

Yellowtail Dam Water Supply and Projected Operations



BUREAU OF RECLAMATION

March 2021



Bighorn River Basin Map Source: DEMIS Mapserver

March Operating Range			
Forecast	Minimum	Median	Maximum
Monthly Average Inflow (cfs)	1,665	1,805	2,130
Monthly Average River Release (cfs)	2,105	2,330	2,510
End of March Elevation (feet)	3618.8	3618.0	3619.3
April through July 2021 Inflow Forecast (kaf)			
April through July Volume		922	
Percent of Average		73	
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		

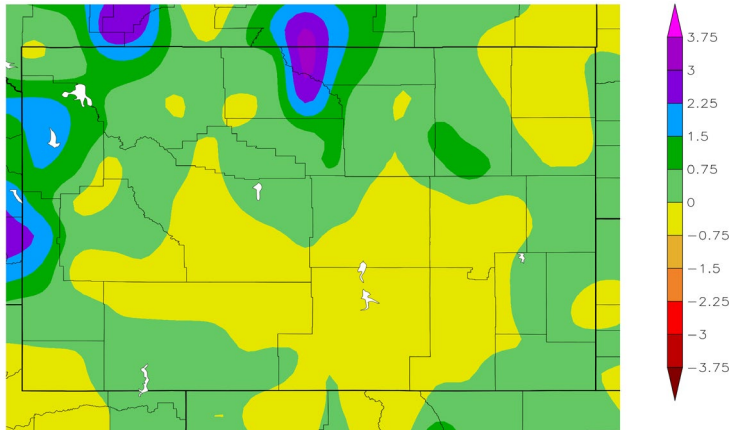


Climate Departure from Normal

February 1 through February 28, 2021

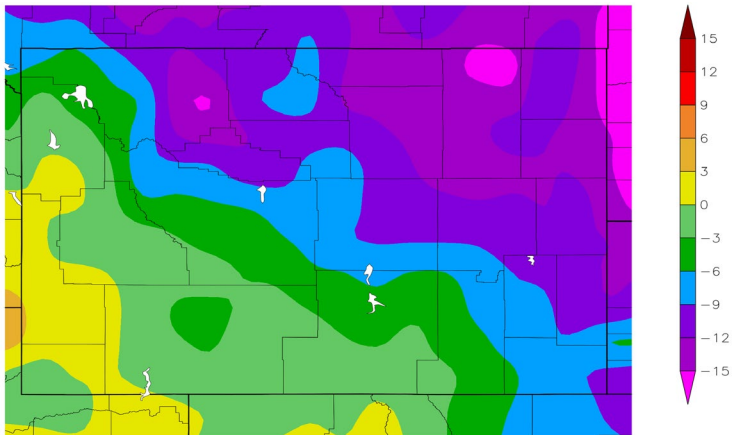
Precipitation

Departure from Normal (inches)



Temperature

Departure from Normal (°F)



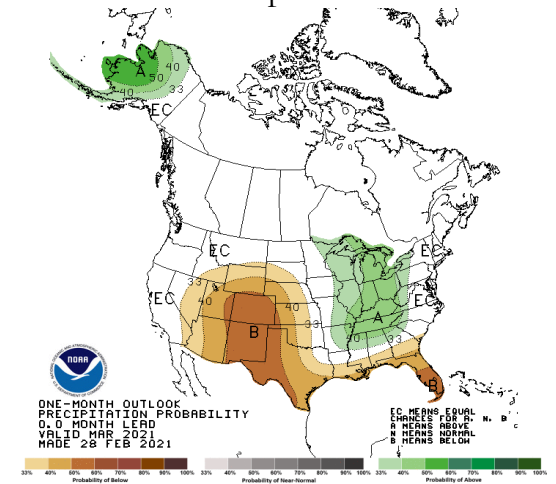
CLIMATE SUMMARY

The climate in the Bighorn Basin above Yellowtail Dam was wetter and much cooler than average in the northern portion and was drier and cooler than average in the southern portion for February.

The climate outlook shows there is a 33 to 40 percent chance precipitation will be below average during March. There is an equal chance temperatures will be either average, above average, or below average.

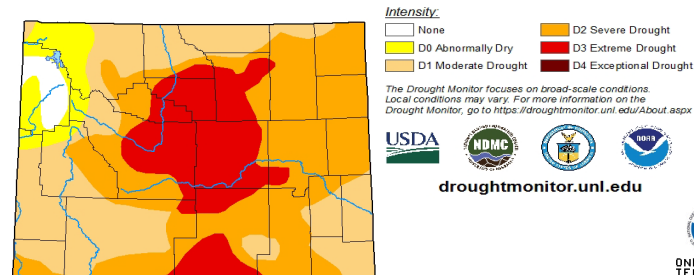
March Climate Outlook

Precipitation

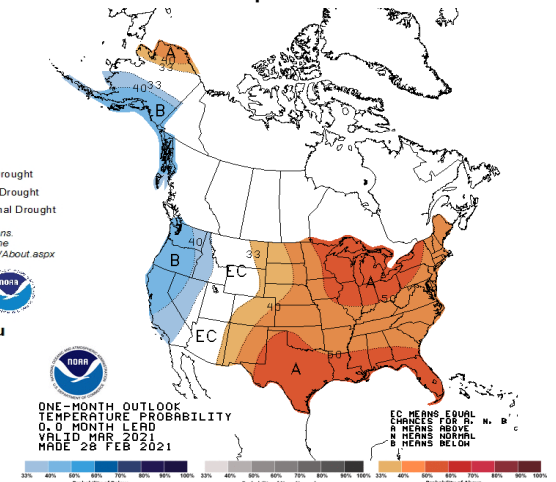


Wyoming Drought Monitor Map

March 2, 2021



Temperature

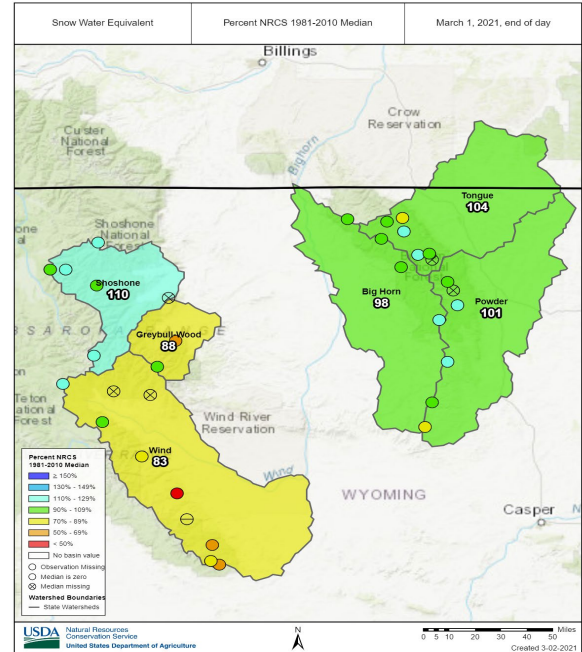
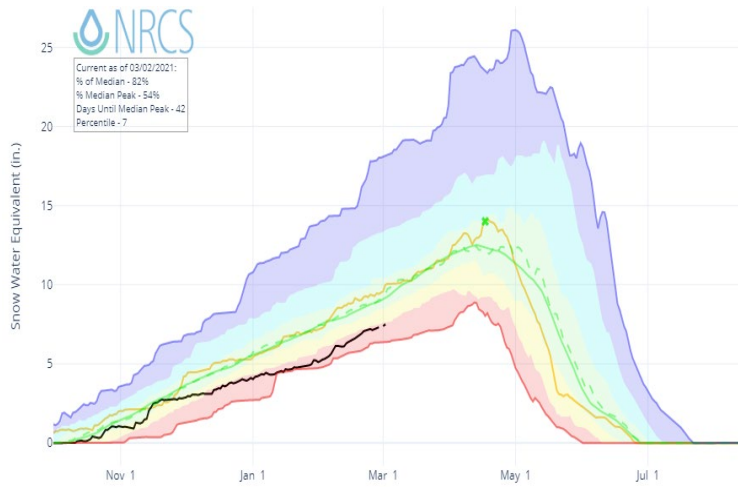


HPRCC using provisional data from NOAA Regional Climate Centers

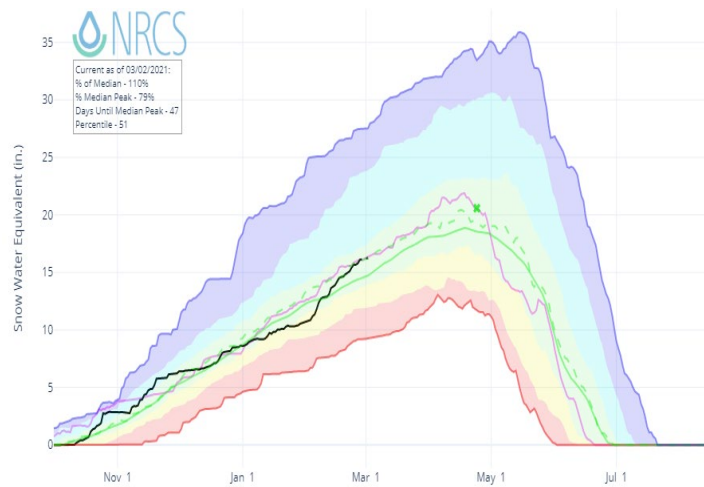
SNOWPACK SUMMARY

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).

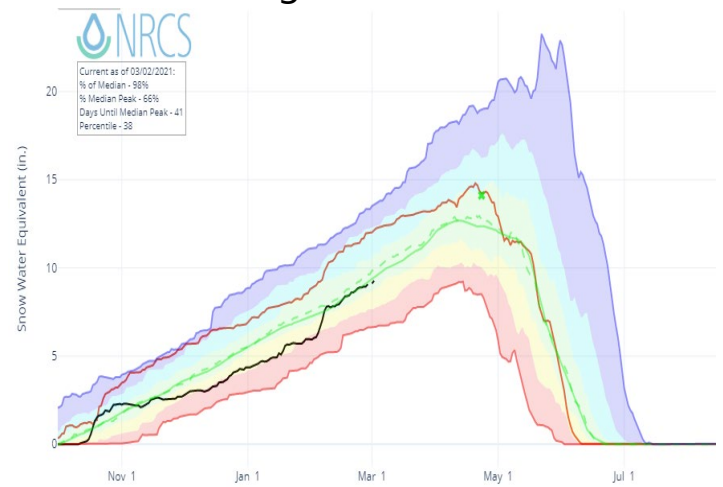
Wind River



Shoshone River



Bighorn River



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

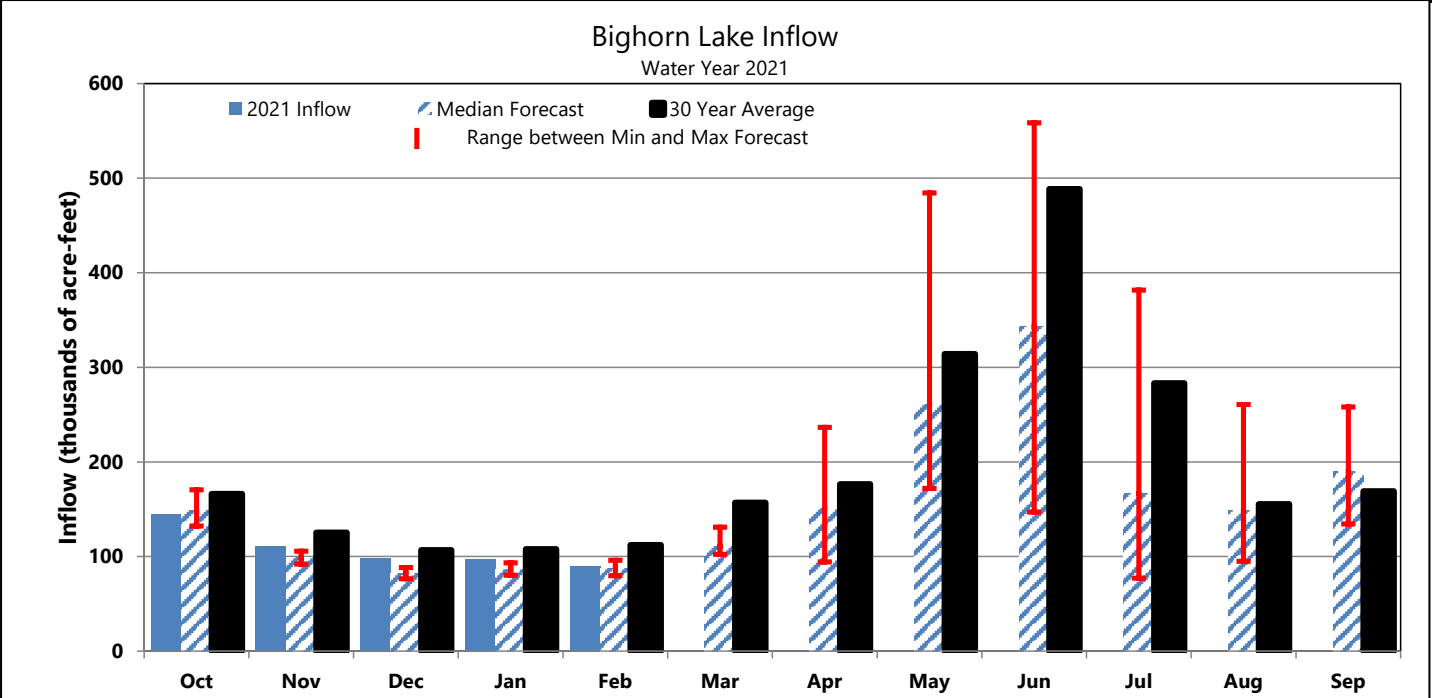
NRCS Montana Snow Survey Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/mt/snow/>

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

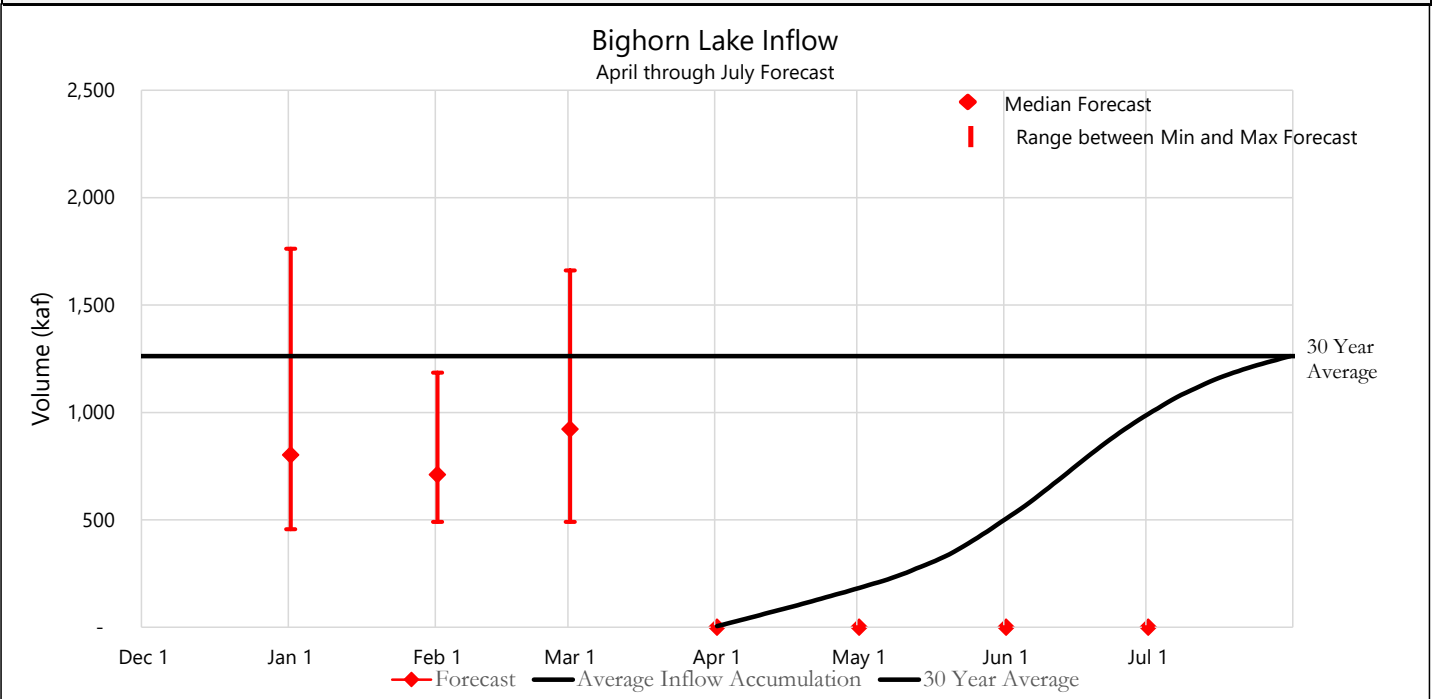
FORECAST SUMMARY

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

February Forecast Review				
	Median Forecast (kaf)	Actual (kaf)	Difference (kaf)	Actual (% of Avg)
February Inflow	87.8	89.8	2.0	80



April through July Inflow Forecast for March 1					
	Median Forecast (kaf)	% of Average	Minimum Forecast (kaf)	Maximum Forecast (kaf)	
April through July Inflow	922	73	490	1,661	
Historic Maximum (2017)	2,953 kaf	Historic Minimum (2004)	392 kaf	Average	1,262 kaf

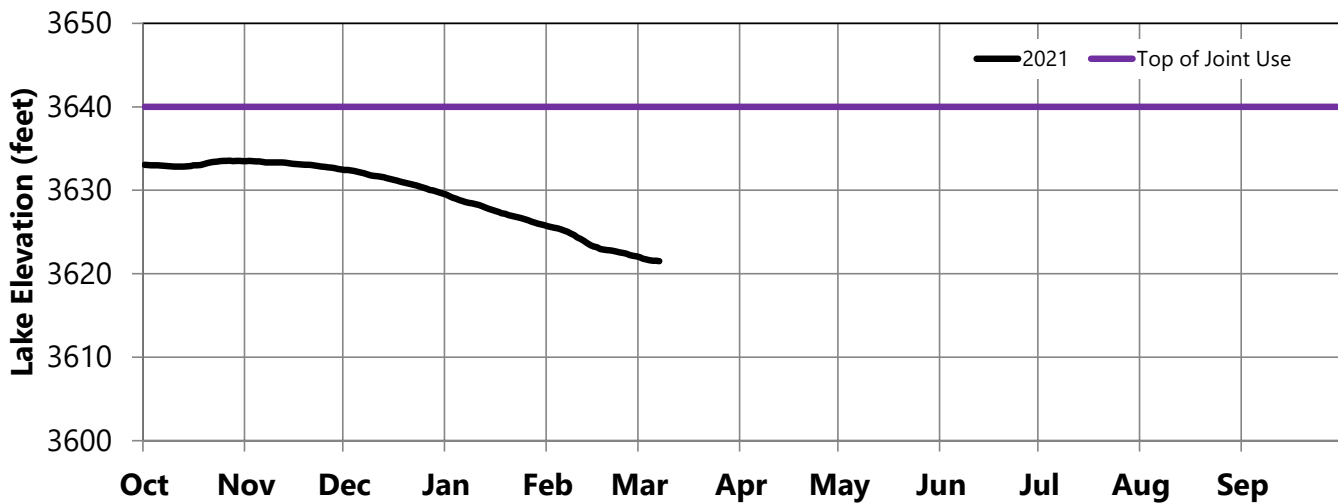


OPERATIONS REVIEW (October 1, 2020 through February 28, 2021)

River releases were maintained at 2,220 cfs during February since the April through July forecast of 711 kaf was less than the 727 kaf required to fill Bighorn Lake to normal full pool, 3640 feet, while maintaining a river release of 2,000 cfs. Since the February 1 forecast is less than the amount for minimum fill, water releases were being guided by long term storage targets and not the end of March target of 3617 feet. The elevation of Bighorn Lake decreased by 3.7 feet during February.

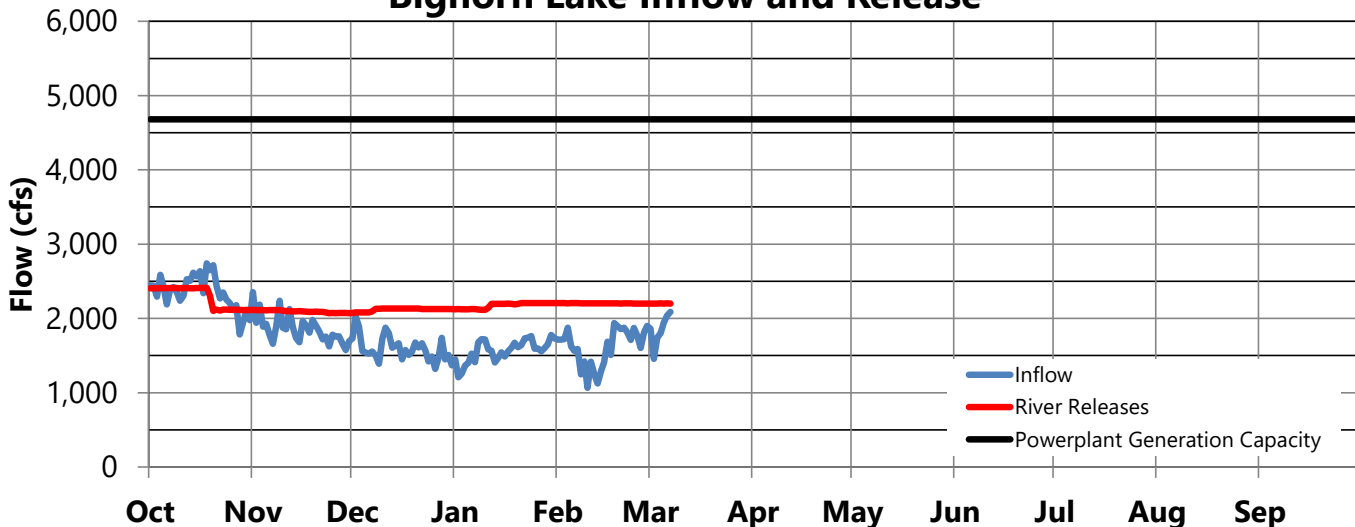
March 1 Storage Conditions				
	Elevation feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3622.1	831,287	107	82
Buffalo Bill	5367.7	451,445	104	70
Boysen	4714.0	551,069	102	74

Bighorn Lake Operations Water Year 2020



	Average February Inflow		Average February Release		
	Monthly Avg cfs	Percent of Average	Monthly Avg cfs	Percent of Average	
Bighorn Lake	1,615	81	Bighorn River	2,205	86
Buffalo Bill	210	87	Buffalo Bill Total Release	195	63
Boysen	515	74	Boysen Release	605	79

Bighorn Lake Inflow and Release



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

River releases may increase or decrease during March depending on actual conditions and updates to forecasted conditions. The current April 30 storage target is 3616.2 feet based on the April through July forecast of 922 kaf. Under median inflow conditions releases are expected to increase again in March and April to hit this storage target.

Median Inflow Conditions (April through July Inflow: 922 kaf)

	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	701	1,200	1,250	1,251
Buffalo Bill Release (cfs)	205	1,262	2,222	2,558	2,631
Tributary Gain (cfs)	1,000	571	826	1,958	-1,169
Monthly Inflow (cfs)	1,805	2,534	4,248	5,766	2,713
Monthly Inflow (kaf)	111.0	150.8	261.2	343.1	166.8
Monthly Release (kaf)	143.3	167.4	205.8	201.4	197.4
Afterbay Release (cfs)	2,331	2,814	3,347	3,385	3,210
River Release (cfs)	2,331	2,664	3,122	3,000	2,750
End-of-Month Content (kaf)	803.3	790.8	850.5	996.4	970.1
End-of-Month Elevation (feet)	3618.0	3616.0	3624.6	3638.9	3636.8

Minimum Inflow Conditions (April through July Inflow: 491 kaf)

	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	701	1,099	1,250	1,251
Buffalo Bill Release (cfs)	205	684	1,781	1,901	1,976
Tributary Gain (cfs)	859	200	-83	-681	-1,973
Monthly Inflow (cfs)	1,664	1,585	2,797	2,470	1,254
Monthly Inflow (kaf)	102.3	94.3	172.0	147.0	77.1
Monthly Release (kaf)	129.5	115.2	123.6	116.3	120.5
Afterbay Release (cfs)	2,106	1,936	2,010	1,955	1,960
River Release (cfs)	2,106	1,736	1,735	1,500	1,500
End-of-Month Content (kaf)	808.4	791.7	844.4	879.2	840.1
End-of-Month Elevation (feet)	3618.8	3616.2	3623.8	3628.1	3623.3

Maximum Inflow Conditions (April through July Inflow: 1,661 kaf)

	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	1,101	2,249	2,252	2,527
Buffalo Bill Release (cfs)	205	1,738	3,342	3,464	3,537
Tributary Gain (cfs)	1,325	1,136	2,287	3,670	143
Monthly Inflow (cfs)	2,130	3,975	7,878	9,386	6,207
Monthly Inflow (kaf)	131.0	236.5	484.4	558.5	381.7
Monthly Release (kaf)	154.4	297.0	487.7	354.7	339.7
Afterbay Release (cfs)	2,511	4,992	7,932	5,961	5,525
River Release (cfs)	2,511	4,992	7,732	5,711	5,105
End-of-Month Content (kaf)	812.2	755.8	756.8	964.8	1,011.1
End-of-Month Elevation (feet)	3619.3	3610.1	3610.3	3636.4	3640.0

OPERATIONS OUTLOOK (March 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)

	Mar	Apr	May	Jun	Jul
Median Forecast	0	150	225	385	460
Minimum Forecast	0	200	275	455	460
Maximum Forecast	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)

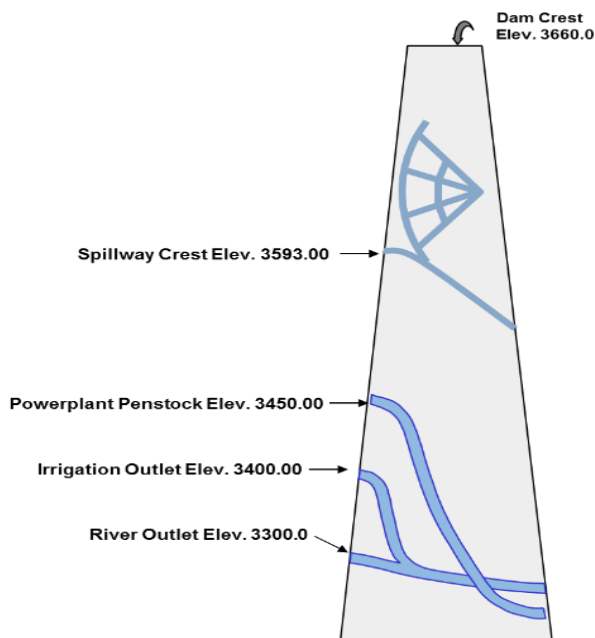
	Mar	Apr	May	Jun	Jul
Median Forecast	2,261	2,744	3,277	3,315	3,140
Minimum Forecast	2,036	1,866	1,940	1,885	1,890
Maximum Forecast	2,441	4,753	4,947	4,703	4,623

Yellowtail Powerplant Generation (gwh)

	Mar	Apr	May	Jun	Jul
Median Forecast	54.1	64.2	79.1	79.7	79.2
Minimum Forecast	48.4	42.8	46.2	44.3	45.8
Maximum Forecast	58.8	107.8	113.8	110.2	113.8

Yellowtail Spill (cfs)

	Mar	Apr	May	Jun	Jul
Median Forecast	0	0	0	0	0
Minimum Forecast	0	0	0	0	0
Maximum Forecast	0	169	2,914	1,187	832



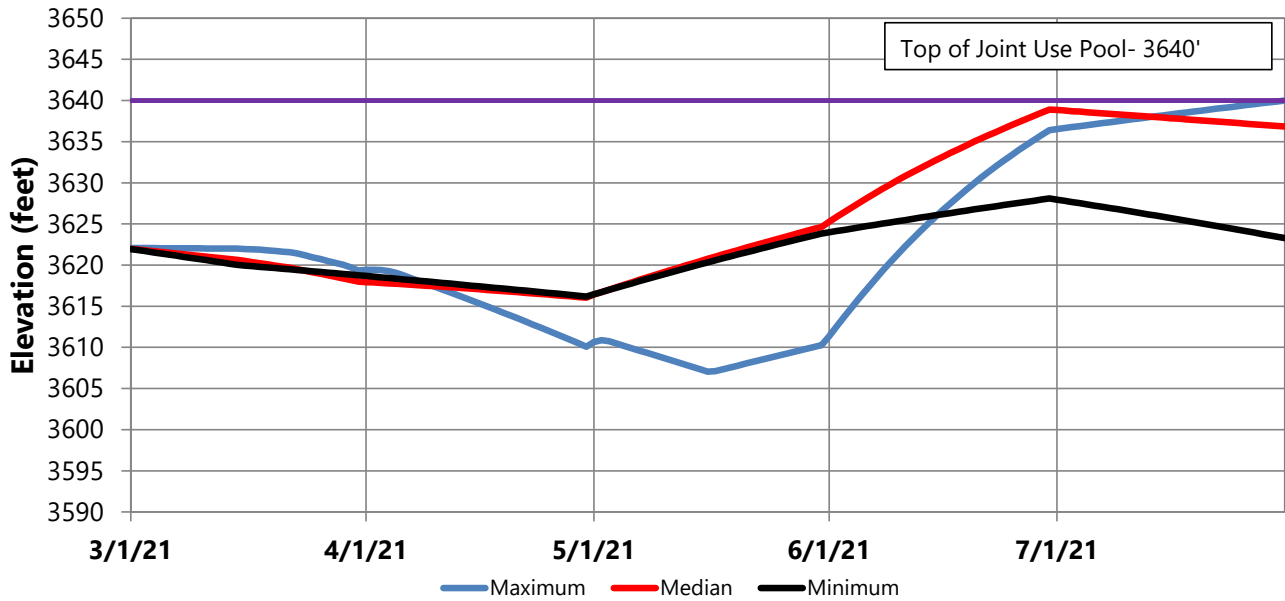
Release Outlook by Outlet

All releases are currently going through the powerplant and are expected to go through the powerplant through the end of July under median and minimum inflow conditions. Additional releases would be made through the spillway or river outlet works during April through July under maximum inflow conditions.

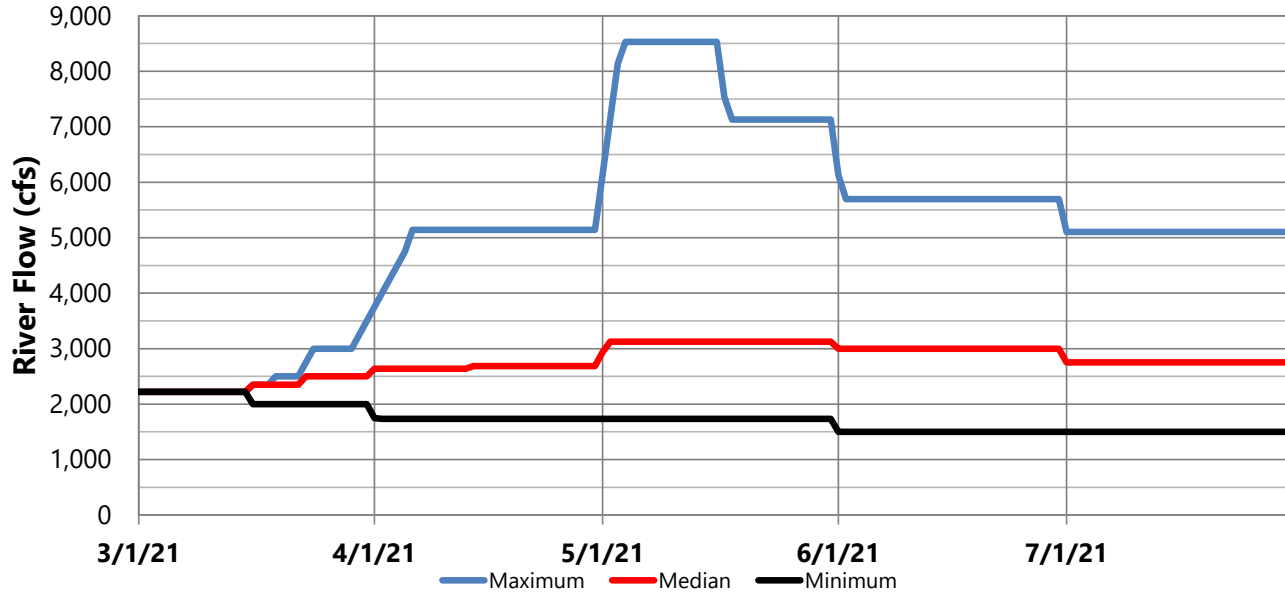
OPERATIONS OUTLOOK (March 1, 2021 through July 31, 2021)

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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