additional 500,000 acre-feet of water from Flaming Gorge reservoir to help protect critical infrastructure at Lake Powell. In May 2022 Reclamation announced a reduction in the WY 2022 Lake Powell release to 7.0 MAF as an additional infrastructure protection measure. Lake Powell rose above elevation 3525' in May 2022 and fell below that threshold elevation in December 2022. Due to improved hydrologic conditions, Lake Powell elevations rose above 3525' in April 2023 and are now projected to remain above that threshold through 2024.

This increase in forecasted inflow and storage elevation resulted in several actions in spring 2023, including the cessation of DROA releases in early March, changing focus to recovery of previously released DROA water for the May 2023 - April 2024 DROA plan, and a substantial increase in WY 2023 releases from Lake Powell. WY 2023 is the first year in which Lake Powell



has operated in the Lower Elevation Balancing Tier. In that tier, releases from Lake Powell are initially set to 7.0 MAF but can be adjusted in April through September up to a maximum of 9.5 MAF based on inflow forecasts. Lake Powell releases totaled 8.58 MAF for WY 2023, including the release of the 480,000 acre-feet withheld in Lake Powell in WY 2022. As the forecast fell quickly throughout September, Reclamation dropped to the minimum allowable LTEMP release, but still inadvertently released 40,000 acre-feet more from Powell than was required under balancing. They claim to have no authority to correct this inadvertent release in WY 2024. As determined by Reclamation's August 2023 24-Month Study, Lake Powell will operate in the Mid-Elevation Release Tier in WY 2024 with an annual release of 7.48 MAF.



Projected Lake Mead elevations from Reclamation's August 2022 24-Month Study triggered a 2023 Tier 2a shortage condition for the Lower Basin and reduced deliveries to Mexico pursuant to Minute 323, totaling 721,000 acre-feet as shown in the table below.



**2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan,
and Binational Water Scarcity Contingency Plan**
Total Volumes (kaf)

Lake Mead Elevation (feet msl)	2007 Interim Guidelines Shortages		Minute 323 Delivery Reductions	Total Combined Reductions	DCP Water Savings Contributions			Binational Water Scarcity Contingency Plan Savings	Combined Volumes by Country US: (2007 Interim Guidelines Shortages + DCP Contributions) Mexico: (Minute 323 Delivery Reductions + Binational Water Scarcity Contingency Plan Savings)					Total Combined Volumes
	AZ	NV	Mexico	Lower Basin States + Mexico	AZ	NV	CA	Mexico	AZ Total	NV Total	CA Total	Lower Basin States Total	Mexico Total	Lower Basin States + Mexico
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

2022 Operations

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2023 Operations

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2022 Operations

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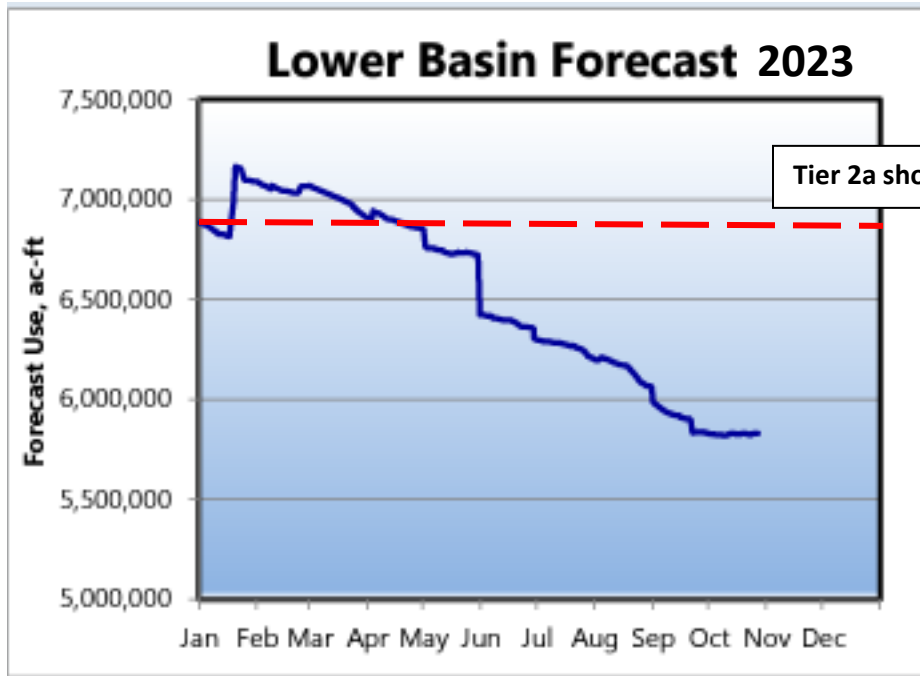
2023 Operations

The Secretary of the Interior will take affirmative actions to implement programs designed to create or conserve 100,000 acre-ft per annum or more of Colorado River System water 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 law, including availability of appropriations.



Early in Calendar Year 2023, the Lower Basin was projecting to consumptively use up to 7.2 MAF - about 320,000 AF more than their allocation under Tier 2a shortage. This would have involved the withdrawal of banked ICS. However, as the spring came, historic precipitation flooded the Arizona tributaries, and the California State Water Project issued a 100% allocation for the first time since the year 2006 (due to high snow in the Sierras; Lake Oroville spilled by May 2023). Hurricane Hilary in August 2023 further reduced Lower Basin demands due to heavy local precipitation. The Lower Basin forecast has dropped and now resides at 5.829 MAF - a drop of almost 1.4 MAF from their initial CY 2023 water orders. This will cause creation of ICS and accumulation limits will likely be hit this year. This “historically low consumptive use” in the Lower Basin was due to local hydrology - it was not caused by significant actions by the Lower Basin contractors.





California State Water Project Allocation

YEAR	DATE	ALLOCATION
2020	12/2/2019	10%
	1/24/2020	15%
	5/22/2020	20%
2021	12/1/2020	10%
	3/23/2021	5%
2022	12/1/2021	0% ³
	1/20/2022	15%
	3/18/2022	5% ⁴
2023	12/1/2022	5% ⁵
	1/26/2023	30%
	2/22/2023	35%
	3/24/2023	75%
	4/20/2023	100%



As determined by the Reclamation August 2023 24-Month Study, Lake Mead will operate in a Tier 1 shortage condition for 2024, as it did in 2022. As described in the table above, 2024 Lake Mead operations will incorporate a combined total of 613,000 acre-feet of Lower Basin shortages, reduced deliveries to Mexico pursuant to Minute 323, and water conservation measures under the Lower Basin Drought Contingency Plan and Binational Water Scarcity Plan.

In addition to the shortages agreed to pursuant to the 2007 Guidelines and 2019 Drought Contingency Plans, in December 2021 the Lower Division States also committed to creating an additional 500,000 acre-feet of water per year in 2021-2022, and 2023, of conserved water to remain in Lake Mead on a voluntary basis. The amount of water modeled for each year pursuant to the “500+ Plan” is included in the table below. Planned conservation in late 2022 and 2023 increased by almost 600,000 AF from August 2022 projections, which reflects the improved hydrology in the Lower Basin. Similar to shortage conditions, the amount of water conserved in Lake Mead under the “500+ Plan” may be partially offset by other withdrawals.

Additional Water Modeled Under 500 Plus Plan (as anticipated to be modeled in the April 2023 Most Probable 24-Month Study)

Conservation Activity (volumes in AF)	2021	2022 (Provisional)	2023 (Projected)
CAP ICS delivery offset	6,147	15,876	-10,900
GRIC System Conservation	40,000	58,837	125,000
GRIC ICS creation	0	78,565	0
CRIT System Conservation	4,685	4,685	0
CAWCD System Conservation	0	87,794	0
YMIDD System Conservation	0	8,523	13,670
MVIDD System Conservation	0	9,531	12,819
FMYN System Conservation	0	0	13,933
MWD ICS delivery offset and/or creation	58,134	58,211	107,347
PVID System Conservation	12,305	52,789	58,400
CVWD System Conservation	0	9,083	0
SNWA ICS creation	12,832	28,330	44,000
Annual Total (Non-Shortage/DCP)	134,103	412,224	364,269
Cumulative Total	134,103	546,327	910,596

- 2023 volumes reflect executed agreements under the 500+ Plan and LC Conservation Program and current operational projections and are subject to change.
- Additional conservation activities are being considered. After new agreements are finalized and executed, these additional activities will be included in Reclamation's operational planning and modeling.



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2. Supplemental Environmental Impact Statement for Near-Term Operations

Background

On October 28, 2022, the Bureau of Reclamation published a Notice of Intent to prepare a Supplemental Environmental Impact Statement (SEIS). This purpose of the SEIS is to adjust the current operating guidelines for Glen Canyon and Hoover Dams and to provide options for the Bureau of Reclamation to adapt to potentially dry years through 2026.



On January 30, 2023, the states of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming jointly submitted the Consensus-Based Modeling Alternative (CBMA) to the Bureau of Reclamation. The CBMA was intended to serve as a framework for Reclamation to analyze in its SEIS process.

Key components of the CBMA include:

- Assessment of evaporation and transit losses in the Lower Basin States in the amount of 1.5 million acre-feet each year.
- Additional shortages at higher Mead elevations for Lower Basin States.
- Upper Basin contributions included recognition of hydrologic shortages that Upper Basin water users routinely face, and additional voluntary conservation measures as possible, subject to approval by the Upper Division States and fully voluntary participation by water users.

On January 31, California provided to the Bureau of Reclamation an alternative proposal in response to the SEIS. California's proposal differed from the six-state CBMA in several ways and called for higher reservoir releases and much lower levels of conservation, to be achieved on a priority basis.

On April 11, 2023, the Bureau of Reclamation released a Draft Supplemental Environmental Impact Statement (D-SEIS). The D-SEIS included three alternatives, described below:

- No Action Alternative: Continuation of the 2007 Guidelines as written.
 - Lower Basin reductions continue to include shortages as determined by the 2007 Interim Guidelines and additional contributions as determined by the 2019 Lower Basin Drought Contingency Plan.
 - No additional conservation action or reservoir operational changes to protect critical reservoir elevations.
- Action Alternative 1:
 - In addition to reductions under the 2007 Interim Guidelines and the 2019 Lower Basin Drought Contingency Plan, additional reductions in Lower Basin State water deliveries distributed based on priority are contemplated, beginning in 2024. Reductions would be borne entirely by junior contractors.
 - These additional reductions begin at Mead elevation <1,090'.
 - Total Lower Basin reductions are capped at 2.083 million acre-feet in 2024.
 - In 2025-2026, additional reductions increase at Mead elevation <1,040', up to 4.0 million acre-feet of reductions at Mead elevation 950'.
 - Lake Powell operations modified to create the Lower Elevation Release tier (as opposed to "Balancing Tier") at elevation 3,500 - 3,575', with the initial release set at 6.0 million acre-feet and adjusted in April based on the End-of-Water Year projection, for a release of up to 8.23 million acre-feet.
- Action Alternative 2:
 - In addition to the reductions under the 2007 Interim Guidelines and the 2019 Lower Basin Drought Contingency Plan, additional Lower Basin reductions are contemplated in the same volume and elevation triggers as in Alternative 1 but are distributed based on a pro-rata additional reduction to each contractor. For example, a reduction of 1 million acre-feet would be distributed as a 13% reduction for every contractor.
 - Lake Powell operations modified consistent with Action Alternative 1.



The D-SEIS did include potential contributions from Upper Basin reservoirs through the Drought Response Operations Agreement in Alternative 2 and stated that any such contributions would occur consistent with the DROA and Framework agreements, which remain in place and are not modified by this D-SEIS.

Following release of the D-SEIS, the Lower Division States submitted a proposal to conserve at least 3 million acre-feet of water by 2026, in lieu of Reclamation taking either of the actions identified in the D-SEIS. In a letter sent to the Bureau of Reclamation on May 22, the Basin States requested Reclamation further analyze the Lower Basin proposal and urged Reclamation to immediately turn to planning for long-term operations at Lake Powell and Lake Mead.

In response to this submission, the Bureau of Reclamation withdrew the previously released D-SEIS and committed to releasing a revised D-SEIS analyzing the Lower Basin proposal.

Revised Supplemental D-SEIS

On October 25, the Bureau of Reclamation released a revised D-SEIS. This D-SEIS identifies one Preferred Alternative, the No Action Alternative, and several alternatives considered but eliminated from detailed analysis, including the previously identified Alternatives 1 and 2.

The D-SEIS notes that the previously released D-SEIS (April 2023) relied on September 2022 hydrology, while the revised D-SEIS relies on June 2023 hydrology. The D-SEIS further acknowledges that along with improved hydrology, an additional alternative has now been put forward since the release of the previous D-SEIS. At the time of the previously released D-SEIS, according to Reclamation, 57% of traces showed that critical elevations would be reached at Lake Powell in the interim period, while 52% of traces showed that critical elevations would be reached at Lake Mead. With the improved 2023 hydrology, Reclamation's modeling indicates that only 8% of traces show critical elevations at Lake Powell in the interim period and 4% of traces show Lake Mead reaching critical elevations.

The Proposed Alternative assumes 3.0 million acre-feet of Lower Basin conservation through 2026, with 1.5 million acre-feet physically conserved by the end of calendar year 2024. This is in addition to contributions made under the 2007 Guidelines and DCP. Up to 2.3 million acre-feet of this would be federally compensated. The D-SEIS notes that all or a portion of the remaining required conservation may be offset with ICS created in 2023-2026.

The Proposed Action also includes adjustments to releases from Glen Canyon Dam that would permit the release of as low as 6.0 million acre-feet if Lake Powell is projected to drop below 3,500' in the following 12 months. In addition, if Lake Mead is projected to drop below 1,025', the Proposed Alternative calls for the Lower Division States to develop a plan to protect Mead elevation 1000' in consultation with the Upper Division States.

The Colorado team has significant open questions about underlying technical assumptions within the D-SEIS as well as the performance of the Preferred Alternative, and will continue to analyze these issues in the coming weeks to determine an appropriate response. There is a 45-day comment period.



3. **Negotiations relating to Post-2026 Operational Guidelines for Lake Powell and Lake Mead**

In June, the Department of Interior announced the initiation of the formal process to develop future operating guidelines for Lake Powell and Lake Mead. The new guidelines will replace the 2007 Colorado River Interim Guidelines, which govern the operations of Lake Powell and Lake Mead through 2026. The 2007 Guidelines are set to expire in 2026. The formal process was announced through a Notice of Intent published in the Federal Register.

On August 15, 2023, Colorado, through Commissioner Becky Mitchell and Director Lauren Ris, provided [official comments](#) to the Department of Interior. The letter highlighted Colorado's negotiating priorities and "irrefutable truths" that Commissioner Mitchell has developed based on input from and discussions with water users, key stakeholders, Tribal Nations, and others across the State. In summary, the letter states that Post-2026 operations should:

- Acknowledge climate change and include operations that adapt and respond to a drier and more variable future
- Include mechanisms to rebuild depleted storage at Lake Mead and Lake Powell
- Recognize that Lower Basin overuse is unsustainable and puts the entire system at risk
- Not interfere with the right of any state to administer and distribute waters within its boundaries
- Ensure operations do not favor one basin over the other and recognize the Upper and Lower Basins' equal apportionments to the river
- Acknowledge that Colorado River Basin Tribes have water rights and that development of strategies for post-2026 operations depend upon participation by the Tribes

Colorado also joined [a letter with the other Upper Division States](#), as well as a [letter sent on behalf of the seven Basin States](#).

On October 19, 2023, the Department of Interior published a [Scoping Summary Report as well as an outline of the proposed scope and purpose of post-2026 operational guidelines](#). This signals the next step in developing post-2026 operational guidelines for Lake Powell and Lake Mead. This notice, published in the Federal Register Notice, indicates that the federal action will allow for the development of operating guidelines that do not preclude upstream or downstream actions to protect critical infrastructure at Lake Powell and Lake Mead, and contemplates inclusion of "total system storage in all major Colorado River reservoirs," as well as "[t]emporary emergency response operations at upstream Colorado River reservoirs to protect critical infrastructure at Glen Canyon Dam." Commissioner Mitchell and her team will coordinate with the Upper Division States and consider an appropriate response to this notice.

