Upper Basin Snowpack

117% of median
Forecast Development

January 1st Forecast
• What we know:
  • About 40% snowpack accumulation
  • Fall Soil Moisture conditions
• What we don’t know:
  • Jan-May weather
  • About 60% of the snowpack accumulation

April 1st Forecast
• What we know:
  • About 98% of the snowpack accumulation
  • Dec-March weather
• What we don’t know:
  • April-May weather
  • Snowmelt pattern
Upper Basin Storage and Inflow

Upper Colorado River Drainage Basin

Basin Storage

As of 02/10/2020

- Fontenelle: 87% Full
- Flaming Gorge: 66% Full
- Blue Mesa: 50% Full
- Navajo: 77% Full
- Powell: 48% Full

Reservoir Forecast

Reservoir Forecast (kaf) Percent of Average\(^1\)

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Forecast (kaf)</th>
<th>Percent of Average(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fontenelle</td>
<td>971</td>
<td>90</td>
</tr>
<tr>
<td>Flaming Gorge</td>
<td>1,339</td>
<td>92</td>
</tr>
<tr>
<td>Blue Mesa</td>
<td>819</td>
<td>86</td>
</tr>
<tr>
<td>Navajo</td>
<td>682</td>
<td>63</td>
</tr>
<tr>
<td>Powell</td>
<td>8,644</td>
<td>80</td>
</tr>
</tbody>
</table>

Water Year 2020
Forecasted Unregulated Inflow
Issued February 4, 2020

Forecasts are based on the period of record from 1981-2010.

April-July 2020
Forecasted Unregulated Inflow

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Forecast (kaf)</th>
<th>Percent of Average(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fontenelle</td>
<td>620</td>
<td>85</td>
</tr>
<tr>
<td>Flaming Gorge</td>
<td>870</td>
<td>89</td>
</tr>
<tr>
<td>Blue Mesa</td>
<td>560</td>
<td>83</td>
</tr>
<tr>
<td>Navajo</td>
<td>500</td>
<td>68</td>
</tr>
<tr>
<td>Powell</td>
<td>5,700</td>
<td>80</td>
</tr>
</tbody>
</table>

\(^1\) Percent of average based on the period of record from 1981-2010.
Lake Powell Inflow

Lake Powell Unregulated Inflow
Water Year 2020 Forecast (Issued February 4)
Comparison with History

Water Year 2020 Forecast
Feb Most Prob: 8.64 maf (80%)
Jan Min Prob: 6.4 maf (59%)
Jan Max Prob: 12.82 maf (118%)

April-July 2020 Forecast
Feb Most Prob: 5.7 maf (80%)
Jan Min Prob: 3.6 maf (50%)
Jan Max Prob: 9.4 maf (131%)

Average: 10.83 maf (1981-2010)
Lake Powell 2020 Operating Tier

- Tier was set in August 2019
  - Start with 8.23 maf release
- Use April 24-Month Study projections of end of water year storage to potentially adjust
  1. Stay with 8.23 maf
  2. Balancing: 8.23 – 9.0 maf
  3. Equalization: >8.23 maf

<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Operation According to the Interim Guidelines</th>
<th>Live Storage (maf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,700</td>
<td>Equalization Tier: Equalize, avoid spills or release 8.23 maf</td>
<td>24.3</td>
</tr>
<tr>
<td>3,638 - 3,668</td>
<td>Upper Elevation Balancing Tier:&lt;br&gt;Release 8.23 maf; if Lake Mead &lt; 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf</td>
<td>15.5 - 19.3 (2008-2026)</td>
</tr>
<tr>
<td>3,575</td>
<td>Mid-Elevation Release Tier:&lt;br&gt;Release 7.48 maf; if Lake Mead &lt; 1,025 feet, release 8.23 maf</td>
<td>9.5</td>
</tr>
<tr>
<td>3,525</td>
<td>Lower Elevation Balancing Tier:&lt;br&gt;Balance contents with a min/max release of 7.0 and 9.5 maf</td>
<td>5.9</td>
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<tr>
<td>3,490</td>
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<td>4.0</td>
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<tr>
<td>3,370</td>
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</table>
Release Scenarios under Interim Guidelines

Lake Powell Release Scenarios under Section 6.B
Water Year 2020 Release Volume as a Function of Upper Elevation Balancing Tier based on January 2020 24-Month Study Conditions

Jan Maximum Probable Inflow Scenario
WY Unreg Inflow = 12.82 maf (118%)
Powell Release = 8.23 maf
Powell inflows remain below elevation 3,657 feet at EOWY

Jan Minimum Probable Inflow Scenario
WY Unreg Inflow = 6.4 maf (59%)
Powell Release = 8.23 maf
Observed inflows keep Mead above 1,075 feet at EOWY

January 2020 Most Probable
WY Unreg Inflow = 8.94 maf (82%)
Powell Release = 8.23 maf
Mead Elevation Above 1,075 feet at EOWY

Water Year 2020 Upper Elevation Balancing Tier
Initial Release 8.23 maf

Potential Glen Canyon Water Year Release Volume (maf)
Powell Monthly Release Volumes

Potential Lake Powell Monthly Release Volume Distribution
Release Scenarios for Water Year 2020
Based on January 2020 Modeling

WY 2020 Release Scenarios
Jan Probable Min: 8.23 maf
Jan Most Probable: 8.23 maf
Jan Probable Max: 8.23 maf

Historical
Future

Monthly Release Volumes

Oct-19: 625
Nov-19: 625
Dec-19: 750
Jan-20: 760
Feb-20: 675
Mar-20: 700
Apr-20: 630
May-20: 630
Jun-20: 650
Jul-20: 750
Aug-20: 835
Sep-20: 599

January Min Probable
January Most Probable
January Max Probable
Powell Elevations

Lake Powell End of Month Elevations
Historic and Projected based on January 2020 Modeling

- Dec 2020 Elevations
  - Jan Most: 3613.91 ft (54%)
  - Jan Min: 3598.83 ft (48%)
  - Jan Max: 3649.6 ft (71%)

- Feb 2021 Elevations
  - Jan Most: 3629.3 ft (58%)
  - Jan Min: 3576.1 ft (40%)
  - Jan Max: 3659 ft (75%)

- Sep 2021 Elevations
  - Jan Most: 3629.3 ft (61%)
  - Jan Min: 3576.1 ft (40%)
  - Jan Max: 3659 ft (75%)

- February 11: 3604.59 ft (50%)
Mead Elevations

End of CY 2019 Elevation:
1,090.49 feet (42% full)

Most Probable End of CY 2020 Projection:
1,084.89 feet (40% full)
Min/Max Range: 1,081.08 to 1,086.94 feet

Most Probable End of CY 2021 Projection:
1,085.45 feet (40% full)
Min/Max Range: 1,071.77 to 1,118.64 feet
## Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2020

### Projected Release

1. Projected release, based on January 2020 MOST Probable Inflow Projections and 24-Month Study model runs.
2. Projected release, based on January 2020 Min and Max Probable Inflow Projections and 24-Month Study model runs.
3. *Dependent upon availability to shift regulation and reserves.

### Units Available

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### Capacity (cfs)

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<tbody>
<tr>
<td>5</td>
<td>16,800</td>
<td>20,500</td>
<td>20,400</td>
<td>20,400</td>
<td>20,300</td>
<td>16,600</td>
<td>29,650/20,300</td>
<td>20,500</td>
<td>20,700</td>
<td>20,750</td>
<td>20,700</td>
<td></td>
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<tr>
<td>6</td>
<td>1,060</td>
<td>1,160</td>
<td>1,420</td>
<td>1,250</td>
<td>1,180</td>
<td>1,100</td>
<td>1,290</td>
<td>1,280</td>
<td>1,270</td>
<td>1,310</td>
<td>1,340</td>
<td>1,270</td>
</tr>
<tr>
<td>Max (kaf)¹</td>
<td>625</td>
<td>625</td>
<td>750</td>
<td>760</td>
<td>675</td>
<td>700</td>
<td>630</td>
<td>630</td>
<td>650</td>
<td>750</td>
<td>835</td>
<td>599</td>
</tr>
<tr>
<td>Most (kaf)²</td>
<td>625</td>
<td>625</td>
<td>750</td>
<td>760</td>
<td>675</td>
<td>700</td>
<td>630</td>
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<tr>
<td>Min (kaf)¹</td>
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<td>630</td>
<td>630</td>
<td>650</td>
<td>750</td>
<td>835</td>
<td>599</td>
</tr>
</tbody>
</table>

### Notes

- **1** Projected release, based on January 2020 MOST Probable Inflow Projections and 24-Month Study model runs.
- **2** Projected release, based on January 2020 Min and Max Probable Inflow Projections and 24-Month Study model runs.
- **3** *Dependent upon availability to shift regulation and reserves.

(updated 01-29-2020)
### Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2021

1. **Units Available:**
   - Units: 6, 6, 6, 6, 6, 6, 6, 7, 8, 8, 8, 6

2. **Capacity (cfs):**
   - January 2021: 20,650
   - February 2021: 20,600
   - March 2021: 20,550
   - April 2021: 20,450
   - May 2021: 20,400
   - June 2021: 20,350
   - July 2021: 20,400
   - August 2021: 24,800
   - September 2021: 28,650
   - October 2021: 28,550
   - November 2021: 20,900

3. **Capacity (kaf/month):**
   - January 2021: 1,310
   - February 2021: 1,270
   - March 2021: 1,340
   - April 2021: 1,310
   - May 2021: 1,180
   - June 2021: 1,150
   - July 2021: 1,200
   - August 2021: 1,460
   - September 2021: 1,670
   - October 2021: 1,820
   - November 2021: 1,810
   - December 2021: 1,360

4. **Max (kaf):**
   - January 2021: 640
   - February 2021: 640
   - March 2021: 720
   - April 2021: 760
   - May 2021: 680
   - June 2021: 1,150
   - July 2021: 1,200
   - August 2021: 1,100
   - September 2021: 1,100
   - October 2021: 1,350
   - November 2021: 1,380
   - December 2021: 1,174

5. **Most (kaf):**
   - January 2021: 640
   - February 2021: 640
   - March 2021: 720
   - April 2021: 860
   - May 2021: 750
   - June 2021: 800
   - July 2021: 710
   - August 2021: 710
   - September 2021: 750
   - October 2021: 850
   - November 2021: 900
   - December 2021: 670

6. **Min (kaf):**
   - January 2021: 640
   - February 2021: 640
   - March 2021: 720
   - April 2021: 860
   - May 2021: 750
   - June 2021: 800
   - July 2021: 710
   - August 2021: 710
   - September 2021: 750
   - October 2021: 850
   - November 2021: 900
   - December 2021: 670

---

1. Projected release, based on January 2020 Most Probable Inflow Projections and 24-Month Study model runs
2. Projected release, based on January 2020 Min and Max Probable Inflow Projections and 24-Month Study model runs

(updated 01-29-2020)
January 2020 Hourly Releases

Glen Canyon Dam Hourly Release Pattern January 2020

January 1-31, 2020
40 MW reg, 30 MW res

January Volume = 760 kaf
February 2020 Hourly Releases

Glen Canyon Dam Hourly Release Pattern February 2020

February 1-29, 2020
40 MW reg, 30 MW res

February Volume = 675 kaf

Scheduled Hourly Releases
Actual Hourly Releases
Lees Ferry Flow
Lake Powell Release Temperatures

Lake Powell Release Temperature
Projected Temperature based on Jan 2020 Forecast

Historic

Projected

Temperature, °C


Jan 2020 Most Probable Hydrology
Oct 2019 Min Probable Hydrology
Monthly average Temp LF
Oct 2019 Max Probable Hydrology
Monthly average Temp CRBD

#Projection start date is based on initial conditions (Jan 2018)
Glen Canyon Water Temperatures

Colorado River, Grand Canyon Water Temperatures
Projections based on Jan 2020, Most Probable Hydrology
Lake Powell Temperature Profile
Lake Powell Reservoir Temperature Profile
Historical Dissolved Oxygen
Powell December Forebay Information
Powell Reservoir Temperature Profile for December

Lake Powell Temperature Dec 10-13 2019

Penstock
Powell Reservoir Dissolved Oxygen Profile for December

Lake Powell Dec 10 - 13 2019 Dissolved Oxygen