Analysis of Colorado River Basin Storage Suggests Need For Immediate Action

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Consumptive water use in the Colorado River Basin continues to outpace natural flow. The dwindling reserve stored in reservoirs that has long sustained this shortfall might soon be exhausted. Immediate steps should be taken to reduce current consumptive uses in the Upper and Lower Basins.

The Bureau of Reclamation's most recent forecasts for reservoir storage indicate that the mismatch between natural flow and consumptive use will continue, necessitating further draw down of the Basin's reservoirs that are already as low as they were in the early 2020s. The operating rules presently in place (i.e., not the elusive post-2026 Guidelines) will be the ones that guide our response to this crisis. Those existing rules allow reservoir releases and consumptive use to continue at rates typical of the past few years, despite the shrinking storage buffer, intensifying the present predicament and severely constraining options for post-2026 management. Here we use a simple mass balance approach, conservative but not alarmist, to analyze what might happen during the next twelve months if next year's natural flow is the same as this year's. The results are grim.

If next year is a repeat of this year and uses of water remain the same, we estimate that consumptive use will exceed the natural flow in the Colorado River Basin by at least **3.6 million acre feet**. Lake Mead and Lake Powell would absorb the bulk of that imbalance, causing drawdown of a great deal of the storage remaining in those reservoirs. Although most reporting of reservoir storage describes the amount of water above dead pool, we focus on "realistically accessible storage," which is the amount of water stored above the levels identified by Reclamation as critical for the safe operation of the infrastructure of Hoover and Glen Canyon Dams. In this scenario, it is likely that **less than 4 million acre feet** will be available above these elevations in Lake Powell and Lake Mead in late summer 2026. Such a situation

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would constrain subsequent reservoir operations at the beginning of the season of reservoir depletion that typically continues until early April of the following year. Such a small amount of remaining storage would also constrain operational flexibility and management options under the Post-2026 operating guidelines now being formulated. Given the existing limitations of the river's infrastructure, avoiding this possible outcome requires **immediate and substantial** reductions in consumptive use across the Basin.

INTRODUCTION AND BACKGROUND

Reclamation's August 2025 24-Month Study that projects reservoir storage and reservoir releases for the next two years was released on August 15, 2025. These forecasts are used to determine the amount of water available to Lower Basin water users and the operations of Lake Powell and Lake Mead for the coming year.

The primary takeaways from the August 24-Month Study are that 7.48 million acre feet will be released from Lake Powell during Water Year 2026, and a Tier 1 shortage condition will continue in the Lower Basin, based on Reclamation's projection of the elevations of Lake Powell and Lake Mead on January 1, 2026.[7] The Tier 1 shortage condition requires a collective reduction of 533,000 acre feet in water deliveries to Arizona and Nevada, and Reclamation estimates that approximately 800,000 acre feet of additional Lower Basin conservation will occur in 2026.[8] The Tier 1 level also dictates a reduced delivery of 1.42 million acre feet to Mexico pursuant to Minute 323, and Mexico will generate an additional 67,000 acre feet of water savings under a conservation program established by Minute 330, resulting in a total delivery to Mexico of 1.353 million acre feet.[9] All of these conditions are basically unchanged from last year, except that Mexico's Minute 330 contribution will be less in 2026 than it was in 2025.[10]

There is no lack of Colorado River data on which to focus and draw conclusions, and the sheer volume of these data can be challenging to absorb and understand. Reclamation publishes daily, even hourly, records on reservoir conditions at 46 reservoirs in the Basin, and graphs and data tables are updated daily on inflows, releases, and losses from these reservoirs. Lower Basin water use and river flows are reported daily. The USGS operates more than 500 stream gages in the Colorado River watershed and provides real time measurements of stream flow. NOAA's Colorado Basin River Forecast Center provides weekly reports projecting reservoir inflows and data on soil moisture conditions. As soon as the snow begins to fall, the condition of the snowpack is reported by the Natural Resources Conservation Service as snow water equivalent.

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[7] BUREAU OF RECLAMATION, AUGUST 2025 MOST PROBABLE 24-MONTH STUDY (2025).
[8] Bureau of Reclamation, Webinar on August 2025 24-Month Study, Slide 19 (2025).
[9] International Boundary and Water Commission, *2026 Colorado River Allocations Announced for the United States and Mexico*, Aug. 15, 2025.
[10] International Boundary and Water Commission, *2025 Colorado River Allocations*, Aug. 15, 2024.

Despite this abundance of important and detailed information, it is sometimes difficult to see the water forest amid all the data trees. To further complicate interpretation of these data, there are deeply embedded assumptions in some of the projections of inflow and reservoir elevation that are not well-known and can result in misleading forecasts and expectations about the future. Our previous blog[11] described several reasons why Reclamation's "most probable" 24-month forecast does not reflect the most likely impending hydrologic reality, and why even the "minimum probable" forecast may be overly optimistic about what lies ahead.

Regardless of the data density and inherent uncertainty, we can all agree that for most of the years in the 21st century, the Basin's water users consumed more water than nature provided, resulting in net withdrawal from the water stored in the Basin's reservoirs; in other words, we have operated in the red. Twelve federal reservoirs in the Basin[12] were nearly full in early September 1999, and since that time, those same reservoirs lost 60% of the water they once stored.[13] Since 1999, nature provided significantly more water than we consumed only in 2005, 2011, 2019, and 2023, and the gains in those years did not offset the depletions in other years.[14] Despite the recent large runoff of 2023, we are now getting close to the end game of an insecure water supply. How close to the edge of the cliff are we?

This analysis is a simple mass balance - take storage contents today, add a conservative but plausible projection of annual inflow, subtract recent average consumptive use and losses, and look at the impact on reservoir storage at the end of one year. This straightforward supply and demand equation provides a clear picture about how much water we are likely to have in the reservoir storage "savings account" in late summer 2026, one year from now, facing a 9-month period of further reservoir depletion before significant new inflow occurs in 2027. This critical period will also mark the beginning of implementation of new operating guidelines for the river. We demonstrate that we are likely to have very little remaining buffer to support consumptive uses during the summer 2026 to spring 2027 period and even less buffer if 2027 is another dry year. This analysis provides a foundation for immediate discussion about further water use reductions during the next twelve months to avoid reducing accessible reservoir storage to dangerously low levels.

ANALYSIS

[11] Fleck et al., *Awaiting the Colorado River 24-Month Study*, Aug. 14, 2025; Wang, et al, Evaluating the Accuracy of Reclamation's 24-Month Study Lake Powell Projections (Feb. 18, 2022).
[12] These are the twelve reservoirs assessed in Reclamation's 24-Month Studies – Taylor Park, Blue Mesa, Morrow Point, Crystal, Fontenelle, Flaming Gorge, Navajo, Vallecito, Powell, Mead, Mohave, and Havasu.
[13] Storage in the twelve reservoirs was 56.38 million acre feet on September 6, 1999. Storage of these reservoirs on September 1, 2025, was 22.27 million acre feet. Schmidt et al., *The Colorado River water crisis: its origins and the future*, 10 WIREs WATER e1672 (2023).
[14] Schmidt & Fleck, *Colorado River Basin Reservoir Storage: where do we stand?*, INKSTAIN, Jun. 1, 2025.

The River recognizes no human laws or governance structures and follows only physical ones. There is a declining amount of water available in the Colorado River system, primarily caused by the effects of a warming climate – longer growing seasons, drier soils, and less efficient conversion of the winter snowpack into stream flow. Although American society has developed infrastructure to store the spring snowmelt and make that water available in other seasons to more completely utilize the variable runoff, the Colorado River watershed produces only a finite volume of water, regardless of how many dams exist. The reservoirs of the Colorado River are the largest in relation to the natural flow of any watershed in North America and can store the excess of occasional wet years. These reservoirs, the two largest of which are Lake Mead and Lake Powell, allow complete utilization of the watershed's runoff, but do not increase its size.

Infrastructure Constraints

The dams themselves possess physical limitations in the rates at which water can be released that are determined by the elevation of the reservoirs. There are three ways that water is released at most Colorado River reservoirs – reservoir overflow using the spillways at times when the reservoir is full, through the penstocks into the turbines of the powerplant where hydroelectricity is produced, and through river outlets that withdraw water at elevations lower than the penstocks. The water in a reservoir below the elevation of the river outlets is termed dead pool or dead storage. We usually account for reservoir contents in terms of "active storage," that is the volume of water above dead storage. But there may be engineering and safety constraints that prohibit release of some of the water even within the active storage pool.

For example, at Glen Canyon Dam, the river outlets theoretically allow for reservoir releases down to elevation 3370 feet (below which is dead storage). But Reclamation has stated that elevation 3394 feet is the minimum reservoir elevation at which the river outlets can be safely used, thereby decreasing the volume of active storage by approximately 400,000 acre feet.[15] In addition, Reclamation has reported that the river outlets were not designed for long-term use at low reservoir levels, and there is potential for cavitation damage, acceleration of necessary operation and maintenance tasks, and interference with efficient operation of the powerplant if the river outlets are the sole method of release.[16]

These concerns have prompted short-term constraints on the use of the river outlets and the operation of Glen Canyon Dam. The May 2024 Record of Decision for

[15] BUREAU OF RECLAMATION, ESTABLISHMENT OF INTERIM OPERATING GUIDANCE FOR GLEN CANYON DAM DURING LOW RESERVOIR LEVELS AT LAKE POWELL, at 3, 9, (2024). The volume of storage at different elevations of Lake Powell is based on Root and Jones, 2022, Elevation-area-capacity relationships of Lake Powell in 2018 and estimated loss of storage capacity since 1963. U.S. GEOLOGICAL SURVEY, ELEVATION-AREA-CAPACITY RELATIONSHIPS OF LAKE POWELL IN 2018 AND ESTIMATED LOSS OF STORAGE CAPACITY SINCE 1963, SCIENTIFIC INVESTIGATIONS REPORT 2022-5017 (2022).

[16] BUREAU OF RECLAMATION, *supra* note 15, at 4-9.

near-term Colorado River operations (SEIS ROD) states Reclamation's intention "to consider all tools that are available . . . to avoid Lake Powell elevation declining below 3500 feet" (10 feet above the level of the intakes for the penstocks) to protect the infrastructure of Glen Canyon Dam.[17] While engineering "fixes" to the infrastructure may eventually alleviate concerns about the elevation of Lake Powell and allow full use of the river outlets, we are not aware of any such repairs to the infrastructure contemplated in the near future.[18] In effect, at least for the short term, the engineering and safety issues associated with the ability to release water through Glen Canyon Dam mean that the amount of water actually available for release from Lake Powell is only that which exists above elevation 3500 feet.

Similarly, at Lake Mead, the SEIS ROD states Reclamation's intent to protect the reservoir from going below elevation 1000 feet.[19] If the April 24-Month Study minimum probable forecast projects Lake Mead reaching elevation 1025 feet, the Lower Division States, in consultation with the Upper Division States, must provide Reclamation with an implementation plan to protect Lake Mead from reaching that elevation. If the plan proposed is not acceptable, Reclamation has stated that it may take additional action to protect elevation 1000 feet.[20] This means that the water available for use in Lake Mead may be limited in the short term to the amount of active storage above 1000 feet of elevation.[21]

In this paper, we look at the amount of stored water realistically accessible in Lake Powell and Lake Mead for use during the next year. Recognizing the engineering issues described above, our analysis considers only the amount of water in storage above the 3500 feet and 1000 feet protection levels for Lake Powell and Lake Mead, respectively.[22]

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[17] BUREAU OF RECLAMATION, SUPPLEMENT TO 2007 COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND THE COORDINATED OPERATIONS OF LAKE POWELL AND LAKE MEAD, RECORD OF DECISION XI. G. Sec. 6.E, (2024).

[18] The authors have recommended that modifications to the reservoir release structures at Glen Canyon and Hoover Dams be explored to access water now deemed "dead pool," but such engineering fixes have not as yet been initiated and will require substantial time for planning, analysis, and funding. *See* Castle et al., *Essential Pillars for the Post-2026 Guidelines*, GETCHES WILKINSON CENTER, Apr. 25, 2025.

[19] BUREAU OF RECLAMATION, *supra* note 17, at p. 4, 11, 19, 25.

[20] *Id.* at 25; *see also* BUREAU OF RECLAMATION, RECORD OF DECISION COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND COORDINATED OPERATIONS FOR LAKE POWELL AND LAKE MEAD XI.G.Sec.7.B.4 (2007).

[21] Note also that Reclamation has indicated if Lake Mead elevations drop below 1035 feet, only five of the seventeen turbines in Hoover Dam will be operated, due to cavitation concerns. *Once a Showcase of American Engineering and Optimism, Hoover Dam Faces New Hydropower Generation Declines*, CIRCLE OF BLUE, June 23, 2025.

[22] We recognize that if reservoir elevations descend to these critical levels, there will be considerable pressure from Colorado River water users, including the Basin States and Tribal Nations, for release of additional water despite the engineering and safety concerns. It is difficult to predict the outcome of those competing priorities, and we do not attempt to do so.

Realistic Projections of Available Storage, Likely Supply, and Current Demand[23]

We estimate the physical inflows and outflows and calculate the net difference between the two. Inflows are the natural flow of the Colorado River as estimated at Lees Ferry plus the inflows that occur in the Lower Basin, primarily in the Grand Canyon.[24] Outflows are the consumptive uses and losses associated with human diversions and reservoir evaporation. The difference between the two is the net effect on reservoir storage.

Realistically accessible storage

On September 1, 2025, there was 7.0 million acre feet of water in active storage in Lake Powell, but only 2.7 million acre-feet was above elevation 3500 feet. On the same day, there was 8.1 million acre-feet of water in active storage in Lake Mead, but only 3.6 million acre feet was above elevation 1000 feet.[25] Thus, although Lake Powell and Lake Mead had 15.1 million acre feet of active storage, **only 6.3 million acre feet (2.7 + 3.6) was above the higher thresholds established by Reclamation.**

Further complicating matters is the existence in Lake Mead of "assigned water," (i.e., Intentionally Created Surplus or Mexico's Recoverable Water Savings and Reserve).[26] Owners of assigned water have the right to withdraw this water in specific annual amounts when Lake Mead elevation is above elevation 1025 feet,[27] but Lower Division entitlement holders also have a right to water in Lake Mead

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[23] Although some of the data that we use in our mass balance analysis are reported to a high degree of precision, we recognize that other critical data such as reservoir evaporation, evapotranspiration, and consumptive use associated with irrigated agriculture have significant uncertainty. Here we report all components of our mass balance analysis to one significant decimal place in an effort to represent the uncertainty in measuring some of these physical processes.

[24] This analysis does not include contributions from the Gila River as it is only rarely that Gila River flows reach its confluence with the Colorado River at Yuma and it also does not include contributions from the Bill Williams River.

[25] Active storage and elevation data downloaded from Reclamation Hydro database. Bureau of Reclamation, *Reservoir Hydrodata*, (last visited Sep. 9, 2025). Elevation-storage data for Lake Powell are based on U.S. GEOLOGICAL SURVEY, *supra* note 15. Elevation-storage data for Lake Mead and Lake Mead area and capacity are based on BUREAU OF RECLAMATION, LAKE MEAD AREA AND CAPACITY TABLES (2011).

[26] "Assigned water" is a term used to describe water created and held in Lake Mead pursuant to the Secretary's authority to allocate surplus water articulated in Consolidated Decree, Arizona v. California, 2005, Art. II.B.2; INTERNATIONAL BOUNDARY AND WATERS COMMISSION, MINUTE 323, EXTENSION OF COOPERATIVE MEASURES AND ADOPTION OF A BINATIONAL WATER SCARCITY CONTINGENCY PLAN IN THE COLORADO RIVER BASIN at V.E.3 (2023). This stored water is assigned to and held by an individual entity independently from the priority system of water allocation to which all other water in Lake Mead available for delivery in the Lower Division is subject. Holders of higher priority entitlements, however, would likely contest the Secretary's authority to cut their deliveries while withholding assigned water from the priority system.

[27] Annual limits are 400,000 acre feet for California, 300,000 acre feet each for Arizona and Nevada, and 200,000 acre feet for Mexico. BUREAU OF RECLAMATION, *supra* note 20 at XI.G.Sec.3.C.4; BUREAU OF RECLAMATION, LOWER BASIN DROUGHT CONTINGENCY PLAN AGREEMENT, EXHIBIT 1 at III.F; INTERNATIONAL BOUNDARY AND WATERS COMMISSION, *supra* note 26.

allocated through the priority system. As of the end of 2024, there was approximately 3.5 million acre feet of assigned water in Lake Mead,[28] almost the same as the amount of water in storage above elevation 1000 feet. So long as both annual orders in the priority system and desired withdrawals of assigned water can be fulfilled, there is no conflict, but further declines in storage in Lake Mead could lead to one.

Likely runoff and supply

At this time, it is difficult to predict how much runoff will result from the coming winter's snowpack. The National Weather Service's seasonal forecast shows substantially above average temperatures and below average precipitation for the next three months.[29] Reclamation's projection of minimum probable Lake Powell inflows for the next twelve months has in recent years proven to be a more accurate predictor of conditions in the coming year,[30] and that forecast projects significantly below average inflow.[31] All of these signs underscore the need for conservative assumptions in managing the declining Colorado River water supply.

Here we assume that next year's natural flow will be the same as last year's. This assumption is a realistic and conservative, but not overly alarmist, projection of next year's inflow, useful for prudent management planning purposes. Reclamation estimates that the Water Year 2025 natural flow at Lees Ferry will be approximately **8.5 million acre feet**, and we assume that next year will be the same.[32]

A small volume of water enters the Colorado River downstream from Lees Ferry and upstream from Lake Mead, primarily from springs within the Grand Canyon but also from some larger watersheds including the Virgin River. Consistent with our prudent and conservative assumption about next year's natural flow, we assume that next year's inflow to the Colorado River from these sources will be the same as last year's – **0.8 million acre feet**.[33] Thus, a conservative assumption of inflow during the next twelve months is **9.3 million acre feet (8.5 + 0.8)**.

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[28] BUREAU OF RECLAMATION, COLORADO RIVER ACCOUNTING AND WATER USE REPORT: ARIZONA, CALIFORNIA, AND NEVADA (2024).

[29] National Weather Service, Climate Prediction Center, *Three Month Outlooks, Official Forecast, Sept.-Nov. 2025*, last visited Sep. 9, 2025.

[30] Fleck, et al., *supra* note 11; Wang, et al., *supra* note 11.

[31] BUREAU OF RECLAMATION, AUGUST 2025 MINIMUM PROBABLY 24-MONTH STUDY (2025).

[32] Personal conversations between Jim Prairie (Bureau of Reclamation) and Jack Schmidt on Aug. 27, 2025. Note that this amount of natural flow is similar to the three-year average of 8.69 million acre feet from 2002 to 2004, further supporting its use as a planning tool. *See* Bureau of Reclamation, *Colorado River Basin Natural Flow and Salt Data* (last visited Sep. 9, 2025).

[33] Grand Canyon inflows were calculated as the difference between the mean annual flow of the Colorado River above Diamond Creek near Peach Springs (USGS gage 09404200) and the Colorado River at Lees Ferry (USGS gage 09380000). In Water Year 2024, 0.67 million acre feet of the flow past gage 09404200 entered the river downstream from Lees Ferry. Virgin River inflows were the measured flow at USGS gage 09415250 (Virgin River below confluence of Muddy River near Overton). In Water Year 2024, 0.12 million acre feet flowed past this gage into Lake Mead.

Consumptive use

Future consumptive water use is also difficult to predict. We know, however, that allowable deliveries from Lake Mead under a Tier 1 condition will be the same in 2026 as they were in 2024 and 2025. We assume that uses and losses will be the same as the average for the most recent four years (2021-2024). Reclamation reports that this recent average was **11.5 million acre-feet** for the Upper and Lower Basins, including estimated reservoir evaporation.[34,35] As discussed above, Mexico is entitled to delivery of 1.353 million acre-feet in Water Year 2026.[36] Thus, a prudent and conservative assumption of future total use in the U.S. and Mexico is **12.9 million acre feet (11.5 + 1.4)**.[37]

Gap between use and inflow and resulting reservoir drawdown

We estimate that consumptive uses and losses in the coming twelve months could be 3.6 million acre feet more than inflow (12.9 - 9.3), if next year is a repeat of this year. Assuming that three-quarters of this amount is drawn from Lake Powell and Lake Mead (2.7 million acre feet),[38] this will leave **only 3.6 million acre**

[34] Average consumptive uses and losses in the Upper Basin between 2021 and 2024 were 4.47 million acre feet. This value includes estimated net evaporation at Lake Powell. Averages were calculated from annual data, based on personal conversations between Jim Prairie (Bureau of Reclamation) and Jack Schmidt on Aug. 27, 2025. Average consumptive uses in the Lower Basin are based on BUREAU OF RECLAMATION, *supra* note 28. Evaporation for Lake Mead, Lake Mohave, and Lake Havasu were from BUREAU OF RECLAMATION, *supra* note 25.

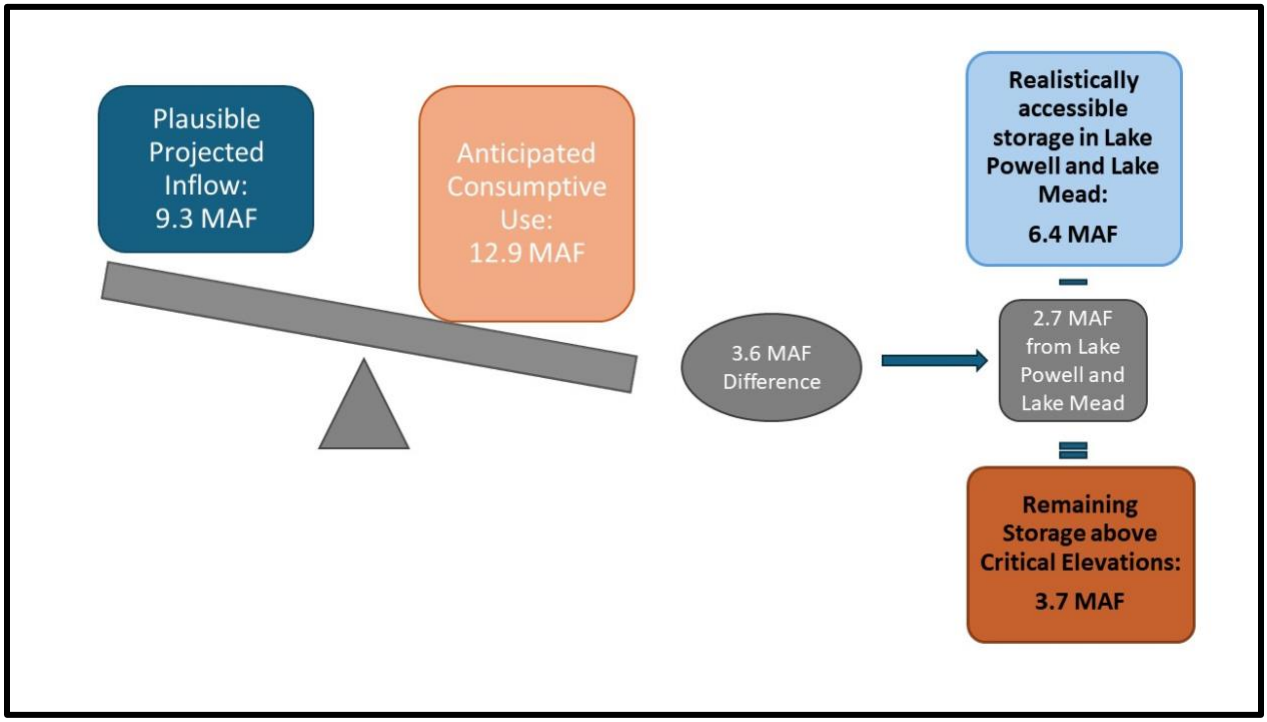
[35] This number reflects significant involuntary cuts together with voluntary conservation during the past three years, particularly in the Lower Basin. The voluntary conservation was made possible in large part through federal funding, which may or may not continue. Cumulative conservation in the Lower Basin for 2023 - 2025 is estimated at 2.93 million acre feet. Bureau of Reclamation, Webinar on August 2025 24-Month Study, Aug. 15, 2025, Slide 19. Upper Basin conservation during the same time period was approximately 0.1 million acre feet, but it is unclear how much of that water ultimately made its way to Lake Powell, and the authorization for the Upper Basin program has now expired. UPPER COLORADO RIVER COMMISSION, COLORADO RIVER SYSTEM CONSERVATION PILOT PROGRAM (2023); Shannon Mullane, *Federal Colorado River program lapses, faces uncertain future*, COLORADO SUN, Dec. 24, 2024.

[36] International Boundary and Water Commission, *supra* note 11.

[37] This value does not account for the difference between net evaporation and gross evaporation at Lake Powell, which averaged 0.17 million acre feet between 2021 and 2024. Reclamation reports that the agency incorporated the difference between gross and net evaporation at Lake Powell into its estimate of natural flow at Lees Ferry. Personal conversations between Jim Prairie (Bureau of Reclamation) and Jack Schmidt on Aug. 27, 2025. Our estimate of Lower Basin uses and losses also does not account for channel conveyance and evapotranspiration losses downstream from Davis Dam that have not been reported since 2015. There is large uncertainty in the estimation of channel and evapotranspiration losses; the average loss reported by Reclamation between 2010 and 2015 was 0.43 million acre feet. Thus, our estimate of losses may be a slight underestimate of actual reservoir evaporation, riparian evapotranspiration, and channel conveyance losses in different parts of the river network.

[38] On September 1, there was 5.2 million acre feet of active storage in eight federal reservoirs upstream from Lake Powell, but we assume that most of the deficit between use/losses and supply will be drawn from Lake Powell and Lake Mead. Currently, total active storage in Lake Powell and

feet of (6.3 – 2.7) realistically accessible water in those two reservoirs in late summer 2026, when a 9-month season of even further drawdown typically occurs. The figure below illustrates the stark conclusions from this reasonable and conservative scenario for the next year.



Reclamation's August 24-Month Study minimum probable projection presents a similar, but even more concerning, outcome. That study projects that total storage in Lake Powell and Lake Mead will be drawn down by 3.8 million acre-feet during the next year, 2.9 million acre-feet coming from Lake Powell alone. Under this projection, the elevation of Lake Powell drops below 3500 feet in August 2026.[39] All of the remaining realistically accessible storage, 2.5 million acre-feet, would be in

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Lake Mead is three times greater than total active storage in eight federal reservoirs upstream from Lake Powell. Consistent with this proportion, we assume that 75% of the deficit between use/losses and water supply in the next twelve months would come from the Powell-Mead system and 25% would come from the eight federal reservoirs upstream from Lake Powell. Thus, we estimate that total storage drawdown in Lake Powell and Lake Mead would be approximately 2.7 million acre feet, leaving only 3.6 million acre feet of realistically available storage in those two reservoirs on September 1. 2026. We estimate that storage in federal reservoirs upstream from Lake Powell will be 0.9 million acre feet less than it is today if watershed runoff in the coming year is as low as in 2025 and if present management policies remain in place. Our results are consistent with an alternative analysis in which we assumed the same initial storage, assumed that depletion of storage in Lake Powell and Lake Mead would be the same as in 2024 and 2025, and assumed that these reservoirs would increase in storage in 2026 the same amount as they did in 2025.

[39] BUREAU OF RECLAMATION, *supra* note 31. The minimum probable forecast assumes an unregulated inflow to Lake Powell of 4.20 million acre-feet in Water Year 2026. This implies a year which is slightly drier than 2025 where the final unregulated inflow will be about 4.6 million acre-feet.

Lake Mead. Under the assumption that the current operating rules remain in effect in Water Year 2027, this projection shows that the elevation of Lake Powell stays below elevation 3500 feet through the remainder of the study period - July 2027. While we do not know what the detailed operating rules will be for 2027, this reasonable and conservative scenario means that, under Reclamation's current operating guidelines that require keeping Lake Powell above elevation 3500 feet, the reservoir would have to be operated as a "run of river" facility in which only the inflow to Lake Powell would be released downstream.

Potential Releases from Upstream Colorado River Storage Project Reservoirs

The 2019 Drought Response Operations Agreement (DROA) among the Upper Division states and the Secretary of the Interior provides for usage of stored water at the initial units authorized in the Colorado River Storage Project Act (CRSPA: Lake Powell, Flaming Gorge Reservoir, the Aspinall Unit (Blue Mesa, Morrow Point, and Crystal Reservoirs), and Navajo Reservoir) under certain circumstances.[40] Recognizing the 21st century fluctuation and decreases in key Colorado River reservoirs, the DROA seeks to maintain the ability of the Upper Division states to continue fulfilling their interstate water compact obligations and the generation of hydropower at Glen Canyon Dam.

The DROA establishes a goal of maintaining a target elevation of 3525 feet at Lake Powell (much higher than our assumption of a critical threshold elevation of 3500 feet), using releases from the three upstream CRSPA initial units, and provides a detailed protocol for how those upstream units would be refilled in subsequent years should DROA releases be made. DROA can be implemented by the Secretary of the Interior unilaterally if an emergency requires the protection of the target elevation of 3525 feet at Lake Powell, as occurred in 2021 when releases were made from Flaming Gorge and Blue Mesa Reservoirs.[41] DROA can also be invoked through consultation and agreement with the Upper Division states, as occurred in 2022-23 when releases were made from Flaming Gorge.[42] A DROA plan in 2023 provided for complete storage recovery in both reservoirs.[43]

Initial drought response discussions were triggered in April 2025 when the minimum probable forecast in the 24-Month Study projected Lake Powell's elevation to dip below the target elevation of 3525 feet within the next 24 months.[44] The preparation of a drought response plan utilizing releases from the upstream reservoirs has now

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[40] Upper Colorado River Commission, Agreement for Drought Response Operations at the Initial Units of the Colorado River Storage Project Act (2019).
[41] Bureau of Reclamation, *July 24-Month Study implements contingency operations in the Upper Colorado River Basin* (Jul. 16, 2021).
[42] Bureau of Reclamation, 2022 Drought Response Operations Plan (2022).
[43] Bureau of Reclamation, 2023 Drought Response Operations Plan (2023).
[44] Bureau of Reclamation, April 2025 24-Month Study, Minimum Probable Inflow (2025); see Upper Colorado River Commission, *supra* note 40 at Sec. II.A.4.a.

been triggered by the August 24-Month Study most probable projection that Lake Powell will fall below the target elevation as early as March 2026.[45]

In practice, Navajo Reservoir has been determined not to be a viable candidate for DROA releases because of downstream flow targets stemming from the San Juan River Endangered Fish Recovery Program and contractual obligations to the Navajo Indian Irrigation Project and the Navajo-Gallup Water Supply Project.[46] The release of 36,000 acre feet from Blue Mesa Reservoir in 2021 resulted in a decrease in elevation of about 8 feet and caused the reservoir to reach its lowest elevation since it began to fill in the 1960s.[47] It was not clear that the Blue Mesa release water actually reached Lake Powell as there was no administrative "shepherding" of the water as it flowed downstream,[48] and many downstream water rights holders in Colorado may have diverted the released water for themselves. Thus, the primary focus for additional water to maintain Lake Powell would likely be on Flaming Gorge Reservoir.

In theory, approximately 3.7 million acre feet of additional water could be available from Flaming Gorge Reservoir, the full amount of its active storage capacity.[49] Currently, however, Flaming Gorge holds approximately 3.0 million acre feet[50] and only a portion of this active storage is likely to be released to protect critical elevations at Lake Powell.[51]

It must be kept in mind that a release from any of the upstream reservoirs is only a one-time solution. Such releases do not solve the fundamental problem of the gap between supply and use/losses. The water provided from upstream reservoirs will not be available again unless wet years return and those reservoirs are refilled,[52] and

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[45] BUREAU OF RECLAMATION, *supra* note 7; *see* UPPER COLORADO RIVER COMMISSION *supra* note 40 at Sec. II.A.4.a.iv.2.
[46] BUREAU OF RECLAMATION, *supra* note 42 at Appendix E, Operations at Navajo Reservoir.
[47] Michael Elizabeth Sakas, *Drought-Hit Blue Mesa Reservoir Losing 8 Feet Of Water To Save Lake Powell*, CPR NEWS (Sept. 3, 2021); Bella Biondini, *Blue Mesa's Miracle Recovery*, GUNNISON TIMES (Jul. 19, 2023).
[48] Bella Biondini, *supra* note 47.
[49] Bureau of Reclamation, *Flaming Gorge Dam* (last visited Sep. 9, 2025).
[50] Bureau of Reclamation, *Flaming Gorge Storage* (last visited Sep. 9, 2025).
[51] As we understand it, Reclamation and the UCRC are currently discussing how much water will be released from Flaming Gorge under DROA. Using all of the 3 million acre-feet of active storage in Flaming Gorge would drain the reservoir below the minimum power elevation (4871 feet) to the dead pool (4740 feet). We do not believe this scenario is realistic. Given the regional economic impacts, power generation concerns, downstream environmental issues, and refill concerns involved, 1.0-1.5 million acre feet may be a more realistic estimate of the amount of water that might be available for delivery to Lake Powell. Note that between 2021 and 2023, a total of 588,000 acre feet was released from Flaming Gorge, causing Flaming Gorge Reservoir to drop approximately fifteen feet. *See* BUREAU OF RECLAMATION, *supra* notes 42, 43.
[52] The Upper Division states have indicated they will not concur with a subsequent DROA release until full recovery of storage has been accomplished. Upper Colorado River Commission, *Resolution of the Upper Colorado River Commission, Clarifying Principles for Future Releases from Upstream Initial Units under 2019 Drought Response Operations Agreement* (Sep. 21, 2023).

that refilling will reduce the inflows to Lake Powell. The use of upstream reservoir releases as authorized by DROA was contemplated as a remedy for fluctuations in reservoir levels that would cause Lake Powell to drop below the minimum power pool elevation rather than as a solution to sustained water usage in excess of supply. Unless overall system water use is brought down to a sustainable level, using Flaming Gorge Reservoir releases simply exacerbates future shortages.

Implications

We are not predicting that our assumptions about the gap between supply and use/losses and the dramatic drawdown of Lake Powell and Lake Mead will necessarily occur in the next year. We do not know what the spring inflows to Lake Powell will actually be. But this discussion spotlights the need to take additional and immediate action across the Basin to reduce water consumption even further during the next year, well before any new guidelines are governing system operations. Taking steps now to decrease consumptive uses across the Basin will reduce the need to implement draconian measures in the following years. Increased conservation actions today can immediately slow the rate of reservoir decline and create more room for creative Colorado River management solutions. If, on the other hand, we delay reducing water usage and addressing reservoir drawdown, we may find ourselves in a bigger hole at the beginning of the Post-2026 guidelines.

In April, we proposed seven essential pillars for a successful post-2026 operating regime for the Colorado River that balances use with supply and accomplishes reservoir storage recovery to an acceptable level of reliability and security.[53] These pillars can also function as guideposts for immediate action. Particularly relevant is the principle on "enforceable reductions" in both Basins.

The focus within the Basin and among its principal water users and state negotiators has been on the formulation of the Post 2026 guidelines for operation of the river. It may be difficult, if not impossible, for the Basin States to implement immediate, additional reductions in use. That reality puts the onus on the Department of the Interior to take immediate action.

CONCLUSION

The entire basin is in agreement that we must balance our water use with the natural supply. Despite laudable efforts, we are currently not doing so, at least in part because the hydrology has been unforgiving. Unfortunately, however, this is the hydrology we must plan for, with the knowledge that the next few years could be even worse. While inflows and uses during the next year cannot be predicted with certainty, using the past year as a proxy for the coming year makes for prudent, conservative planning. We currently have about 6.3 million acre feet in accessible

[53] *See* Castle, et al., *supra* note 18.

storage in Lakes Powell and Mead, and if we continue business as usual, we will deplete nearly half that amount. That will put us in a very difficult position for the following year when the new operating regime comes into effect. Near-term actions must reflect this stark reality.