Yellowtail Dam Water Supply and Projected Operations

January 2022

<table>
<thead>
<tr>
<th>January Operating Range</th>
<th>Forecast</th>
<th>Minimum</th>
<th>Median</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Average Inflow (cfs)</td>
<td>1,375</td>
<td>1,480</td>
<td>1,590</td>
<td></td>
</tr>
<tr>
<td>Monthly Average River Release (cfs)</td>
<td>2,255</td>
<td>2,255</td>
<td>2,255</td>
<td></td>
</tr>
<tr>
<td>End of January Elevation (feet)</td>
<td>3621.2</td>
<td>3622.1</td>
<td>3623.0</td>
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</tbody>
</table>

April through July 2022

<table>
<thead>
<tr>
<th>Inflow Forecast (kaf)</th>
<th>April through July Volume</th>
<th>874</th>
<th>Percent of Average</th>
<th>71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Year</td>
<td>Historic Inflow</td>
<td>Rank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>607</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>1,042</td>
<td>32</td>
<td></td>
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<tr>
<td>2019</td>
<td>1,678</td>
<td>12</td>
<td></td>
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<tr>
<td>2018</td>
<td>2,318</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 Year Average</td>
<td>1,228</td>
<td></td>
<td></td>
<td></td>
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</table>

Bighorn River Basin Map Source: DEMIS Mapserver
**CLIMATE SUMMARY**

Precipitation was near average while temperatures were above average during December in the Bighorn Basin above Yellowtail Dam. Drought conditions persist throughout the Basin.

The climate outlook shows there is 40 to 50 percent chance precipitation will be above average during January. There is an equal chance temperatures will be either average, above average, or below average.
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**

Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th Percentiles
Normal ('81-'10) – Official median calculated from 1981-2010 data
Normal (POR) – Unofficial mean calculated from Period of Record data

NRCS Montana Snow Survey Website: [https://www.nrcs.usda.gov/wps/portal/nrcs/mt/snow/](https://www.nrcs.usda.gov/wps/portal/nrcs/mt/snow/)
Streamflow data and planned releases from Boysen and Buffalo Bill Reservoirs are used to compute an inflow forecast for Bighorn Lake. Actual December inflow was greater than the maximum inflow forecast.

### December Forecast Review

<table>
<thead>
<tr>
<th>Median Forecast (kaf)</th>
<th>Actual (kaf)</th>
<th>Difference (kaf)</th>
<th>Actual (% of Avg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>December Inflow</td>
<td>87.0</td>
<td>101.5</td>
<td>14.5</td>
</tr>
</tbody>
</table>

### April through July Inflow Forecast for January 1

<table>
<thead>
<tr>
<th>Median Forecast (kaf)</th>
<th>% of Average</th>
<th>Minimum Forecast (kaf)</th>
<th>Maximum Forecast (kaf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April through July Inflow</td>
<td>874</td>
<td>71</td>
<td>519</td>
</tr>
</tbody>
</table>

- **Historic Maximum (2017):** 2,953 kaf
- **Historic Minimum (2004):** 392 kaf
- **Average: 1,228 kaf**

### Bighorn Lake Inflow

**Water Year 2022**

- **2022 Inflow**
- **Median Forecast**
- **30 Year Average**
- **Range between Min and Max Forecast**
River releases were increased to 2,190 cfs during December based on forecasted inflows and the March 31, 2022 carryover storage target of 3617 feet. The storage in Bighorn Lake decreased 3.0 feet during December.

### January 1 Storage Conditions

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Storage</th>
<th>Percent of</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>feet</td>
<td>acre-feet</td>
<td>Average</td>
<td>Full</td>
</tr>
<tr>
<td>Bighorn Lake</td>
<td>3627.6</td>
<td>874,604 104</td>
<td>87</td>
</tr>
<tr>
<td>Buffalo Bill</td>
<td>5358.3</td>
<td>388,836 92</td>
<td>60</td>
</tr>
<tr>
<td>Boysen</td>
<td>4719.0</td>
<td>631,586 114</td>
<td>85</td>
</tr>
</tbody>
</table>

### Bighorn Lake Operations Water Year 2022

**Average December Inflow**

- **Bighorn Lake**: 1,650 cfs, 95% of average
- **Bighorn River**: 2,165 cfs, 88% of average
- **Buffalo Bill**: 195 cfs, 70% of average
- **Buffalo Bill Total Release**: 205 cfs, 68% of average
- **Boysen**: 520 cfs, 81% of average
- **Boysen Release**: 695 cfs, 88% of average

**Average December Release**

- **Bighorn Lake**: 1,650 cfs, 95% of average
- **Bighorn River**: 2,165 cfs, 88% of average
- **Buffalo Bill**: 195 cfs, 70% of average
- **Buffalo Bill Total Release**: 205 cfs, 68% of average
- **Boysen**: 520 cfs, 81% of average
- **Boysen Release**: 695 cfs, 88% of average
Releases during January will increase to 2,290 cfs based on actual December inflows being higher than the median inflow forecast and the March 31, 2022, storage target of 3617 feet.

### Median Inflow Conditions (April through July Inflow: 874 kaf)

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boysen Release (cfs)</td>
<td>699</td>
<td>700</td>
<td>1,000</td>
<td>1,050</td>
<td>2,160</td>
<td>2,294</td>
<td>1,665</td>
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<tr>
<td>Buffalo Bill Release (cfs)</td>
<td>205</td>
<td>205</td>
<td>205</td>
<td>684</td>
<td>1,680</td>
<td>1,901</td>
<td>1,976</td>
</tr>
<tr>
<td>Tributary Gain (cfs)</td>
<td>577</td>
<td>738</td>
<td>968</td>
<td>482</td>
<td>608</td>
<td>1,323</td>
<td>-1,363</td>
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<tr>
<td>Monthly Inflow (cfs)</td>
<td>1,481</td>
<td>1,643</td>
<td>2,173</td>
<td>2,216</td>
<td>4,448</td>
<td>5,518</td>
<td>2,278</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Monthly Inflow (kaf)</td>
<td>91.1</td>
<td>91.3</td>
<td>133.6</td>
<td>131.9</td>
<td>273.5</td>
<td>328.3</td>
<td>140.1</td>
</tr>
<tr>
<td>Monthly Release (kaf)</td>
<td>138.5</td>
<td>127.0</td>
<td>140.1</td>
<td>137.0</td>
<td>218.5</td>
<td>192.5</td>
<td>181.4</td>
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</thead>
<tbody>
<tr>
<td>Afterbay Release (cfs)</td>
<td>2,253</td>
<td>2,287</td>
<td>2,278</td>
<td>2,303</td>
<td>3,554</td>
<td>3,235</td>
<td>2,950</td>
</tr>
<tr>
<td>River Release (cfs)</td>
<td>2,253</td>
<td>2,287</td>
<td>2,278</td>
<td>2,278</td>
<td>3,354</td>
<td>2,835</td>
<td>2,500</td>
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</thead>
<tbody>
<tr>
<td>End-of-Month Content (kaf)</td>
<td>831.5</td>
<td>799.6</td>
<td>797.4</td>
<td>796.4</td>
<td>855.7</td>
<td>995.7</td>
<td>958.7</td>
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<tr>
<td>End-of-Month Elevation (feet)</td>
<td>3622.1</td>
<td>3617.4</td>
<td>3617.1</td>
<td>3616.9</td>
<td>3625.3</td>
<td>3638.9</td>
<td>3635.9</td>
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### Minimum Inflow Conditions (April through July Inflow: 519 kaf)

<table>
<thead>
<tr>
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<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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</thead>
<tbody>
<tr>
<td>Boysen Release (cfs)</td>
<td>699</td>
<td>700</td>
<td>600</td>
<td>701</td>
<td>1,025</td>
<td>1,200</td>
<td>1,150</td>
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<tr>
<td>Buffalo Bill Release (cfs)</td>
<td>205</td>
<td>205</td>
<td>205</td>
<td>684</td>
<td>1,680</td>
<td>1,901</td>
<td>1,976</td>
</tr>
<tr>
<td>Tributary Gain (cfs)</td>
<td>472</td>
<td>591</td>
<td>844</td>
<td>262</td>
<td>72</td>
<td>-235</td>
<td>-1,836</td>
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<tr>
<td>Monthly Inflow (cfs)</td>
<td>1,376</td>
<td>1,496</td>
<td>1,649</td>
<td>1,647</td>
<td>2,777</td>
<td>2,866</td>
<td>1,290</td>
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<tbody>
<tr>
<td>Monthly Inflow (kaf)</td>
<td>84.6</td>
<td>83.1</td>
<td>101.4</td>
<td>98.0</td>
<td>170.7</td>
<td>170.5</td>
<td>79.3</td>
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<tr>
<td>Monthly Release (kaf)</td>
<td>138.5</td>
<td>121.6</td>
<td>117.3</td>
<td>107.1</td>
<td>121.2</td>
<td>130.9</td>
<td>138.3</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Afterbay Release (cfs)</td>
<td>2,253</td>
<td>2,190</td>
<td>1,908</td>
<td>1,800</td>
<td>1,971</td>
<td>2,200</td>
<td>2,250</td>
</tr>
<tr>
<td>River Release (cfs)</td>
<td>2,253</td>
<td>2,190</td>
<td>1,908</td>
<td>1,725</td>
<td>1,721</td>
<td>1,750</td>
<td>1,750</td>
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</tr>
</thead>
<tbody>
<tr>
<td>End-of-Month Content (kaf)</td>
<td>825.0</td>
<td>790.3</td>
<td>778.7</td>
<td>773.8</td>
<td>827.6</td>
<td>871.4</td>
<td>816.6</td>
</tr>
<tr>
<td>End-of-Month Elevation (feet)</td>
<td>3621.2</td>
<td>3616.0</td>
<td>3614.1</td>
<td>3613.2</td>
<td>3621.6</td>
<td>3627.2</td>
<td>3620.0</td>
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</table>

### Maximum Inflow Conditions (April through July Inflow: 1,589 kaf)

<table>
<thead>
<tr>
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<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boysen Release (cfs)</td>
<td>699</td>
<td>700</td>
<td>1,600</td>
<td>2,250</td>
<td>3,114</td>
<td>3,114</td>
<td>3,523</td>
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<tr>
<td>Buffalo Bill Release (cfs)</td>
<td>205</td>
<td>205</td>
<td>745</td>
<td>1,513</td>
<td>2,804</td>
<td>2,924</td>
<td>2,997</td>
</tr>
<tr>
<td>Tributary Gain (cfs)</td>
<td>685</td>
<td>884</td>
<td>1,090</td>
<td>773</td>
<td>1,345</td>
<td>2,615</td>
<td>-704</td>
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<tr>
<td>Monthly Inflow (cfs)</td>
<td>1,589</td>
<td>1,789</td>
<td>3,435</td>
<td>4,536</td>
<td>7,263</td>
<td>8,653</td>
<td>5,816</td>
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</thead>
<tbody>
<tr>
<td>Monthly Inflow (kaf)</td>
<td>97.7</td>
<td>99.4</td>
<td>211.2</td>
<td>269.9</td>
<td>446.6</td>
<td>514.9</td>
<td>357.6</td>
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<tr>
<td>Monthly Release (kaf)</td>
<td>138.5</td>
<td>133.3</td>
<td>264.5</td>
<td>272.1</td>
<td>442.9</td>
<td>323.3</td>
<td>315.7</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Afterbay Release (cfs)</td>
<td>2,253</td>
<td>2,400</td>
<td>4,302</td>
<td>4,572</td>
<td>7,203</td>
<td>5,433</td>
<td>5,134</td>
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<tr>
<td>River Release (cfs)</td>
<td>2,253</td>
<td>2,400</td>
<td>4,302</td>
<td>4,572</td>
<td>7,053</td>
<td>5,083</td>
<td>4,734</td>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>End-of-Month Content (kaf)</td>
<td>838.1</td>
<td>808.0</td>
<td>759.0</td>
<td>761.0</td>
<td>769.0</td>
<td>964.8</td>
<td>1,011.1</td>
</tr>
<tr>
<td>End-of-Month Elevation (feet)</td>
<td>3623.0</td>
<td>3618.7</td>
<td>3610.7</td>
<td>3611.0</td>
<td>3612.4</td>
<td>3636.4</td>
<td>3640.0</td>
</tr>
</tbody>
</table>
OPERATIONS OUTLOOK (January 1, 2022 through July 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

<table>
<thead>
<tr>
<th>Bighorn Canal (cfs)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Forecast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>200</td>
<td>400</td>
<td>450</td>
</tr>
<tr>
<td>Minimum Forecast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>75</td>
<td>250</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td>Maximum Forecast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>150</td>
<td>350</td>
<td>400</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Yellowtail Powerplant Release (cfs)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Forecast</td>
<td>2,183</td>
<td>2,217</td>
<td>2,208</td>
<td>2,233</td>
<td>3,484</td>
<td>3,165</td>
<td>2,880</td>
</tr>
<tr>
<td>Minimum Forecast</td>
<td>2,183</td>
<td>2,120</td>
<td>1,838</td>
<td>1,730</td>
<td>1,901</td>
<td>2,130</td>
<td>2,180</td>
</tr>
<tr>
<td>Maximum Forecast</td>
<td>2,183</td>
<td>2,330</td>
<td>4,232</td>
<td>4,502</td>
<td>4,926</td>
<td>4,690</td>
<td>4,623</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Yellowtail Powerplant Generation (gwh)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Forecast</td>
<td>52.6</td>
<td>47.7</td>
<td>52.2</td>
<td>51.2</td>
<td>84.0</td>
<td>76.4</td>
<td>73.2</td>
</tr>
<tr>
<td>Minimum Forecast</td>
<td>52.5</td>
<td>45.2</td>
<td>43.3</td>
<td>39.4</td>
<td>45.0</td>
<td>49.4</td>
<td>52.3</td>
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<tr>
<td>Maximum Forecast</td>
<td>52.6</td>
<td>50.6</td>
<td>99.5</td>
<td>100.8</td>
<td>113.8</td>
<td>110.2</td>
<td>113.8</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Yellowtail Spill (cfs)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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<tr>
<td>Median Forecast</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Maximum Forecast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,207</td>
<td>673</td>
<td>441</td>
</tr>
</tbody>
</table>

### 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 in May.
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.