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INSIGHT

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

Updated October 23, 2023

The Colorado River Basin (**Figure 1**) covers more than 246,000 square miles in seven U.S. states and Mexico. Basin waters are managed and governed by multiple laws, court decisions, and other documents known collectively as the *Law of the River*. The Colorado River Compact of 1922 established a framework to apportion water supplies between the river's Upper and Lower Basins (divided at Lee Ferry, AZ). Each basin was allocated 7.5 million acre-feet (MAF) annually under the compact; an additional 1.5 MAF in annual flows was made available to Mexico under a 1944 treaty. The Bureau of Reclamation (Reclamation) and the Department of the Interior (DOI) play a prominent role in basin water management due to the many federally authorized projects in the basin. This Insight discusses the status of the basin's hydrology, as well as efforts to address its water supply issues.

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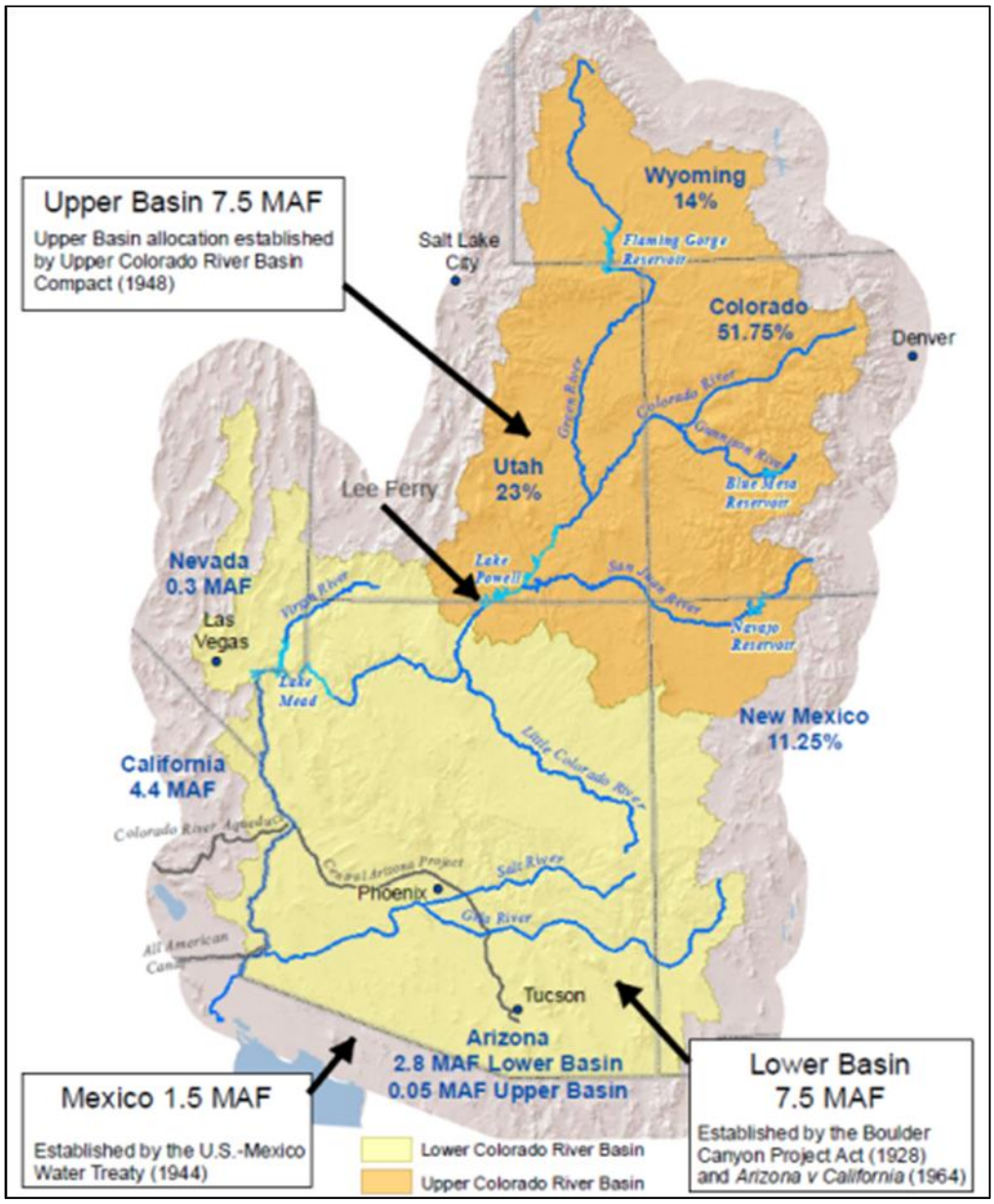
IN11982

Figure 1. Colorado River Basin Allocations

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



Source: Figure by the Congressional Research Service, using data from U.S. Geological Survey ESRI Data & Maps, 2017, Central Arizona Project, and ESRI World Shaded Relief Map.

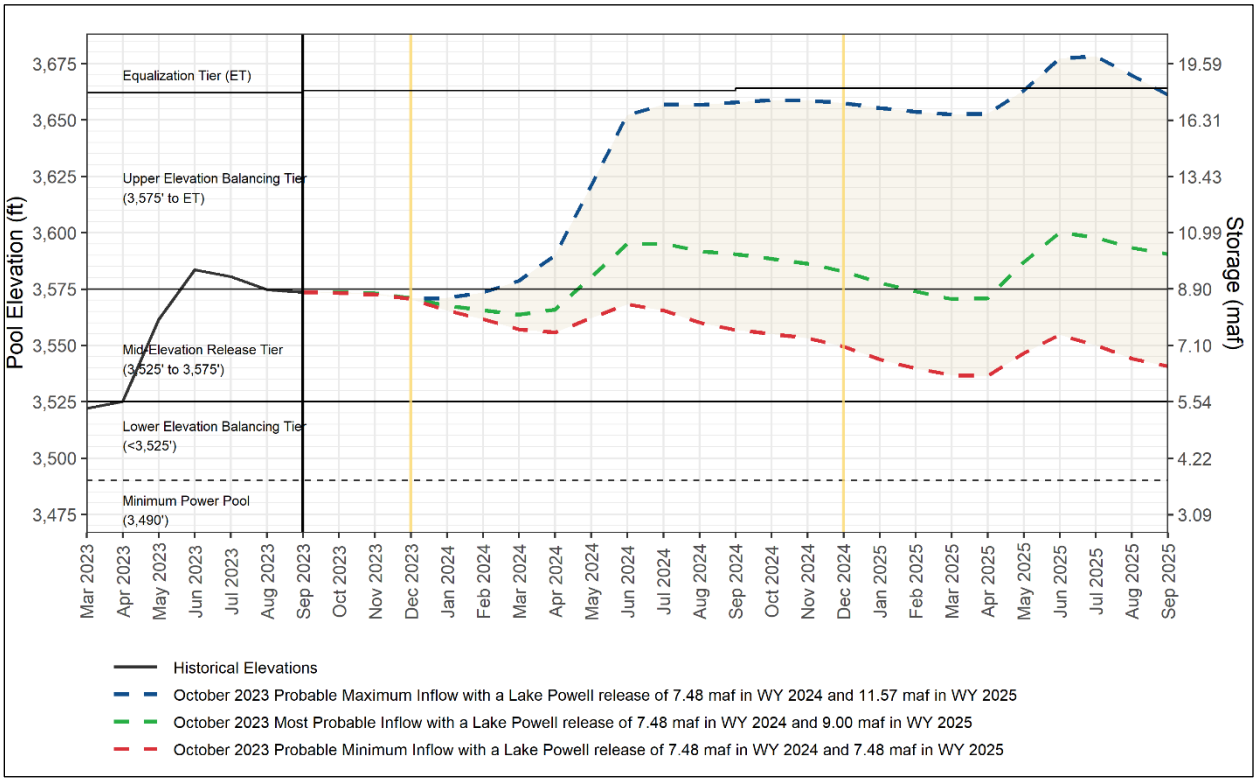
Notes: 7.5 MAF in Upper Basin allocations assumes full allocations under the Colorado River Compact. Due to uncertainty about how much water would remain after meeting obligations to the Lower Basin and Mexico, most Upper Basin Compact apportionments are in terms of percentage of the overall Upper Basin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

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 the basin's drought began in 2000. Several studies have projected lower annual runoff volumes in the future compared with the historical baseline.

The *structural deficit* 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 municipal and agricultural 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)

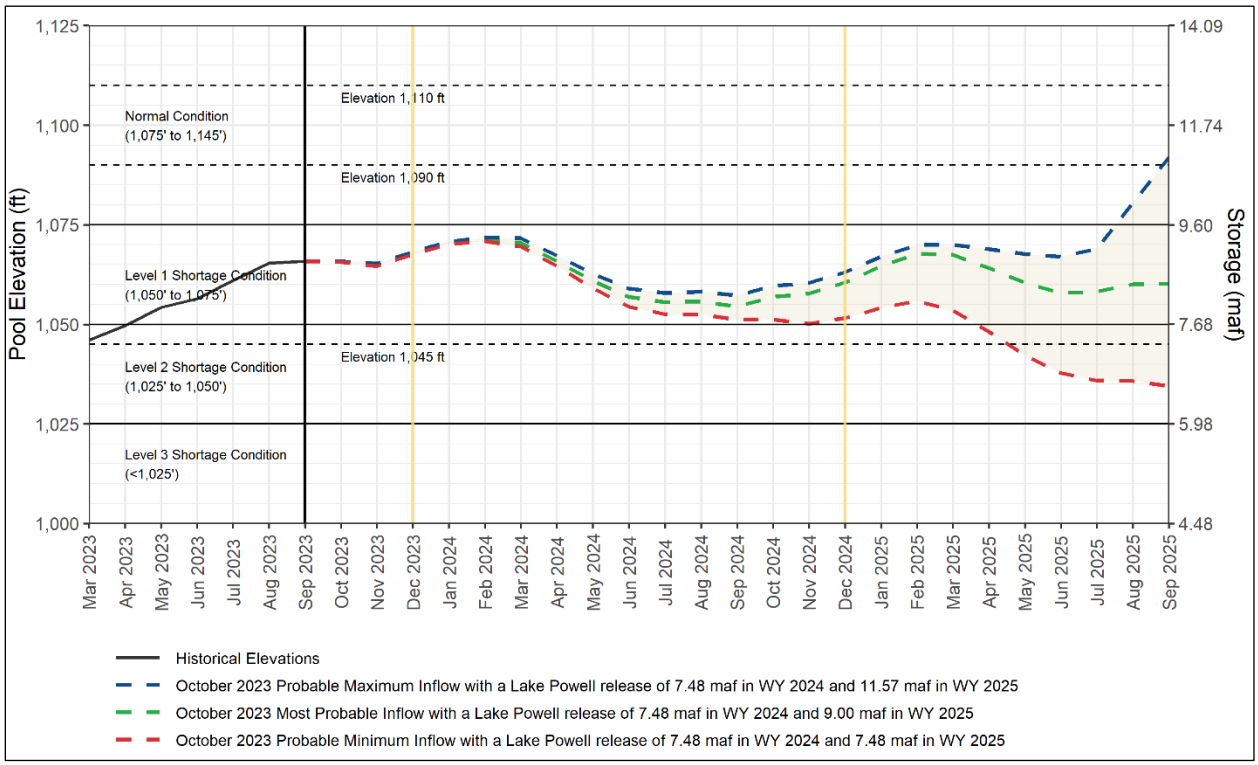


Source: Bureau of Reclamation, 24-Month Study Projections, https://www.usbr.gov/lc/region/g4000/riverops/24ms-projections.html.

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

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, among other things, 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 have continued to fall, and since 2020 Reclamation has annually curtailed 6.8% to 21.1% of deliveries for Arizona and 2.6% to 8.3% of deliveries for Nevada, depending on hydrologic conditions (**Table 1**). In the Upper Basin, falling levels at Lake Powell led to 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%)

Year	Operational Tier	Cumulative Delivery Cutbacks by KAF (percentage of total deliveries)		
		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 June 14, 2022, congressional hearing, Reclamation announced that states needed to conserve an *additional* 2-4 MAF in 2023 and 2024, and that the Secretary of the Interior was prepared to act unilaterally if these targets were not met. After no new state commitments were announced, 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 modeling for two federal action alternatives under the EIS process. Both alternatives would impose 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 and the year). The primary difference between the two alternatives is the approach to apportioning reductions among those contracted to receive Colorado River water. One alternative would apportion reductions based on water rights priority (i.e., fewer reductions for California water users); the other would impose the same percentage-based delivery reductions on all Lower Basin contractors.

On May 22, 2023, DOI and basin states announced a consensus-based proposal in which Lower Basin states would 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. DOI announced a revised EIS timeline focused on analyzing this proposal, with a goal of finalizing near-term changes by the end of 2023. Parallel to this 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 to basin water management 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 need to accompany future water delivery curtailments.

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