

Deficit Spending

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12/03/2024

Drawdown of the Colorado River's reservoirs now slightly exceeds the amount of gain that occurred during the 2024 snowmelt season. For the next four months until snowmelt begins again, the basin's reservoirs will be drawing from the excess accumulated in 2023, demonstrating the immense challenge in balancing water consumption with supply.

In Detail...

On 30 November 2024, total basin reservoir storage was 27.5 million af (acre feet)¹, approximately two years' supply at today's rate of consumptive use and loss (Fig. 1). That amount is 43% of the maximum system contents of July 1983² and is the same amount as at the beginning of July 2021 when the basin's water managers were beginning to get worried. Conditions are not quite as bleak as in summer 2021, because that year's snowmelt season had already passed. Now, we can hope that the 2025 snowmelt season might be a good one. Nevertheless, reservoir storage is the bank account from which we draw to maintain the economy of the American Southwest and parts of northwestern Mexico. It would be preferable for there to be more water in that account.

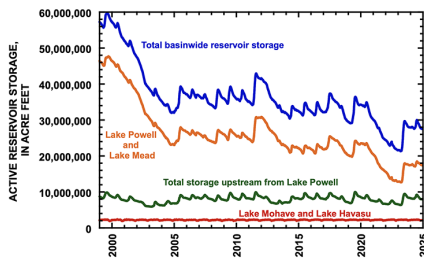


Figure 1. Graph showing total storage in 46 reservoirs (blue line) in the Colorado River basin since 1 January 1999. Also shown are the total contents of Lake Mead and Lake Powell (orange line), total contents of Lake Mohave and Lake Havasu (red line), and 42 reservoirs upstream from Lake Powell (green line) which includes reservoirs managed by the federal and state governments, municipalities, and water districts.

Approximately 63% of current total reservoir storage is in Lake Mead and Lake Powell. Presently, there is approximately 400,000 af more water in Lake Powell than in Lake Mead, but the contents of Lake Powell are slowly being depleted. The contents of Lake Mead held fairly constant during the past month. The contents of Lake Powell decreased by approximately 4300 af/day during November, but the contents of Lake Mead decreased by only 800 af/day (Fig. 2). Upstream from Lake Powell, Colorado River Storage Project (CRSP) initial unit reservoirs, as well as Fontenelle Reservoir, decreased by only 600 af/day in November, and other Upper Basin reservoirs lost even less (400 af/day).

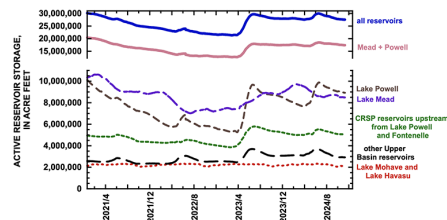


Figure 2. Graph showing total basin reservoir storage (blue line), and storage in different parts of the Colorado River watershed between 1 January 2021 and 30 November 2024.

Basin reservoir storage must be increased to improve the security of our water supply. We need to increase the balance in our “bank account,” and the only way to do that is to spend less than the amount of our actual water “income.” Most of our income arrives during the snowmelt season of late spring and early summer. Mid- and late-summer, fall, winter, and early spring is the period when we spend the snowmelt-season income, although summer rains and groundwater inflow offset some of our uses.

Occasionally, we have an unusually snowy winter, and the basin's reservoirs significantly refill. 2023 was one of those years. Reclamation estimates that the natural flow of the Upper Basin³ was 17.4 million af in 2023, the third largest of the 21st century (after 2011 and 2019), and total basin storage increased by 8.38 million af, only exceeded by the increase in storage in 2011⁴. 2024 was a moderately snowy winter.

2024 was a different story, however. The NRCS estimated that the peak snow water content in 2024 was 14% greater

than the 30-year average, but dry soils and other effects of a warming climate limited natural flows to between 11.9 and 12.1 million af, which is less than the average for the 21st century⁵. In 2024, the basin's reservoirs increased in storage by 2.45 million af. The drawdown of the basin's reservoirs as of 30 November was 2.46 million af, slightly more than the gain from snowmelt (Fig. 3). The contents of Lake Mead and Lake Powell increased by 1.39 million af in 2024, and the drawdown in those two reservoirs has been 1.07 million af this year. During the next four months, the basin will begin drawing from storage that accumulated in 2023.

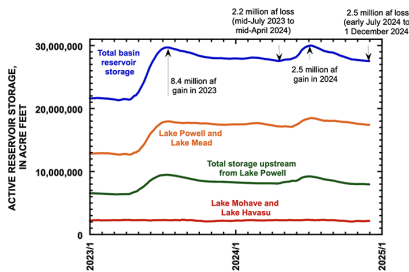


Figure 3. Graph showing reservoir storage between 1 January 2023 and 30 November 2024, highlighting the amount of reservoir recovery during the past two snowmelt seasons and the amount of intervening reservoir drawdown. The drawdown of the basin's reservoirs since July 2024 slightly exceeds the recovery that occurred due to snowmelt in 2024.

Drawdown of the basin's reservoirs has been much greater in 2024 than in 2023. The amount of drawdown between early summer and today is slightly more than the median drawdown for the past 15 years⁶ and is 43% greater than the drawdown at this time last year (Table 1). The drawdown of Lake Mead and Lake Powell in 2024 is slightly less than the median for the past 15 years⁷ but is 98% greater than it was at this time last year.

Table 1. Reservoir drawdown between the summer peak and 30 November during the past nine years. The largest drawdown of basin reservoir storage occurred in 2021, 2020, and 2018 when drawdown in Lake Mead and Lake Powell significantly exceeded drawdown in Upper Basin reservoirs. The smallest drawdown occurred last year.

	Reservoir drawdown between summer peak in indicated year and 30 November, in million acre feet									
Date of maximum reservoir storage	6 July 2024	13 July 2023	30 June 2022	14 June 2021	18 June 2020	28 July 2019	10 June 2018	13 July 2017	5 July 2016	
Total watershed ^a	2.46	1.73	2.24	3.22	4.42	2.26	4.15	2.01	2.58	
Reservoirs upstream from Lake Powell	1.26	1.11	0.988	1.17	1.49	1.25	1.57	0.918	1.38	
Lake Powell and Lake Mead	1.07	0.544	1.16	2.01	2.85	1.03	2.55	1.05	1.23	

The total reservoir drawdown between early summer and 30 November is now 14% greater than in all of last year, and drawdown in Mead and Powell also exceeds the total drawdown in those reservoirs last year (Table 2). We did well last year, but not so well this year.

Table 2. Reservoir drawdown during the first five months following the 2024 snowmelt compared to the total drawdown during the nine months following the 2023 snowmelt season.

Reservoir drawdown during indicated period, in million acre feet	6 July 2024 and 30 November 2024	13 July 2023 and 17 April 2024
Total watershed ^a	2.46	2.15
All reservoirs upstream from Lake Powell	1.26	1.35
Lake Powell and Lake Mead	1.07	0.798

There are many details ignored in this overview. Reservoir drawdown in the Upper Basin is not only determined by consumptive use, but also by reservoir operating rules that require winter drawdown and by requirements to provide environmental flows. Water use in southern California is significantly affected by water supply available from northern California, the Owens River, and locally. Nevertheless, every drop of water released from upstream is used, lost, or stored in a downstream reservoir, and total basin storage is the only available supply to make up the shortfall between annual precipitation and annual use.

Conservation in the Lower Basin and in Mexico is reducing drawdown in Lake Mead, and the storage contents of Lake Mead are likely to increase during the next few months as water is delivered from upstream. Drawdown of the total contents of Lake Mead and Lake Powell is still 0.32 million af less than what accumulated there from the 2024 inflow season and a 2024 deficit might not occur if Lower Basin water use is drastically reduced or if Upper Basin reservoirs are emptied.

Efforts to date to reduce water consumption in the basin have been significant, and required a significant investment by the federal government. Despite those efforts, we have four months ahead of us before snowmelt in 2025 begins, and we are likely to begin deficit spending unless radical changes in use are immediately implemented. The challenge faced by the federal government, Mexico, the seven basin states, every tribe, and every water user is immense and is not solely restricted to negotiating the post-2026 agreements. We remain in a water crisis today, and the time to greatly reduce water consumption is right now in the present moment.

- [1] Basin reservoir storage is for 46 reservoirs reported by the Bureau of Reclamation in its Hydrodata base https://www.usbr.gov/uc/water/hydrodata/reservoir_data/site_map.html.
- [2] There was 63.6 million af of storage in the basin on 15 July 1983. Some of this storage exceeded the generally accepted capacity of some reservoirs, notably Lake Powell.
- [3] at Lees Ferry
- [4] Basin reservoir storage increased by 8.78 million af in 2011.
- [5] Natural flows for calendar year and water year 2024 were 12.1 and 11.9 million af, respectively, based on Reclamation's 12 September 2024 estimate. The average natural flow at Lees Ferry between 2000 and 2024 was 12.4 million af/yr, based on Reclamation's estimates.
- [6] The median drawdown between the summer peak and 30 November during the past 15 years was 2.26 million af for the 46 reservoirs of the watershed.
- [7] The median drawdown between the summer peak and 30 November during the past 15 years was 1.16 million af for the total contents of Lake Mead and Lake Powell.
- [8] Includes drawdown of Lake Mohave and Lake Havasu.

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