December 24-Month Study
Date: December 14, 2023

From: River Operations Group, Salt Lake City
To: All Colorado River Annual Operating Plan (AOP) Recipients

Current Reservoir Status

	November Inflow (unregulated) (acre-feet)	Percent of Average (percent)	December 13 Midnight Elevation (feet)	December 13, Midnight Reservoir Storage (acre-feet)
Fontenelle	44,570	107	6491.94	231,217
Flaming Gorge	63,989	130	6028.51	3,208,362
Blue Mesa	27,907	94	7491.38	588,512
Navajo	11,502	43	6044.08	1,104,390
Powell	379,962	91	3570.31	8,541,412

Expected Operations

The operation of Lake Powell and Lake Mead in the December 2023 24-Month Study is pursuant to the December 2007 Record of Decision on Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations of Lake Powell and Lake Mead (Interim Guidelines) and reflects the 2023 Annual Operating Plan (AOP) and draft 2024 AOP. Pursuant to the Interim Guidelines, the August 2023 24-Month Study projections of the January 1, 2024, system storage and reservoir water surface elevations set the operational tier for the coordinated operation of Lake Powell and Lake Mead during 2024.

Consistent with Section 2.D.1 of the Interim Guidelines, a Shortage Condition consistent with Section 2.D.1.b is governing the operation of Lake Mead for calendar year (CY) 2023. In addition, Section III.B of Exhibit 1 to the Lower Basin Drought Contingency Plan (DCP) Agreement will govern the operation of Lake Mead for CY 2023. Efforts to conserve additional water in Lake Mead under a 2021 Lower Basin Memorandum of Understanding (MOU) to facilitate near-term actions to maintain the water surface elevation of Lake Mead and additional conservation efforts under the Lower Colorado River Basin System Conservation and Efficiency Program (LC Conservation Program) will also take place in CY 2023.

The August 2023 24-Month study projected the January 1, 2024, Lake Powell elevation to be less than 3,575 feet and at or above 3,525 feet and the Lake Mead elevation to be at or above 1,025 feet. Consistent with Section 6.C.1 of the Interim Guidelines the operational tier for Lake Powell in water year (WY) 2024 will be the Mid-Elevation Release Tier and the water year release volume from Lake Powell will be 7.48 million acre-feet (maf).

The 2022 Drought Response Operations Agreement (DROA) Plan[1] for May 2022 through April 2023 was amended to suspend 2022 DROA Plan releases as of March 7, 2023. A total DROA release of approximately 463 thousand acre-feet (kaf) occurred under the 2022 DROA Plan. Reclamation will attempt

[1] For more information: https://www.usbr.gov/uc/DocLibrary/Plans/20220429-2022DroughtResponseOperationsPlan-ApprovalMemo-508-DOI.pdf.

to maximize DROA recovery in the Upper Initial Units in WY 2023 and through April 2024. Reclamation will provide monthly DROA accounting, including DROA releases and recovery, which can be found online at: https://www.usbr.gov/dcp/DROSummarySheet.pdf.

Reclamation will continue to carefully monitor hydrologic and operational conditions and assess the need for additional responsive actions and/or changes to operations. Reclamation will continue to consult with the Basin States, Basin Tribes, Mexico, and other partners on Colorado River operations to consider and determine whether additional measures should be taken to further enhance the preservation of these benefits, as well as recovery protocols, including those of future protective measures for both Lakes Powell and Mead.

The August 2023 24-Month Study projected the January 1, 2024 Lake Mead elevation to be below 1,075 feet and above 1,050 feet. Consistent with Section 2.D.1 of the Interim Guidelines, a Shortage Condition consistent with Section 2.D.1.a will govern the operation of Lake Mead for CY 2024. In addition, Section III.B of Exhibit 1 to the Lower Basin DCP Agreement will also govern the operation of Lake Mead for CY 2024. Lower Basin projections for Lake Mead take into consideration updated water orders to reflect additional conservation efforts under the LC Conservation Program.

The 2024 operational tier determinations for Lake Powell and Lake Mead will be documented in the 2024 AOP, which is currently in development.

The draft 2024 AOP is available online at:
https://www.usbr.gov/lc/region/g4000/AOP2024/AOP24_draft.pdf
The 2023 AOP is available online at:
https://www.usbr.gov/uc/water/rsvrs/ops/aop/AOP23.pdf.
The Interim Guidelines are available online at:
https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf.
The Colorado River DCPs are available online at:
https://www.usbr.gov/dcp/finaldocs.html.
The 2021 Lower Basin MOU is available online at:
https://www.usbr.gov/lc/region/g4000/2021_MOU.pdf.
The Upper Basin DROA is online at:
https://www.usbr.gov/dcp/droa.html.
The Upper Basin Hydrology Summary is available online at:
https://www.usbr.gov/uc/water/crsp/studies/24Month_11_ucb.pdf.
Information on the LC Conservation Program is available online at:
https://www.usbr.gov/lc/LCBConservation.html.

Fontenelle Reservoir

As of December 04, 2023, the Fontenelle Reservoir pool elevation is 6493.36 feet, which amounts to 72 percent of live storage capacity. Inflows for the month of November totaled approximately 44,570 acre-feet (af) or 107 percent of average.

Current release rate is set at 1,175 cfs. This release shall remain constant throughout the winter base flow period, pending significant hydrological changes or emergencies. The winter base flow period is typically from mid-November and ending approximately mid-March, pending icing conditions in the Green River downstream of the dam this coming spring.

The December final forecast for unregulated inflows into Fontenelle for the next three months projects above average conditions. December, January, and February Most Probable inflow volumes amount to 38,000 af (119 percent of average), 35,000 af (117 percent of average), and 33,000 af (118 percent of average) respectively.

The next Fontenelle Working Group meeting is April 18, 2024 at 10 AM MDT and location is pending. Details on the meeting will be provided as we get closer to the meeting date. Prior Fontenelle Working Group meeting minutes are available online on USBR's website at https://www.usbr.gov/uc/water/crsp/wg/ft/ftcurrnt.html. The Fontenelle Working Group is an open public forum for information exchange between Reclamation and other parties associated with the operation of Fontenelle Reservoir.

Flaming Gorge Reservoir

As of December 4, 2023 (end of day), Flaming Gorge Reservoir pool elevation is 6028.83 feet, which amounts to 88 percent of live storage capacity. Unregulated inflow volume for the month of November is approximately 64,000 acre-feet (af), which is 130 percent of the average November unregulated inflow volume.

Flaming Gorge Dam operations are in an average hydrologic classification for the month of December and are projected to remain in the average hydrologic classification through the remainder of the base flow period. The winter average daily release remains within the average hydrologic classification range of 1,500 cfs to 2,400 cfs in Reach 2, measured at the Jensen USGS Gage. Current average daily release is approximately 2,120 cfs. This data is considered the most likely scenario given the current forecast, is general, and is subject to changing conditions.

The December unregulated inflows into Flaming Gorge for the next three months projects near average. December, January, and February forecasted unregulated inflow volumes 42,000 af (127 percent of average), 48,000 af (119 percent of average), and 50,000 af (110 percent of average), respectively.

Reclamation is planning to hold Flaming Gorge Working Group meetings tentatively on March 21, 2024 and April 17, 2024, at 10:00 am (and Teams virtual meeting). The location is TBD. The Flaming Gorge Working Group is an open public forum for information exchange between Reclamation and the stakeholders of Flaming Gorge Dam. The public is encouraged to attend and comment on the operations and plans presented by Reclamation at these meetings. Meeting notes from past Working Group meetings are posted on the Working Group webpage. For more information on this group and these meetings please contact Alex Pivarnik at (385) 475 – 8329.

Aspinall Unit Reservoirs

As of December 10, 2023, releases from Crystal Dam are approximately 650 cfs. Flows of the Gunnison River in the Black Canyon are being maintained at about 620 cfs while the Gunnison Tunnel is intermittently diverting to fill Fairview Reservoir about 1 day every 2 weeks. Flows in the Whitewater Reach of the Gunnison River are about 1,260 cfs.

The unregulated inflow volume in November to Blue Mesa was 27,900 af (93 percent of average). Unregulated Inflow volumes forecasted for Blue Mesa for the next three months (November, December,

January) are projected to be: 25,000 af (100 percent of average), 23,000 af (96 percent of average) and 21,000 af (95 percent of average), respectively. The December 24-Month Study will be reflective of these new forecasted inflows.

The forecasted 2024 water year unregulated inflow volume to Blue Mesa is projected to be 777,000 af (86 percent of average). The water supply period (April-July) for 2024 is forecasted currently for an unregulated inflow volume of to be 535,000 af of unregulated inflow (84 percent of average).

The Aspinall Unit Operations Group is an open public forum for information exchange between Reclamation and the stakeholders of the Aspinall Unit. The public is encouraged to attend and comments on the operations and plans presented by Reclamation at these meetings. Meeting notes from past working Group meetings are posted on the Operations Group webpage. For more information on this group and these meetings please contact Erik Knight in the Grand Junction Area Office at (970) 248-0629.

The next Operations Group meeting will be held January 18, 2024 at 1:00 p.m., in person in Montrose Colorado. This will be an in-person meeting with an option for remote participation. Contact Erik Knight in the Grand Junction Area Office at (970) 248-0629 to get more information regarding this Operation Group meeting.

Navajo Reservoir

n December 4th, the daily average release rate from Navajo Dam was 350 cfs while reservoir inflow was averaging 223 cfs. The water surface elevation was 6044.43 feet above sea level. At this elevation the live storage is 1.11 maf (67 percent of live storage capacity) and the active storage is 0.482 maf (47 percent of active storage capacity). Diversions to Cutter Reservoir for the Navajo Indian Irrigation Project (NIIP) and the Navajo Gallup Water Supply Project (NGWSP) have ceased for the year. Due to streamflows below minimum bypass, 0 cfs is being diverted to the San Juan-Chama Project (SJC) above Navajo Reservoir. NIIP has diverted 197 kaf and SJC has diverted 142 kaf since January 1st of this year.

Releases from Navajo Dam are made for authorized purposes of the Navajo Unit and are pursuant to the Record of Decision for the Navajo Reservoir Operations. Releases target the San Juan River Recovery Implementation Program's (SJRIP) recommended downstream baseflow range of 500 cfs to 1,000 cfs through the critical habitat reach of the San Juan River (Farmington, NM to Lake Powell).

Preliminary modified unregulated inflow (MUI) into Navajo in November was 11.4 kaf (43 percent of average). The release averaged 340 cfs and totaled 20.3 kaf, which was 73 percent of average for the month. Navajo had a net storage change of -13 kaf in November.

The most probable MUI forecast for December, January, and February is 11 kaf (53 percent of average), 12.5 kaf (62 percent of average), and 16 kaf (59 percent of average), respectively.

Reclamation conducts Public Operations Meetings three times per year to gather input for determining upcoming operations for Navajo Reservoir. Input from individuals, organizations, and agencies along with other factors such as weather, water rights, endangered species requirements, flood control, hydro power, recreation, fish and wildlife management, and reservoir levels, will be considered in the development of these reservoir operation plans. In addition, the meetings are used to coordinate activities and exchange information among agencies, water users, and other interested parties concerning the San Juan River and Navajo Reservoir. The next meeting will be held on Tuesday, January 16th 2024 at 1:00 PM. This meeting is

open to the public, and will be held at the Farmington Civic Center, 200 West Arrington, in Farmington, New Mexico (subject to change based on guidance at the time). The meeting will also have a virtual option.

Glen Canyon Dam / Lake Powell

Current Status

The unregulated inflow volume to Lake Powell during November was 380 thousand acre-feet (kaf) (91 percent of average). The release volume from Glen Canyon Dam in November was 500 kaf. The end of November elevation and storage of Lake Powell were 3,571.43 feet (129 feet from full pool) and 8.63 million acre-feet (maf) (36 percent of live capacity), respectively.

Current Operations

The August 2023 24-Month study projects the January 1, 2023, Lake Powell elevation to be less than 3,575 feet and at or above 3,525 feet and the Lake Mead elevation to be at or above 1,025 feet. Consistent with Section 6.C.1 of the Interim Guidelines the operational tier for Lake Powell in water year 2024 is the Mid-Elevation Release Tier and the water year release volume from Lake Powell is 7.48 maf.

December release volume will be 600,000 acre-feet and hourly releases will fluctuate from a low of approximately 6,157 cubic feet per second (cfs) during the early morning hours to a high of 11,558 cfs during the afternoon and evening hours with a Sunday minimum of 5,022 cfs. The anticipated monthly release volume for January is anticipated to be 723,000 acre-feet.

In addition to daily scheduled fluctuations for power generation, the instantaneous releases from Glen Canyon Dam may also fluctuate to provide 40 megawatts (MW) of system regulation. These instantaneous release adjustments stabilize the electrical generation and transmission system and translate to a range of about 1,300 cfs above or below the hourly scheduled release rate. Under normal system conditions, fluctuations for regulation are typically short lived and generally balance out over the hour with minimal or no noticeable impacts on downstream river flow conditions.

Releases from Glen Canyon Dam can also fluctuate beyond scheduled releases when called upon to respond to unscheduled power outages or power system emergencies. Depending on the severity of the system emergency, the response from Glen Canyon Dam can be significant, within the full range of the operating capacity of the power plant for as long as is necessary to maintain balance in the transmission system. Glen Canyon Dam currently maintains 30 MW (approximately 1,300 cfs) of generation capacity in reserve in order to respond to a system emergency even when generation rates are already high. System emergencies occur infrequently and typically require small responses from Glen Canyon Dam. However, these responses can have a noticeable impact on the river downstream of Glen Canyon Dam.

Inflow Forecasts and Model Projections

The forecast for water year 2024 unregulated inflow to Lake Powell, issued on December 1, 2023, by the Colorado Basin River Forecast Center, projects that the most probable (median) unregulated inflow volume in water year 2024 will be 7.62 maf (79 percent of average).

In addition to the December 2023 24-Month Study based on the Most Probable inflow scenario, and in accordance with the Upper Basin Drought Response Operations Agreement (DROA), Reclamation has conducted model runs in December to determine a possible range of reservoir elevations. The December 2023 24-Month Study probable most and minimum and the October 2023 maximum probable inflow scenarios were used to determine the range of probable outcomes. The probable minimum and probable maximum model runs are conducted simultaneously in January, April, August, and October, or when necessary to incorporate changing conditions. The probable minimum inflow scenario reflects a dry hydrologic condition which statistically would be exceeded 90 percent of the time. The most probable inflow scenario reflects a median hydrologic condition which statistically would be exceeded 50 percent of the time. The probable maximum inflow scenario reflects a wet hydrologic condition which statistically would be exceeded 10 percent of the time. There is approximately an 80 percent probability that a future elevation will fall inside the range of the minimum and maximum inflow scenarios. Additionally, there are possible inflow scenarios that would result in reservoir elevations falling outside the ranges indicated in these reports.

The DROA coordination will continue until either (i) the minimum probable projected elevation remains above 3,525 feet for 24 months or (ii) the process moves to the next step when the most probable projected elevation indicates Powell elevations below 3,525 feet and a Drought Response Operations Plan is developed. This current Plan is described above and available for review here: https://www.usbr.gov/dcp/droa.html.

The December forecast for WY 2024 ranges from a minimum probable of 4.90 maf (51% of average) to a forecasted December 24-Month Study maximum probable of 13.5 maf (141 percent of average). There is a 10 percent chance that inflows could be higher than the current maximum probable forecast and a 10 percent chance that inflows could be lower than the minimum probable forecast.

Based on the current forecast for water year 2024 of 7.62 maf unregulated, the December 24-Month Study projects Lake Powell elevation will end calendar year 2024 near 3568.50 feet with approximately 8.14 maf in storage (36 percent of capacity). Note that projections of elevation and storage for calendar year 2024 have significant uncertainty at this point in the season. Projections of end of calendar year 2024 elevation using the December minimum and October maximum inflow forecast results are 3,534.57 feet and 3,657.44 feet, respectively. The annual release volume from Lake Powell during water year 2024 is 7.48 maf under the Mid-Elevation Release Tier as determined under Section 6.C.1 of the Interim Guidelines as determined by the Department of the Interior as described above.

Upper Colorado River Basin Hydrology

Upper Colorado River Basin regularly experiences significant year to year hydrologic variability. The 30-year average was updated in October 2022 from 1981 through 2010 to 1991 through 2020. Shifting the period of record decreased the average unregulated inflow 1.20 maf. The period 2000-2022 is the lowest 23-year period since the closure of Glen Canyon Dam in 1963, with an average unregulated inflow of 8.29 maf, or 93 percent of the 30-year average (1991-2020). (For comparison, the 1991-2020 total water year average is 9.60 maf.) The unregulated inflow during the 2000-2022 period has ranged from a low of 2.64 maf (28 percent of average) in water year 2002 to a high of 15.97 maf (166 percent of average) in water year 2011. In water year 2021 unregulated inflow volume to Lake Powell was 3.50 maf (36 percent of average), the second driest year on record above 2002. Under the current most probable forecast, the total water year 2024 unregulated inflow to Lake Powell is projected to be 7.62 maf (79 percent of average).

At the beginning of water year 2024, total system storage in the Colorado River Basin was 25.27 maf (43 percent of 58.48 maf total system capacity). This is an increase of 5.72 maf over the total storage at the beginning of water year 2023 when total system storage was 19.55 maf (33 percent of capacity). Since the beginning of water year 2000, total Colorado Basin storage has experienced year to year increases and decreases in response to wet and dry hydrology, ranging from a high of 94 percent of capacity at the beginning of 2000 to the beginning of water year 2023 with 19.55 maf (33 percent of capacity). Based on current inflow forecasts, the current projected end of water year 2024 total Colorado Basin reservoir storage is approximately 24.32 maf (41.6 percent of total system capacity). The actual end of water year 2024 system storage may vary from this projection, primarily due to uncertainty regarding this season's runoff and reservoir inflow.