



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

Updated August 18, 2022

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. Since the Upper Basin's waters were developed after the Lower Basin, its apportionments are less than the full amount allowed under the compact and are framed in terms of percentages of available supplies. 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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Wyoming Upper Basin 7.5 MAF 14% Upper Basin allocation established Salt Lake laming Gorge by Upper Colorado River Basin City Compact (1948) Colorado 51.75% Utah Lee Ferry 23% Nevada 0.3 MAF Las Vegas **New Mexico** 11.25% California **4.4 MAF** Tucson Arizona Lower Basin 2.8 MAF Lower Basin 0.05 MAF Upper Basin Mexico 1.5 MAF 7.5 MAF Established by the Boulder

Figure 1. Colorado River Basin Allocations

(Upper Basin allocation in terms of 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.

Lower Colorado River Basin

Upper Colorado River Basin

Canyon Project Act (1928)

and Arizona v California (1964)

Established by the U.S.-Mexico

Water Treaty (1944)

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

The basin is in the midst of a long-term drought, during which consumptive use has regularly exceeded natural flows. When federal and state governments originally approved the compact, it was assumed that river flows would average 16.4 MAF per year. Actual flows from 1906 to 2020 were approximately 13.9 MAF, and have averaged approximately 12.5 MAF since the onset of the basin's drought in 2000. These conditions are projected to continue.

3,425

Jan-22 Feb-22 Mar-22

Historical Elevations

Observers track the status of two large federal reservoirs—Lake Powell in the Upper Basin and Lake Mead in the Lower Basin—as an indicator of basin storage conditions. Reclamation makes operational decisions for basin reservoirs in monthly 24-month studies. Recent studies projected additional reductions in water storage at both reservoirs (**Figure 2**, **Figure 3**).

3,700 Historical Future 3,675 **Equalization Tier** 3,663 ft 3,662 ft 3.660 ft 3,659 ft 3,650 **Upper Elevation Balancing** Tier 3,575 ft and above 3,625 3,600 Surface Water Elevation (feet) 3,575 Mid-Elevation Release Tier 3,550 3,525 **Lower Elevation Balancing** 3,500 Tier below 3,525 ft Minimum Power Pool 3,475 3,490 ft 3,450

Oct-22

Jan-23

- - April 2022 Probable Maximum Inflow with a Lake Powell release of 7.48 maf in WY 2022 and 7.48 maf in WY 2023
- - April 2022 Most Probable Inflow with a Lake Powell release of 7.48 maf in WY 2022 and 7.50 maf in WY 2023
- - April 2022 Probable Minimum Inflow with a Lake Powell release of 7.48 maf in WY 2022 and 7.00 maf in WY 2023

Jul-23

Figure 2. Lake Powell Storage Elevations and Projections

July 2022 24-Month Study

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

Note: WY = water year (the 12-month period from October through September).

Jun-22 Jul-22 Aug-22

1,110 1,095 Elevation 1,090 ft Normal Condition 1,080 1,145 ft to 1,075 ft Surface Water Elevation (feet) Level 1 Shortage Condition 1,075 ft to 1,050 Elevation 1,045 ft Level 2 Shortage Condition 1,035 1,050 ft to 1,025 ft 1,020 Level 3 Shortage Condition 1,005 990 Jun-22 Jul-22 Jan-23 Feb-23 Jun-23 Jul-23 May-Aug-Febť Mar Apr Historical Flevations - July 2022 DROA Maximum Probable Inflow with a Lake Powell release of 7.00 maf in WY 2022 and 9.50 maf in WY 2023 - July 2022 Most Probable Inflow with a Lake Powell release of 7.00 maf in WY 2022 and 7.00 maf in WY 2023 - - July 2022 DROA Minimum Probable Inflow with a Lake Powell release of 7.00 maf in WY 2022 and 7.00 maf in WY 2023

Figure 3. Lake Mead Storage Elevations and Projections

July 2022 24-Month Study

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

Note: DROA = Drought Response Operations Agreement

Mitigating Drought in the Colorado River Basin

Previously, there have been multiple efforts to improve the basin's water supply outlook, including the 2003 Quantitative Settlement Agreement, the 2007 Interim Shortage Guidelines, and the 2019 drought contingency plans (DCPs) for the Upper and Lower Colorado River Basins. (The latter were authorized in P.L. 116-14.) The DCPs required reduced Lower Basin deliveries based on Lake Mead storage levels, authorized additional water conservation efforts, and put in place the framework for a Drought Response Operations Agreement (DROA) to coordinate Upper Basin operations to prevent the loss of hydropower generation at Glen Canyon Dam. In 2021, Lower Basin states agreed on a new set of actions—the 500+ Plan—which are expected to result in the conservation of an additional 500,000 AF in Lake Mead in 2022 and 2023 (i.e., 1 MAF total).

Despite these efforts, storage levels at both reservoirs have continued to fall. Reclamation declared the first ever level one and level two shortages for the Lower Basin in August 2021 and 2022, respectively. These declarations resulted in delivery curtailments for Arizona and Nevada. Reclamation studies indicate the ongoing possibility of Lake Mead falling significantly more (and triggering additional shortages/actions) within two years.

In the Upper Basin, in March 2022 Lake Powell fell below 3,525 feet for the first time since the late 1960s. To alleviate the potential for lost hydropower generation at Glen Canyon Dam, the Department of the Interior initiated DROA operations, resulting in operational changes in July 2021 and January 2022. In May 2022, Reclamation invoked emergency authority to move approximately 500,000 AF of water from Flaming Gorge Reservoir to Lake Powell and held back 480,000 AF of Lower Basin releases pursuant to the 2007 guidelines.

At a June 14, 2022, congressional hearing, Reclamation announced that states needed to conserve an *additional* 2 MAF to 4 MAF in 2023 to protect storage volumes over the near term (2023-2026). This estimate was the result of a 2022 Reclamation analysis. Reclamation noted that if the target is not met with voluntary commitments, the agency was prepared to act unilaterally. In a July 18, 2022, letter to Reclamation, Upper Basin representatives declined to contribute a specific volume of cutbacks to these efforts, instead laying out a five-point plan as the basis for its water conservation efforts.

Congress is involved in basin management primarily through authorizations and appropriations for Reclamation projects and activities. In addition to the 2019 authorization of the DCPs, Congress has authorized "system conservation" efforts in the basin that expire in 2022. Congress also has appropriated regular and supplemental appropriations for Colorado River water conservation efforts in addition to regular operational funds. Most recently, in Section 50233 of P.L. 117-169 (popularly known as the Inflation Reduction Act), Congress provided \$4.0 billion for drought mitigation in the West, with priority given to Colorado River basin activities. These activities include compensation for reduction in water diversions and funding for system conservation projects and ecosystem restoration to address drought in a river basin or inland water body.

The 2007 guidelines and the 2019 DCPs are set to expire at the end of 2026. Extending, amending, or replacing these agreements is central to future basin water management. Reclamation previously published a "pre-scoping" notice seeking input on how to foster participation in the National Environmental Policy Act process to develop post-2026 basin operations.

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