COLORADO
Colorado Water Conservation Board
Department of Natural Resources

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Jared Polis, Governor

Dan Gibbs, DNR Executive Director

Lauren Ris, CWCB Director

TO: Colorado Water Conservation Board Members

FROM: Amy Ostdiek and Michelle Garrison

DATE: July 17, 2024

SUBJECT: Agenda Item 17: Colorado River Updates

This is an informational item with no board action requested.

1. Hydrology and operations update

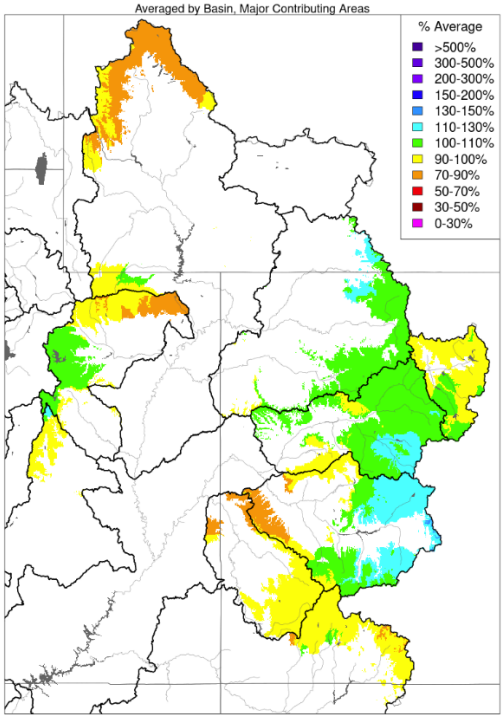
Hydrology

Extremely dry conditions in Water Years 2021 and 2022 placed significant strain on basin storage and on water users in the Upper Basin. WY 2023 precipitation and streamflow were slightly above average, with well above average snowpack and high spring runoff followed by warm and dry summer conditions. WY 2024 precipitation has been average. Snowpack peaked near to above average in April, with below average conditions in the southern subbasins in Colorado. Soil moisture conditions have improved but remain below normal in most basins in western Colorado. Inflow into Lake Powell has been slightly below normal. Inflow forecasts of 85% of average for Lake Powell reflect recent snowpack and soil moisture conditions. Climate forecasts indicate increased likelihood of warmer and dryer than average conditions for the summer and fall. Southern subbasins have benefited recently from a monsoonal moisture pattern.

Drought and reservoir storage conditions have improved; however, long-term impacts from depleted storage are expected to continue, as indicated in current forecasts for reservoir operations.

Water Year Precipitation, October 2023 - June 2024

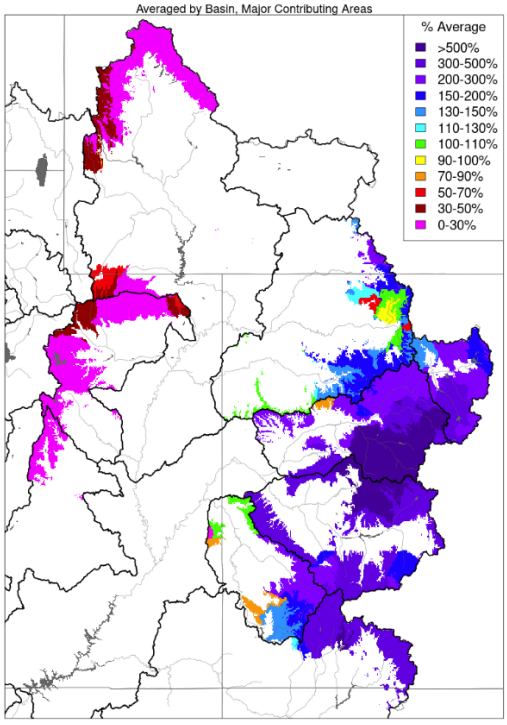
Averaged by Basin, Major Contributing Areas



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Month to Date Precipitation - July 03 2024

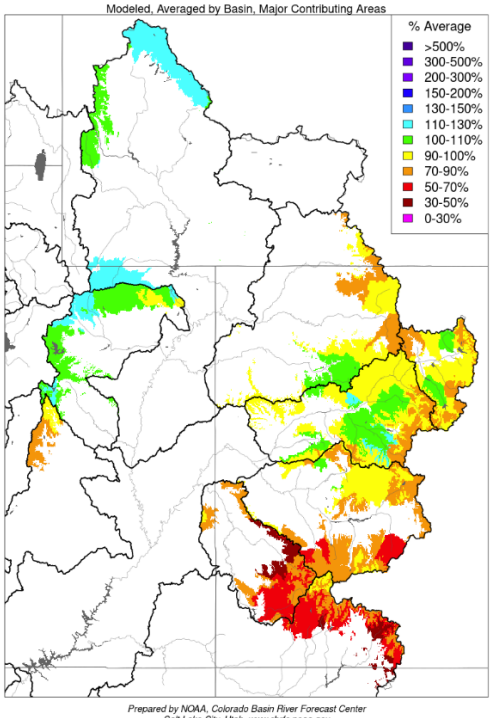
Averaged by Basin, Major Contributing Areas



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Soil Moisture - Fall - 2023 (November 15)

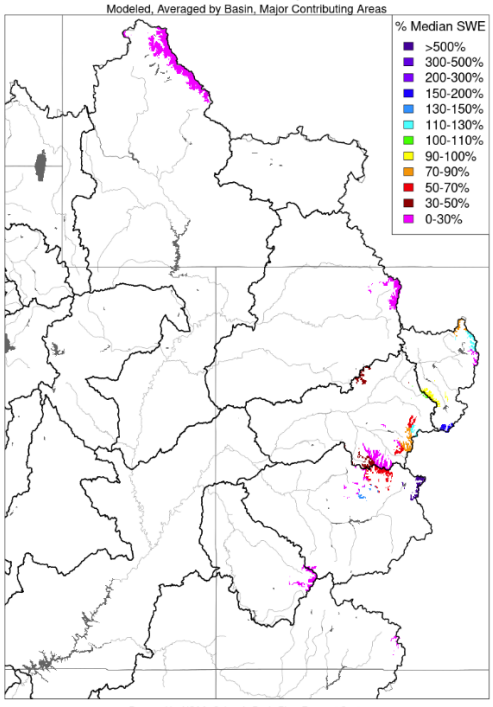
Modeled, Averaged by Basin, Major Contributing Areas



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Snow Conditions - July 02 2024

Modeled, Averaged by Basin, Major Contributing Areas



Prepared by NOAA, Colorado Basin River Forecast Center
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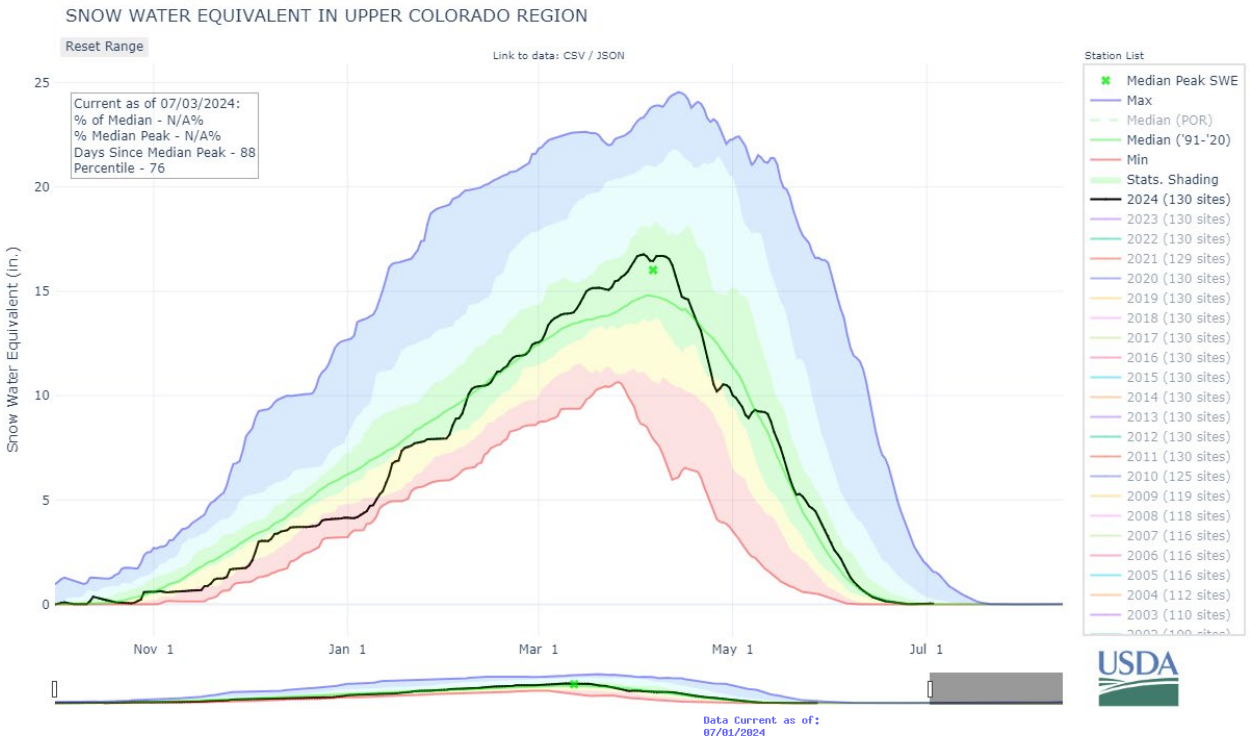
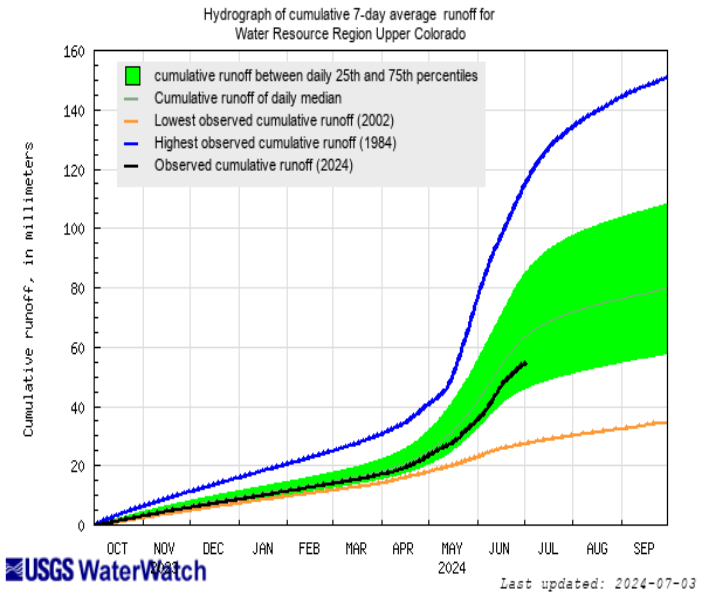
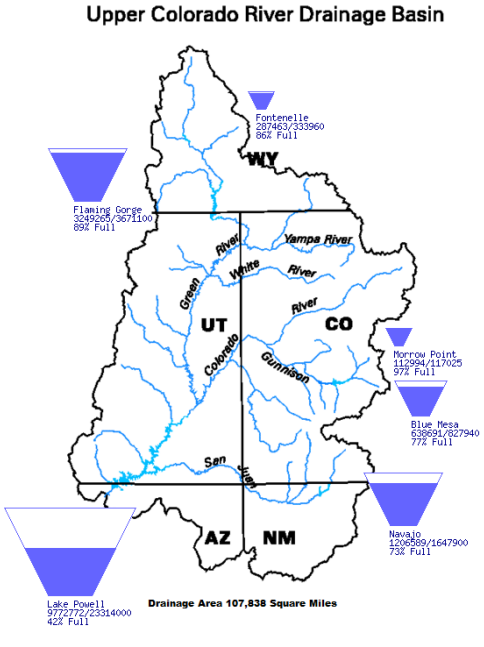
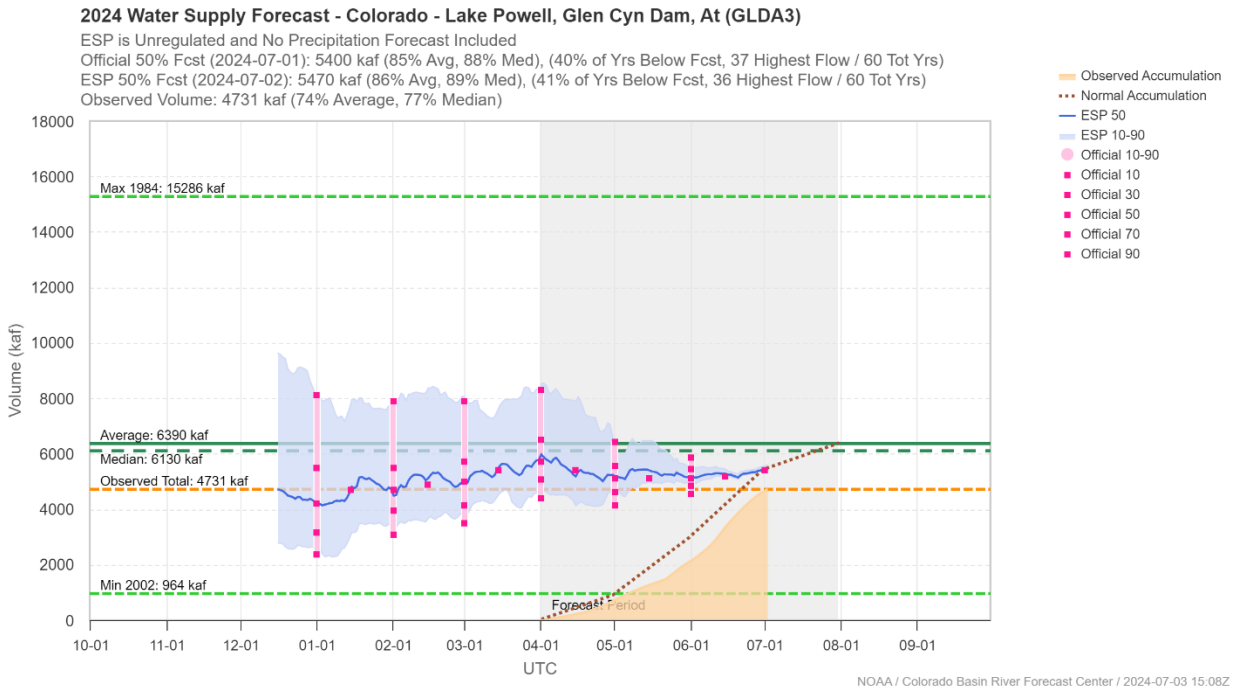
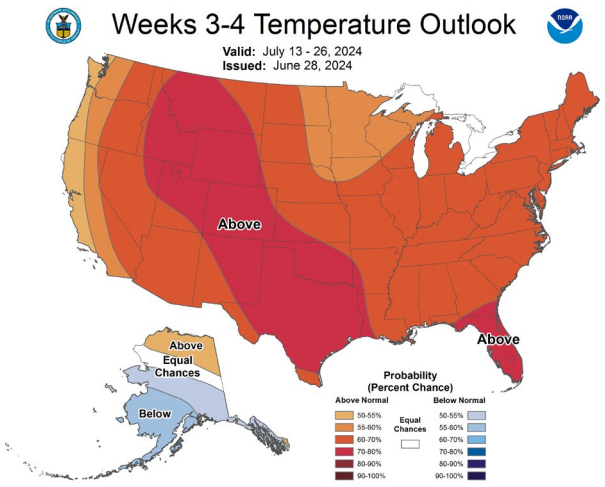
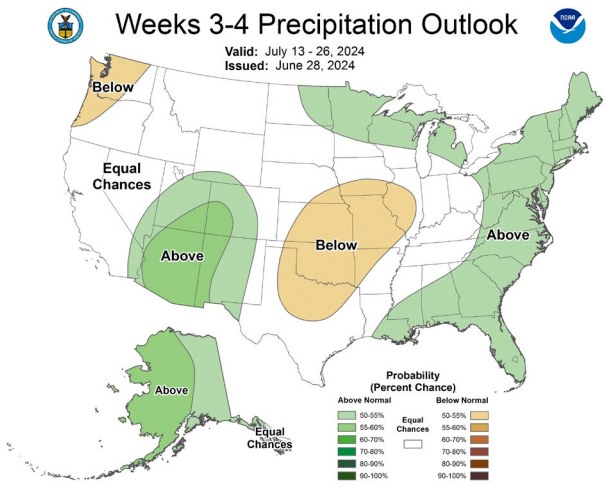

SNOW WATER EQUIVALENT IN UPPER COLORADO REGION
Reset Range
Link to data: CSV / JSON
Current as of 07/03/2024:
% of Median - N/A%
% Median Peak - N/A%
Days Since Median Peak - 88
Percentile - 76
Snow Water Equivalent (in.)
25
20
15
10
5
0
Nov 1
Jan 1
Mar 1
May 1
Jul 1
Station List
Median Peak SWE
Max
Median (POR)
Median ('91-'20)
Min
Stats. Shading
2024 (130 sites)
2023 (130 sites)
2022 (130 sites)
2021 (129 sites)
2020 (130 sites)
2019 (130 sites)
2018 (130 sites)
2017 (130 sites)
2016 (130 sites)
2015 (130 sites)
2014 (130 sites)
2013 (130 sites)
2012 (130 sites)
2011 (130 sites)
2010 (125 sites)
2009 (119 sites)
2008 (118 sites)
2007 (116 sites)
2006 (116 sites)
2005 (116 sites)
2004 (112 sites)
2003 (110 sites)
USDA
Data Current as of:
07/01/2024


Hydrograph of cumulative 7-day average runoff for
Water Resource Region Upper Colorado
cumulative runoff between daily 25th and 75th percentiles
Cumulative runoff of daily median
Lowest observed cumulative runoff (2002)
Highest observed cumulative runoff (1984)
Observed cumulative runoff (2024)
Cumulative runoff, in millimeters
160
140
120
100
80
60
40
20
0
OCT
NOV
2023
DEC
JAN
FEB
MAR
APR
MAY
2024
JUN
JUL
AUG
SEP
USGS WaterWatch
Last updated: 2024-07-03


Upper Colorado River Drainage Basin
Fontenelle
287463/333960
86% Full
Flaming Gorge
3249265/3671100
89% Full
WY
Green River
White River
Yampa River
UT
CO
Colorado
Gunnison
Morrow Point
112994/117025
97% Full
Blue Mesa
538691/827940
77% Full
San Juan
AZ
NM
Navajo
1206589/1647900
73% Full
Lake Powell
9772772/23314000
42% Full
Drainage Area 107,838 Square Miles


2024 Water Supply Forecast - Colorado - Lake Powell, Glen Cyn Dam, At (GLDA3)
ESP is Unregulated and No Precipitation Forecast Included
Official 50% Fcst (2024-07-01): 5400 kaf (85% Avg, 88% Med), (40% of Yrs Below Fcst, 37 Highest Flow / 60 Tot Yrs)
ESP 50% Fcst (2024-07-02): 5470 kaf (86% Avg, 89% Med), (41% of Yrs Below Fcst, 36 Highest Flow / 60 Tot Yrs)
Observed Volume: 4731 kaf (74% Average, 77% Median)
Observed Accumulation
Normal Accumulation
ESP 50
ESP 10-90
Official 10-90
Official 10
Official 30
Official 50
Official 70
Official 90
Max 1984: 15286 kaf
Average: 6390 kaf
Median: 6130 kaf
Observed Total: 4731 kaf
Min 2002: 964 kaf
Forecast Period
Volume (kaf)
UTC
NOAA / Colorado Basin River Forecast Center / 2024-07-03 15:08Z


Weeks 3-4 Temperature Outlook
Valid: July 13 - 26, 2024
Issued: June 28, 2024
Above
Above
Above Equal Chances
Below
Probability (Percent Chance)
Above Normal
Below Normal
Equal Chances


Weeks 3-4 Precipitation Outlook
Valid: July 13 - 26, 2024
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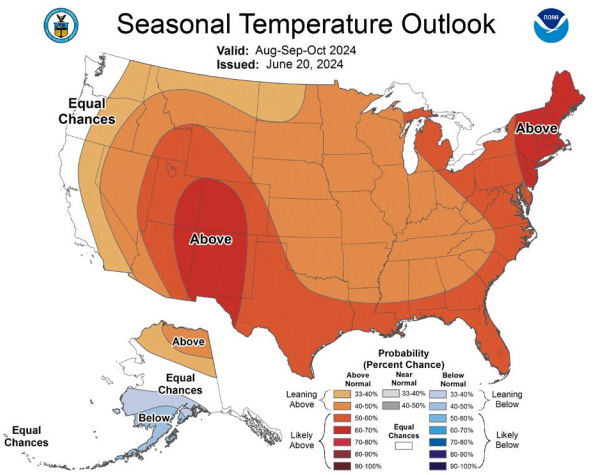
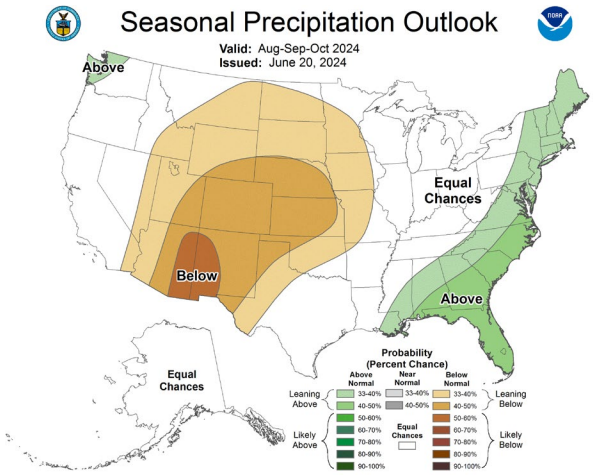
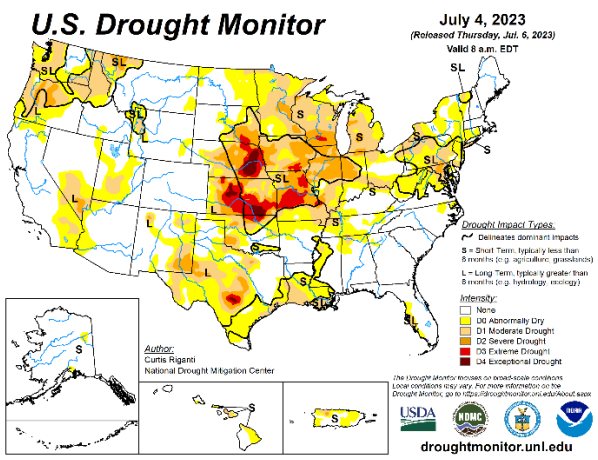
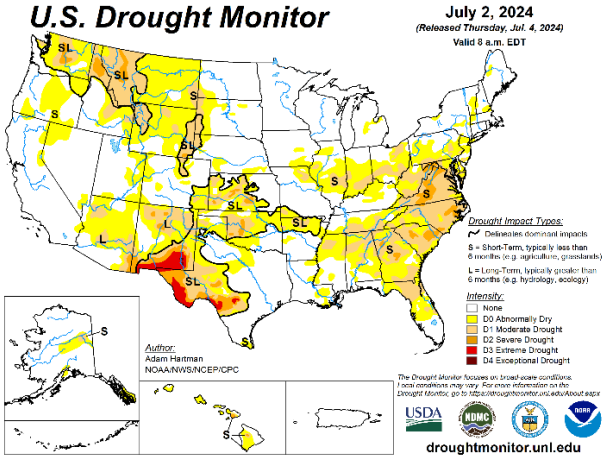
Below
Equal Chances
Above
Below
Above
Above
Equal Chances
Probability (Percent Chance)
Above Normal
Below Normal
Equal Chances









Operations

Low inflows and reservoir storage prompted multiple reservoir operation changes and Upper Basin Drought Contingency Plan (DCP) activities in WY 2022 and 2023. To protect critical infrastructure in Lake Powell, Reclamation decreased WY 2022 Lake Powell releases. May 2022 – April 2023 Flaming Gorge reservoir releases were increased as part of the Drought Response Operations Plan. Lake Powell rose above elevation 3525' in May 2022 and fell below that threshold elevation in December 2022. Due to improved hydrologic conditions in WY 2023, Lake Powell elevations rose significantly in April 2023 and remain above the 3525' threshold.

High spring runoff and increasing reservoir elevations prompted the cessation of Drought Response Operations Agreement (DROA) releases in March 2023, changing focus to recovery of previously released DROA water for the May 2023 – April 2024 plan, and a substantial increase in WY 2023 releases from Lake Powell. WY 2023 was the first year in which Lake Powell operated in the Lower Elevation Balancing Tier. In that tier, releases from Lake Powell are initially set to 7.0 MAF but can be adjusted up to a maximum of 9.5 MAF based on inflow

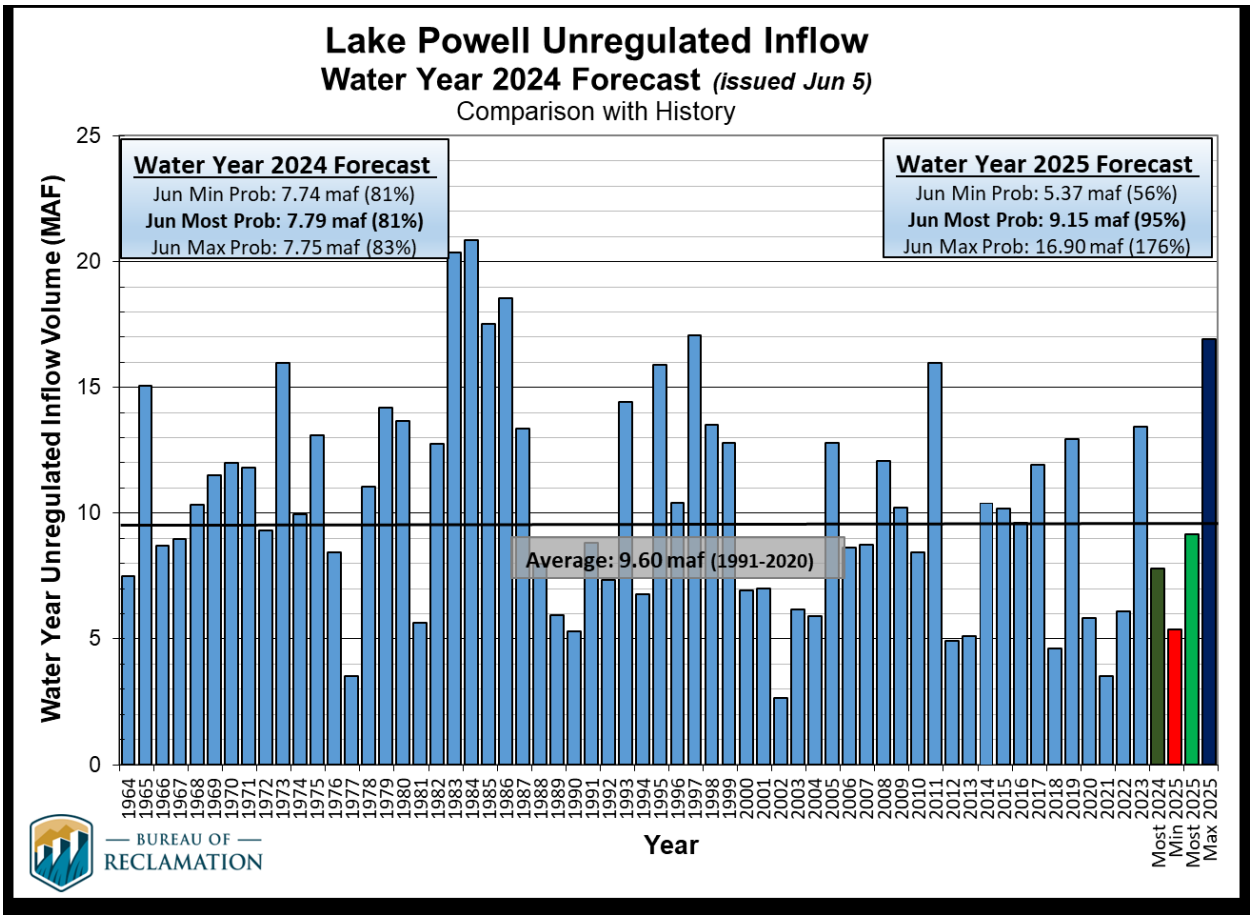
forecasts. Releases were adjusted monthly from April through September based on inflow and reservoir storage forecasts. Lake Powell releases totaled 8.58 MAF for WY 2023, including the release of the 480,000 acre-feet withheld in Lake Powell in WY 2022. As the inflow forecasts declined quickly due to the warm and dry conditions and Lake Mead projections increased due to precipitation and decreasing demand, Reclamation decreased Lake Powell releases, but still inadvertently released 40,000 acre-feet more from Powell than was required under balancing. They claim to have no authority to correct this inadvertent release in WY 2024.

In spring 2023 as Lake Powell elevation was very low but inflow and elevation were rising, Reclamation increased releases significantly for several days to mobilize sediment remaining in the system from tributary inflows below Glen Canyon Dam and deposit it onto eroding sandbars within the Grand Canyon. Reclamation increased powerplant releases and made releases through the bypass tubes similar to a High Flow Experiment (HFE), but this high release was conducted outside the LTEMP protocol for such experiments. This was the first time releases of that magnitude were made through the bypass tubes with Lake Powell at such a low elevation, and the altered hydraulic conditions damaged one of the bypass tubes. Reclamation is evaluating potential short-term limitations to Glen Canyon Dam operations and long-term actions to prevent additional damage to the bypass tubes and has issued temporary guidance limiting bypass tube releases at low elevation while it analyzes potential solutions.

As determined by Reclamation's August 2023 24-Month Study, Lake Powell will operate in the Mid-Elevation Release Tier in WY 2024 with a fixed annual release of 7.48 MAF. Streamflow at the Lees Ferry gage includes Lake Powell releases, flow of water around the Glen Canyon dam through bank storage and leakage, and inflows from the Paria River. The 10-year cumulative streamflow at Lees Ferry through WY 2023 was approximately 86 million acre-feet.

Blue Mesa reservoir achieved recovery of its previously released DROA water in late December 2023. Flaming Gorge reservoir achieved recovery of previously released DROA water in late February 2024. No DROA operations are expected for WY2024.

DROA actions helped protect critical infrastructure in Lake Powell from late 2021 through April 2023. However, half of the DROA water in Lake Powell was released in WY 2023 as part of the balancing releases. Lake Powell elevations are now lower than they would have been without DROA releases, leaving Lake Powell at increased risk of dropping below critical elevations in the future. The lack of long-term effectiveness of the 2021 – 2023 DROA releases does not match the goals and objectives of the DROA and may factor into future Upper Basin DCP decisions.



The table below describes the Interim Guideline Lower Basin shortage tiers, reduction of deliveries to Mexico pursuant to Minute 323, Lower Basin DCP contributions and Binational Water Scarcity Contingency Plan contributions as determined by projected elevations at Lake Mead. In Calendar Year 2023 Lake Mead operated in a Tier 2a shortage condition. As determined by the August 2023 24-Month Study, in CY 2024 Lake Mead is operating in a Tier 1 shortage condition, as it did in CY 2022.

2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan, and Binational Water Scarcity Contingency Plan

Total Volumes (kaf)

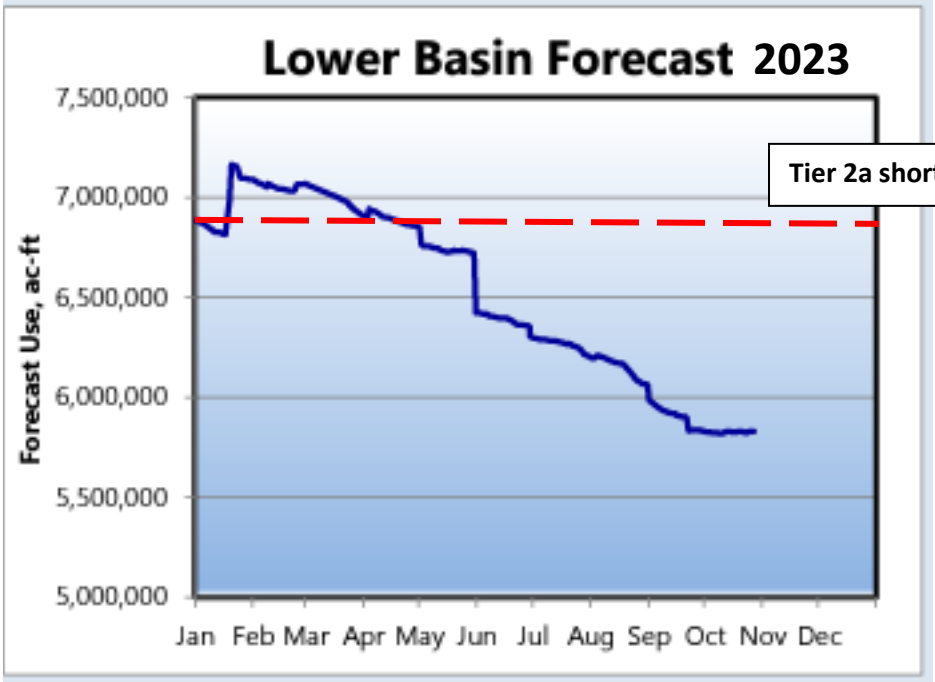
Lake Mead Elevation (feet msl)	2007 Interim Guidelines Shortages		Minute 323 Delivery Reductions	Total Combined Reductions	DCP Water Savings Contributions			Binational Water Scarcity Contingency Plan Savings	Combined Volumes by Country *US: (2007 Interim Guidelines Shortages + DCP Contributions)* *Mexico: (Minute 323 Delivery Reductions + Binational Water Scarcity Contingency Plan Savings)*					Total Combined Volumes
	AZ	NV	Mexico	***Lower Basin States + Mexico***	AZ	NV	CA	Mexico	*AZ Total*	*NV Total*	*CA Total*	*Lower Basin States Total*	*Mexico Total*	***Lower Basin States + Mexico***
1,090 - 1,075	0	0	0	***0***	192	8	0	41	192	8	0	*200*	*41*	***241***
1,075 - 1050	320	13	50	***383***	192	8	0	30	512	21	0	*533*	*80*	***613***
1,050 - 1,045	400	17	70	***487***	192	8	0	34	592	25	0	*617*	*104*	***721***
1,045 - 1,040	400	17	70	***487***	240	10	200	76	640	27	200	*867*	*146*	***1,013***
1,040 - 1,035	400	17	70	***487***	240	10	250	84	640	27	250	*917*	*154*	***1,071***
1,035 - 1,030	400	17	70	***487***	240	10	300	92	640	27	300	*967*	*162*	***1,129***
1,030 - 1,025	400	17	70	***487***	240	10	350	101	640	27	350	*1,017*	*171*	***1,188***
<1,025	480	20	125	***625***	240	10	350	150	720	30	350	*1,100*	*275*	***1,375***

2022 Operations (1,090 - 1,075 through 1,050 - 1,045)

2023 Operations (1,045 - 1,040 through <1,025)

The Secretary of the Interior will take affirmative actions to implement programs designed to create or conserve 100,000 acre-ft per annum or more of Colorado River System water to contribute to conservation of water supplies in Lake Mead and other Colorado River reservoirs in the lower basin. All actions taken by the United States shall be subject to applicable law, including availability of appropriations.

Early in CY 2023, the Lower Basin was projecting to consumptively use up to 7.2 MAF – about 320,000 AF more than their allocation under Tier 2a shortage. This would have involved the withdrawal of banked ICS. However, as the spring came, historic precipitation flooded the Arizona tributaries, and the California State Water Project issued a 100% allocation for the first time since the year 2006 (due to high snow in the Sierras; Lake Oroville spilled by May 2023). Hurricane Hilary in August 2023 further reduced Lower Basin demands due to heavy local precipitation. The large decrease in demands allowed for creation of ICS instead of the projected withdrawal. This "historically low consumptive use" in the Lower Basin was due to local hydrology – it was not caused by significant actions by the Lower Basin contractors.



California State Water Project Allocation

YEAR	DATE	ALLOCATION
2020	12/2/2019	10%
	1/24/2020	15%
	5/22/2020	20%
2021	12/1/2020	10%
	3/23/2021	5%
2022	12/1/2021	0% [3]
	1/20/2022	15%
	3/18/2022	5% [4]
2023	12/1/2022	5% [5]
	1/26/2023	30%
	2/22/2023	35%
	3/24/2023	75%
	4/20/2023	100%

In addition to the shortages agreed to pursuant to the 2007 Guidelines and 2019 Drought Contingency Plans, in December 2021 the Lower Division States also committed to creating an additional 500,000 acre-feet of water per year in 2021-2022, and 2023, of conserved water to remain in Lake Mead on a voluntary basis. The amount of water modeled for each year pursuant to the "500+ Plan" is included in the table below. Planned conservation in late 2022 and 2023 increased by almost 600,000 AF from August 2022 projections, which reflects the improved hydrology in the Lower Basin. Similar to shortage conditions, the amount of water conserved in Lake Mead under the "500+ Plan" may be partially offset by other withdrawals.

Additional Water Modeled Under 500 Plus Plan

(as anticipated to be modeled in the April 2023 Most Probable 24-Month Study)

Conservation Activity *(volumes in AF)*	2021	2022 *(Provisional)*	2023 *(Projected)*
CAP ICS delivery offset	6,147	15,876	-10,900
GRIC System Conservation	40,000	58,837	125,000
GRIC ICS creation	0	78,565	0
CRIT System Conservation	4,685	4,685	0
CAWCD System Conservation	0	87,794	0
YMIDD System Conservation	0	8,523	13,670
MVIDD System Conservation	0	9,531	12,819
FMYN System Conservation	0	0	13,933
MWD ICS delivery offset and/or creation	58,134	58,211	107,347
PVID System Conservation	12,305	52,789	58,400
CVWD System Conservation	0	9,083	0
SNWA ICS creation	12,832	28,330	44,000
Annual Total *(Non-Shortage/DCP)*	**134,103**	**412,224**	**364,269**
Cumulative Total	**134,103**	**546,327**	**910,596**

- 2023 volumes reflect executed agreements under the 500+ Plan and LC Conservation Program and current operational projections and are subject to change.
- Additional conservation activities are being considered. After new agreements are finalized and executed, these additional activities will be included in Reclamation's operational planning and modeling.

26

The Lower Basin proposed up to 3 million acre-feet of compensated conservation and other activities through 2025 to address drought conditions as part of Reclamation's Supplemental Environmental Impact Statement (SEIS) process to contemplate additional changes to Lake Powell and Lake Mead reservoir operations through the end of the Interim Guidelines ("near-term operations"). Reclamation released its final Interim Guidelines SEIS in March 2024 and issued its Record of Decision (ROD) in May 2024. The final SEIS analyzed only two alternatives, a No Action alternative and the Lower Basin alternative, removing the previously proposed action alternatives from final consideration. Reclamation is adding the expected conservation volumes to its models as conservation agreements with participating entities are signed, which is increasing projected Lake Mead elevations. The contracted conservation volumes as of May 2024 are summarized in the table below. The hydrology-driven increase in ICS creation in 2023 is also reflected.

Status of SEIS ROD Lower Basin Conservation[1]

As of May 2024 (all volumes in acre-feet)

State	LCB Water Entitlement Holder/Tribe	*2023*	2024	2025	2026
Arizona	Fort McDowell Yavapai Nation SCW	*13,933*	13,933	13,933	
Arizona	Gila River Indian Community SCW	*91,319*	125,000	125,000	
Arizona	Hopi Tribe SCW	*2,679*	3,059	3,059	
Arizona	San Carlos Apache Tribe SCW	*23,804*			
Arizona	Central Arizona Project (CAP) Subcontractors SCW	*141,400*	129,400	128,800	2,400
Arizona	Mohave Valley Irrigation and Drainage District SCW	*12,819*	13,441	13,441	
Arizona	Yuma Mesa Irrigation and Drainage District SCW	*21,556*	21,795	21,795	
Arizona	Cibola Valley Irrigation and Drainage District SCW	*1,682*	2,328	2,328	
Arizona	Cathcart Farms SCW	*57*	61	61	
Arizona	GM Gabrych Family Limited Partnership SCW	*3,240*	3,240	3,240	
Arizona	242 Wellfield Additional Pumping Agreement with CAWCD	*7,007*	25,000	25,000	25,000
Arizona	CAP ICS Preservation Program	*41,776*			
California	Coachella Valley Water District SCW	*35,000*	35,000	45,000	10,000
California	Quechan Tribe-Metropolitan Water District (MWD) SCW	*13,000*	13,000	13,000	
California	Palo Verde Irrigation District-MWD SCW	*71,507*	117,021	117,021	79,830
California	Imperial Irrigation District SCW	*106,111*			
California	MWD Extraordinatary Conservation ICS	*450,000*			
California	MWD Extraordinary Conservation Left in Lake Mead (non-ICS)	*25,066*			
Nevada	SNWA Tributary Conservation ICS	*36,075*			
Nevada	SNWA Extraordinary Conservation Left in Mead (non-ICS)	*88,156*			
	Annual Volumes	*1,186,187*	*502,278*	*511,678*	*117,230*
	Cumulative Volumes	*1,186,187*	1,688,465	2,200,143	2,317,373

[1] Volumes reflect final accounting in the 2023 Water Accounting Report and executed system conservation agreements based on current projections. Any projected or provisional volumes are subject to change. Additional conservation activities are being considered including system conservation, ICS, and other conserved water in 2024, 2025, and 2026. These additional activities will be included in Reclamation's operational modeling.

Reclamation recently released a Final SEIS for the Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP) that explores options for changing monthly and daily releases and release temperatures to help prevent the establishment of smallmouth bass and other non-native fish in the Grand Canyon and to alter sediment accounting and implementation windows for high flow experiments to distribute sand higher on sandbars. The options include releases through the bypass tubes, limited by the new interim operating guidance. LTEMP does not alter annual releases, which are determined according to the Interim Guidelines. A ROD is expected to be issued in early July.

2. Consumptive Uses and Losses Report

On June 7, the Bureau of Reclamation released an updated Colorado River Consumptive Uses and Losses report. The report contains recalculated estimated of consumptive use for years 1971 to 2015 in the Lower Basin and from 1971 to 2023 in the Upper Basin. This recalculation was an effort to improve accuracy and consistency across basins. Staff are working to confirm the accuracy of Upper Basin accounting and continue to analyze Lower Basin consumptive use data. Generally, the uses align with staff's current understanding of uses across the basin, as represented in the "Where the Water is Used" infographic.

2. June 2024 UCRC Meeting

The Upper Colorado River Commission met June 25-26 in Cheyenne, Wyoming. The Commission heard several updates and discussed ongoing progress in the Post-2026 negotiations. The Commission also directed staff to explore opportunities to obtain credit for conserved water. Generally, there is interest in better understanding potential mechanisms to

preserve conserved water in Lake Powell or other upstream Initial Units, rather than allowing that water to be released from Lake Powell pursuant to the terms of the 2007 Guidelines. In the coming weeks, staff of the Upper Division States and UCRC will work together to better understand opportunities to retain conserved water in Lake Powell or the upstream Initial Units, and will report back to the Commission on this work on August 12.