

Yellowtail Dam Water Supply and Projected Operations



— BUREAU OF —
RECLAMATION

January 2021



Bighorn River Basin Map Source: DEMIS Mapserver

January Operating Range			
Forecast	Minimum	Median	Maximum
Monthly Average Inflow (cfs)	1,305	1,410	1,515
Monthly Average River Release (cfs)	2,185	2,185	2,185
End of January Elevation (feet)	3623.6	3624.5	3625.3
April through July 2021 Inflow Forecast (kaf)			
April through July Volume			803
Percent of Average			64
Water Year	Historic Inflow	Rank	
2020	1,042	32	
2019	1,678	12	
2018	2,318	3	
2017	2,953	1	
30 Year Average	1,262		

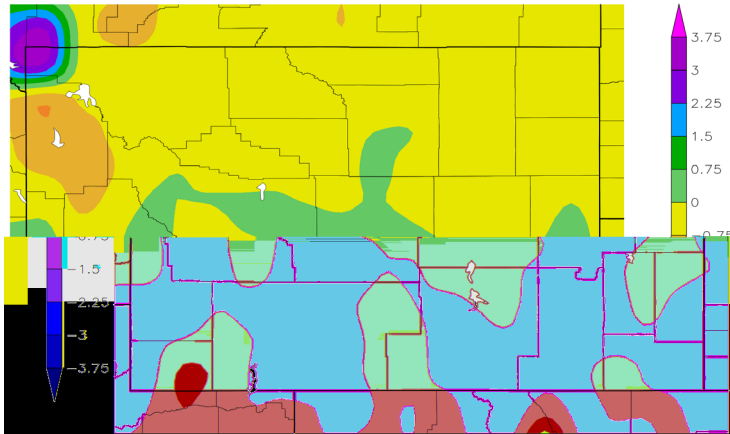


Climate Departure from Normal

December 1 through December 31, 2020

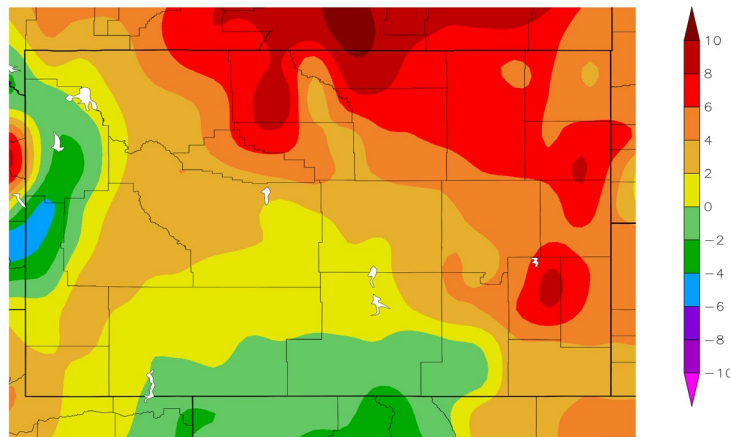
Precipitation

Departure from Normal (inches)



Temperature

Departure from Normal (°F)



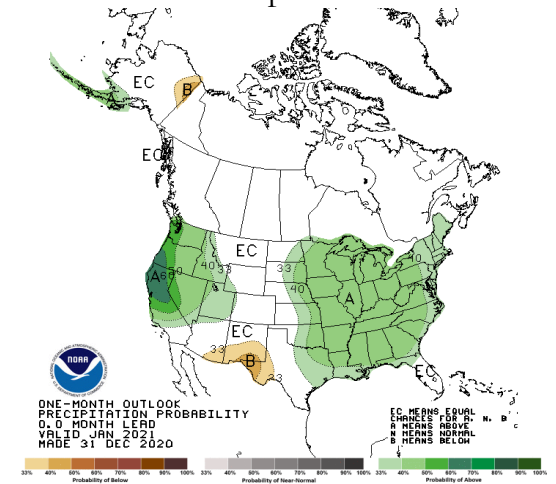
CLIMATE SUMMARY

The climate in the Bighorn Basin above Yellowtail Dam was generally drier and warmer than average during December.

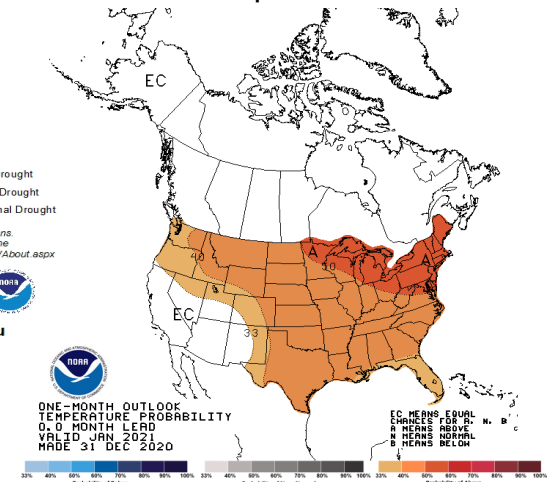
The January climate outlook shows there is an equal chance precipitation will be either average, above average, or below average. There is a 40 to 50 percent chance temperatures will be above average.

January Climate Outlook

Precipitation

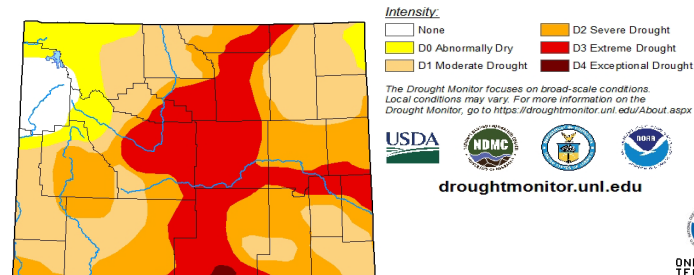


Temperature



Wyoming Drought Monitor Map

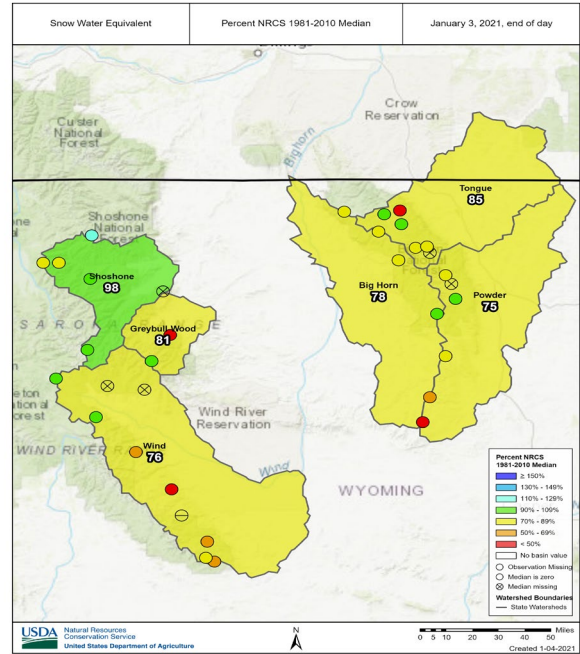
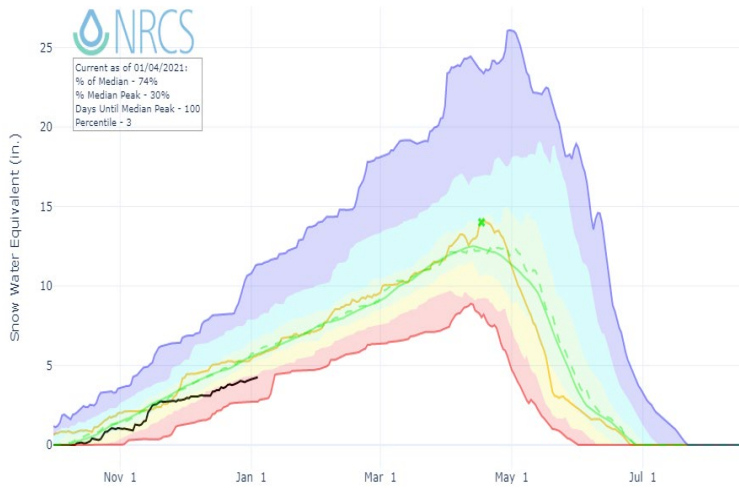
December 29, 2020



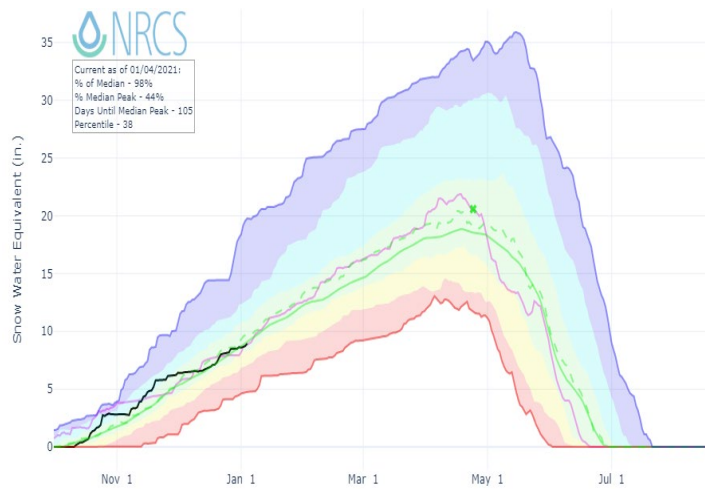
SNOWPACK SUMMARY

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

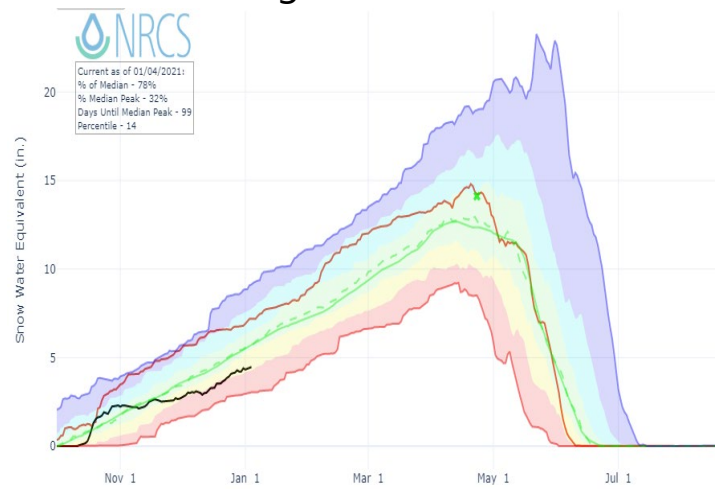
Wind River



Shoshone River



Bighorn River



- ✱ Median Peak SWE
- Max
- - - Median (POR)
- Median ('81-'10)
- Min
- Stats. Shading
- 2021
- 2020

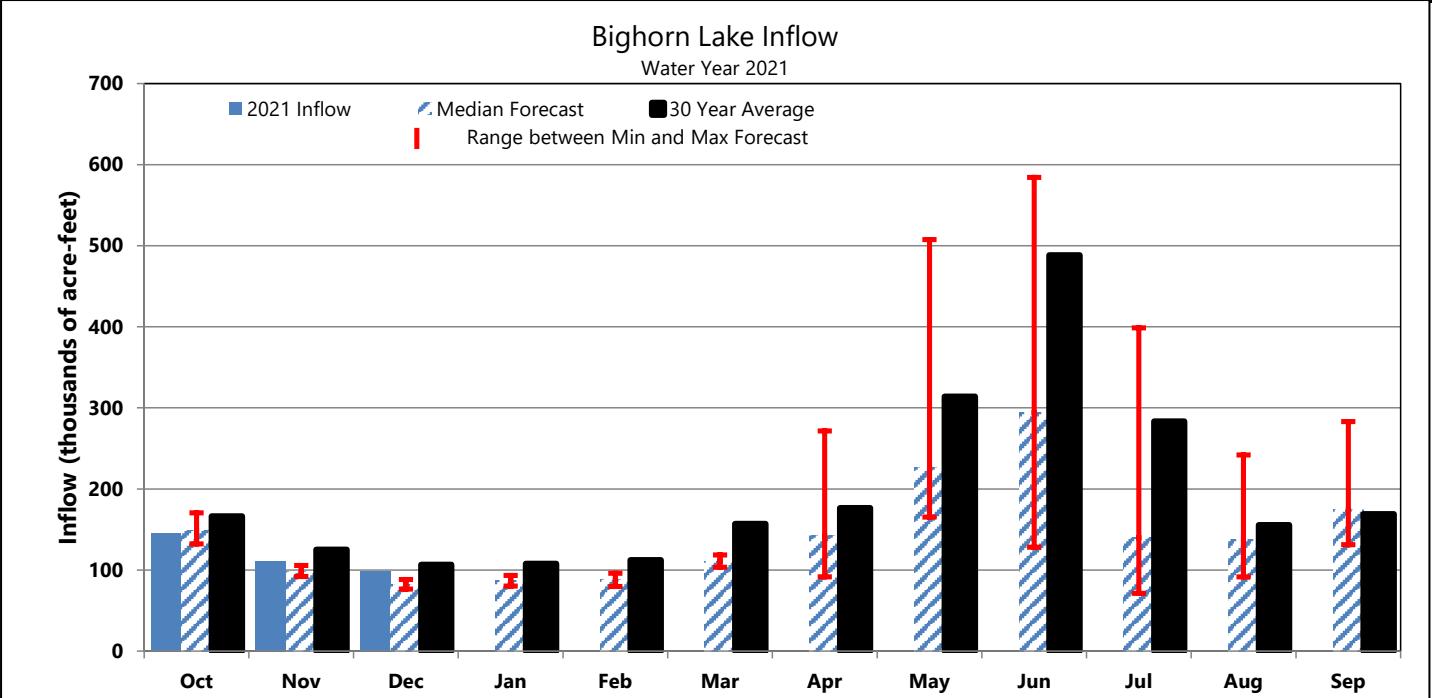
NRCS Montana Snow Survey Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/mt/snow/>

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

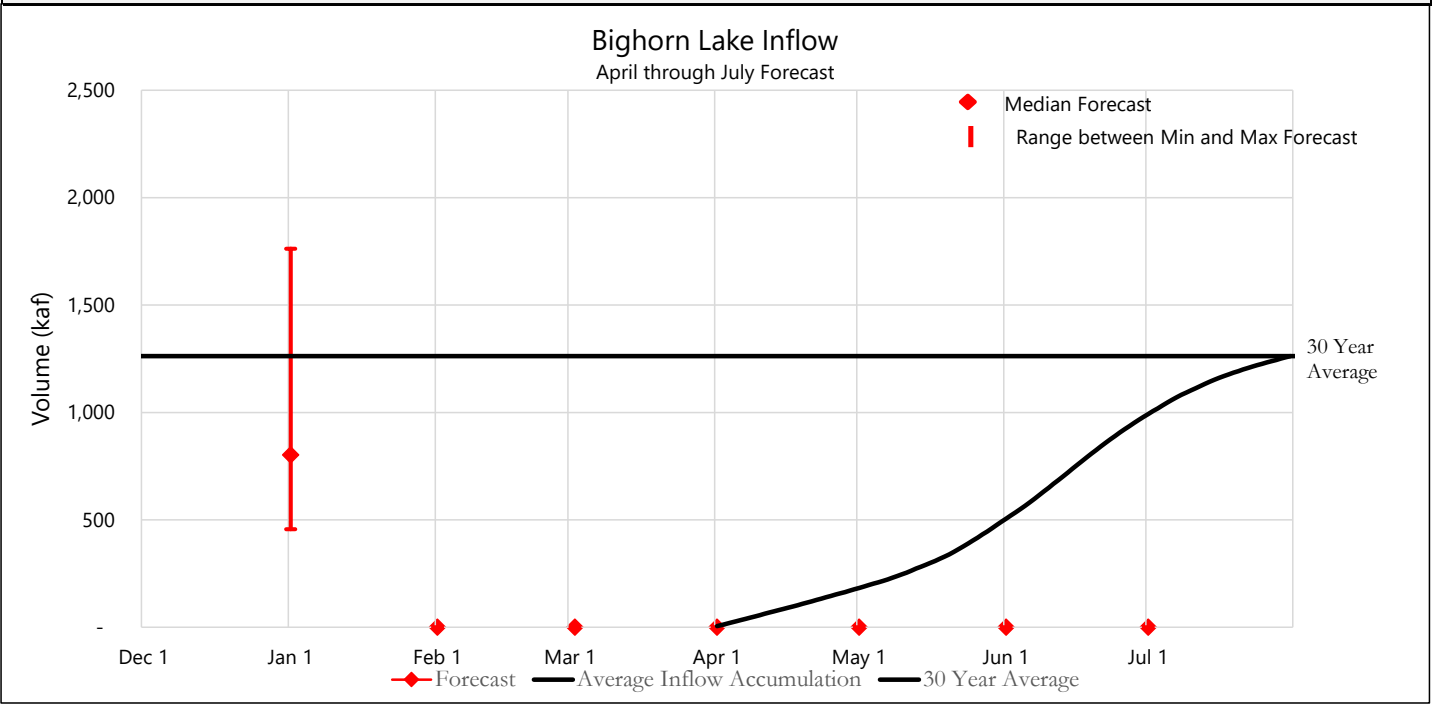
FORECAST SUMMARY

SNOTEL data, streamflow data and planned releases from Boysen and Buffalo Bill Reservoirs are used to compute an inflow forecast for Bighorn Lake.

December Forecast Review				
	Median Forecast (kaf)	Actual (kaf)	Difference (kaf)	Actual (% of Avg)
December Inflow	82.4	98.0	15.6	92



April through July Inflow Forecast for January 1					
	Median Forecast (kaf)	% of Average	Minimum Forecast (kaf)	Maximum Forecast (kaf)	
April through July Inflow	803	64	456	1,762	
Historic Maximum (2017)	2,953 kaf	Historic Minimum (2004)	392 kaf	Average	1,262 kaf

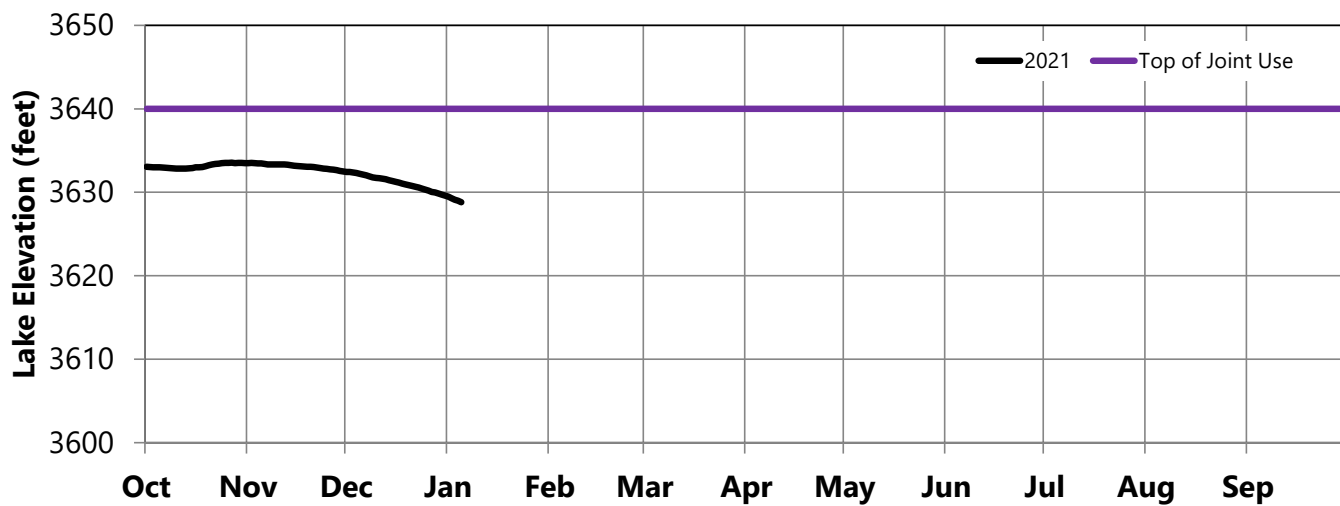


OPERATIONS REVIEW (October 1, 2020 through December 31, 2020)

River releases were increased to 2,125 cfs during December based on actual November inflows being greater than median inflow forecast, forecasted December through March inflows, and a March 31, 2021 elevation target of 3617 feet. The elevation of Bighorn Lake decreased by 2.9 feet during December.

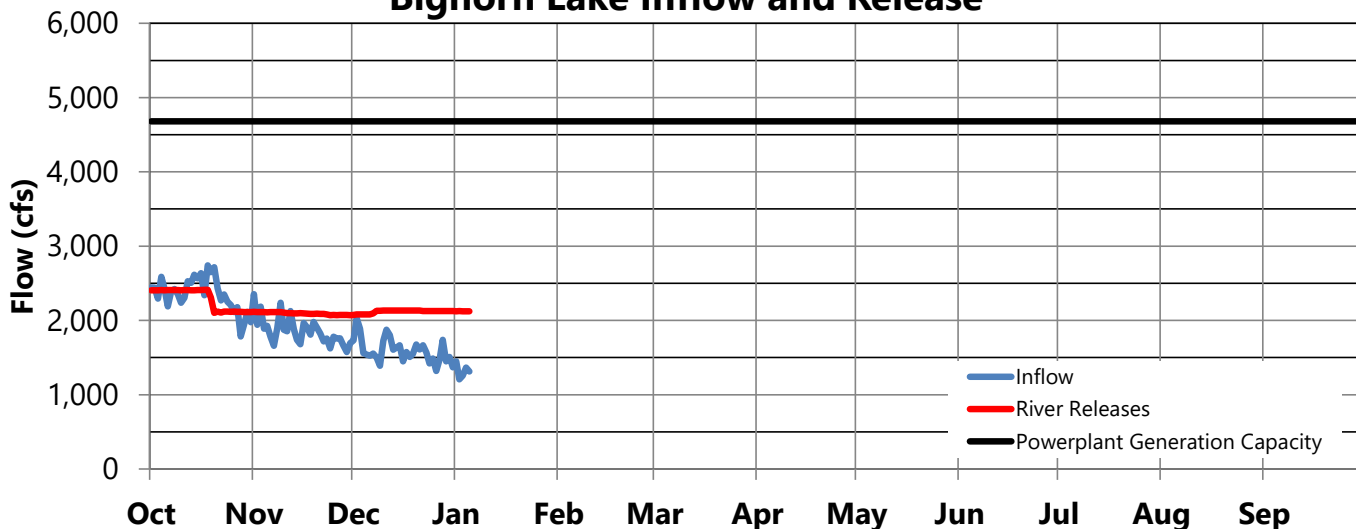
January 1 Storage Conditions				
	Elevation feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3629.6	892,713	106	88
Buffalo Bill	5367.1	447,752	105	69
Boysen	4714.6	560,016	101	76

Bighorn Lake Operations Water Year 2020



	Average December Inflow		Average December Release	
	Monthly Avg cfs	Percent of Average	Monthly Avg cfs	Percent of Average
Bighorn Lake	1,595	92	Bighorn River	2,120
Buffalo Bill	285	103	Buffalo Bill Total Release	195
Boysen	590	93	Boysen Release	635

Bighorn Lake Inflow and Release



OPERATIONS OUTLOOK (January 1, 2021 through July 31, 2021)

River releases are increasing to 2,220 cfs during January due to actual December inflows being higher than the median inflow forecast. In accordance with the operating criteria, releases from Yellowtail Dam are adjusted to stay on track with the March 31 storage target of 3617 feet. As actual inflows vary from the median inflow forecast, releases to the Bighorn River will be adjusted. Releases during March are based on the April through July inflow forecast and the April 30 storage target.

Median Inflow Conditions (April through July Inflow: 803 kaf)

	Jan	Feb	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	600	600	701	1,099	1,576	1,251
Buffalo Bill Release (cfs)	205	205	205	1,262	2,106	2,427	2,501
Tributary Gain (cfs)	607	776	1,000	428	476	942	-1,478
Monthly Inflow (cfs)	1,412	1,581	1,805	2,391	3,681	4,945	2,274
Monthly Inflow (kaf)	86.8	87.8	111.0	142.3	226.4	294.2	139.8
Monthly Release (kaf)	134.4	123.2	136.7	140.5	162.5	168.1	178.3
Afterbay Release (cfs)	2,185	2,218	2,222	2,361	2,643	2,825	2,900
River Release (cfs)	2,185	2,218	2,222	2,339	2,443	2,440	2,440
End-of-Month Content (kaf)	849.4	817.9	796.6	802.5	870.7	1,001.0	966.8
End-of-Month Elevation (feet)	3624.5	3620.2	3617.0	3617.9	3627.1	3639.3	3636.6

Minimum Inflow Conditions (April through July Inflow: 456 kaf)

	Jan	Feb	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	600	600	701	1,099	1,250	1,251
Buffalo Bill Release (cfs)	205	205	205	684	1,781	1,901	1,976
Tributary Gain (cfs)	499	630	877	155	-191	-997	-2,069
Monthly Inflow (cfs)	1,304	1,435	1,682	1,540	2,689	2,154	1,158
Monthly Inflow (kaf)	80.2	79.7	103.4	91.6	165.3	128.2	71.2
Monthly Release (kaf)	134.3	112.6	116.4	105.1	114.1	116.3	120.5
Afterbay Release (cfs)	2,185	2,028	1,894	1,766	1,855	1,955	1,960
River Release (cfs)	2,185	2,028	1,894	1,731	1,600	1,500	1,500
End-of-Month Content (kaf)	842.9	813.8	805.1	795.8	851.4	867.4	822.4
End-of-Month Elevation (feet)	3623.6	3619.6	3618.3	3616.8	3624.7	3626.7	3620.8

Maximum Inflow Conditions (April through July Inflow: 1,762 kaf)

	Jan	Feb	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	600	600	1,501	2,249	2,250	2,475
Buffalo Bill Release (cfs)	205	205	205	1,738	3,233	3,354	3,430
Tributary Gain (cfs)	712	924	1,124	1,324	2,773	4,215	579
Monthly Inflow (cfs)	1,517	1,729	1,929	4,563	8,255	9,819	6,484
Monthly Inflow (kaf)	93.3	96.0	118.6	271.5	507.6	584.3	398.7
Monthly Release (kaf)	134.3	152.7	198.3	274.4	490.6	374.0	356.8
Afterbay Release (cfs)	2,185	2,750	3,225	4,611	7,978	6,285	5,802
River Release (cfs)	2,185	2,750	3,225	4,611	7,778	6,035	5,382
End-of-Month Content (kaf)	856.0	803.1	727.7	729.1	750.4	964.8	1,011.1
End-of-Month Elevation (feet)	3625.3	3618.0	3604.9	3605.1	3609.1	3636.4	3640.0

OPERATIONS OUTLOOK (January 1, 2021 through July 31, 2021)

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. Yellowtail Powerplant is limited to 3 units due to on-going refurbishment project.

Irrigation Demands Outlook

Bighorn Canal (cfs)

	Jan	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	0	0	0	22	200	385	460
Minimum Forecast	0	0	0	35	255	455	460
Maximum Forecast	0	0	0	0	200	250	420

Power Generation Outlook

Current Number of Units Available: 3 of 4

Approximate Yellowtail Powerplant Turbine Capacity: 6,150 cfs

Approximate Yellowtail Powerplant Generation Limit: 4,615 cfs

Yellowtail Powerplant Release (cfs)

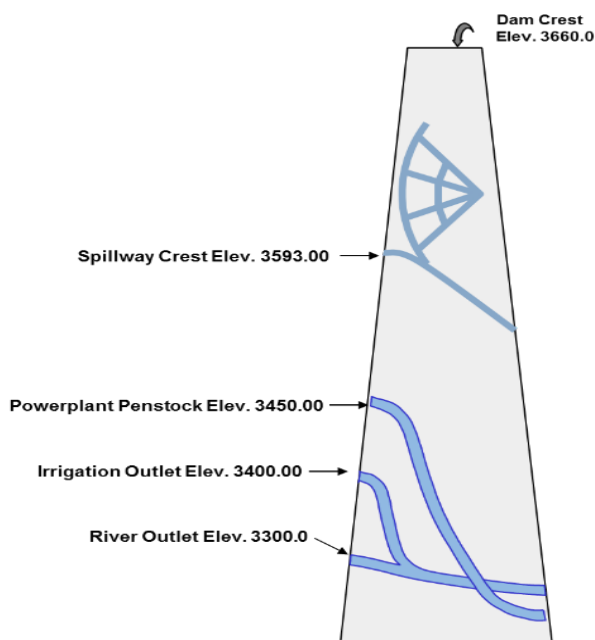
	Jan	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	2,115	2,148	2,152	2,291	2,573	2,755	2,830
Minimum Forecast	2,115	1,958	1,824	1,696	1,785	1,885	1,890
Maximum Forecast	2,115	2,680	3,155	4,399	4,976	4,711	4,623

Yellowtail Powerplant Generation (gwh)

	Jan	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	51.1	46.3	50.9	52.8	62.9	67.3	72.1
Minimum Forecast	51.0	42.3	43.5	39.2	42.9	44.3	45.6
Maximum Forecast	51.1	59.3	74.3	97.5	113.8	110.2	113.8

Yellowtail Spill (cfs)

	Jan	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	0	0	0	0	0	0	0
Minimum Forecast	0	0	0	0	0	0	0
Maximum Forecast	0	0	0	142	2,933	1,504	1,109



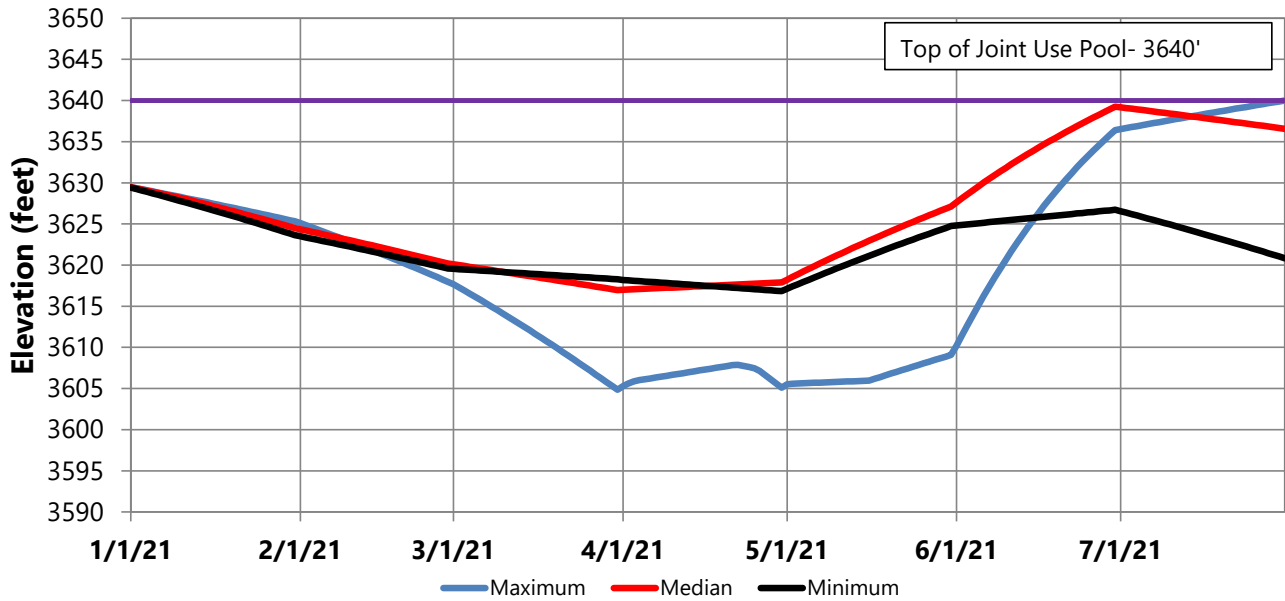
Release Outlook by Outlet

All releases are currently going through the powerplant and are expected to go through the powerplant through the end of April. Under maximum probable conditions, a bypass release through either the river outlet works or spillway would be required during May, June, and July.

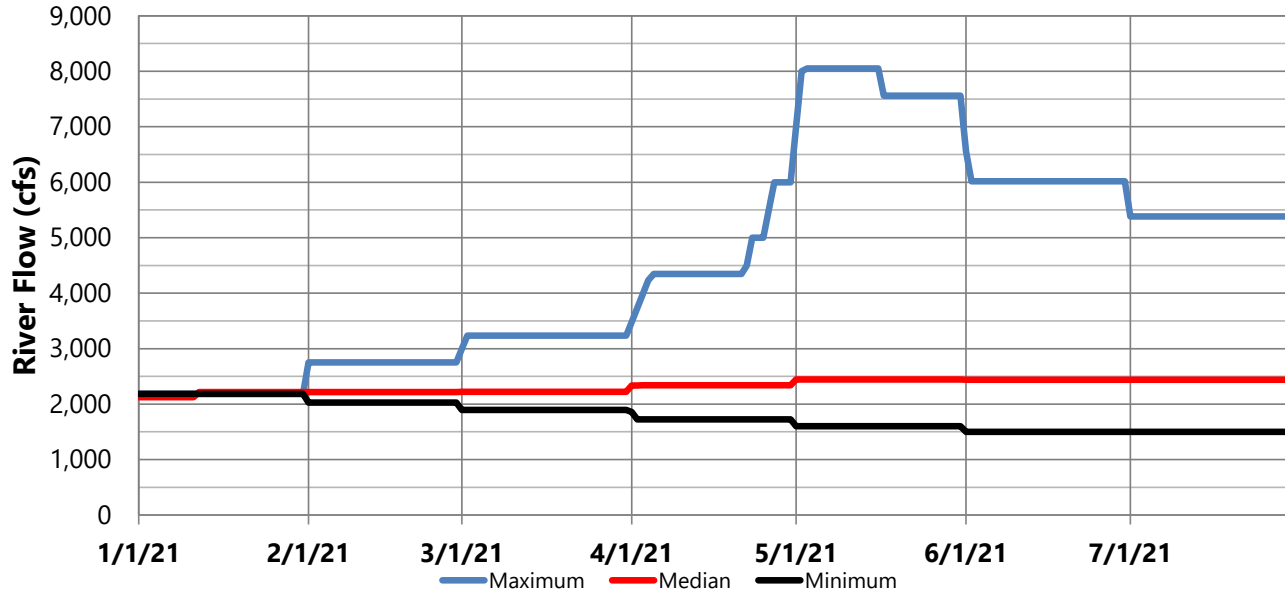
OPERATIONS OUTLOOK (January 1, 2021 through July 31, 2021)

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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