

# RECLAMATION

## *Managing Water in the West*

Yellowtail Dam Water Supply and Projected Operations

July 2019



Bighorn River Basin Map Source: DEMIS Mapserver

### Forecasted July Operating Range

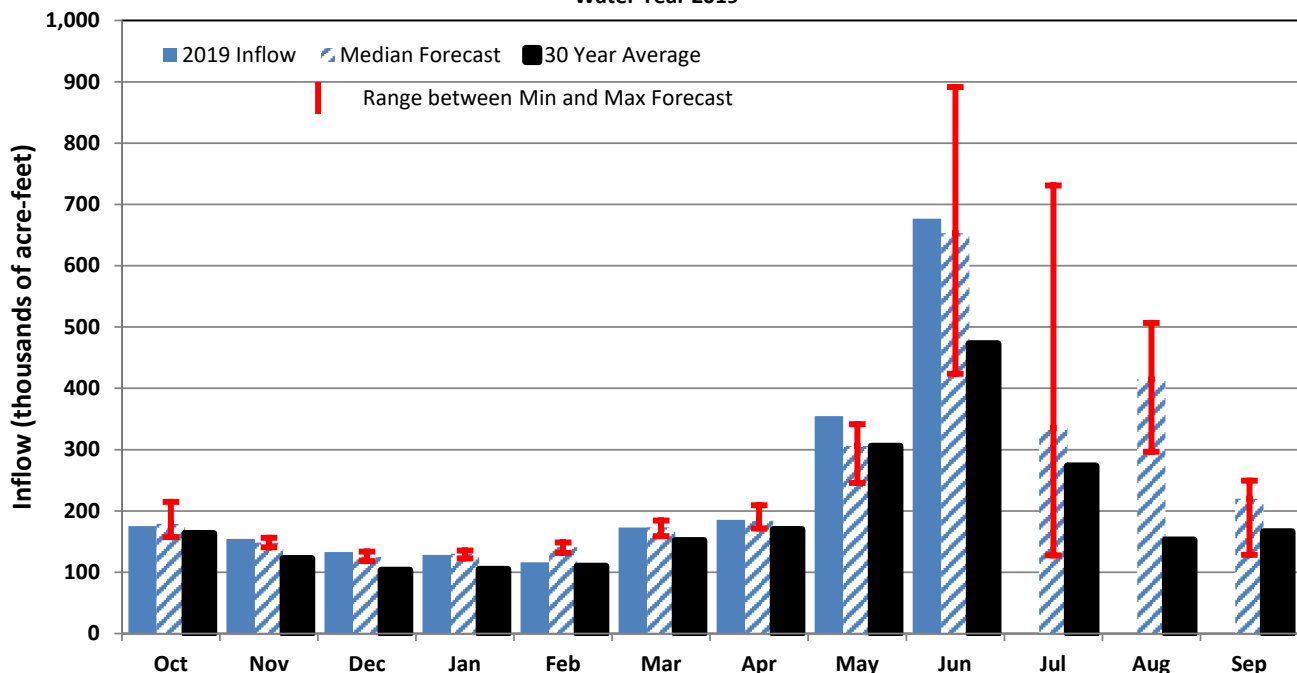
Forecast	Minimum	Median	Maximum
Monthly Average Inflow (cfs)	4,820	6,750	8,240
Monthly Average River Release (cfs)	5,750	7,710	8,880
End of July Elevation (feet)	3640.0	3640.0	3641.6

### July 2019 Inflow Forecast

July Volume	415	
Percent of Average	152	
Water Year	Historic Inflow (kaf)	Rank
2018	373	6
2017	616	3
2016	129	34
2015	224	13
30 Year Average	274	

### Bighorn Lake Inflow

Water Year 2019

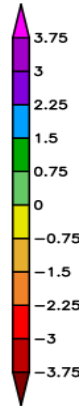
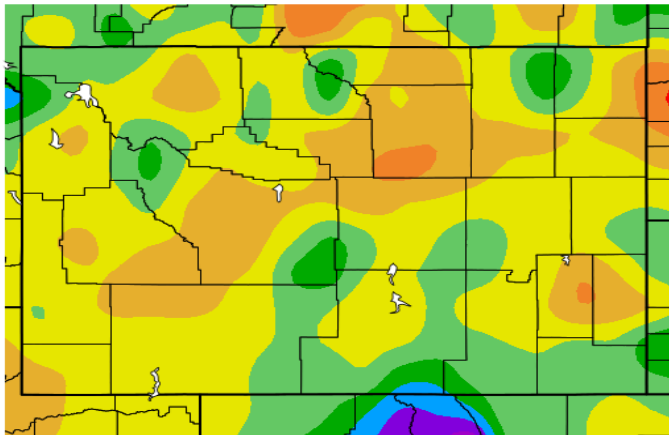


## Climate Departure from Normal

June 1 through June 30, 2019

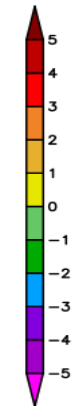
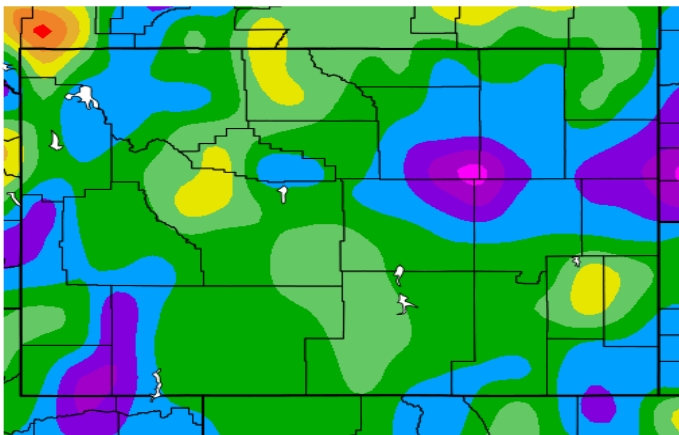
### Precipitation

Departure from Normal (inches)



### Temperature

Departure from Normal (°F)



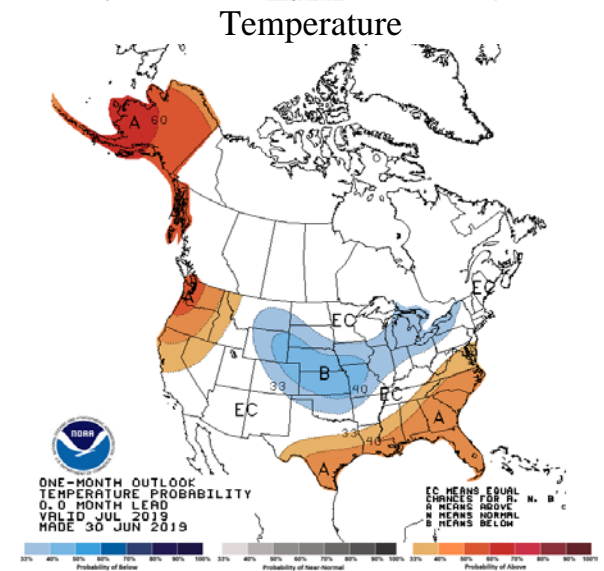
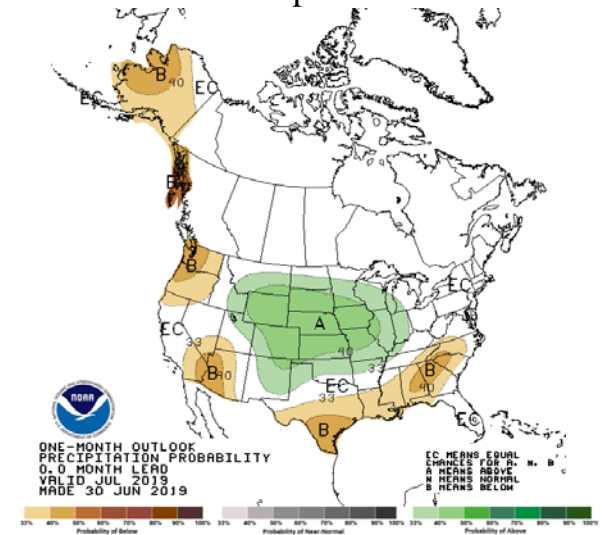
## CLIMATE SUMMARY

Precipitation and temperature were below average with pockets of above average precipitation in the Bighorn River Basin during June.

The July outlook is for 40 percent chance of above average precipitation throughout the Bighorn River Basin. There is also a 33 to 40 percent chance for below average temperatures throughout the Bighorn Basin.

## July Climate Outlook

### Precipitation

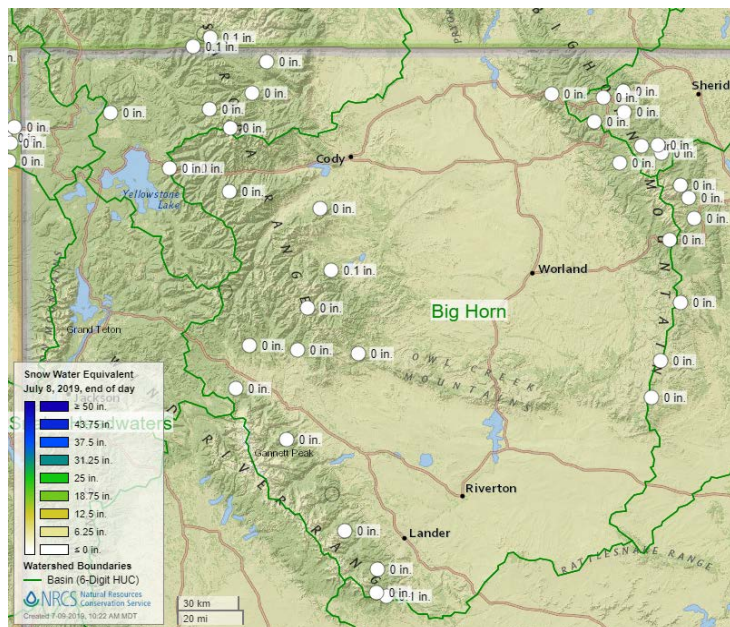
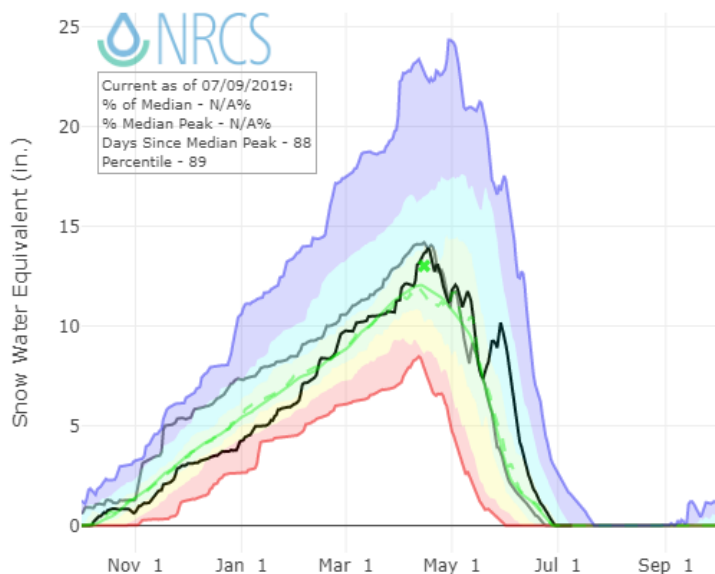


HPRCC using provisional data NOAA Regional Climate Centers

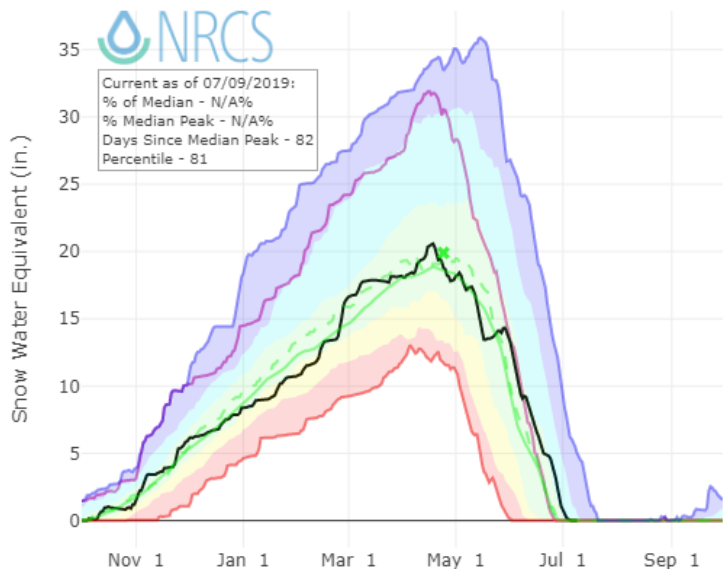
# SNOWPACK SUMMARY

The snow water equivalent (SWE) graphs are a composite of SNOTEL sites within the Bighorn River Basin that is managed by the Department of Natural Resources Conservation Service (NRCS). The July 1, 2019 SNOTEL data, streamflow data and planned releases from Boysen and Buffalo Bill Reservoirs was used to compute a July inflow forecast volume into Bighorn Lake of 414,800 acre-feet, or 152 percent of average.

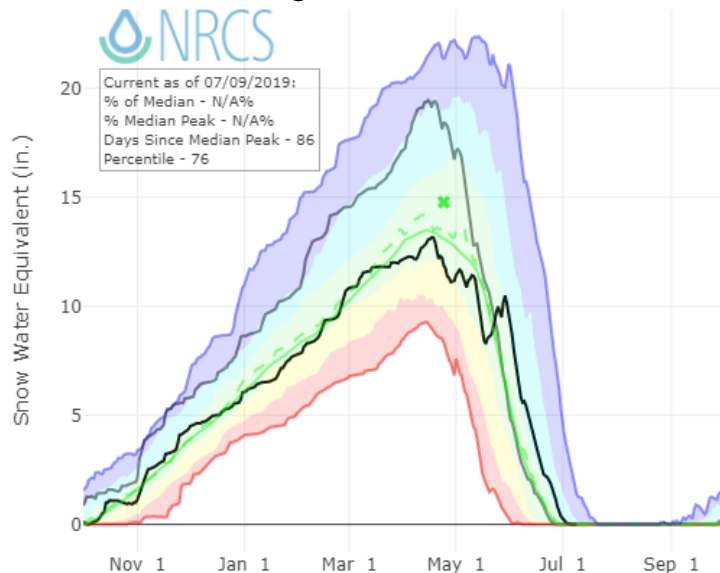
## Wind River



## Shoshone River



## Bighorn River



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

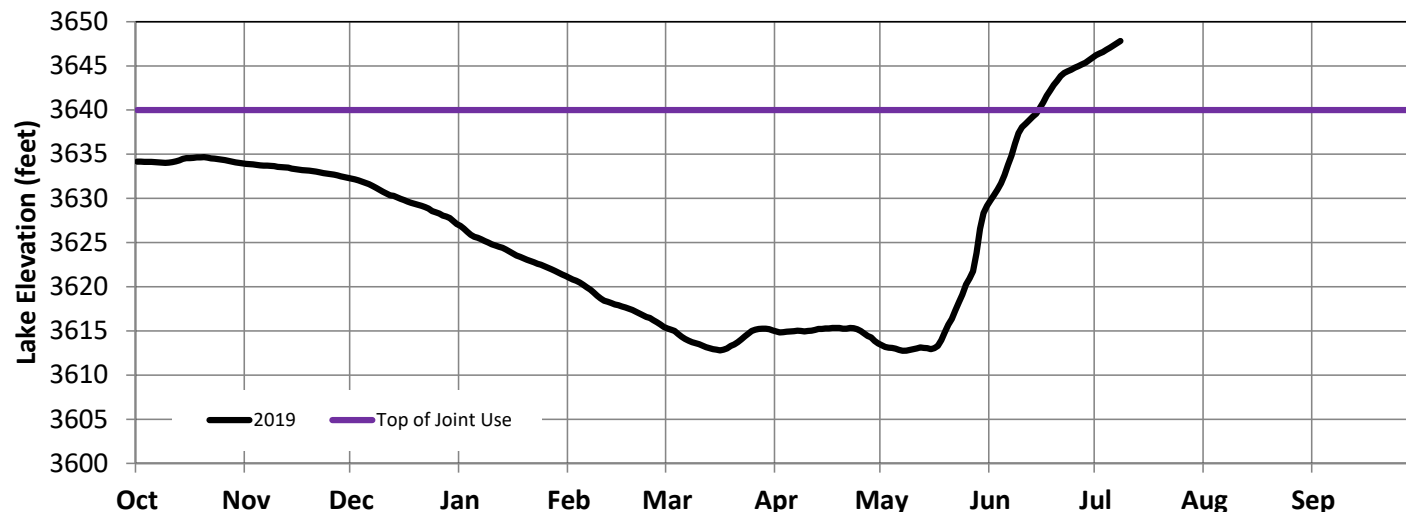
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th Percentiles  
 Normal ('81-'10) – Official median calculated from 1981-2010 data  
 Normal (POR) – Unofficial mean calculated from Period of Record data

- ✱ Median Peak SWE
- Max
- - - Median (POR)
- Median ('81-'10)
- Min
- Stats. Shading
- 2019 (15 sites)
- 2018 (14 sites)

# OPERATIONS REVIEW

Maximum releases to the Bighorn River during June were 11,000 cfs based while peak inflows were 14,655 cfs. Releases were made in accordance with reservoir regulation orders from the U.S. Army Corps of Engineers to assist with flood control along the Missouri River mainstem downstream of Fort Peck Dam.

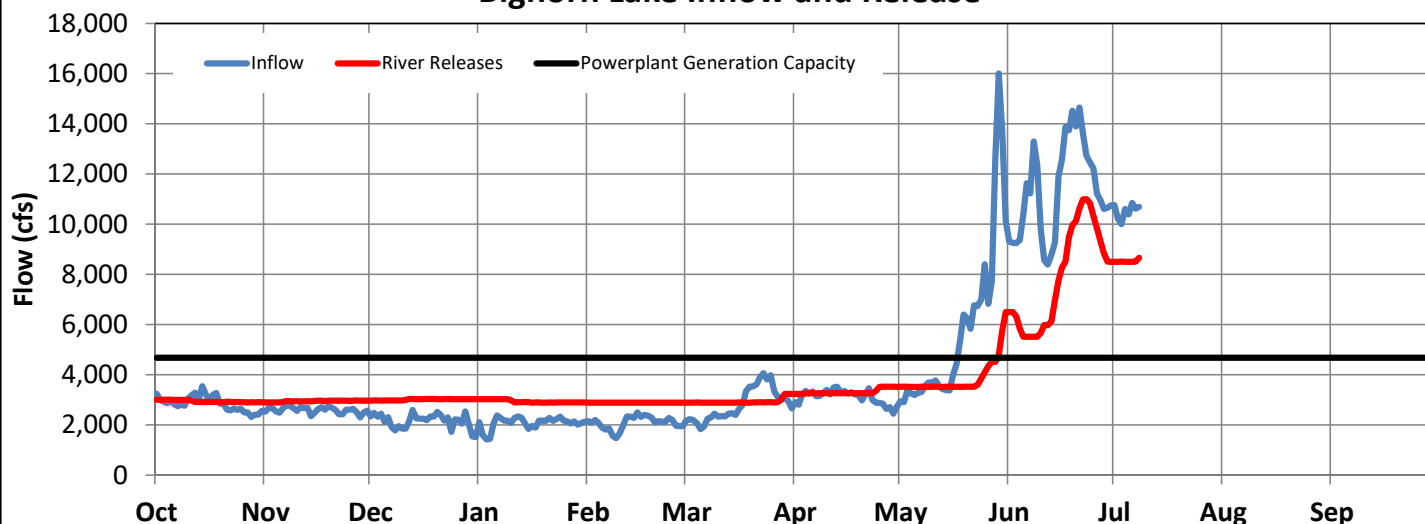
## Bighorn Lake Operations Water Year 2019



### July 1 Storage Conditions

	Elevation feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3645.9	1,101,406	118	108
Buffalo Bill	5388.8	609,049	106	94
Boysen	4726.1	763,382	123	103

## Bighorn Lake Inflow and Release



### Average June Release

### Average June Inflow

	Monthly Avg cfs	Percent of Average		Monthly Avg cfs	Percent of Average
Bighorn River	7,881	102	Bighorn Lake	11,376	116
Buffalo Bill Total Release	3,532	111	Buffalo Bill	7,019	84
Boysen Release	4,782	104	Boysen	7,443	110

# OPERATIONS OUTLOOK

Releases to the Bighorn River are being directed by the U.S. Army Corps of Engineers while water being stored in the exclusive flood control pool. Bighorn Lake is expected to be out of the exclusive flood control pool by approximately the end of July.

## Median Inflow Conditions

	Jul	Aug	Sep	Oct	Nov	Dec
Boysen Release (cfs)	2,882	2,109	1,250	1,000	1,000	1,000
Buffalo Bill Release (cfs)	3,890	1,865	1,721	787	355	355
Tributary Gain (cfs)	-26	-402	524	1,246	1,010	665
Monthly Inflow (cfs)	6,746	3,573	3,496	3,033	2,365	2,020
Monthly Inflow (kaf)	414.8	219.7	208.0	186.5	140.7	124.2
Monthly Release (kaf)	495.6	237.9	193.5	184.9	176.0	181.9
Afterbay Release (cfs)	8,130	3,939	3,322	3,077	3,028	3,028
River Release (cfs)	7,710	3,500	3,028	3,028	3,028	3,028
End-of-Month Content (kaf)	1,020.6	1,002.4	1,016.9	1,018.5	983.2	925.5
End-of-Month Elevation (feet)	3640.0	3638.5	3639.7	3639.8	3636.9	3631.5

## Minimum Inflow Conditions

	Jul	Aug	Sep	Oct	Nov	Dec
Boysen Release (cfs)	2,719	1,200	1,150	1,000	701	699
Buffalo Bill Release (cfs)	2,918	1,862	1,593	779	205	205
Tributary Gain (cfs)	-813	-973	160	1,031	926	594
Monthly Inflow (cfs)	4,824	2,090	2,902	2,810	1,832	1,498
Monthly Inflow (kaf)	296.6	128.5	172.7	172.8	109.0	92.1
Monthly Release (kaf)	377.4	176.4	162.1	152.4	141.2	146.0
Afterbay Release (cfs)	6,208	2,939	2,795	2,548	2,444	2,444
River Release (cfs)	5,751	2,500	2,501	2,500	2,444	2,444
End-of-Month Content (kaf)	1,020.6	972.7	983.3	1,003.7	971.5	917.6
End-of-Month Elevation (feet)	3640.0	3636.0	3636.9	3638.6	3635.9	3630.7

## Maximum Inflow Conditions

	Jul	Aug	Sep	Oct	Nov	Dec
Boysen Release (cfs)	3,443	2,147	1,707	1,000	1,000	1,000
Buffalo Bill Release (cfs)	4,544	2,103	1,795	1,189	358	355
Tributary Gain (cfs)	254	-194	807	1,436	1,071	716
Monthly Inflow (cfs)	8,241	4,056	4,309	3,625	2,428	2,070
Monthly Inflow (kaf)	506.7	249.4	256.4	222.9	144.5	127.3
Monthly Release (kaf)	567.5	297.4	234.4	216.9	180.2	186.2
Afterbay Release (cfs)	9,299	4,907	4,010	3,597	3,099	3,098
River Release (cfs)	8,880	4,500	3,749	3,597	3,099	3,098
End-of-Month Content (kaf)	1,040.6	992.6	1,014.6	1,020.6	984.9	926.0
End-of-Month Elevation (feet)	3641.6	3637.7	3639.5	3640.0	3637.1	3631.6



# OPERATIONS OUTLOOK

Irrigation diversions remained low due to above average precipitaiton throughout the month of June in the Hardin, Montana area. Irrigation diversions are forecasted to increase during July.

## Irrigation Demands Outlook

Bighorn Canal (cfs)	Jul	Aug	Sep	Oct	Nov	Dec
Median Forecast	420	439	294	49	0	0
Minimum Forecast	457	439	294	49	0	0
Maximum Forecast	420	407	260	0	0	0

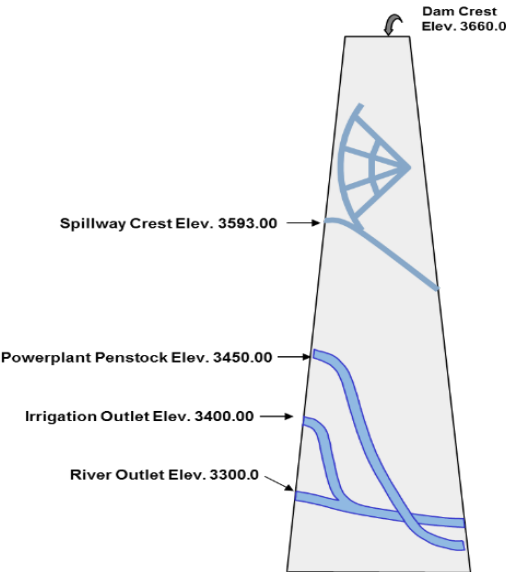
## Power Generation Outlook

Current Number of Units Available: 3  
Approximate Yellowtail Powerplant Turbine Capacity: 6,150 cfs  
Approximate Yellowtail Powerplant Generation Limit: 4,615 cfs

Yellowtail Powerplant Release (cfs)	Jul	Aug	Sep	Oct	Nov	Dec
Median Forecast	4,616	3,869	3,252	3,007	2,958	2,958
Minimum Forecast	4,616	2,869	2,724	2,479	2,373	2,374
Maximum Forecast	4,616	4,616	3,939	3,528	3,028	3,028

Yellowtail Powerplant Generation (gwh)	Jul	Aug	Sep	Oct	Nov	Dec
Median Forecast	115.9	97.3	77.7	73.9	69.4	71.2
Minimum Forecast	115.9	69.4	63.0	58.9	53.5	55.0
Maximum Forecast	115.9	115.9	96.0	88.3	71.3	73.1

Yellowtail Spill (cfs)	Jul	Aug	Sep	Oct	Nov	Dec
Median Forecast	3,445	0	0	0	0	0
Minimum Forecast	1,522	0	0	0	0	0
Maximum Forecast	4,614	221	0	0	0	0



## Release Outlook by Outlet

Release through either the spillway or river outlet works will continue during July.

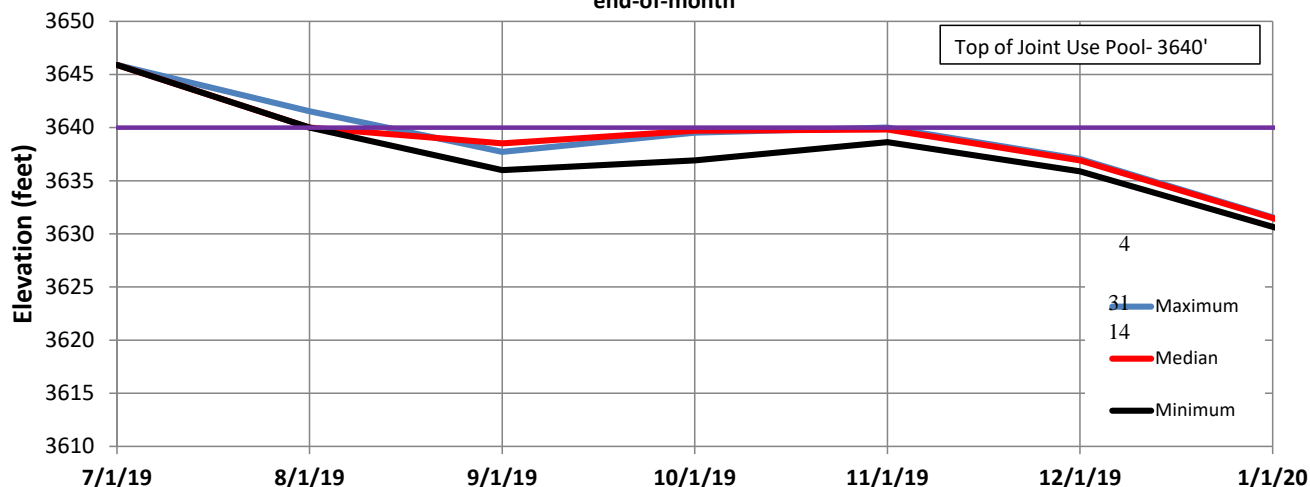
# OPERATIONS OUTLOOK

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. The monthly average river releases during July ranges between 5,750 and 8,880 cfs.

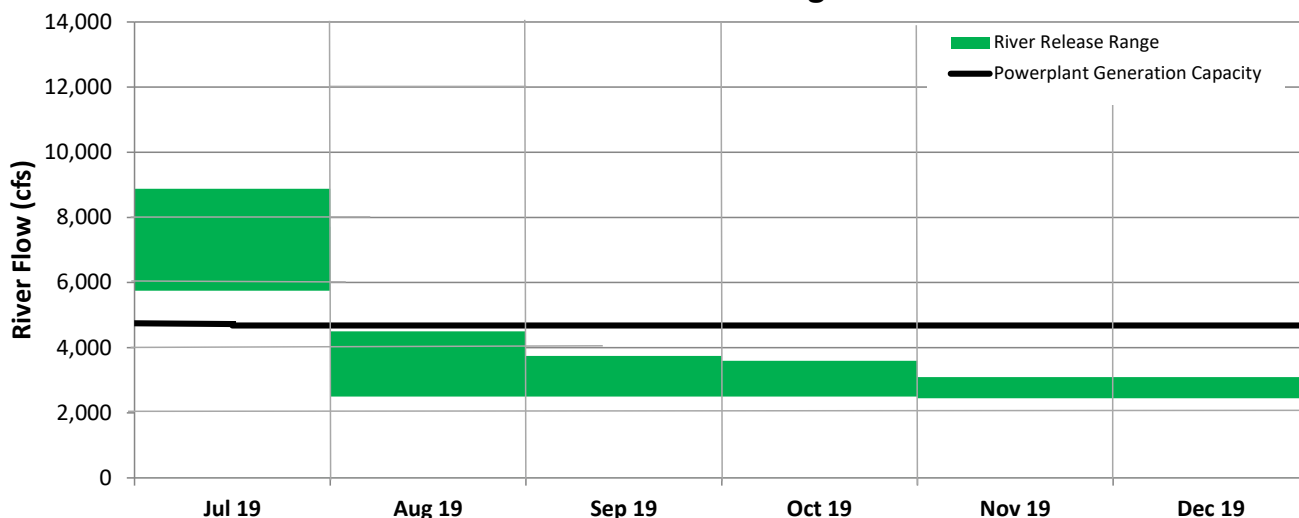
Releases to the Bighorn River are being directed by the U.S. Army Corps of Engineers while water is being stored in the exclusive flood control pool. Bighorn Lake is expected to be out of the exclusive flood control pool by approximately the end of July.

## Bighorn Lake Elevation

end-of-month



## River Release Range



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Monthly Operating Plans, Current Conditions, Snowpack and Other Water Management Information

[https://www.usbr.gov/gp/lakes\\_reservoirs/wareprts/main\\_menu.html](https://www.usbr.gov/gp/lakes_reservoirs/wareprts/main_menu.html)