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INSIGHT

Responding to Drought in the Colorado River Basin: Federal and State Efforts

Updated November 1, 2023

The Colorado River Basin (**Figure 1**) covers more than 246,000 square miles in seven U.S. states and Mexico. Basin waters are governed by multiple documents, known collectively as the *Law of the River*. The Colorado River Compact of 1922 established the framework to apportion water supplies between the river's Upper and Lower Basins, with each basin allocated 7.5 million acre-feet (MAF) annually. The Bureau of Reclamation (Reclamation) plays a prominent role in basin water management due to the many federally authorized projects in the basin.

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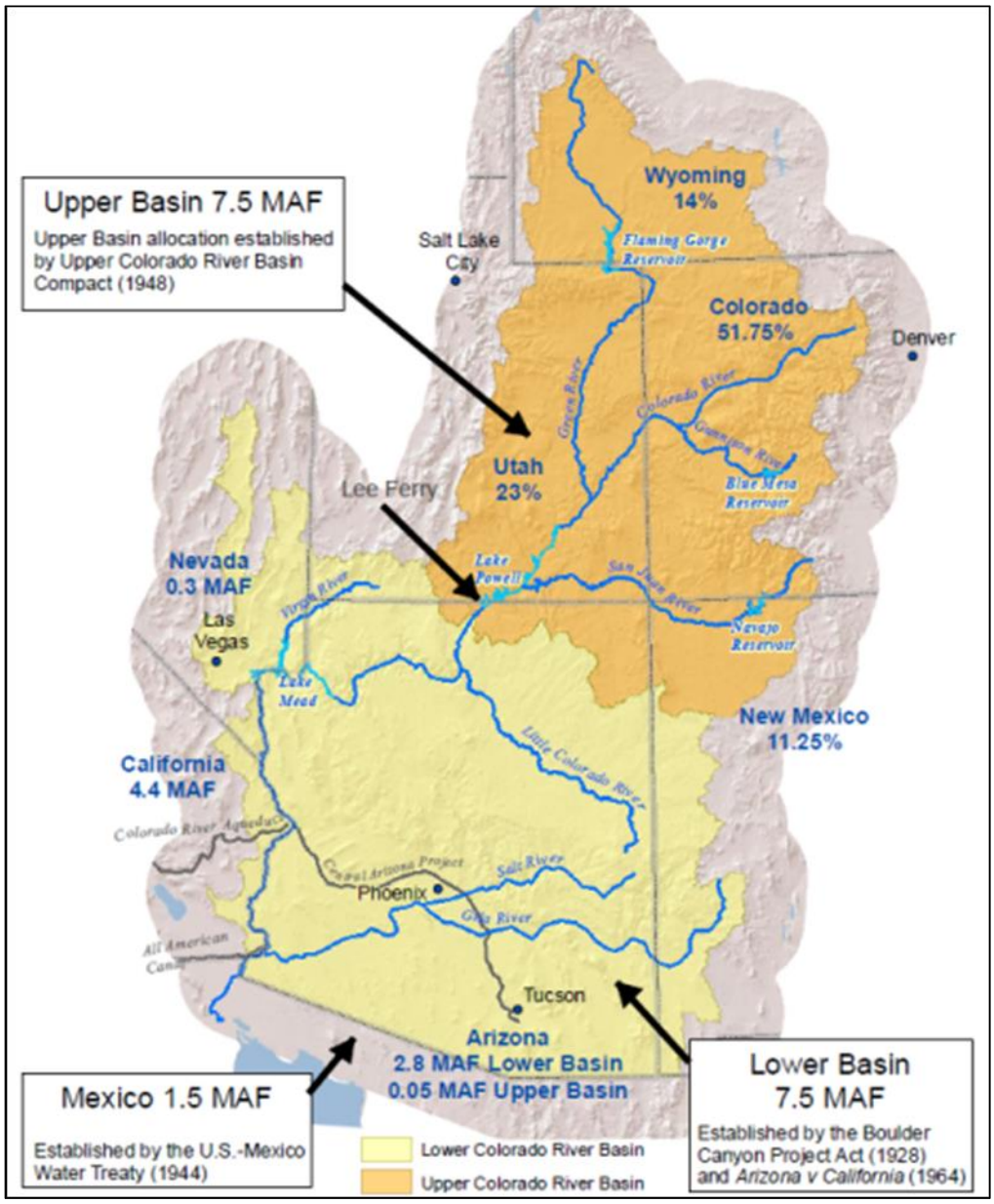
IN11982

Figure 1. Colorado River Basin Allocations

(Upper Basin allocations in percentages of overall allocation, Lower Basin allocations in million acre-feet [MAF])



Source: CRS, using data from U.S. Geological Survey ESRI Data & Maps, 2017, Central Arizona Project, and ESRI World Shaded Relief Map.

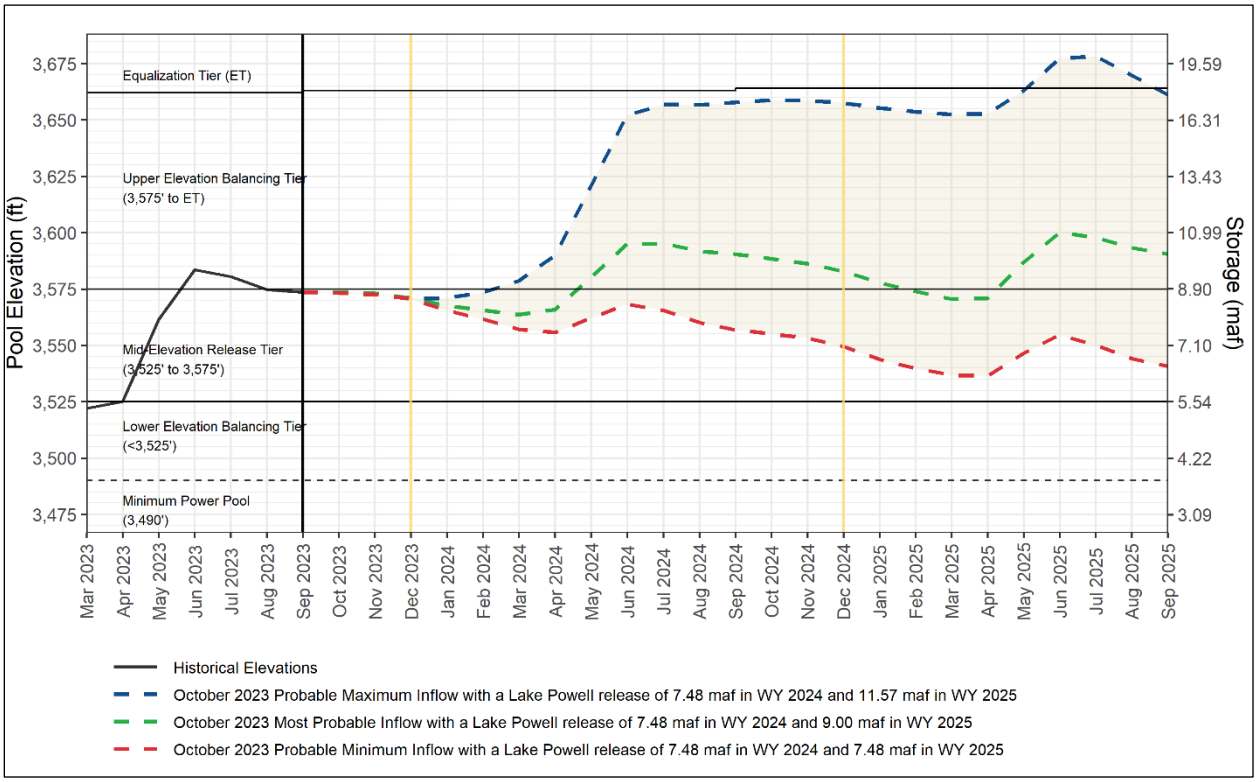
Notes: 7.5 MAF in Upper Basin allocations assumes full allocations under the Colorado River Compact. Due to uncertainty about how much water would remain after meeting obligations to the Lower Basin and Mexico, most Upper Basin Compact apportionments are in terms of percentages.

When federal and state governments originally approved the Colorado River Compact, it was assumed that river flows would average 16.4 MAF per year. Actual annual flows from 1906 to 2023 were approximately 14.6 MAF, and these flows have averaged significantly less (12.4 MAF per year) since 2000. Several studies have projected lower annual runoff volumes in the future compared with the historical baseline.

The imbalance between basin water supplies and demand has depleted storage in the basin's two largest reservoirs—Lake Powell in the Upper Basin and Lake Mead in the Lower Basin—and threatens water supplies for millions in the Southwest. Reclamation makes operational decisions for basin reservoirs in monthly 24-month studies, which project operational conditions for upcoming years (**Figure 2**, **Figure 3**).

Figure 2. Lake Powell Storage Elevations and Projections

(October 2023 24-month study inflow scenarios)

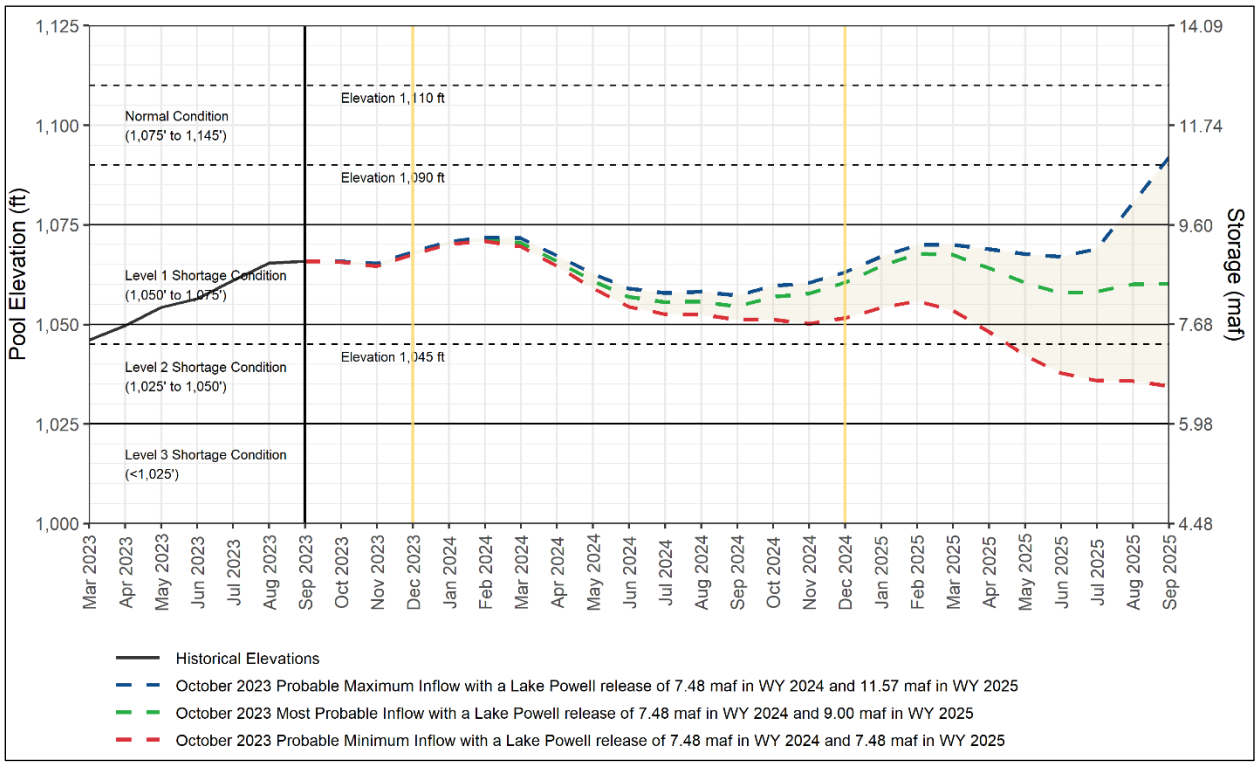


Source: Bureau of Reclamation, 24-Month Study Projections, https://www.usbr.gov/lc/region/g4000/riverops/24ms-projections.html.

Note: MAF = million acre-feet; WY = water year.

Figure 3. Lake Mead Storage Elevations and Projections

(October 2023 24-month study inflow scenarios)



Source: Bureau of Reclamation, 24-Month Study Projections, https://www.usbr.gov/lc/region/g4000/riverops/24ms-projections.html.

Notes: DROA = Drought Response Operations Agreement; WY = water year.

Mitigating Drought in the Colorado River Basin

Previous efforts to improve the basin's water supply outlook included agreements in 2003, 2007, and 2019 (approved by Congress in P.L. 116-14). These agreements reduced Lower Basin deliveries based on operational "tiers" for Lake Mead storage, authorized additional water conservation efforts, and implemented a framework to coordinate Upper Basin operations to prevent losing hydropower generation at Glen Canyon Dam.

Despite these efforts, storage levels declined. Since 2020, Reclamation has curtailed water deliveries for Arizona and Nevada based on annual hydrologic conditions (**Table 1**). In the Upper Basin, Reclamation implemented operational changes in 2021 and 2022. Storage at both lakes rebounded in 2023, but widespread concerns about long-term water supplies remain.

Table 1. Lower Colorado River Basin Operational Tiers, 2020-2024

(water delivery cutbacks in thousand acre-feet [KAF])

Year	Operational Tier	Cumulative Delivery Cutbacks by KAF (percentage of total deliveries)		
		Arizona	California	Nevada
2020	Zero	192 (6.8%)	—	8 (2.6%)

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		Arizona	California	Nevada
2021	Zero	192 (6.8%)	—	8 (2.6%)
2022	One	512 (18.2%)	—	21 (7.0%)
2023	Two	592 (21.1%)	—	25 (8.3%)
2024 (expected)	One	512 (18.2%)	—	21 (7.0%)

Source: CRS, based on Bureau of Reclamation data, 2019-2023.

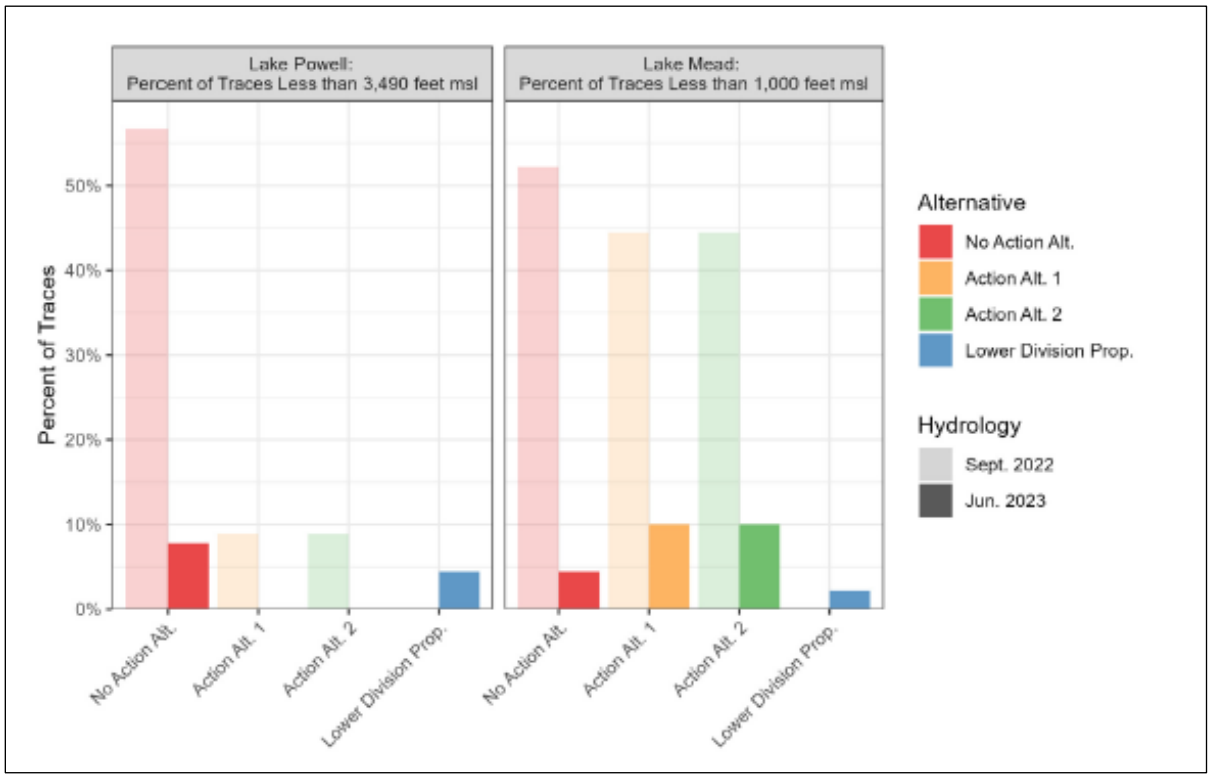
At a 2022 congressional hearing, Reclamation asked states to conserve an *additional* 2-4 MAF in 2023 and 2024 and noted that it was prepared to act unilaterally if these targets were not met. No new state commitments were announced, and in October 2022 Reclamation noticed its intent to study, via an environmental impact statement (EIS), revised "near-term" operations through 2026. In early 2023, California and the six other basin states each responded to this action with their own proposals.

On April 11, 2023, Reclamation released its draft EIS modeling for two federal action alternatives that both would have imposed equal amounts of new Lower Basin delivery reductions (0.020-2.900 MAF per year in water years 2024-2026, depending on Lake Mead elevations). The primary difference between the two alternatives was the approach to apportioning reductions among those contracted to receive Colorado River water; one alternative would have apportioned reductions based on water rights priority, whereas the other would have imposed percentage-based delivery reductions based on evaporation and other factors.

Subsequent developments have shifted this discussion. On May 22, 2023, Reclamation announced a consensus proposal in which Lower Basin states agreed to conserve a total of 3 MAF prior to 2026, with 2.3 MAF of these cuts compensated by the federal government via $4.0 billion in drought response funds appropriated to Reclamation in P.L. 117-169. In October 2023, Reclamation released a new draft supplemental environmental impact statement (SEIS) analysis of the Lower Basin's consensus proposal. Reclamation noted that previous modeling was based on 2022 hydrology and that improved 2023 hydrology had significantly decreased the chances of both reservoirs reaching critical levels prior to 2026 (**Figure 4**).

Figure 4. Improved Hydrological Conditions at Lakes Mead and Powell

(chances of reservoirs reaching "critical elevations" through 2026 under 2023 SEIS alternatives)



Source: Bureau of Reclamation, Department of the Interior, *Near-Term Colorado River Operations*, Revised Draft Supplemental Environmental Impact Statement, October 2023, https://www.usbr.gov/ColoradoRiverBasin/documents/NearTermColoradoRiverOperations/20231019-Near-termColoradoRiverOperations-RevisedDraftEIS-508.pdf.

Notes: SEIS = Supplemental Environmental Impact Statement. Action Alternatives 1 and 2 refer to April 2023 draft SEIS alternatives. Lower Division Proposal refers to April 2023 proposal from Lower Basin states. "Percent of Traces" represents percentage of modeled scenarios.

Parallel to this study process, Reclamation is studying long-term (post-2026) operational alternatives. In October 2023, Reclamation released a scoping report detailing public comments on potential long-term operational changes.

Questions facing Congress include how potential changes would affect long-term water supplies, how state-level commitments would be met if contractors were unwilling to participate in voluntary actions, and whether federal funding commitments would accompany future water delivery curtailments.

Author Information

Charles V. Stern
Specialist in Natural Resources Policy

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