RECLAMATION
Managing Water in the West

Yellowtail Dam Water Supply and Projected Operations April 2019

Bighorn River Basin Map Source DEMIS Mapserver

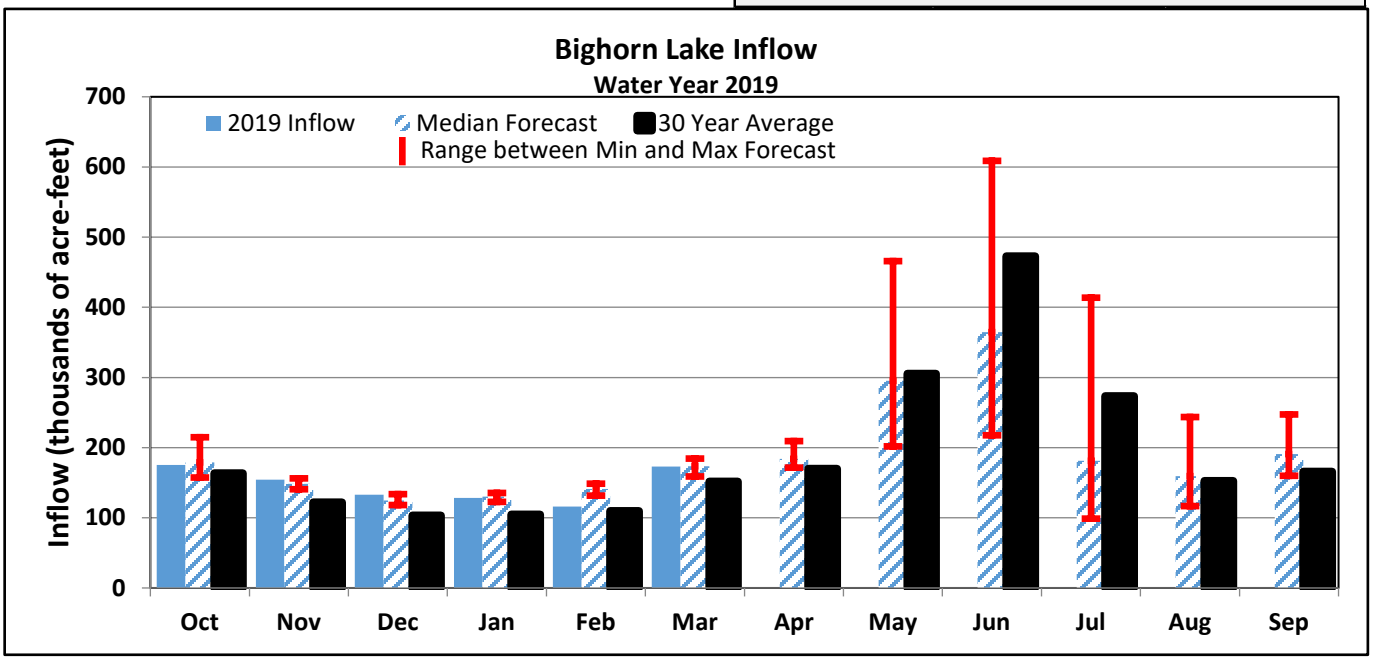
Forecasted April Operating Range

Forecast	Minimum	Median	Maximum
Monthly Average Inflow (cfs)	2,880	3,095	3,515
Monthly Average River Release (cfs)	2,750	3,140	3,750
End of April Elevation (feet)	3616.6	3615.1	3613.5

April 2019 Inflow Forecast
April through July Runoff

April through July Volume (kaf)	1,025
Percent of Average	84

Water Year	Historic Inflow (kaf)	Rank
2018	2,318	3
2017	2,953	1
2016	1,032	32
2015	1,543	17
30 Year Average	1,221	



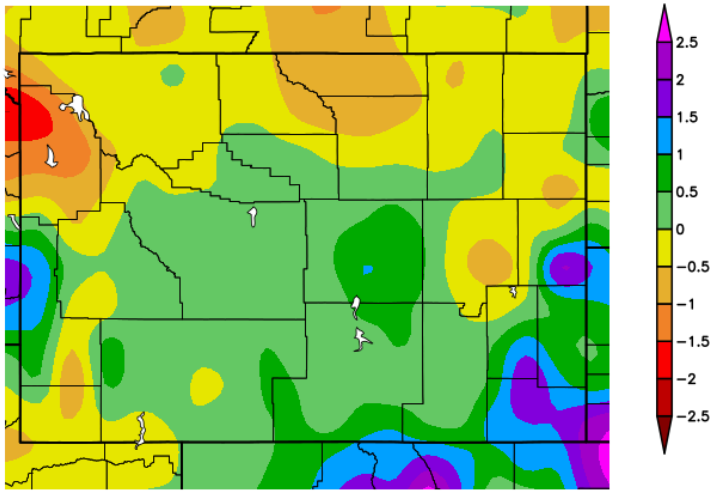
CLIMATE SUMMARY

Climate Departure from Normal

March 1 through March 31, 2019

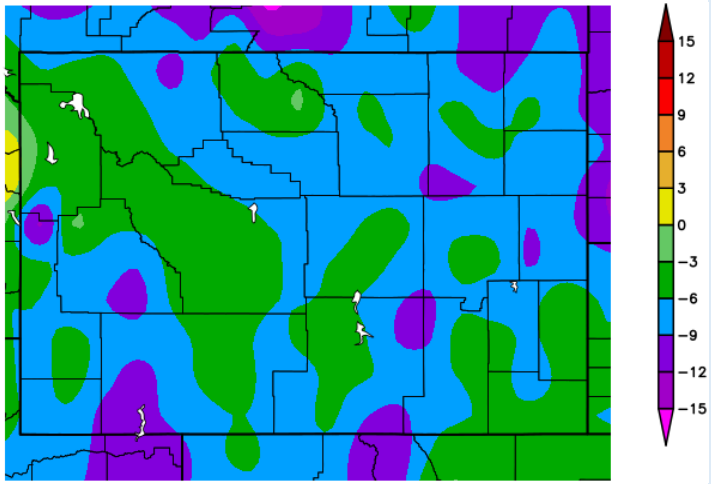
Precipitation

Departure from Normal (inches)



Temperature

Departure from normal (°F)



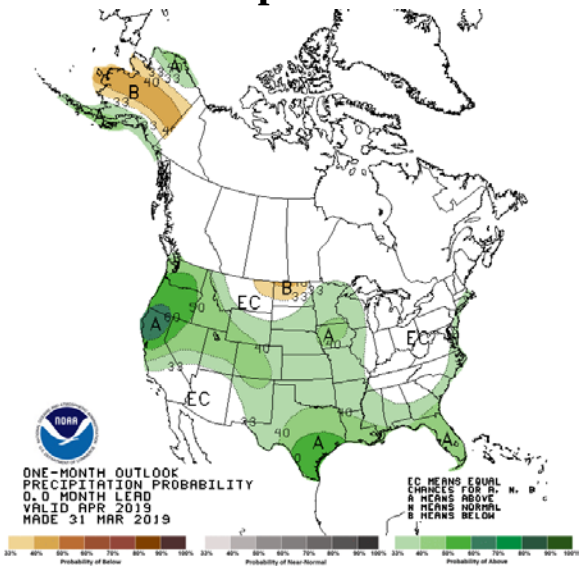
HPRCC using provisional data NOAA Regional Climate Centers

Precipitation was below average in the northern portion of the Bighorn River Basin and drier than average in the southern portion during March. Temperatures were cooler than average throughout the Bighorn River Basin during March.

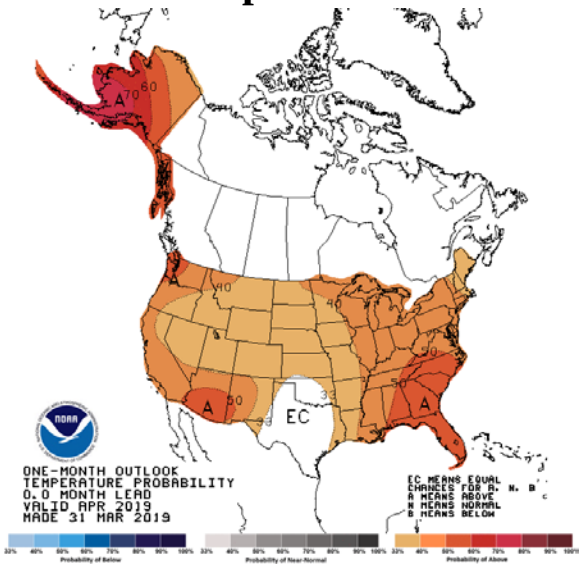
The April outlook is for a greater chance of above average precipitation and temperatures throughout the Bighorn River Basin.

April Climate Outlook

Precipitation



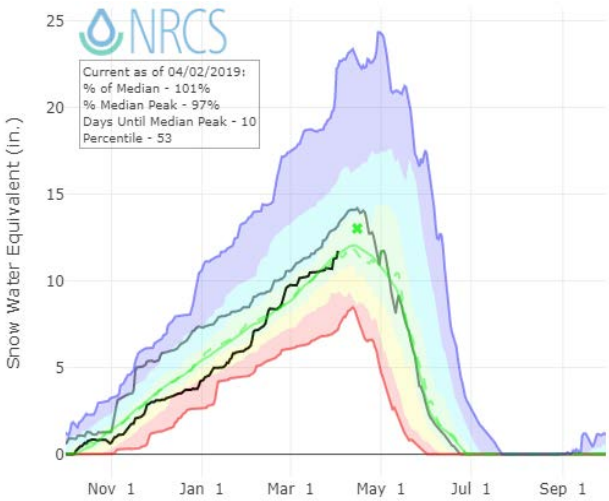
Temperature

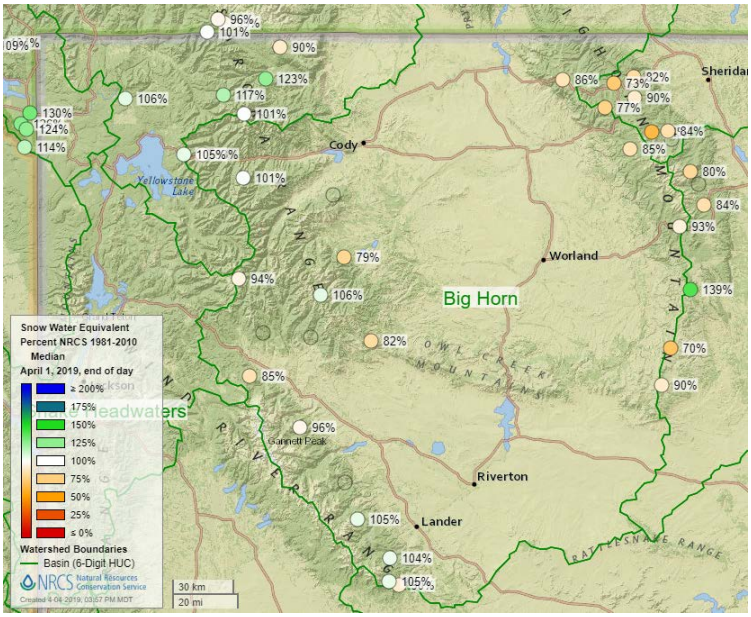


SNOWPACK SUMMARY

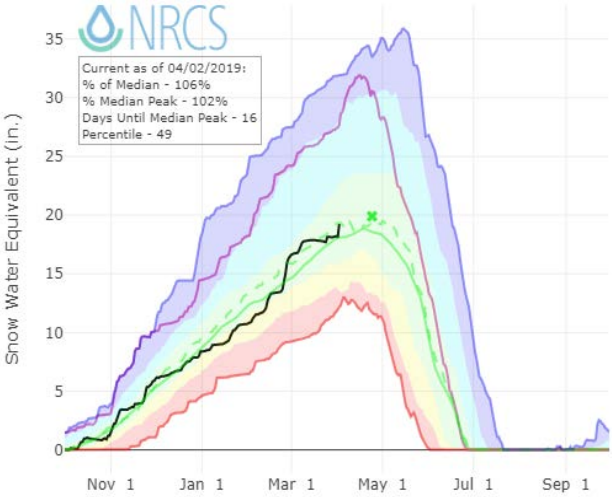
The Snow Water Equivalent graphs are a composite of SNOTEL sites within the Bighorn River Basin that is managed by the Department of Natural Resource and Conservation Service (NRCS). The April 1, 2019 SNOTEL data along with streamflow data was used to compute an April through July runoff inflow forecast volume into Bighorn Lake of 1,025,300 acre-feet, or 84 percent of average.

Wind River

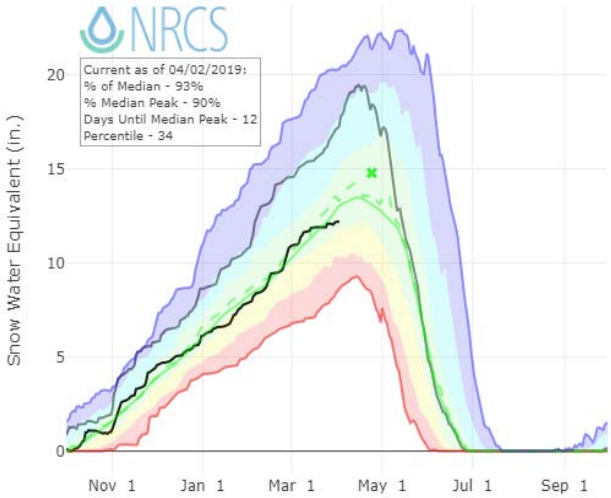




Shoshone River



Bighorn River



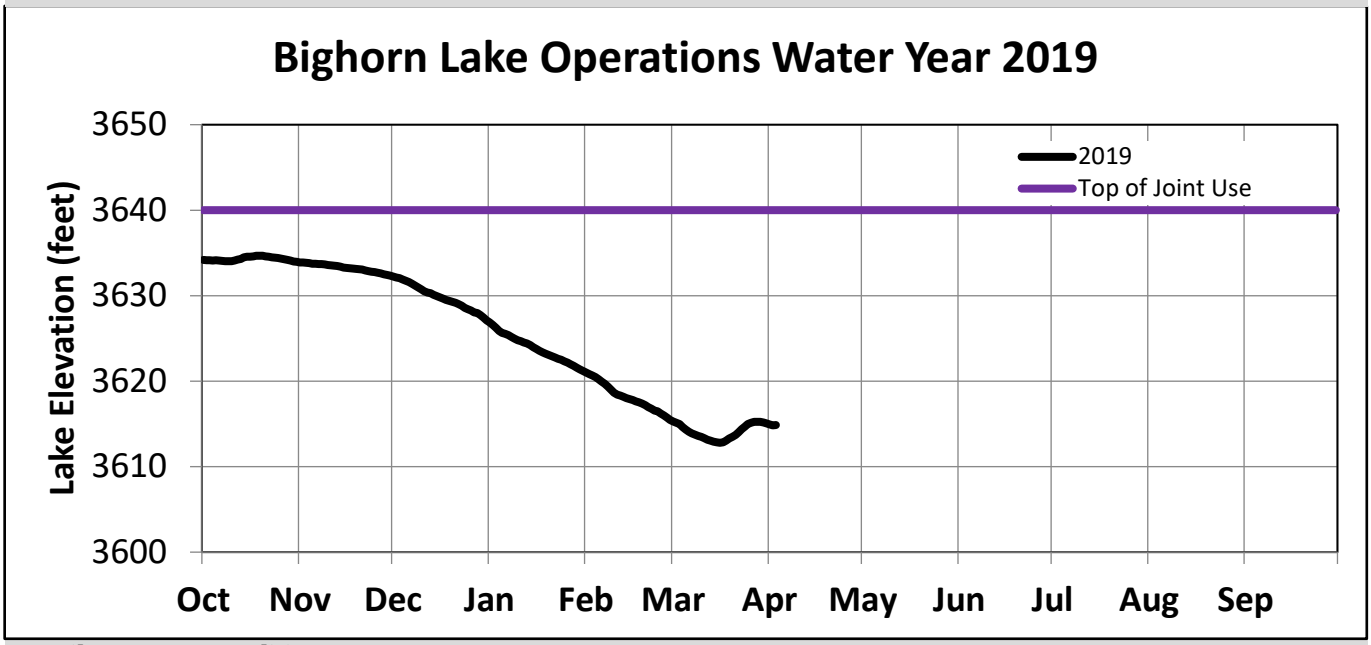
Median Peak SWE
Max
Median (POR)
Median ('81-'10)
Min
Stats. Shading
2019 (5 sites
2018 (4 sites

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

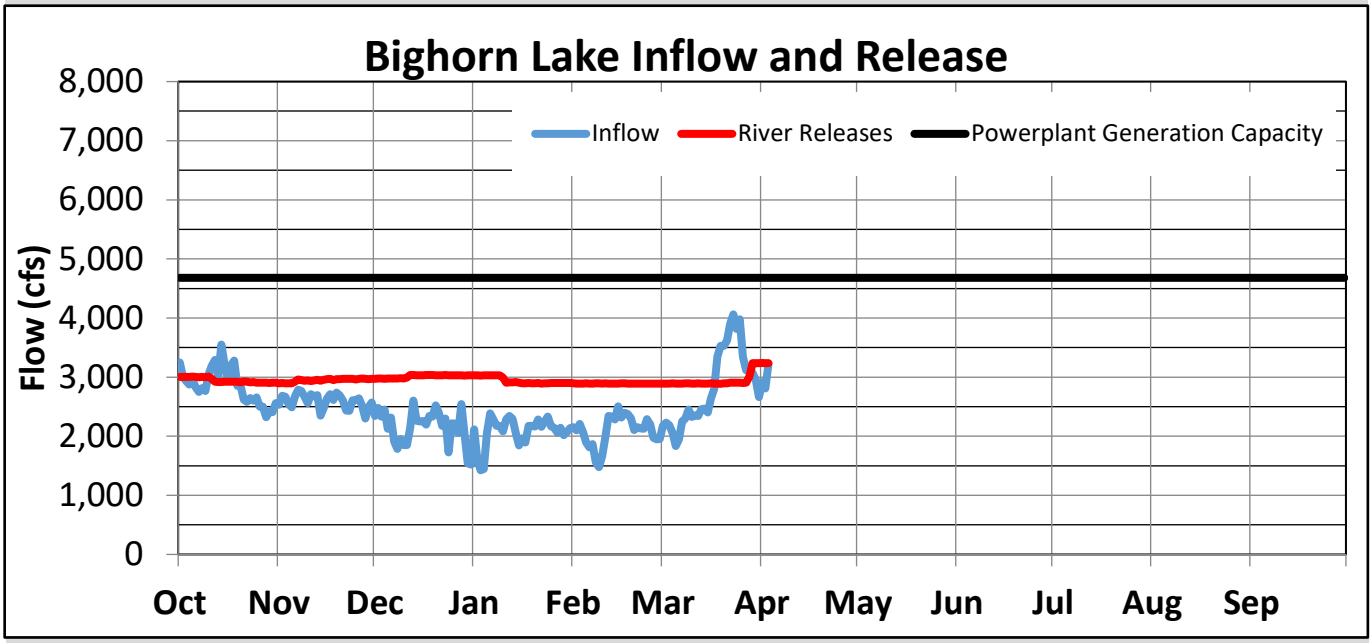
OPERATIONS REVIEW

Releases to the Bighorn River were increased to 3,250 cfs on March 28 based on storage conditions and forecasted inflow. March inflows and releases and end of March elevation were near what was forecasted under median inflow conditions.



April 1 Storage Conditions

	Elevation Feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3615.1	794,937	104	78
Buffalo Bill	5364.7	431,042	104	67
Boysen	4715.4	571,561	107	77



Average March Release

	Monthly Avg cfs	Percent of Average
Bighorn River	2,930	102
Buffalo Bill Total Release	555	138
Boysen Release	1,005	113

Average March Inflow

	Monthly Avg cfs	Percent of Average
Bighorn Lake	2,815	114
Buffalo Bill	355	100
Boysen	960	112

OPERATING OUTLOOK

Releases to the Bighorn River may increase or decrease from 3,250 cfs during April depending upon tributary gains and forecasted outlook for inflows. Bighorn Lake is expected to fill to normal full pool, 3640.0 feet, under median and maximum inflow conditions.

Median Inflow Conditions (April through July Inflow 1,025 kaf)

	April	May	June	July	Aug	Sep
Boysen Release (cfs)	1,002	1,535	1,536	1,535	1,535	1,250
Buffalo Bill Release (cfs)	1,462	2,275	2,396	2,472	1,888	1,694
Tributary Gain (cfs)	630	992	2,195	-1,059	-834	264
Monthly Inflow (cfs)	3,094	4,803	6,127	2,949	2,589	3,208
Monthly Inflow (kaf)	184.1	295.3	364.6	181.3	159.2	190.9
Monthly Release (kaf)	183.9	244.2	226.5	190.6	191.8	176.9
Afterbay Release (cfs)	3,161	4,041	3,877	3,170	3,189	3,043
River Release (cfs)	3,139	3,848	3,494	2,750	2,750	2,749
End-of-Month Content (kaf)	795.1	846.2	984.3	975.0	942.4	956.4
End-of-Month Elevation (feet)	3615.1	3622.2	3637.0	3636.2	3633.2	3634.5

Minimum Inflow Conditions (April through July Inflow 690 kaf)

	April	May	June	July	Aug	Sep
Boysen Release (cfs)	1,000	1,174	1,200	1,199	1,200	1,150
Buffalo Bill Release (cfs)	1,462	1,730	1,850	1,926	1,812	1,499
Tributary Gain (cfs)	420	377	607	-1,517	-1114	39
Monthly Inflow (cfs)	2,882	3,282	3,657	1,607	1,898	2,687
Monthly Inflow (kaf)	171.5	201.8	217.6	98.8	116.7	159.9
Monthly Release (kaf)	161.2	130.6	137.6	144.5	145.7	132.7
Afterbay Release (cfs)	2,780	2,194	2,383	2,420	2,440	2,301
River Release (cfs)	2,749	2,000	2,000	2,000	2,000	2,000
End-of-Month Content (kaf)	805.2	876.4	956.4	910.7	881.7	908.9
End-of-Month Elevation (feet)	3616.6	3626.0	3634.5	3629.9	3626.6	3629.7

Maximum Inflow Conditions (April through July Inflow 1,698 kaf)

	April	May	June	July	Aug	Sep
Boysen Release (cfs)	1,000	2,023	3,354	3,354	2,150	1,707
Buffalo Bill Release (cfs)	1,462	3,371	3,492	3,568	2,103	1,795
Tributary Gain (cfs)	1,055	2,181	3,383	-194	-291	654
Monthly Inflow (cfs)	3,517	7,576	10,230	6,728	3,962	4,156
Monthly Inflow (kaf)	209.3	465.8	608.7	413.7	243.6	247.3
Monthly Release (kaf)	218.9	491.7	396.4	364.8	268.7	234.4
Afterbay Release (cfs)	3,749	8,067	6,732	6,003	4,440	4,010
River Release (cfs)	3,749	7,969	6,485	5,583	4,001	3,749
End-of-Month Content (kaf)	785.3	759.4	971.7	1,020.6	995.5	1008.4
End-of-Month Elevation (feet)	3613.5	3609.2	3635.9	3640.0	3638.0	3639.0

OPERATING OUTLOOK

Irrigation diversions are expected to start in April.

Irrigation Demand Outlook

Bighorn Canal (cfs)

	April	May	June	July	Aug	Sep
Median Forecast	22	194	383	420	439	294
Minimum Forecast	30	194	383	420	439	301
Maximum Forecast	0	98	247	420	439	260

Power Generation Outlook

Current Number of Units Available: 3
Approximate Yellowtail Powerplant Turbine Capacity (cfs): 6,150 cfs
Approximate Yellowtail Powerplant Generation Limit (cfs): 4,680 cfs

Yellowtail Powerplant Release (cfs)

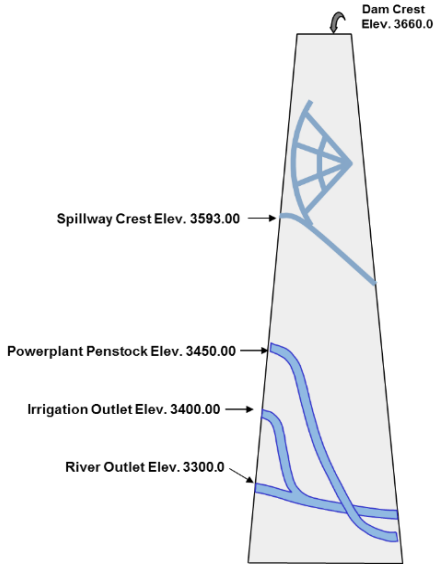
	April	May	June	July	Aug	Sep
Median Forecast	3,091	3,972	3,806	3,100	3,119	2,973
Minimum Forecast	2,709	2,124	2,312	2,350	2,370	2,230
Maximum Forecast	3,679	4,752	4,080	4,752	4,370	3,939

Yellowtail Powerplant Generation (gwh)

	April	May	June	July	Aug	Sep
Median Forecast	69.4	96.5	92.0	75.8	75.9	69.4
Minimum Forecast	59.8	47.7	51.7	54.2	54.4	49.0
Maximum Forecast	84.1	119.3	99.1	119.3	110.4	95.9

Yellowtail Spill (cfs)

	April	May	June	July	Aug	Sep
Median Forecast	0	0	0	0	0	0
Minimum Forecast	0	0	0	0	0	0
Maximum Forecast	0	3,245	2,581	1,181	0	0



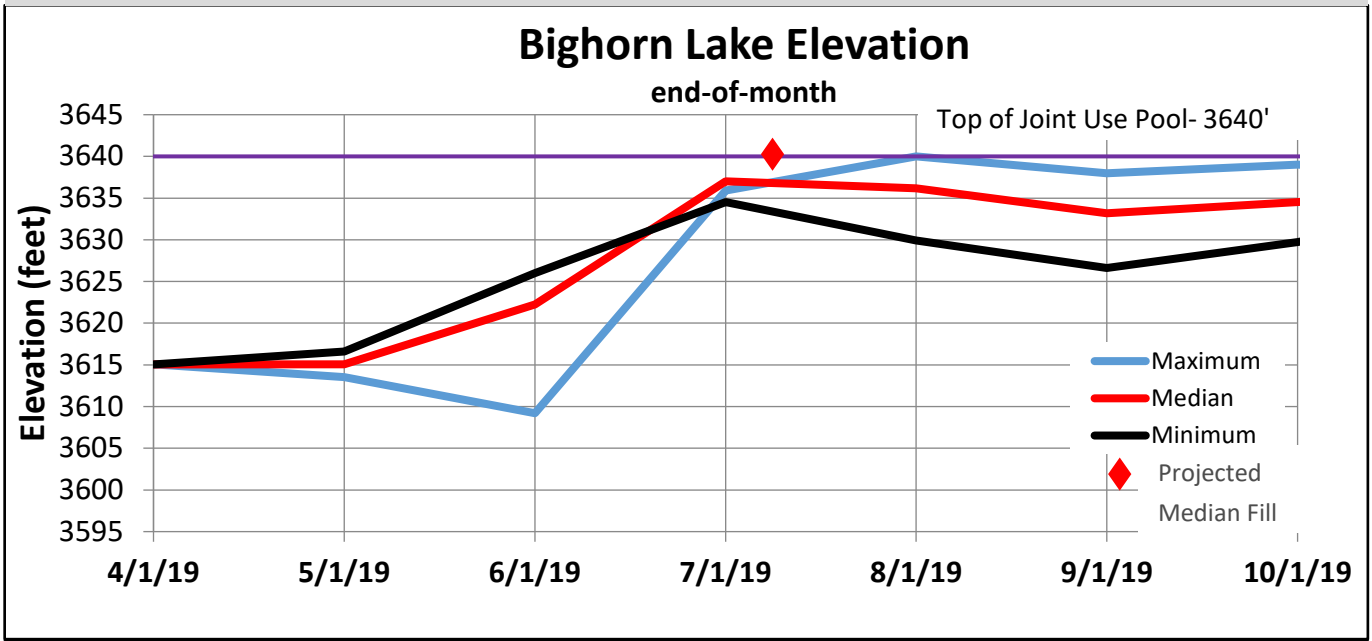
Release Outlook by Outlet

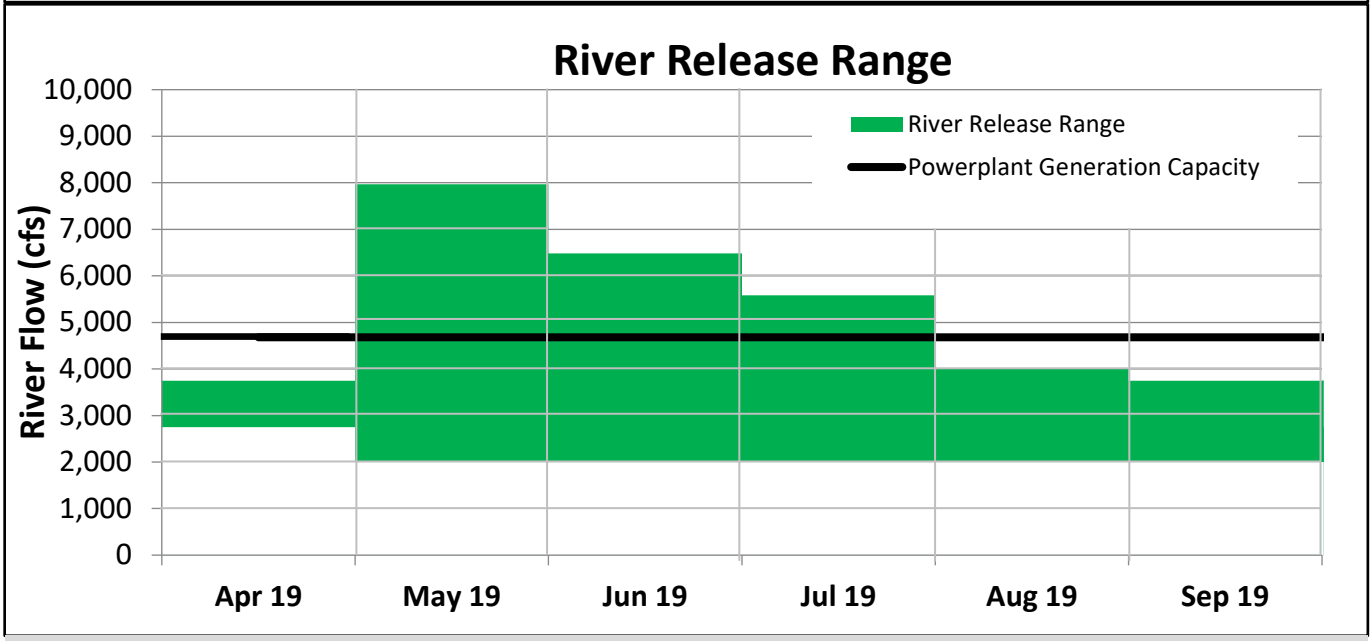
Releases through either the spillway or river outlet works are likely during May, June, and July under maximum inflow conditions.

OPERATING 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 April through July range between 2,000 and 7,970 cfs.

The current median April-July inflow forecast calls for a drawdown to 3615.0 feet and under the maximum inflow forecast a drawdown to 3606.0 feet. The rule curves do not apply to the minimum inflow forecast because the volume, 690,000 acre-feet, is under the minimum reservoir fill volume of 727,000 acre-feet.





Contact Us

Clayton Jordan
cjordan@usbr.gov
406-247-7334

Stephanie Micek
smicek@usbr.gov
406-247-7320

Chris Gomer
cgomer@usbr.gov
406-247-7307

Monthly Operating Plans, Current Conditions, Snowpack and Other Water Management Information
https://www.usbr.gov/gp/lakes_reservoirs/wareprts/main_menu.html