

# Yellowtail Dam Water Supply and Projected Operations



BUREAU OF RECLAMATION

July 2021



Bighorn River Basin Map Source: DEMIS Mapserver

July Operating Range			
Forecast	Minimum	Median	Maximum
<b>Monthly Average Inflow (cfs)</b>	945	1,335	4,290
<b>Monthly Average River Release (cfs)</b>	1,620	1,750	2,115
<b>End of July Elevation (feet)</b>	3618.7	3621.0	3638.1
July 2021 Inflow Forecast (kaf)			
July Volume			82
Percent of Average			29
Water Year	Historic Inflow	Rank	
2020	195	34	
2019	461	11	
2018	373	17	
2017	616	6	
<b>30 Year Average</b>	283		

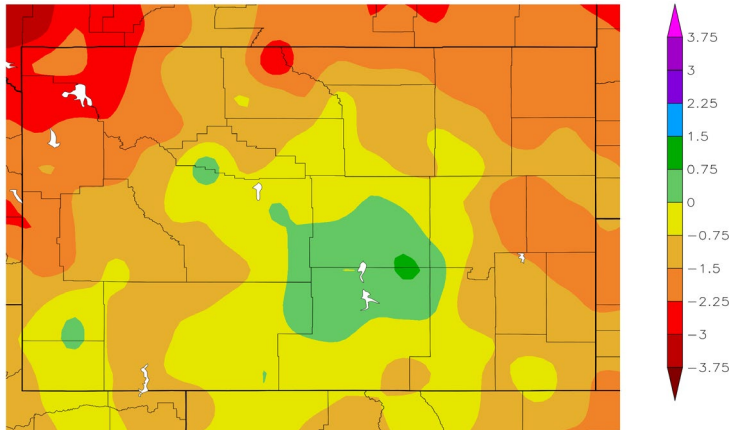


# Climate Departure from Normal

June 1 through June 30, 2021

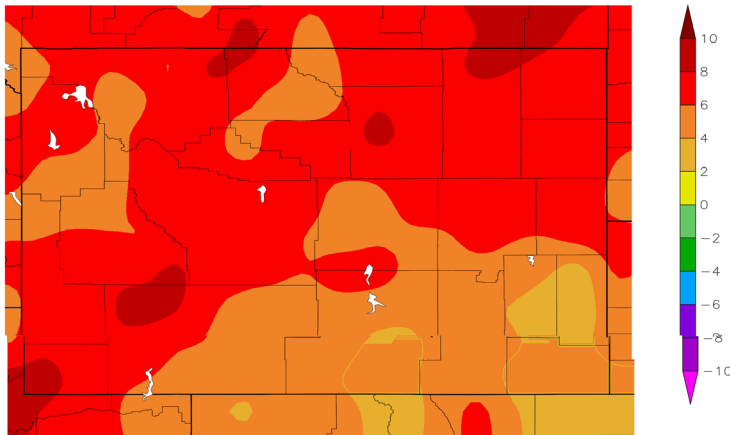
## Precipitation

Departure from Normal (inches)



## Temperature

Departure from Normal (°F)



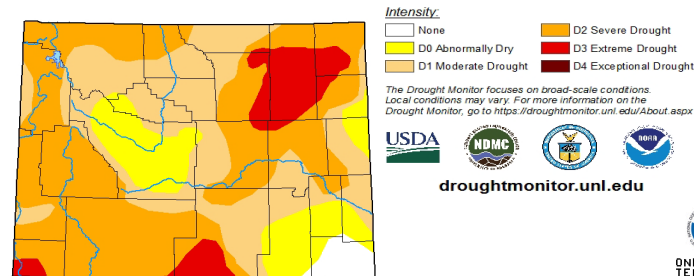
# CLIMATE SUMMARY

Precipitation in the Bighorn Basin above Yellowtail Dam was mostly drier than average during June. The entire Basin was warmer than average.

The climate outlook shows there is a 33 to 50 percent chance precipitation will be below average during July. There is a 50 to 70 percent chance temperatures will be above average.

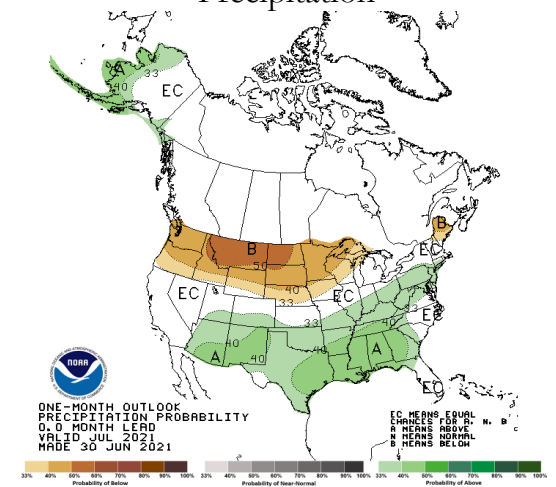
## Wyoming Drought Monitor Map

June 29, 2021

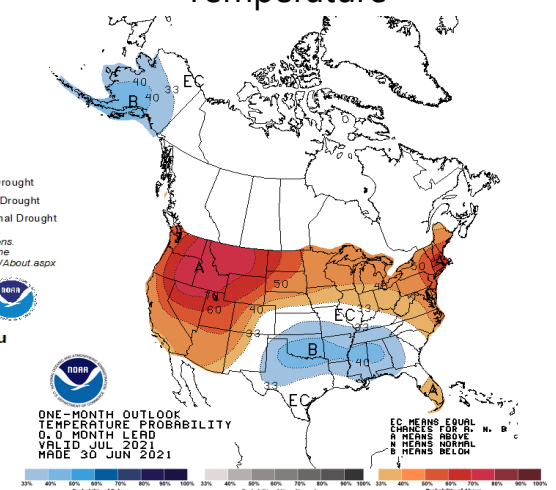


# July Climate Outlook

## Precipitation



## Temperature

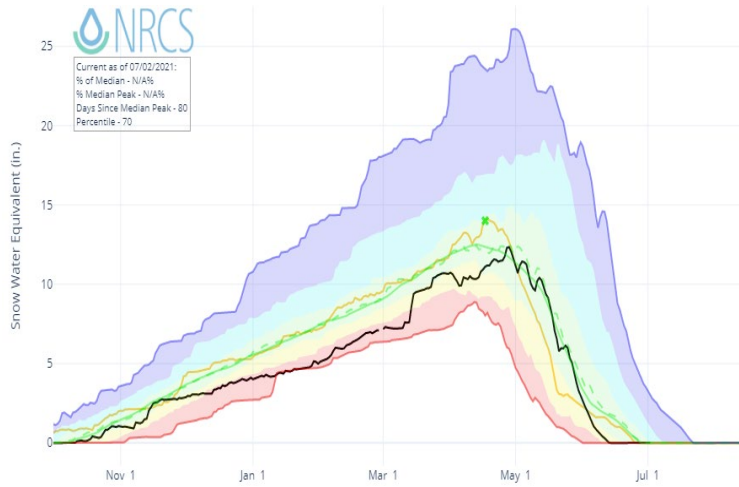




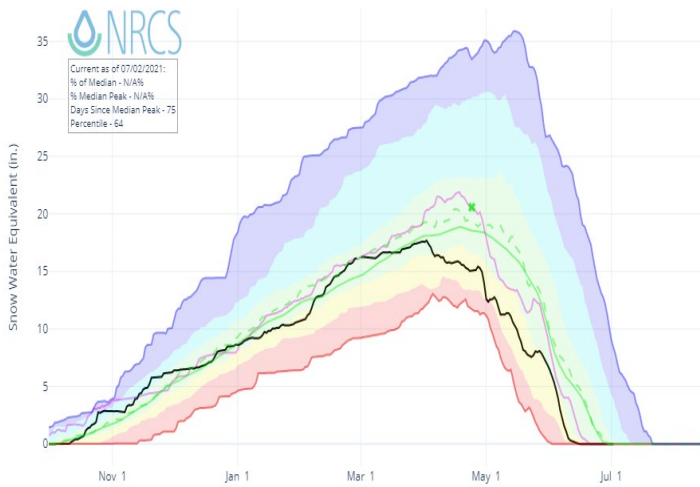
# SNOWPACK SUMMARY

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).

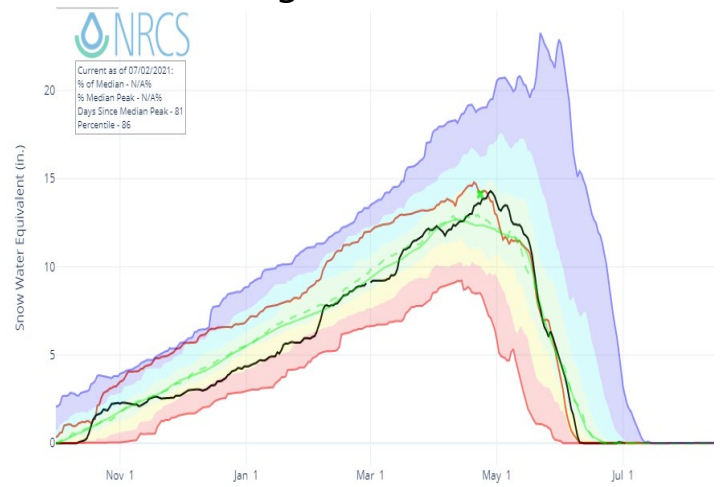
## Wind River



## Shoshone River



## Bighorn River



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

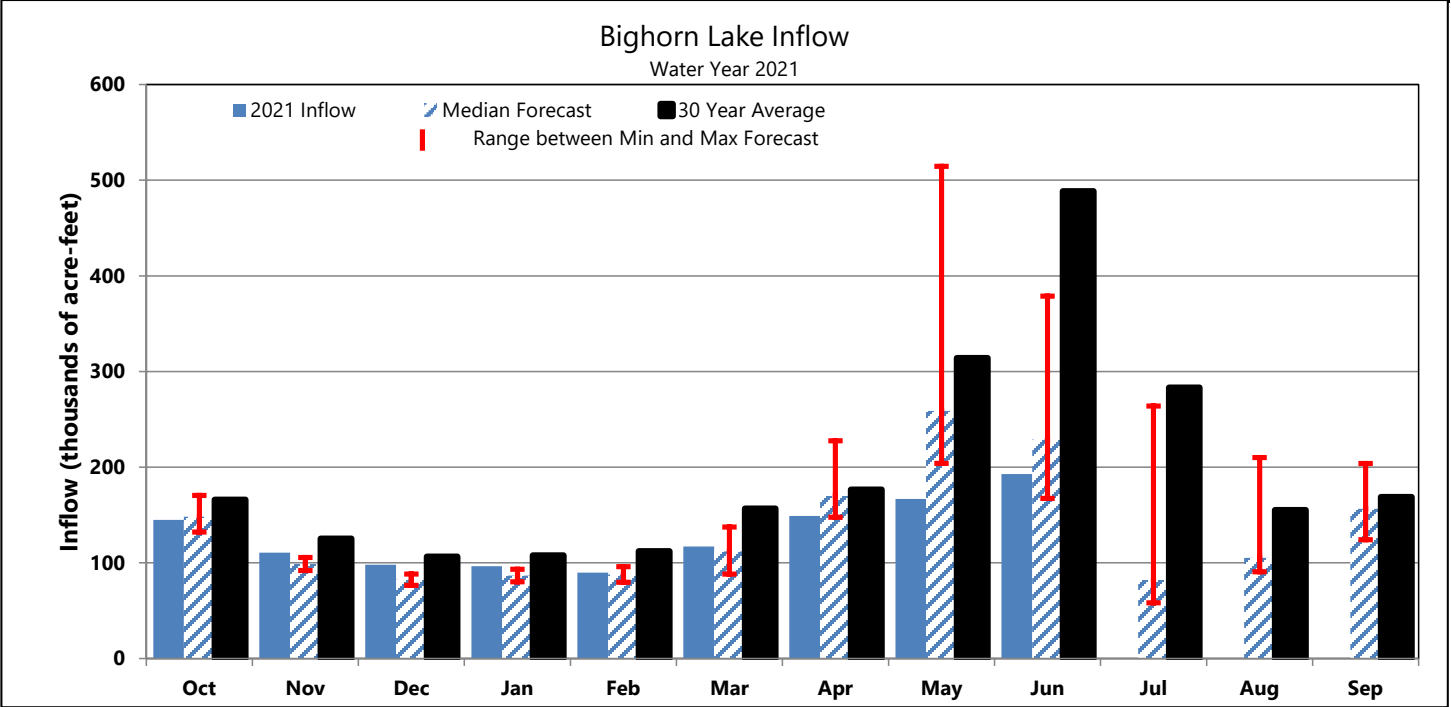
NRCS Montana Snow Survey Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/mt/snow/>

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

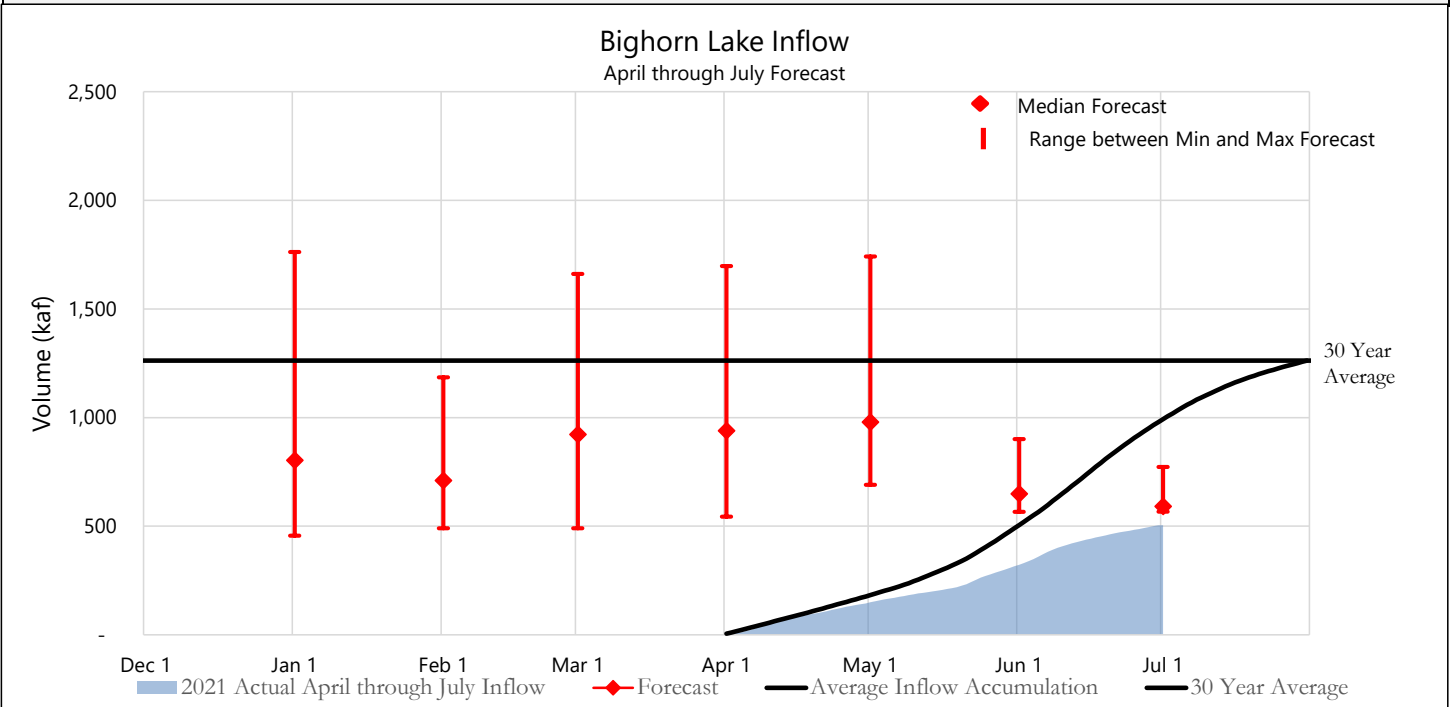
# FORECAST SUMMARY

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

June Forecast Review				
	Median Forecast (kaf)	Actual (kaf)	Difference (kaf)	Actual (% of Avg)
June Inflow	228.9	192.8	(36.1)	39



July Inflow Forecast					
	Median Forecast (kaf)	% of Average	Minimum Forecast (kaf)	Maximum Forecast (kaf)	
July Inflow	82	29	58	264	
Actual April through June Inflow	509 kaf	April-July Inflow Forecast	591 kaf	Average	1,262 kaf



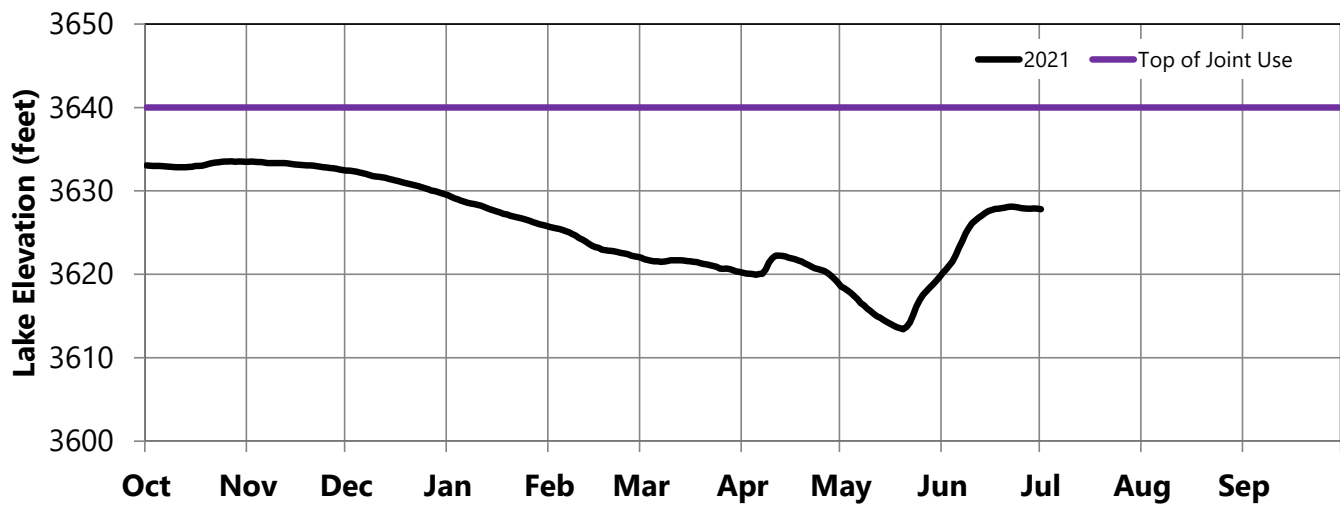
# OPERATIONS REVIEW (October 1, 2020 through June 30, 2021)

River releases were decreased to 1,750 cfs during June based on inflows and a decreasing runoff forecast. The storage in Bighorn Lake peaked for the runoff season at approximately elevation 3628 feet, 12 feet below normal full pool.

## July 1 Storage Conditions

	Elevation feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3627.9	877,205	94	87
Buffalo Bill	5389.6	615,356	106	95
Boysen	4724.2	725,266	115	98

## Bighorn Lake Operations Water Year 2020

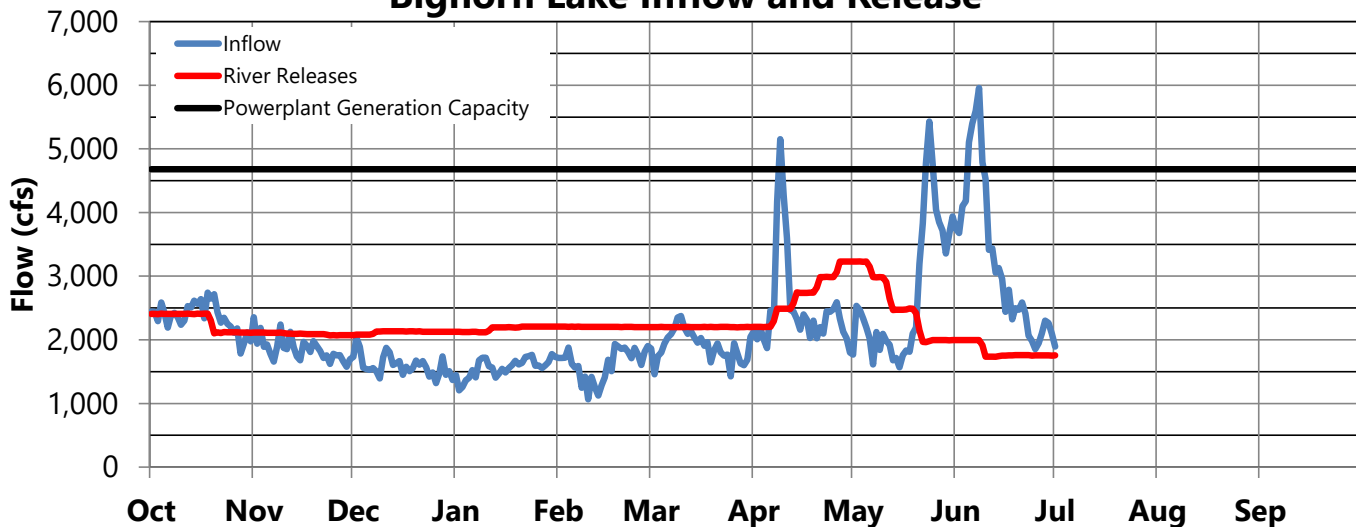


## Average June Inflow

## Average June Release

	Monthly Avg cfs	Percent of Average		Monthly Avg cfs	Percent of Average
Bighorn Lake	3,240	39	Bighorn River	1,820	33
Buffalo Bill	4,680	83	Buffalo Bill Total Release	2,105	63
Boysen	3,310	68	Boysen Release	1,305	40

## Bighorn Lake Inflow and Release



# OPERATIONS OUTLOOK (July 1, 2021 through October 31, 2021)

Storage in Bighorn Lake is expected to continue to decrease until September under median and minimum inflow conditions. Releases will be adjusted based on actual inflows. Releases during July range anywhere between 1,500 and 2,500 cfs based on the minimum, median, and maximum inflow forecasts.

## Median Inflow Conditions

	Jul	Aug	Sep	Oct
Boysen Release (cfs)	1,299	1,299	1,250	800
Buffalo Bill Release (cfs)	1,976	1,761	1,600	696
Tributary Gain (cfs)	-1,940	-1,350	-222	729
Monthly Inflow (cfs)	1,335	1,710	2,628	2,225
Monthly Inflow (kaf)	82.1	105.2	156.4	136.8
Monthly Release (kaf)	139.9	135.3	121.7	110.7
Afterbay Release (cfs)	2,275	2,200	2,045	1,800
River Release (cfs)	1,750	1,750	1,750	1,750
End-of-Month Content (kaf)	823.7	797.9	836.7	867.2
End-of-Month Elevation (feet)	3621.0	3617.2	3622.8	3626.7

## Minimum Inflow Conditions

	Jul	Aug	Sep	Oct
Boysen Release (cfs)	1,251	1,251	1,000	800
Buffalo Bill Release (cfs)	1,976	1,761	1,499	696
Tributary Gain (cfs)	-2,280	-1,537	-412	433
Monthly Inflow (cfs)	947	1,475	2,087	1,929
Monthly Inflow (kaf)	58.2	90.7	124.2	118.6
Monthly Release (kaf)	132.0	121.4	106.8	95.3
Afterbay Release (cfs)	2,146	1,975	1,795	1,550
River Release (cfs)	1,621	1,500	1,500	1,500
End-of-Month Content (kaf)	807.8	781.3	802.9	830.5
End-of-Month Elevation (feet)	3618.7	3614.5	3617.9	3622.0

## Maximum Inflow Conditions

	Jul	Aug	Sep	Oct
Boysen Release (cfs)	2,897	2,249	1,250	1,200
Buffalo Bill Release (cfs)	2,532	2,062	1,949	881
Tributary Gain (cfs)	-1,137	-895	227	1,078
Monthly Inflow (cfs)	4,292	3,417	3,426	3,159
Monthly Inflow (kaf)	263.9	210.1	203.9	194.3
Monthly Release (kaf)	159.1	235.6	212.1	212.1
Afterbay Release (cfs)	2,588	3,831	3,565	3,450
River Release (cfs)	2,113	3,406	3,400	3,450
End-of-Month Content (kaf)	986.3	965.1	961.0	947.4
End-of-Month Elevation (feet)	3638.1	3636.4	3636.1	3634.9

# OPERATIONS OUTLOOK (July 1, 2021 through October 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)

	Jul	Aug	Sep	Oct
Median Forecast	525	450	295	50
Minimum Forecast	525	475	295	50
Maximum Forecast	475	425	165	0

## 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)

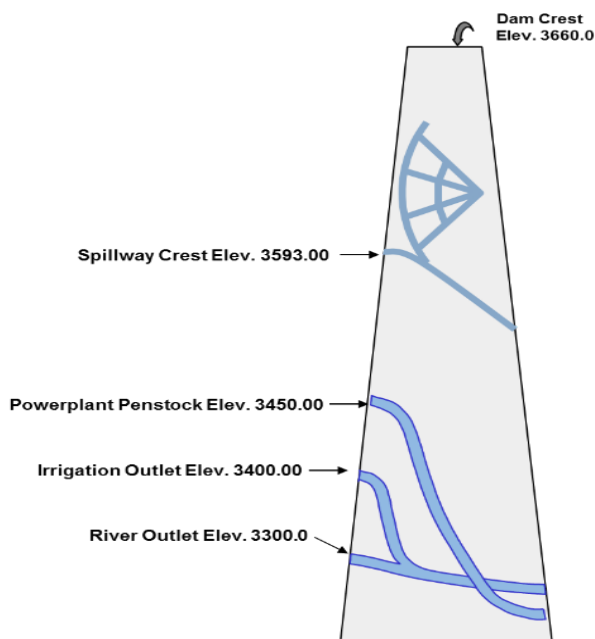
	Jul	Aug	Sep	Oct
Median Forecast	2,205	2,130	1,975	1,730
Minimum Forecast	2,076	1,905	1,725	1,480
Maximum Forecast	2,518	3,761	3,495	3,380

Yellowtail Powerplant Generation (gwh)

	Jul	Aug	Sep	Oct
Median Forecast	53.1	50.3	45.5	42.1
Minimum Forecast	49.8	45.0	39.6	36.0
Maximum Forecast	62.7	93.4	84.3	84.4

Yellowtail Spill (cfs)

	Jul	Aug	Sep	Oct
Median Forecast	0	0	0	0
Minimum Forecast	0	0	0	0
Maximum Forecast	0	0	0	0



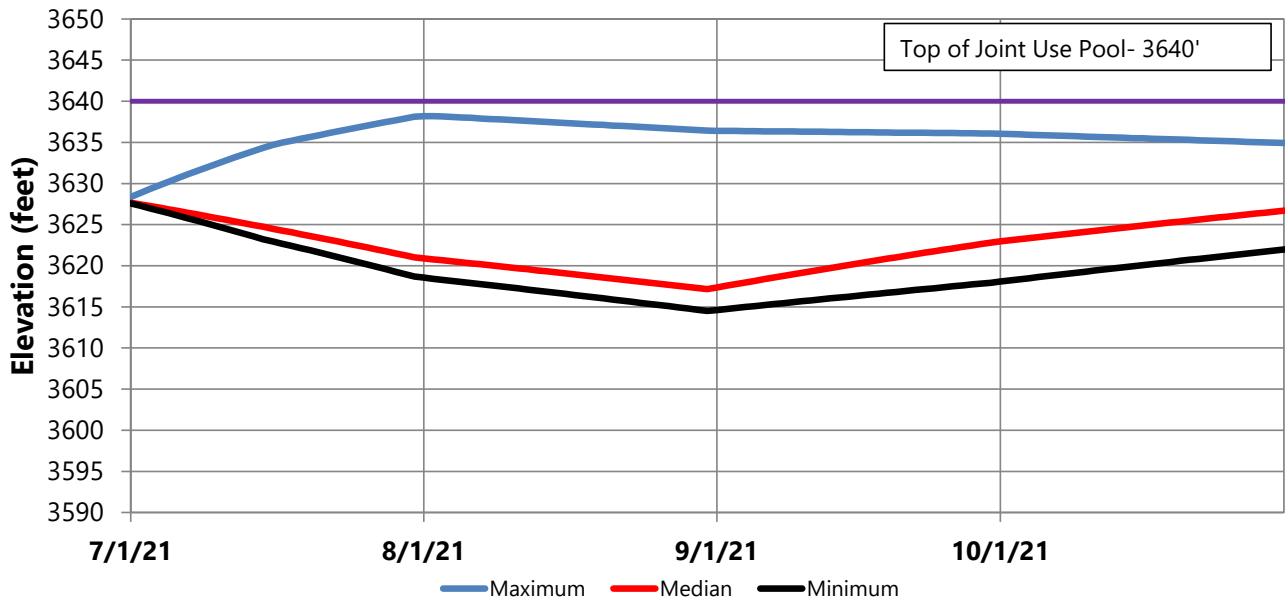
## Release Outlook by Outlet

All releases are currently going through the powerplant and are expected to go through the powerplant under all inflow conditions.

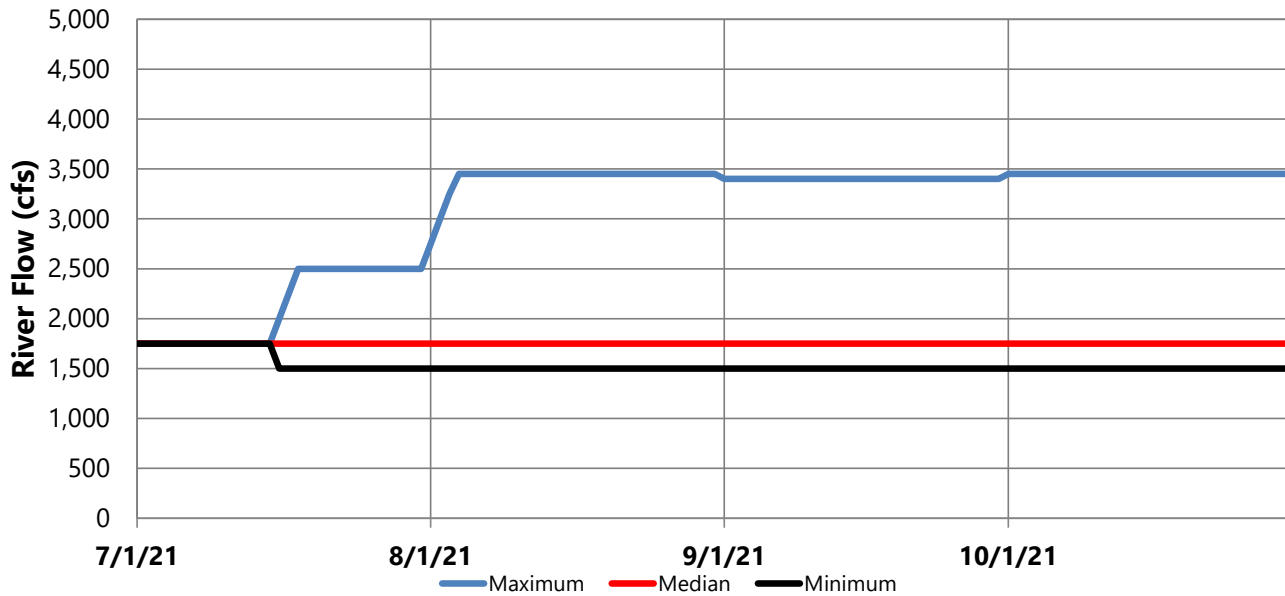
# OPERATIONS OUTLOOK (July 1, 2021 through October 31, 2021)

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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