



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

Updated February 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 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) plays a prominent role in [basin water management](#) due to the many federally authorized projects in the basin.

The basin is in the midst of a long-term [drought](#), during which consumptive use has significantly exceeded natural flows. This Insight discusses the hydrological status of the basin, as well as recent agreements and proposals to address the basin's long-term water supply issues.

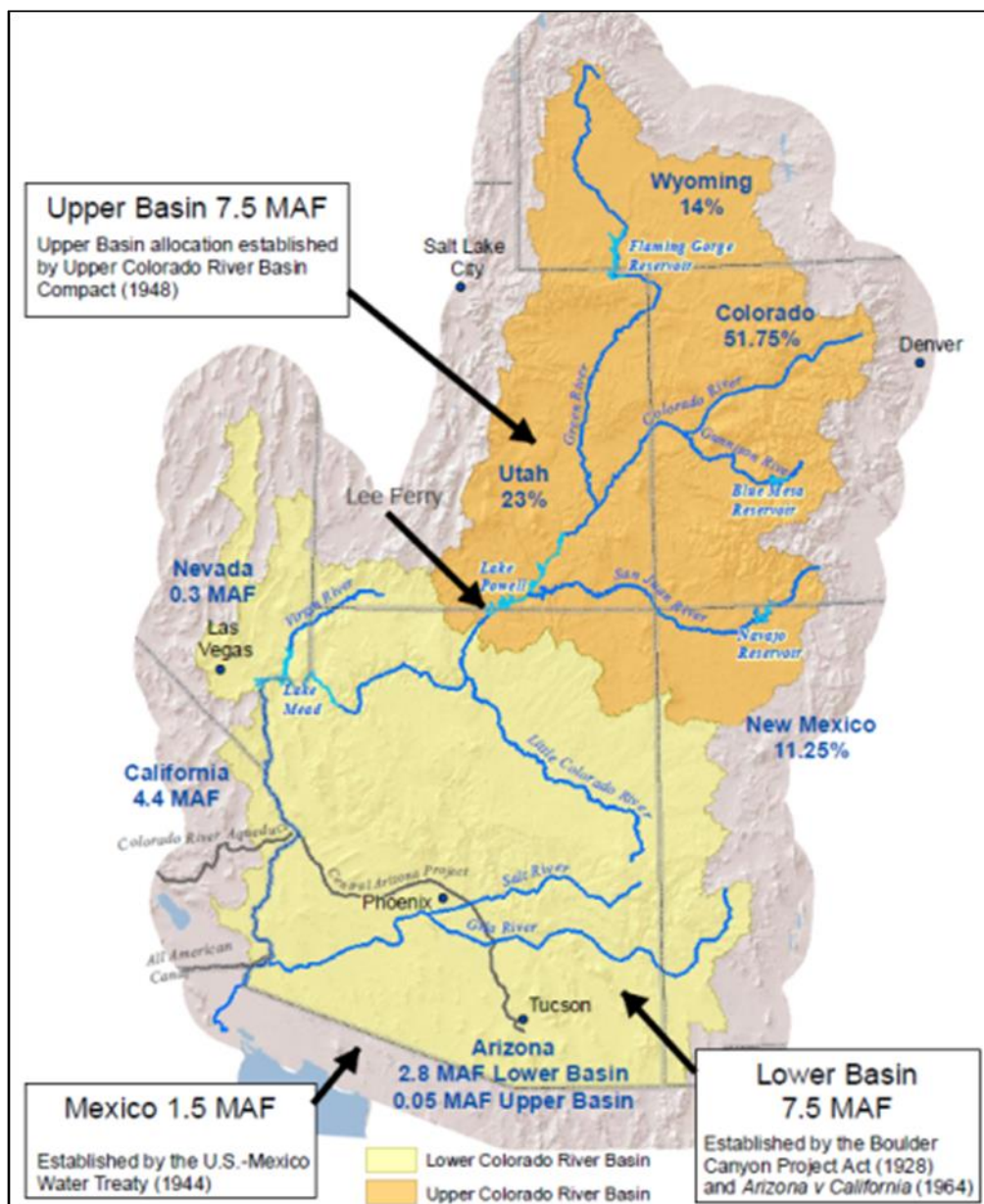
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Figure I. Colorado River Basin Allocations

(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.

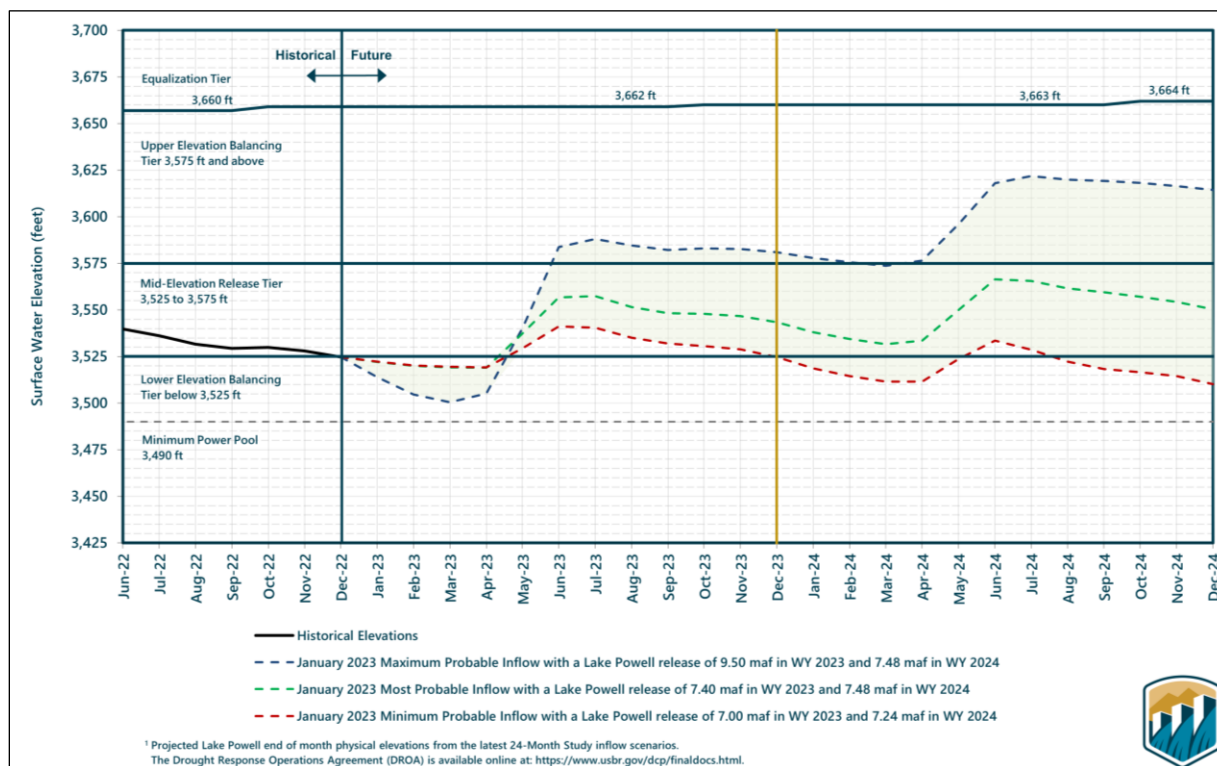
Notes: 7.5 MAF in Upper Basin allocations assumes full allocations under the Colorado River Compact. Due to uncertainty about how much water would remain after meeting obligations to the Lower Basin and Mexico, most Upper Basin Compact apportionments are in terms of percentage of the overall Upper Basin 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 2022 were approximately 14.6 MAF, and have dropped to 12.1 MAF per year since the basin's drought began in 2000. Some [studies](#) have projected that these conditions will continue.

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 urban 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

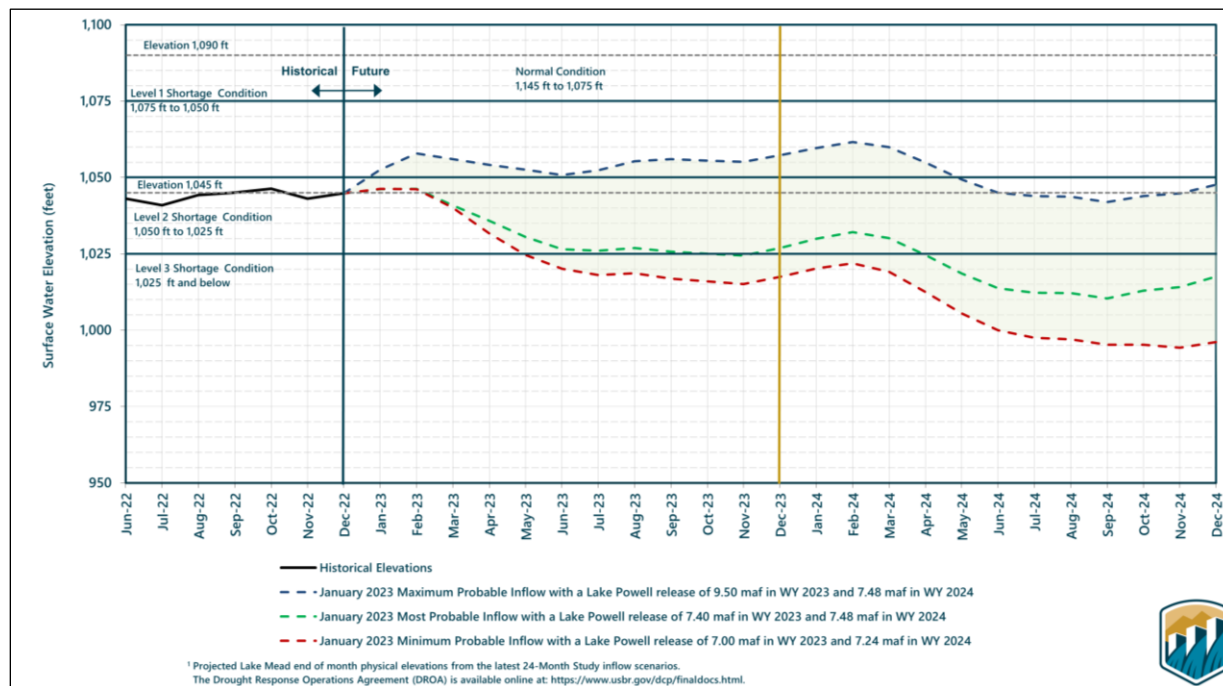
January 2023 24-Month Study Inflow Scenarios



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

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

Figure 3. Lake Mead Storage Elevations and Projections
January 2023 24-Month Study Inflow Scenarios



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 Lake Mead storage levels, authorized additional water conservation efforts, and implemented a framework to coordinate Upper Basin operations to prevent losing hydropower generation at Glen Canyon Dam, among other things.

Despite these efforts, storage levels at both reservoirs have continued to fall, with Reclamation instituting Lower Basin delivery curtailments for Arizona and Nevada in 2021 and 2022. In the Upper Basin, Lake Powell fell below 3,525 feet in March 2022 for the first time since the late 1960s. To alleviate the potential for lost hydropower generation at Glen Canyon Dam at lower storage volumes, Reclamation made operational changes on Upper Basin reservoirs in 2021 and 2022.

Studies project that storage in both reservoirs may decrease further in the coming years. At a June 14, 2022, congressional hearing, Reclamation announced that states needed to conserve an *additional* 2 MAF to 4 MAF in 2023 and 2024 to protect storage volumes. Reclamation noted that if the target was not met with voluntary commitments, it was prepared to act unilaterally.

No major commitments were announced in response to the June request, and Reclamation did not implement new unilateral delivery curtailments. Instead, in October 2022 Reclamation announced its intent to study revised operational guidelines for 2023 and 2024. The alternatives under consideration include new "consensus-based" actions by the states to reduce demand, as well as unilateral delivery curtailments by the federal government.

In response to Reclamation’s announcement, on January 31, 2023, all basin states but California submitted to Reclamation a combined “[Consensus Based Modeling Alternative](#)” (CBMA). The CBMA assumes an additional 1.543 MAF per year in delivery reductions on Lower Basin contractors (largely through assessing evaporative losses on Lower Basin states). On the same day, California submitted its own [proposal](#) that would, among other things, reduce deliveries for Lower Basin contractors by 1.0 MAF per year. A primary difference between the two proposals is that the CBMA would distribute reductions based on consumptive use, whereas the California alternative would institute proportionally greater reductions on Arizona and Nevada to reflect California’s senior water rights under the Law of the River. To date, the Upper Basin states have [declined](#) to contribute a specific volume of cutbacks, instead laying out a five-point plan as the basis for their water conservation efforts. Reclamation’s analysis of short-term operational alternatives for river management is expected later this spring. Parallel to this process, Reclamation and stakeholders are also developing long-term ([post-2026](#)) basin operations.

Congress influences basin water management through authorizations and appropriations for Reclamation projects and activities. In addition to the 2019 authorization of the Drought Conservation Plans, Congress reauthorized “system conservation” efforts in the basin. Furthermore, recent [regular](#) and [supplemental](#) appropriations included funding for Colorado River water conservation efforts. In Section 50233 of P.L. 117-169, Congress provided \$4.0 billion for drought mitigation in the West, with priority given to Colorado River Basin activities. Reclamation is using this funding to establish a [Lower Basin Conservation and Efficiency Program](#) to pay contractors to forgo deliveries of Colorado River Basin waters.

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