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INSIGHT

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

August 5, 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 much of the Lower Basin, its apportionments are significantly less than the full amount allowed under the compact and are framed mostly 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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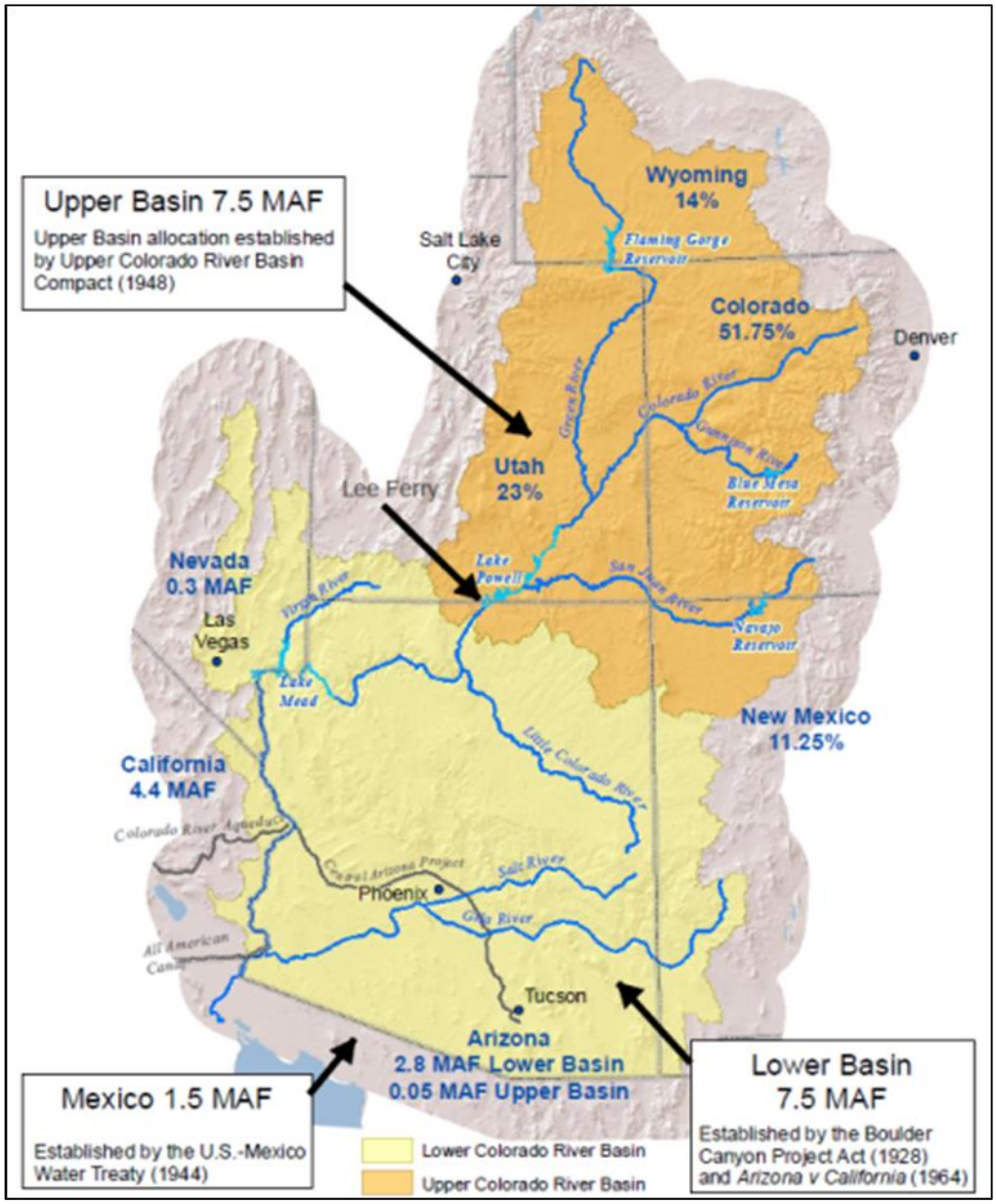
Figure 1. Colorado River Basin Allocations

(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 (CRS), using data from USGS, 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 as to how much water would remain after obligations to the Lower Basin and Mexico are met, outside of 50,000 AF provided annually to Upper Basin portions of Arizona, the Upper Basin Compact includes apportionments in terms of percentage of the overall Upper Basin allocation.

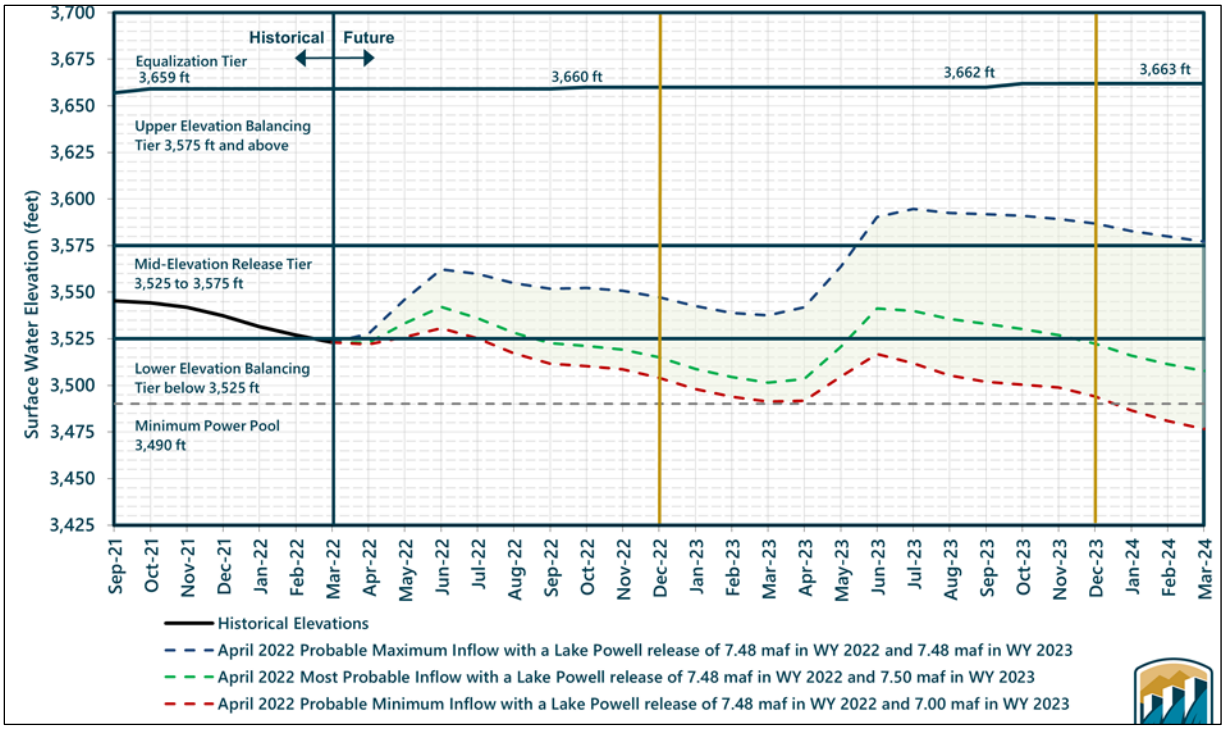
The Colorado River Basin is in the midst of a long-term drought, during which consumptive use has regularly exceeded natural flows. When federal and state governments originally approved the 1922 compact, it was assumed based on the historical record that river flows would average 16.4 MAF per year.

Actual flows from 1906 to 2020 were approximately 13.9 MAF, with flows averaging approximately 12.5 MAF since the onset of the basin's drought in 2000. These conditions are projected to continue.

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

Figure 2. Lake Powell Storage Elevations and Projections

July 2022 24-Month Study

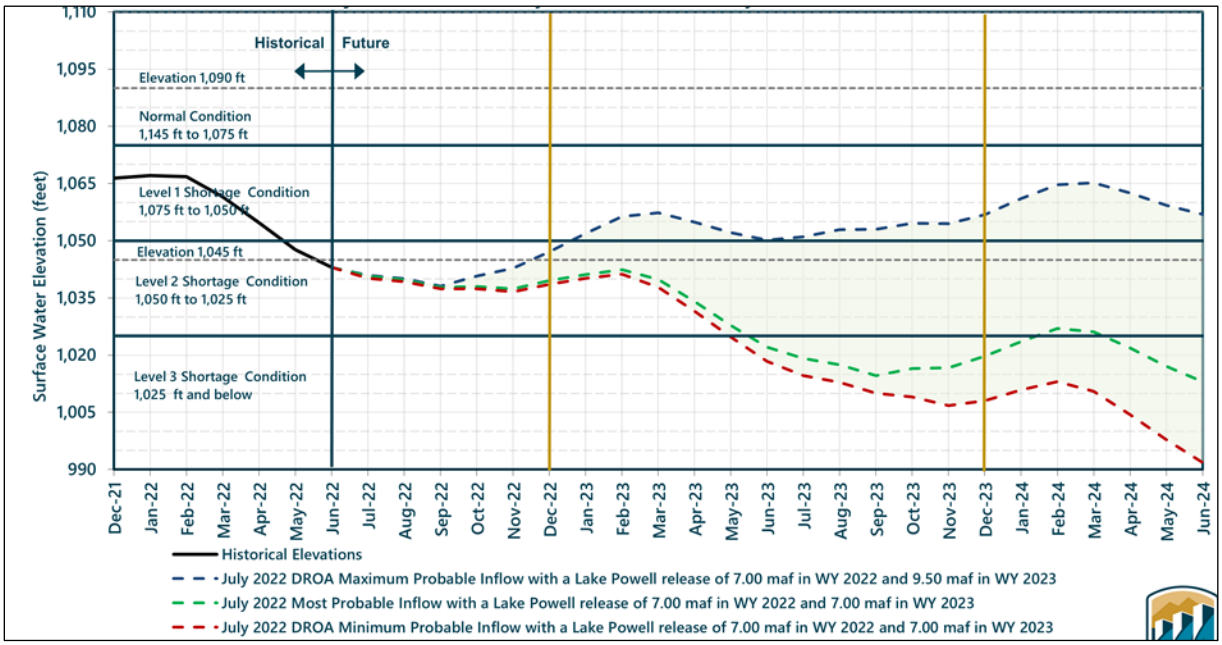


Source: Bureau of Reclamation, https://www.usbr.gov/lc/region/g4000/riverops/24ms-projections.html.

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

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 by Congress 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.

Despite these efforts, storage levels at both reservoirs have continued to fall. In August 2021, Reclamation declared the first-ever Level One Shortage Condition for the Lower Basin, which formally triggered delivery curtailments for Arizona (512,000 AF) and Nevada (21,000 AF). Reclamation's August 2021 24-month study also indicated for the first time the possibility of Lake Mead falling below 1,020 feet within two years, which resulted in agreement on a new set of actions in 2021, known as the 500+ Plan. This effort is expected to result in the conservation of an additional 500,000 AF in Lake Mead in 2022 and 2023 (i.e., 1 MAF total).

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 by August 2022, the agency would 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 directives and authorizations 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. Legislation under consideration in the 117th Congress would enact other new authorities aimed at improving basin water management.

The 2007 Interim Shortage Guidelines and the 2019 DCPs are set to expire at the end of 2026. Extending or amending previous agreements is central to future basin water management. On June 20, 2022, Reclamation published a "pre-scoping" notice seeking input on how to foster participation in the National Environmental Policy Act (NEPA) process to develop post-2026 basin operations. A formal notice for NEPA scoping is expected in 2023.

Author Information

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