

# Yellowtail Dam Water Supply and Projected Operations



— BUREAU OF —  
RECLAMATION

May 2022



Bighorn River Basin Map Source: DEMIS Mapserver

| May Operating Range                         |                 |        |         |
|---|-----------------|--------|---------|
| Forecast                                    | Minimum         | Median | Maximum |
| Monthly Average Inflow (cfs)                | 2,965           | 4,540  | 7,140   |
| Monthly Average River Release (cfs)         | 2,030           | 2,660  | 4,380   |
| End of May Elevation (feet)                 | 3623.0          | 3630.4 | 3636.3  |
| May through July 2022 Inflow Forecast (kaf) |                 |        |         |
| May through July Volume                     |                 |        | 786     |
| Percent of Average                          |                 |        | 75      |
| Water Year                                  | Historic Inflow | Rank   |         |
| 2021  | 458             | 48     |         |
| 2020  | 777             | 36     |         |
| 2019  | 1,493           | 12     |         |
| 2018  | 1,927           | 4      |         |
| 30 Year Average                             | 1,051           |        |         |

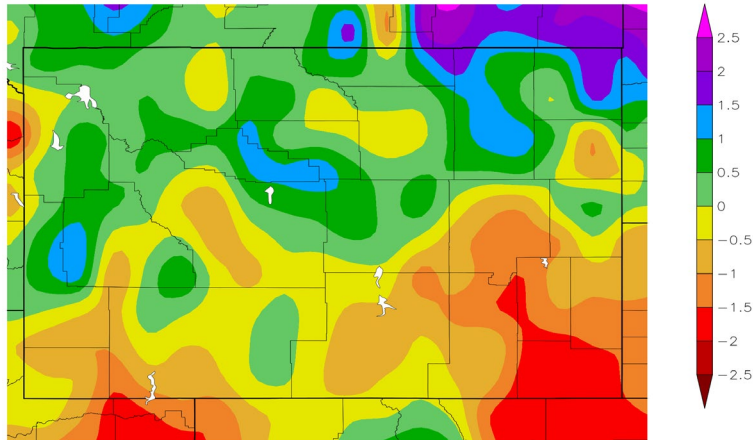


## Climate Departure from Normal

April 1 through April 30, 2022

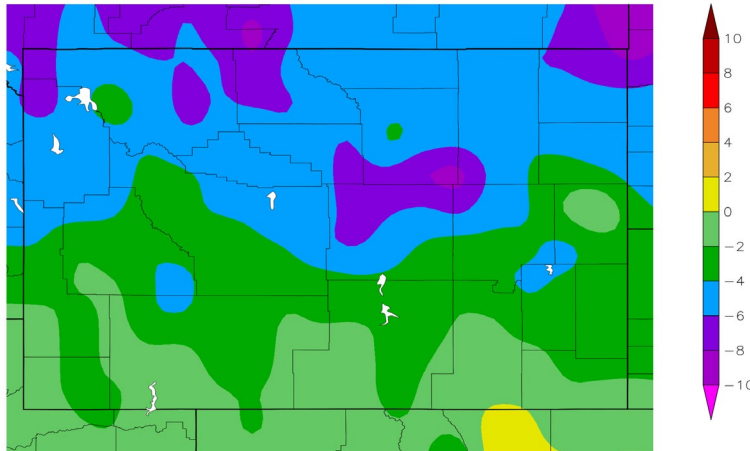
### Precipitation

Departure from Normal (inches)



### Temperature

Departure from Normal (°F)



HPRCC using provisional data from NOAA Regional Climate Centers

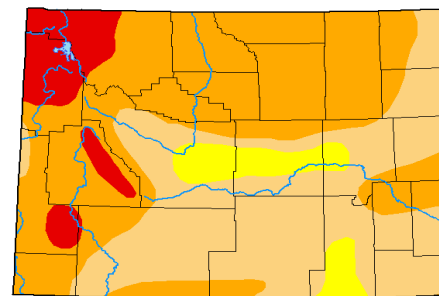
## CLIMATE SUMMARY

In the Bighorn River basin above Yellowtail Dam, precipitation was above average for the northern half of the basin and below average in the southern half during April. Temperatures were below average. Drought conditions persist throughout the Basin.

Most of the Bighorn River basin during May has near equal chances for below, near, or above normal precipitation except in the northern portion of the basin, above normal precipitation is favored. There are equal chances for below, near, or above normal temperatures.

## Wyoming Drought Monitor Map

May 3, 2022



#### Intensity

None  
D0 Abnormally Dry  
D1 Moderate Drought  
D2 Severe Drought  
D3 Extreme Drought  
D4 Exceptional Drought

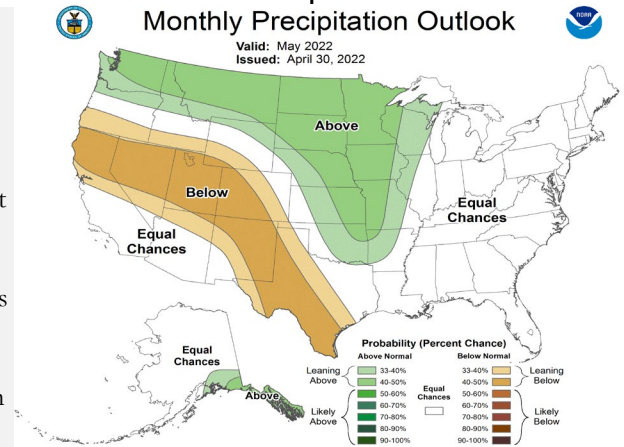


droughtmonitor.unl.edu

## May Climate Outlook

### Precipitation Monthly Precipitation Outlook

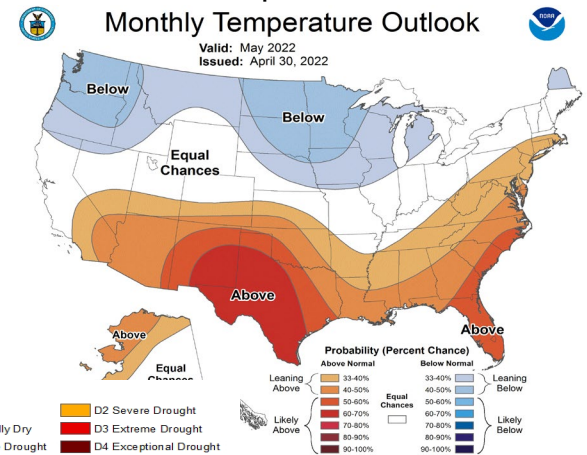
Valid: May 2022  
Issued: April 30, 2022



### Temperature

### Monthly Temperature Outlook

Valid: May 2022  
Issued: April 30, 2022



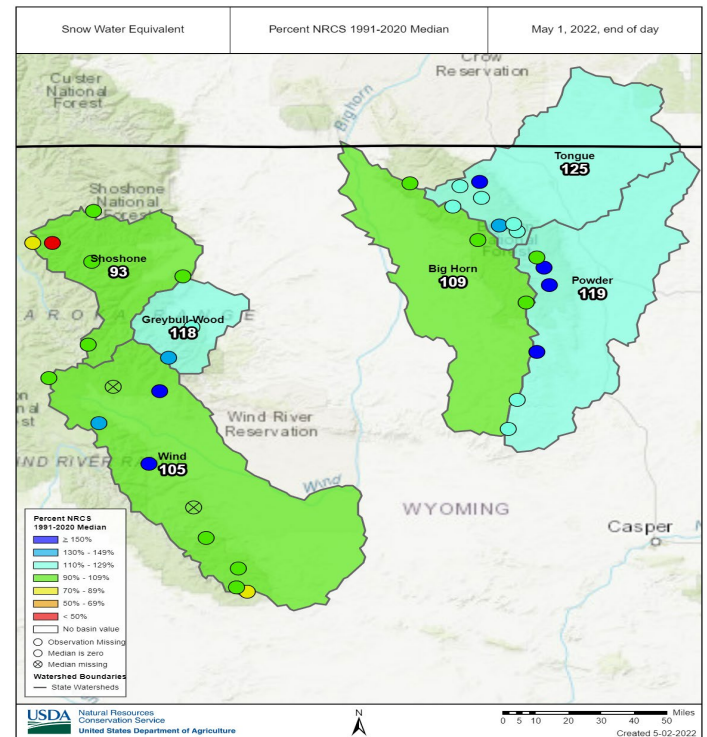
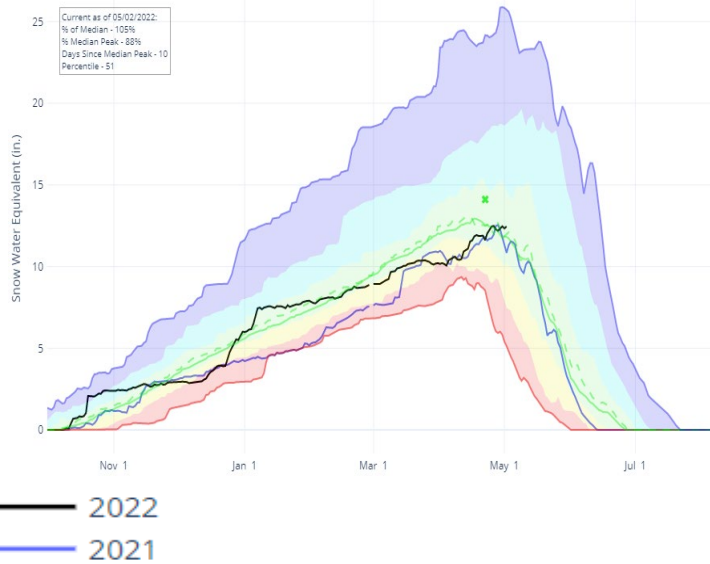
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>



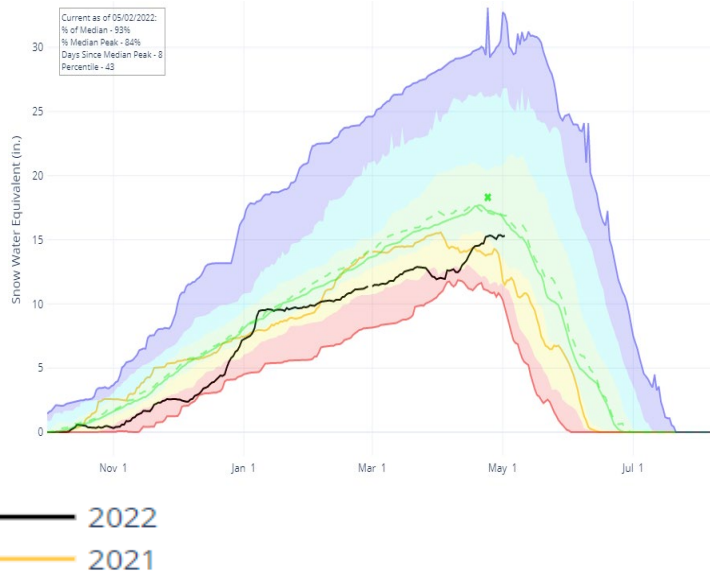
# SNOWPACK SUMMARY

The snow water equivalent (SWE) graphs are a composite of SNOTEL sites within the Bighorn River Basin managed by the Natural Resources Conservation Service (NRCS).

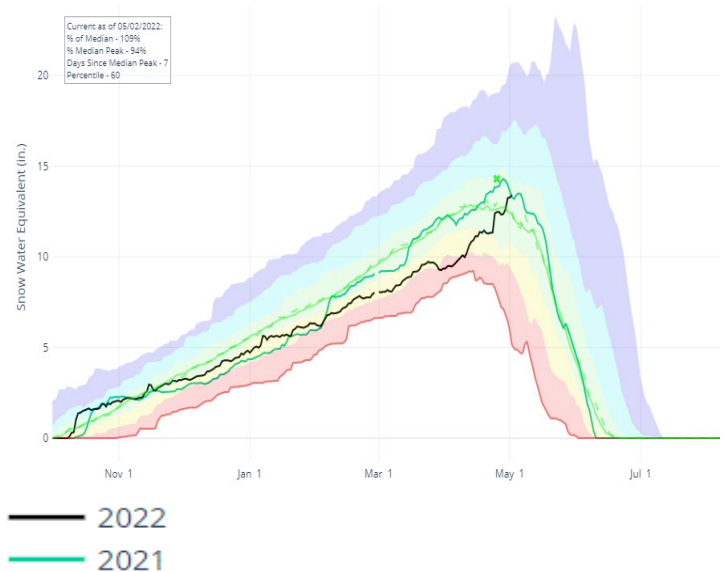
## Wind River



## Shoshone River



## Bighorn River



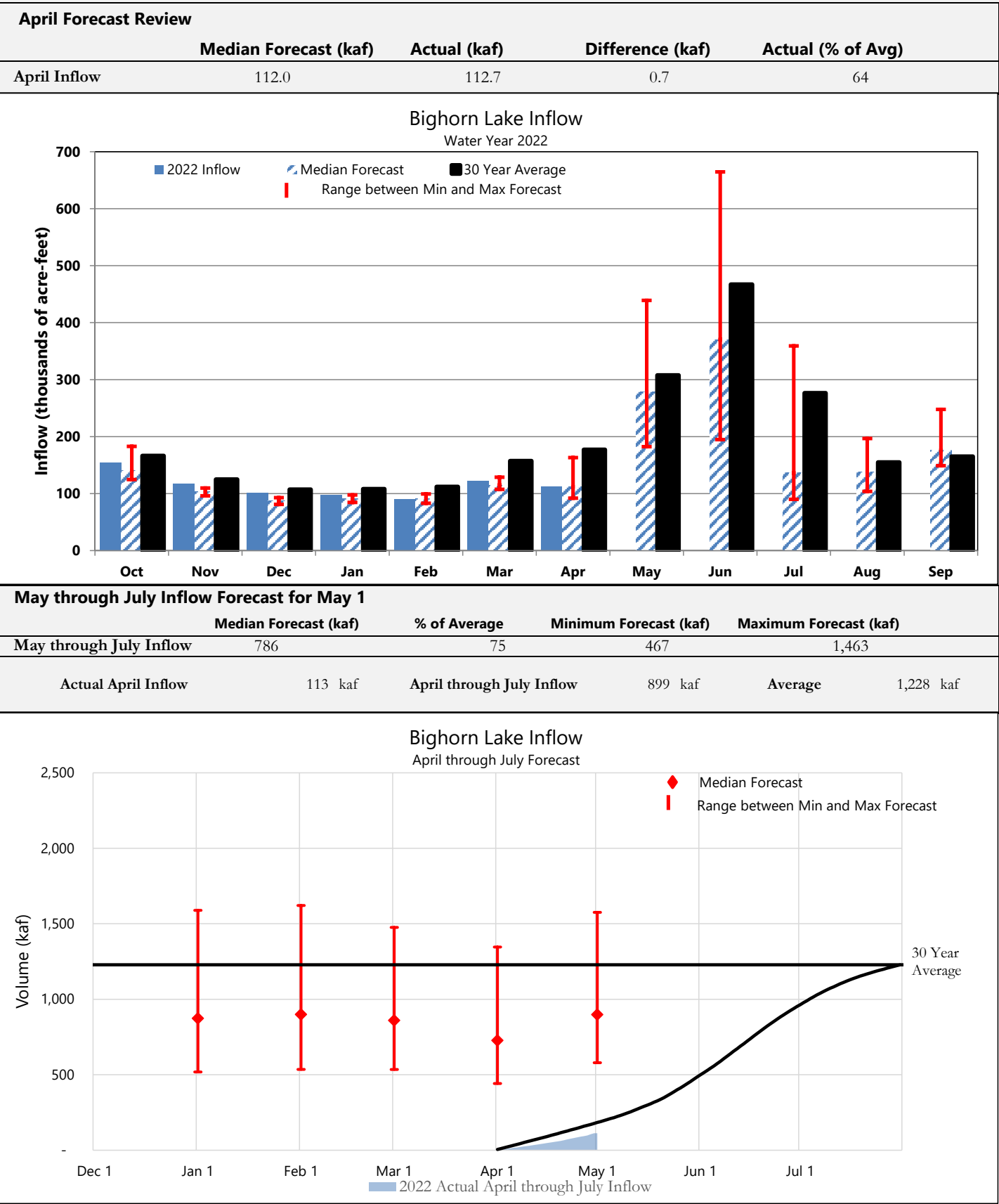
NRCS Montana Snow Survey Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/mt/snow/>

Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th Percentiles  
 Normal ('91-'20) – Official median calculated from 1991-2020 data  
 Normal (POR) – Unofficial mean calculated from Period of Record data

\* Median Peak SWE  
 Max  
 Median (POR)  
 Median ('91-'20)  
 Min  
 Stats. Shading

# FORECAST SUMMARY

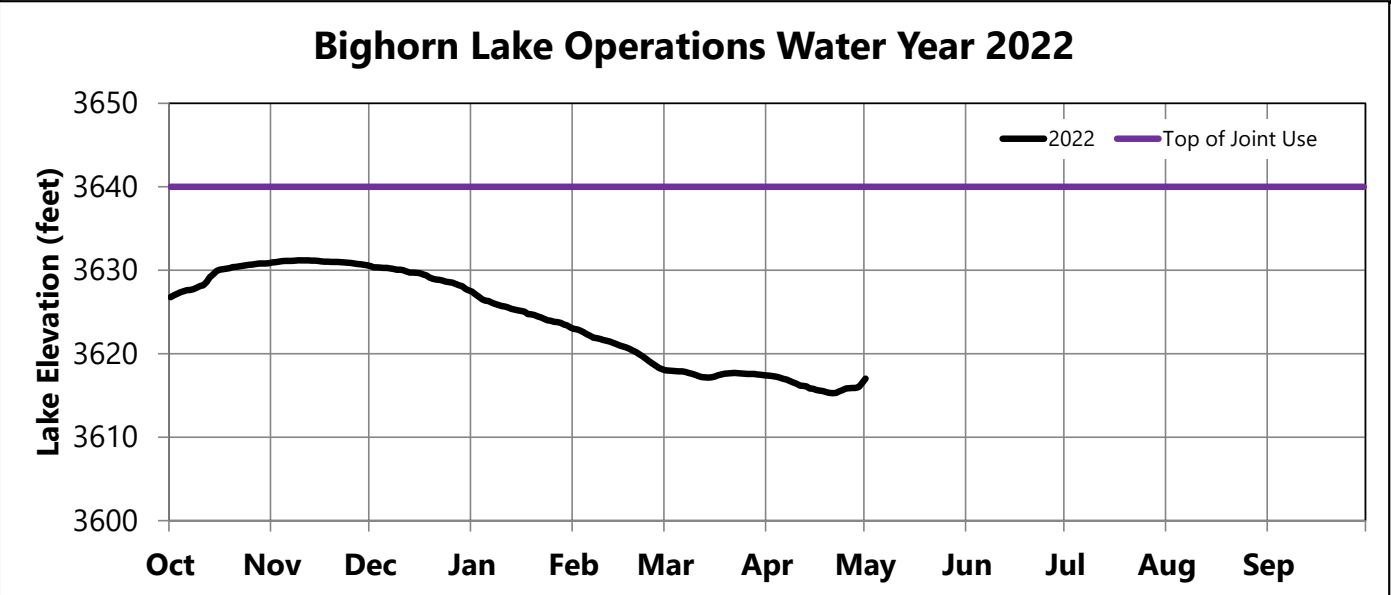
Streamflow data and planned releases from Boysen and Buffalo Bill Reservoirs are used to compute an inflow forecast for Bighorn Lake. Actual March inflow was higher than the median inflow forecast.



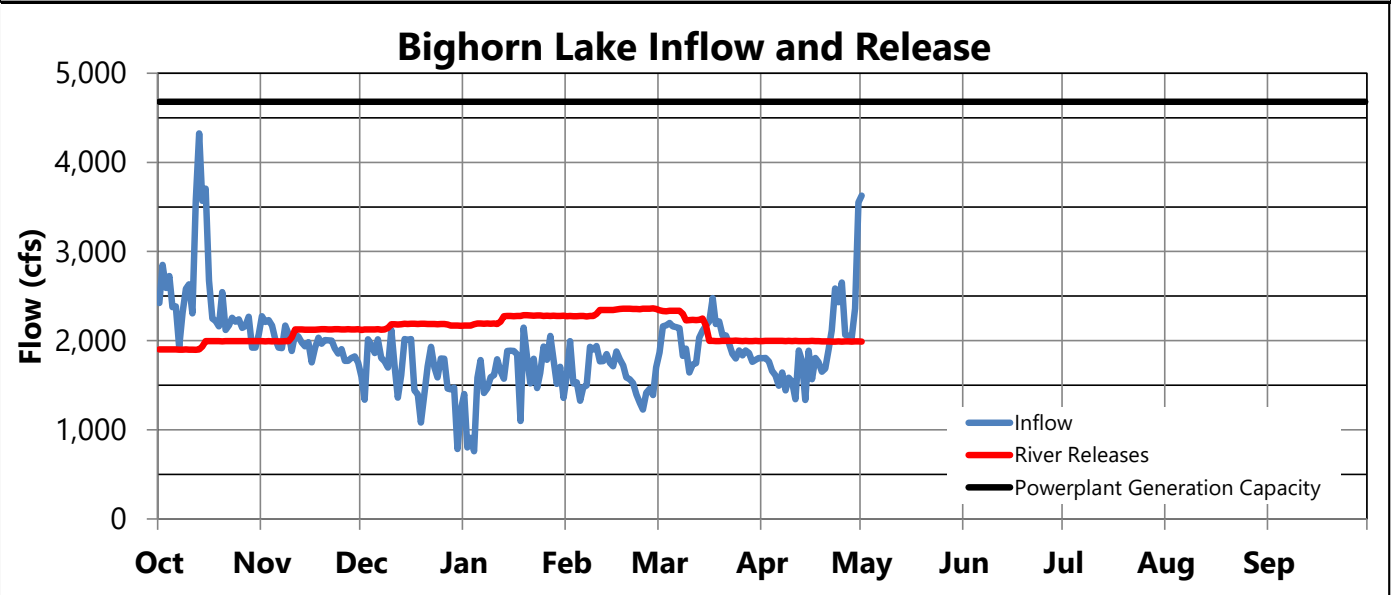
# OPERATIONS REVIEW (October 1, 2021 through April 30, 2022)

River releases were maintained at 2,000 cfs during April based on forecasted inflows and the storage target of 3617 feet on March 31, 2023. The storage in Bighorn Lake decreased by 0.9 feet during April.

| May 1 Storage Conditions |                   |                      |                       |                 |
|--------------------------|-------------------|----------------------|-----------------------|-----------------|
|                          | Elevation<br>feet | Storage<br>acre-feet | Percent of<br>Average | Percent<br>Full |
| Bighorn Lake             | 3616.5            | 793,730              | 106                   | 79              |
| Buffalo Bill             | 5356.2            | 375,364              | 97                    | 58              |
| Boysen                   | 4718.1            | 615,744              | 119                   | 83              |



| Average April Inflow |                    |                       | Average April Release      |                    |                       |
|----------------------|--------------------|-----------------------|----------------------------|--------------------|-----------------------|
|                      | Monthly Avg<br>cfs | Percent of<br>Average |                            | Monthly Avg<br>cfs | Percent of<br>Average |
| Bighorn Lake         | 1,895              | 64                    | Bighorn River              | 1,995              | 59                    |
| Buffalo Bill         | 405                | 51                    | Buffalo Bill Total Release | 640                | 53                    |
| Boysen               | 630                | 74                    | Boysen Release             | 755                | 62                    |



# OPERATIONS OUTLOOK (May 1, 2022 through October 31, 2022)

Releases are increasing on May 11 to 2,500 cfs based on current storage and forecasted inflow. The rule curve elevation for end of May for the median May through July inflow forecast of 786,000 af, is 3624.6 ft. To achieve this elevation target, releases would need to increase between 5,000 to 6,000 cfs by the end of May and decreased to 3,600 cfs in June. Due to the uncertainty of inflows and level river releases, releases during May under median inflow conditions will increase to approximately 4,000 cfs during May. The end of May elevation is projected to be 3630.4 feet. Additional release changes (increases or decreases) will depend on changes to forecasted inflows, actual inflows, and storage conditions.

## Median Inflow Conditions (May through July Inflow: 786 kaf)

|                               | May    | Jun    | Jul    | Aug    | Sep    | Oct    |
|-------------------------------|--------|--------|--------|--------|--------|--------|
| Boysen Release (cfs)          | 1,934  | 2,371  | 1,412  | 1,400  | 1,250  | 1,150  |
| Buffalo Bill Release (cfs)    | 1,781  | 1,901  | 1,976  | 1,761  | 1,499  | 725    |
| Tributary Gain (cfs)          | 825    | 1,953  | -1,171 | -917   | 205    | 1,062  |
| Monthly Inflow (cfs)          | 4,540  | 6,225  | 2,217  | 2,244  | 2,954  | 2,937  |
| Monthly Inflow (kaf)          | 279.1  | 370.4  | 136.3  | 138.0  | 175.8  | 180.6  |
| Monthly Release (kaf)         | 176.6  | 277.6  | 181.9  | 180.2  | 165.4  | 156.2  |
| Afterbay Release (cfs)        | 2,872  | 4,665  | 2,958  | 2,930  | 2,780  | 2,540  |
| River Release (cfs)           | 2,661  | 4,238  | 2,508  | 2,500  | 2,500  | 2,500  |
| End-of-Month Content (kaf)    | 900.6  | 997.6  | 956.3  | 918.4  | 933.0  | 961.7  |
| End-of-Month Elevation (feet) | 3630.4 | 3639.0 | 3635.7 | 3632.3 | 3633.6 | 3636.1 |

## Minimum Inflow Conditions (May through July Inflow: 467 kaf)

|                               | May    | Jun    | Jul    | Aug    | Sep    | Oct    |
|-------------------------------|--------|--------|--------|--------|--------|--------|
| Boysen Release (cfs)          | 1,025  | 1,200  | 1,200  | 1,150  | 1,101  | 899    |
| Buffalo Bill Release (cfs)    | 1,730  | 1,901  | 1,976  | 1,761  | 1,499  | 696    |
| Tributary Gain (cfs)          | 211    | 173    | -1,713 | -1,221 | -96    | 826    |
| Monthly Inflow (cfs)          | 2,966  | 3,274  | 1,463  | 1,690  | 2,504  | 2,421  |
| Monthly Inflow (kaf)          | 182.4  | 194.8  | 90.0   | 103.9  | 149.0  | 148.9  |
| Monthly Release (kaf)         | 142.3  | 135.7  | 143.3  | 143.3  | 128.5  | 118.7  |
| Afterbay Release (cfs)        | 2,313  | 2,280  | 2,330  | 2,330  | 2,160  | 1,930  |
| River Release (cfs)           | 2,028  | 1,830  | 1,830  | 1,830  | 1,830  | 1,830  |
| End-of-Month Content (kaf)    | 838.2  | 901.5  | 852.5  | 817.4  | 842.1  | 876.6  |
| End-of-Month Elevation (feet) | 3623.0 | 3630.5 | 3624.9 | 3620.1 | 3623.5 | 3627.8 |

## Maximum Inflow Conditions (May through July Inflow: 1,463 kaf)

|                               | May    | Jun    | Jul     | Aug    | Sep    | Oct    |
|-------------------------------|--------|--------|---------|--------|--------|--------|
| Boysen Release (cfs)          | 3,145  | 4,743  | 2,784   | 1,480  | 1,481  | 1,480  |
| Buffalo Bill Release (cfs)    | 2,091  | 3,183  | 3,258   | 2,192  | 2,079  | 753    |
| Tributary Gain (cfs)          | 1,906  | 3,244  | -200    | -473   | 605    | 1,316  |
| Monthly Inflow (cfs)          | 7,142  | 11,170 | 5,842   | 3,199  | 4,165  | 3,549  |
| Monthly Inflow (kaf)          | 439.1  | 664.6  | 359.2   | 196.7  | 247.8  | 218.2  |
| Monthly Release (kaf)         | 273.9  | 667.3  | 317.3   | 250.9  | 231.9  | 225.5  |
| Afterbay Release (cfs)        | 4,454  | 11,214 | 5,160   | 4,080  | 3,897  | 3,667  |
| River Release (cfs)           | 4,379  | 10,864 | 4,760   | 3,680  | 3,667  | 3,667  |
| End-of-Month Content (kaf)    | 963.3  | 964.8  | 1,011.1 | 961.2  | 981.3  | 978.3  |
| End-of-Month Elevation (feet) | 3636.3 | 3636.4 | 3640.0  | 3636.1 | 3637.7 | 3637.5 |

# OPERATIONS OUTLOOK (May 1, 2022 through October 31, 2022)

There is approximately 70 cfs of gain between Yellowtail Dam and Yellowtail Afterbay Dam from springs flowing into Yellowtail Afterbay. Total release from Yellowtail Dam is 70 cfs less than total release from Yellowtail Afterbay Dam.

## Irrigation Demands Outlook

| Bighorn Canal (cfs) | May | Jun | Jul | Aug | Sep | Oct |
|---------------------|-----|-----|-----|-----|-----|-----|
| Median Forecast     | 210 | 427 | 450 | 430 | 280 | 40  |
| Minimum Forecast    | 285 | 450 | 500 | 500 | 330 | 100 |
| Maximum Forecast    | 75  | 350 | 400 | 400 | 230 | 0   |

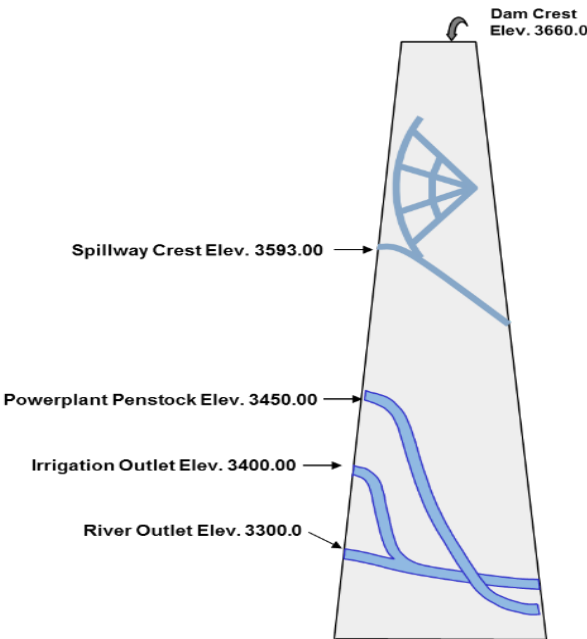
## Power Generation Outlook

Current Number of Units Available: 3 of 4  
Approximate Yellowtail Powerplant Turbine Capacity: 6,150 cfs  
Approximate Yellowtail Powerplant Scheduled Generation Limit: 4,680 cfs

| Yellowtail Powerplant Release (cfs) | May   | Jun   | Jul   | Aug   | Sep   | Oct   |
|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Median Forecast                     | 2,802 | 4,462 | 2,888 | 2,860 | 2,710 | 2,470 |
| Minimum Forecast                    | 2,244 | 2,210 | 2,260 | 2,260 | 2,090 | 1,860 |
| Maximum Forecast                    | 3,258 | 4,644 | 4,593 | 4,010 | 3,827 | 3,597 |

| Yellowtail Powerplant Generation (gwh) | May  | Jun   | Jul   | Aug  | Sep  | Oct  |
|--|------|-------|-------|------|------|------|
| Median Forecast                        | 68.5 | 106.3 | 73.4  | 72.3 | 65.9 | 61.6 |
| Minimum Forecast                       | 53.6 | 51.7  | 54.9  | 54.3 | 48.2 | 45.2 |
| Maximum Forecast                       | 80.1 | 110.2 | 112.9 | 99.3 | 91.8 | 89.7 |

| Yellowtail Spill (cfs) | May   | Jun   | Jul | Aug | Sep | Oct |
|------------------------|-------|-------|-----|-----|-----|-----|
| Median Forecast        | 0     | 132   | 0   | 0   | 0   | 0   |
| Minimum Forecast       | 0     | 0     | 0   | 0   | 0   | 0   |
| Maximum Forecast       | 1,126 | 6,500 | 497 | 0   | 0   | 0   |



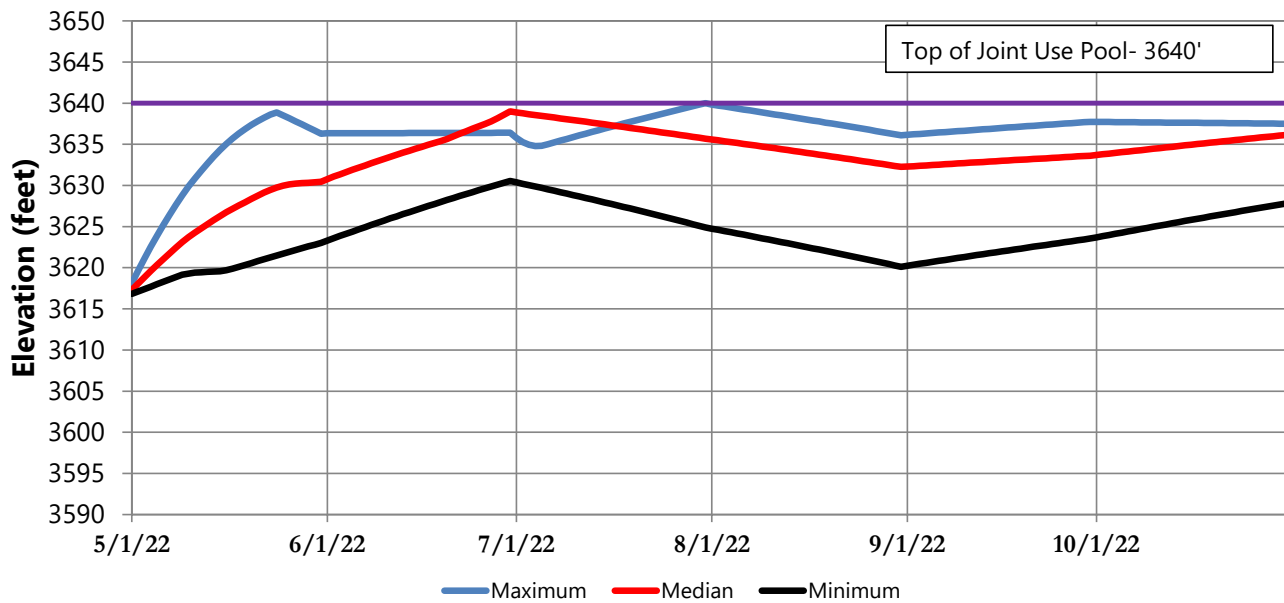
## Release Outlook by Outlet

All releases are currently going through the powerplant and are expected to go through the powerplant under median and minimum inflow conditions. Under maximum conditions, a bypass release is expected to start this month.

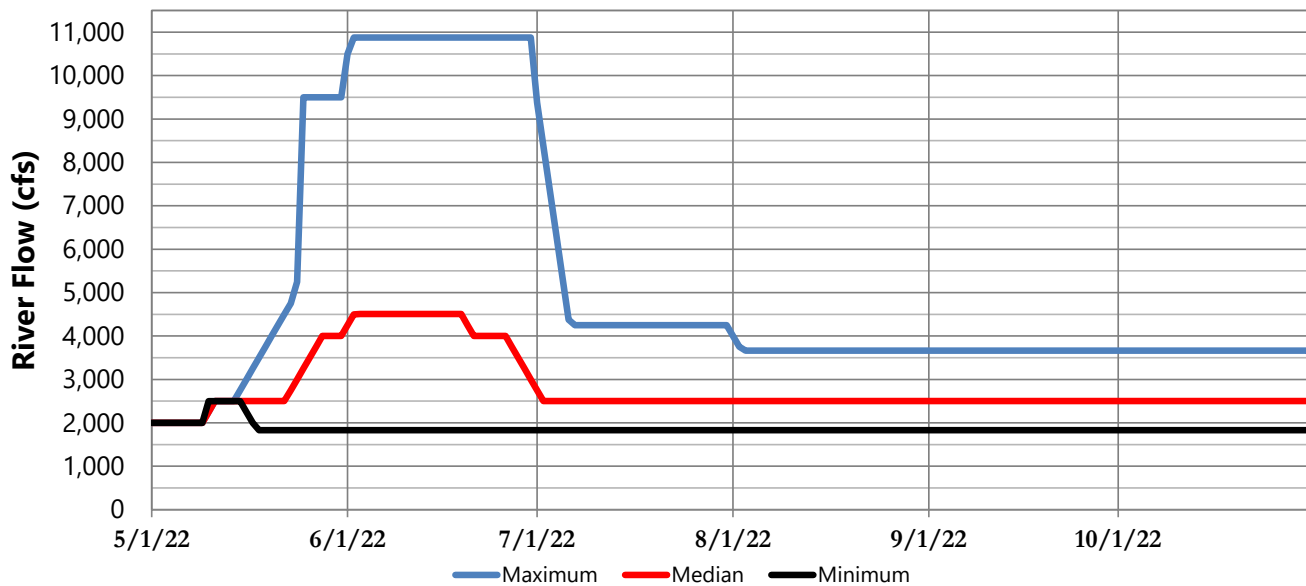
# OPERATIONS OUTLOOK (May 1, 2022 through October 31, 2022)

Projected elevations and the range of river releases are based on the median, minimum, and maximum inflow forecasts. End-of-month elevations and river releases vary based on the difference between forecasted inflow scenarios.

## Bighorn Lake Elevation



## River Release



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Monthly Operating Plans, Current Conditions, Snowpack and Other Water Management Information  
[https://www.usbr.gov/gp/lakes/reservoirs/wareports/main\\_menu.html](https://www.usbr.gov/gp/lakes/reservoirs/wareports/main_menu.html)