March 24-Month Study
Date: March 15, 2022

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

Current Reservoir Status

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>February Inflow (unregulated) (acre-feet)</th>
<th>Percent of Average (percent)</th>
<th>March 14, Midnight Elevation (feet)</th>
<th>March 14, Midnight Reservoir Storage (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fontenelle</td>
<td>22,700</td>
<td>80</td>
<td>6,477.67</td>
<td>146,615</td>
</tr>
<tr>
<td>Flaming Gorge</td>
<td>30,200</td>
<td>67</td>
<td>6,018.13</td>
<td>2,914,100</td>
</tr>
<tr>
<td>Blue Mesa</td>
<td>18,200</td>
<td>81</td>
<td>7,436.11</td>
<td>238,839</td>
</tr>
<tr>
<td>Navajo</td>
<td>14,000</td>
<td>52</td>
<td>6,017.74</td>
<td>846,086</td>
</tr>
<tr>
<td>Powell</td>
<td>214,800</td>
<td>59</td>
<td>3,525.18</td>
<td>5,931,490</td>
</tr>
</tbody>
</table>

Expected Operations

The operation of Lake Powell and Lake Mead in this March 2022 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 2022 Annual Operating Plan (AOP). Pursuant to the Interim Guidelines, the August 2021 24-Month Study projections of the January 1, 2022, system storage and reservoir water surface elevations set the operational tier for the coordinated operation of Lake Powell and Lake Mead during 2022.

The August 2021 24-Month study projected the January 1, 2022, 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 2022 is the Mid-Elevation Release Tier and the water year release volume from Lake Powell will be 7.48 million acre-feet (maf).

The August 2021 24-Month Study projected the January 1, 2022 Lake Mead elevation to be at or below 1,075 feet and at or 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 calendar year 2022. In addition, Section III.B of Exhibit 1 to the Lower Basin Drought Contingency Plan (DCP) Agreement will also govern the operation of Lake Mead for calendar year 2022. 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 will also take place in calendar year 2022.

The Upper Basin Drought Response Operations Agreement (DROA) provisions to protect a target elevation at Lake Powell of 3,525 feet have been incorporated into the March 2022 24-Month Study and includes an adjusted monthly release volume pattern for Glen Canyon Dam that will hold back a total of 0.350 maf in Lake Powell from January through April. There are continued discussions when and how that
same amount of water (0.350 maf) will be released later in the water year. The annual release volume from Lake Powell for water year 2022 will continue to be 7.48 maf. If future projections indicate the monthly adjustments are insufficient to protect Powell’s elevation, Reclamation will again consider additional water releases from the upstream initial units of the Colorado River Storage Project later this year.

Current runoff projections into Lake Powell are provided by the National Weather Service's Colorado Basin River Forecast Center and are as follows. The observed unregulated inflow into Lake Powell for the month of February was 0.215 maf or 59 percent of the 30-year average from 1991 to 2020. The March unregulated inflow forecast for Lake Powell is 0.300 maf or 50 percent of the 30-year average. The 2022 April through July unregulated inflow forecast is 4.400 maf or 69 percent of average.

The 2022 AOP is available online at: https://www.usbr.gov/lc/region/g4000/aop/AOP22.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 Hydrology Summary is available online at: https://www.usbr.gov/uc/water/crsp/studies/24Month_03_ucb.pdf.

**Fontenelle Reservoir**
As of March 6, 2022, the Fontenelle Reservoir pool elevation is 6478.84 feet, which amounts to 46 percent of live storage capacity. Inflows for the month of February totaled 23,000 acre-feet (af) or 80 percent of average.

Fontenelle’s releases will be maintained at 825 cfs through the winter base flow period. These releases will be maintained until March or April when the ice along the Green River begins to melt.

The March final forecast for unregulated inflows into Fontenelle for the next three months projects below average conditions. March, April, and May inflow volumes amount to 40,000 af (70 percent of average), 55,000 af (65 percent of average), and 95,000 af (54 percent of average), respectively. For Water Year 2022, the unregulated inflow is forecasted to be 726,000 af or 68 percent of average.

The August 26, 2021, 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 next Fontenelle Working Group meeting is scheduled for April 28, 2022 at 10:00 a.m. MDT. Details on the meeting will be provided as we get closer

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1 More information on the adjusted release from Glen Canyon Dam can be found here: https://www.usbr.gov/newsroom/#/news-release/4073.
to the meeting date. 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**

As of March 7, 2022, Flaming Gorge Reservoir pool elevation is 6018.03 feet, which amounts to 78 percent of live storage capacity. Unregulated inflow volume for the month of February is approximately 30,000 af, which is 66 percent of the average February unregulated inflow volume.

The winter base flow period ended on February 28, a +/-25 percent base flow period. The daily average release of approximately 850 cfs is planned to be maintained through March.

The March forecast for unregulated inflows into Flaming Gorge for the next three months projects below average conditions. March, April, and May forecasted unregulated inflow volumes amount to 75,000 af (71 percent of average), 85,000 af (68 percent of average), and 125,000 af (50 percent of average), respectively.

The March water supply forecast of the April through July unregulated inflow volume into Flaming Gorge Reservoir is 540,000 acre-feet (56 percent of average). Current snowpack is 80 percent of median for the Upper Green Basin.

Reclamation is planning to hold the next Flaming Gorge Working Group meeting on March 17, 2022 at 10:00 a.m. MDT (tentative) via WebEx. 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 Dale Hamilton at 801-379-1186.

**Aspinall Unit Reservoirs**

As of March 1, 2022 releases from Crystal Dam are approximately 325 cfs. Gunnison Tunnel diversions have terminated for the irrigation season. Flows of the Gunnison River in the Black Canyon are being maintained at about 310 cfs.

The unregulated inflow volume in January to Blue Mesa was 18,180 af (82 percent of average). Unregulated Inflow volumes forecasted for Blue Mesa for the next three months (March, April and May) are projected to be: 27,000 af (71 percent of average), 55,000 af (71 percent of average) and 125,000 af (62 percent of average), respectively. The March 24-Month Study will be reflective of these new forecasted inflows.

The 2022 median water year unregulated inflow volume to Blue Mesa is projected to be 784,000 af (87 percent of average based on period from 1991-2020). The water supply period (April-July) for 2022 is projected to be 560,000 af of unregulated inflow (88 percent of average).

Snowpack development in the Gunnison Basin has been very flat through January but the aggregate snowpack in the Gunnison Basin is still 106 percent of the median for this time of year based on the period from 1991-2020.
Under the Aspinall Record of Decision (2012), base flow minimum targets flows, measured in the Whitewater Reach of the Gunnison River, are established for 6 categories of hydrological conditions. The category for this year is the dry category. The baseflow minimum target flow for dry category years during the months of August through March is 750 cfs in the Whitewater Reach. Flows in the Whitewater Reach are approximately 800 cfs.

Blue Mesa did not fill in water year 2021. Blue Mesa reached a peak elevation of 7,464.28 feet on June 22, 2021. The elevation reached a low elevation 7429.49 feet on November 1, 2021 with a storage level of 208,761 acre-feet (25 percent of full capacity). The elevation is now increasing and as of March 6, 2022 was 7436.5 feet above sea level corresponding to a live storage of 240,800 acre-feet which is 29 percent of capacity.

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 on April 26, 2022 at 1:00 p.m. MDT. The meeting will be held virtually. Contact Erik Knight in the Grand Junction Area Office at (970) 248-0629 to get more information regarding this Operation Group meeting.

*Navajo Reservoir*

On March 6th the daily average release rate from Navajo Dam was 400 cfs while reservoir inflow was averaging approximately 584 cfs. The water surface elevation was 6018.02 feet above sea level. At this elevation the live storage is 0.848 maf (51 percent of live storage capacity) and the active storage is 0.222 maf (22 percent of active storage capacity). The Navajo Indian Irrigation Project (NIIP) is diverting 8 cfs (totaling 4.1 thousand acre-feet (kaf) so far in CY2022). The San Juan-Chama project is diverting 14 cfs (totaling 0.15 kaf so far in CY2022).

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). Current modeling shows the release will most likely vary between 250 and 600 throughout the remainder of the winter and early spring.

Preliminary modified unregulated inflow (MUI) into Navajo in January was 13.8 kaf, 69 percent of average for the month. The volume released downstream totaled 22.6 kaf, which was 80 percent of average for the month.

The most probable MUI forecast for March, April, and May is 35,000 af (43 percent of average), 75,000 af (51 percent of average), and 218,000 af (90 percent of average), respectively.
The Minimum, Most, and Maximum Probable April through July MUI forecasts are 315 kaf (50 percent of average), 455 kaf (72 percent of average), and 680 kaf (108 percent of average), respectively.

The release is expected to range between 250 cfs and 600 cfs throughout the remainder of winter and early spring. No spring peak release, as prescribed by the SJRIP is expected under any of the three inflow forecasts in Water Year 2022. Based on the projected inflows and resulting operations, the reservoir elevation is expected to peak this spring under Most Probable operations at 6036 ft (1,022 kaf live storage) and end the water year on September 30th at 6027 ft (932 kaf storage).

Beginning October 1, 2021 (the start of WY 2022), the area-capacity table for Navajo Reservoir was updated based on a 2019 Survey.

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 virtually on Tuesday, April 19, 2022, at 1:00 p.m..

**Glen Canyon Dam / Lake Powell**

**Current Status**
The unregulated inflow volume to Lake Powell during February was 215 kaf (59 percent of average). The release volume from Glen Canyon Dam in February was 541 kaf. The end of February elevation and storage of Lake Powell were 3,526.97 feet (173 feet from full pool) and 6.05 maf (24 percent of live capacity), respectively.

**Current Operations**
The operating tier for water year 2022 (October 2021 through September 2022) was established in August 2021 as the Mid-Elevation Release Tier consistent with Section 6.C.1 of the Interim Guidelines. The August 2021 24-Month study projected the January 1, 2022, 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 2022 will be the Mid-Elevation Release Tier and the water year release volume from Lake Powell will be 7.48 maf.

The March anticipated release is 575 kaf with fluctuations between about 6,500 cfs to around 11,675 cfs on weekdays and Saturdays, with a Sunday peak of 10,890 cfs. The April anticipated release is 501 kaf with fluctuations between about 5,434 cfs to around 9,943 cfs. The May anticipated release is 599 kaf.

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 1,100 cfs above or below the hourly scheduled release rate. Under system normal 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 800 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 2022 unregulated inflow to Lake Powell, issued on March 3, 2022, by the Colorado Basin River Forecast Center, projects that the most probable (median) unregulated inflow volume this year will be 6.58 maf (69 percent of average).

In addition to the March 2022 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 a model run in March to determine a possible range of reservoir elevations under probable minimum inflow scenarios. The probable maximum scenario results were completed for the February 24-Month Study. The probable minimum and probable maximum model runs are conducted simultaneously in January, April, August, and October. 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.

The March forecast for water year 2022 ranges from a minimum probable of 5.24 maf (55 percent of average) to a maximum probable of 10.67 maf (111 percent of average) with the most probable forecast for water year 2022 of 6.58 maf (69 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 of 6.58 maf unregulated inflow for water year 2022, the March 24-Month Study projects Lake Powell elevation will end water year 2022 near 3,527.35 feet with approximately 6.70 maf in storage (27 percent of capacity). Note that projections of elevation and storage for water year
2022 have significant uncertainty at this point in the season. Projections of end of water year 2022 elevation using the minimum and maximum probable inflow forecast results from the February 2022 model runs are 3,513.33 feet and 3,567.29 feet, respectively. Under these scenarios, there is a 10 percent chance that inflows will be higher, resulting in higher elevation, and 10 percent chance that inflows will be lower, resulting in lower elevation. The annual release volume from Lake Powell during water year 2022 will be 7.48 maf as determined under Section 6.C.1 of the Interim Guidelines.

Upper Colorado River Basin Hydrology

Upper Colorado River Basin regularly experiences significant year to year hydrologic variability. During the 22-year period 2000 to 2021, however, the unregulated inflow to Lake Powell, which is a good measure of hydrologic conditions in the Colorado River Basin, was above average in only 5 out of the past 22 years. The period 2000-2021 is the lowest 22-year period since the closure of Glen Canyon Dam in 1963, with an average unregulated inflow of 8.46 maf, or 88 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 2000-2021 period has ranged from a low of 2.64 maf (24 percent of average) in water year 2002 to a high of 15.97 maf (147 percent of average) in water year 2011. In water year 2021 unregulated inflow volume to Lake Powell was 3.50 maf (32 percent of average), the second driest year on record above 2002. Under the current most probable forecast, the total water year 2022 unregulated inflow to Lake Powell is projected to be 6.58 maf (69 percent of average).

At the beginning of water year 2022, total system storage in the Colorado River Basin was 22.80 maf (38 percent of 59.60 maf total system capacity). This is a decrease of 5.97 maf over the total storage at the beginning of water year 2021 when total system storage was 28.77 maf (48 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 now current level of 38 percent of capacity at the beginning of water year 2022. Based on current inflow forecasts, the current projected end of water year 2022 total Colorado Basin reservoir storage is approximately 20.27 maf (34 percent of total system capacity). The actual end of water year 2022 system storage may vary from this projection, primarily due to uncertainty regarding this season’s runoff and reservoir inflow.