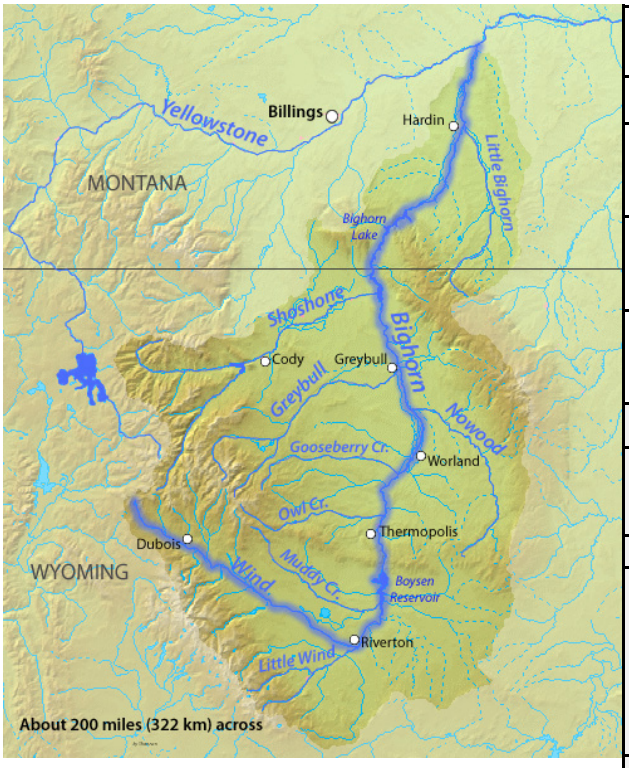
Yellowtail Dam Water Supply and Projected Operations

BUREAU OF RECLAMATION

June 2020



Bighorn River Basin Map Source: DEMIS Mapserver

June Operating Range			
Forecast	**Minimum**	**Median**	**Maximum**
Monthly Average Inflow (cfs)	3,725	5,150	6,905
Monthly Average River Release (cfs)	1,835	2,055	3,895
End of June Elevation (feet)	3630.3	3637.3	3637.1

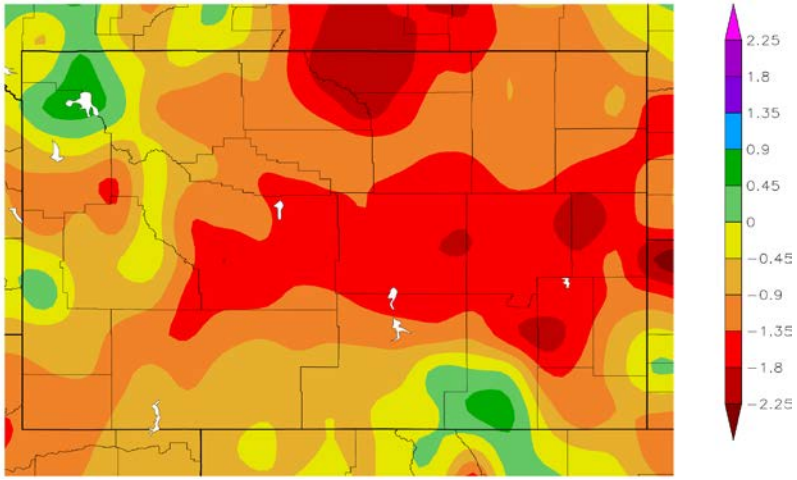
June 2020 Inflow Forecast		
June-July Volume		444
Percent of Average		58
Water Year	**Historic Inflow (kaf)**	**Rank**
2019	1,138	11
2018	1,270	6
2017	1,537	3
2016	552	35
30 Year Average	772	

Climate Departure from Normal

May 1 through May 31, 2020

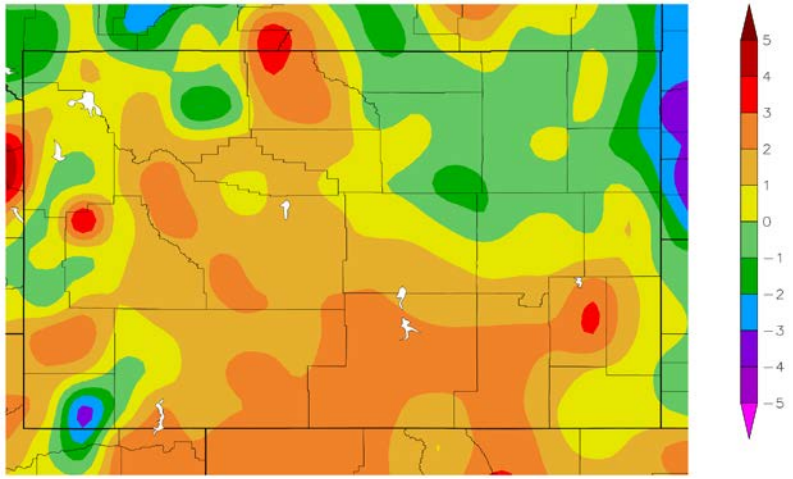
Precipitation

Departure from Normal (inches)



Temperature

Departure from Normal (°F)



HPRCC using provisional data NOAA Regional Climate Centers

CLIMATE SUMMARY

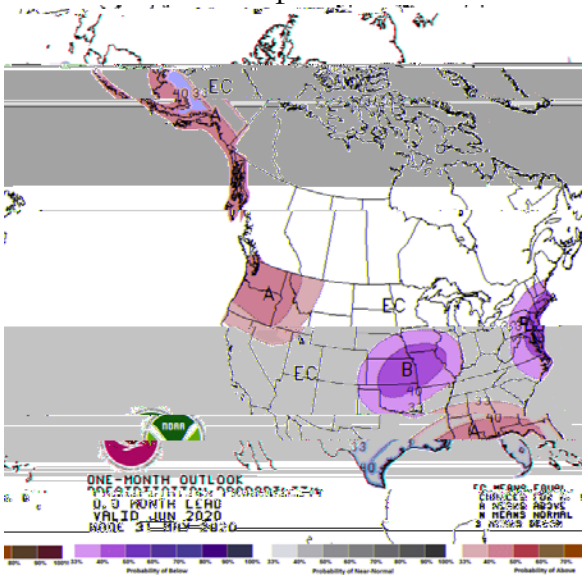
The climate in the Bighorn Basin above Yellowtail Dam was much drier and warmer than average during May.

Record setting temperatures at the end of May melted snowpack quicker than normal leading to increased inflows towards the end of May into the start of June.

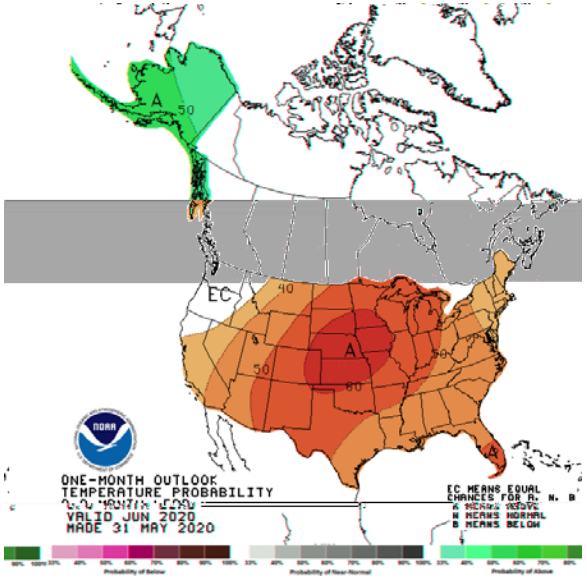
The climate outlook for June shows there is an equal chance precipitation will be above average, below average or average in the Bighorn Basin. There is a 40-50 percent chance temperatures will be above average.

June Climate Outlook

Precipitation



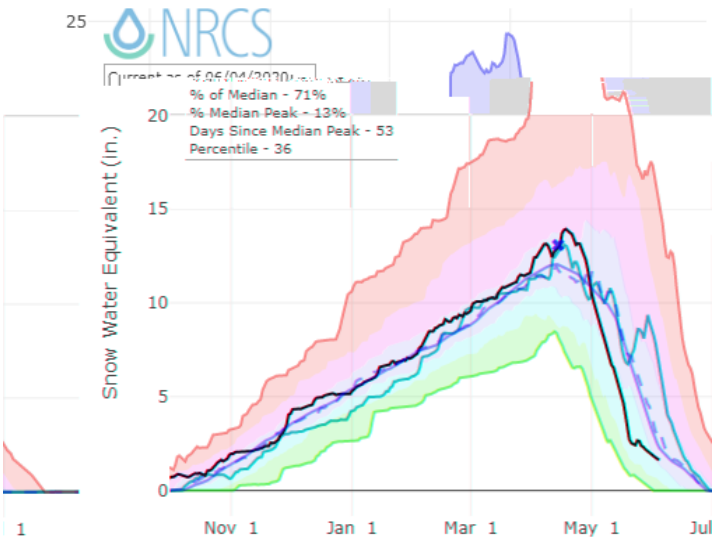
Temperature

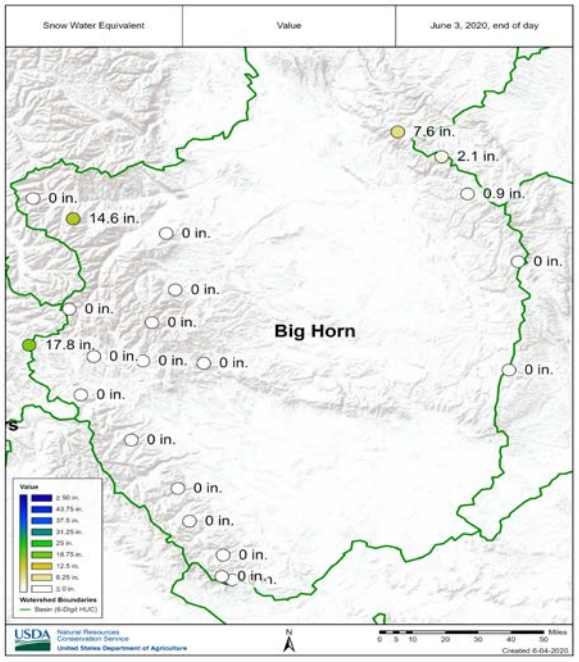


SNOWPACK SUMMARY

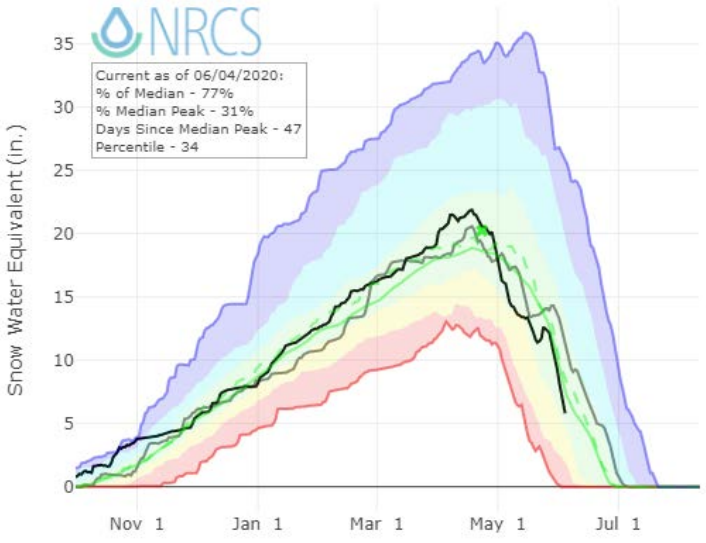
The snow water equivalent (SWE) graphs are a composite of SNOTEL sites within the Bighorn River Basin managed by the Department of Natural Resources Conservation Service (NRCS).

Wind River

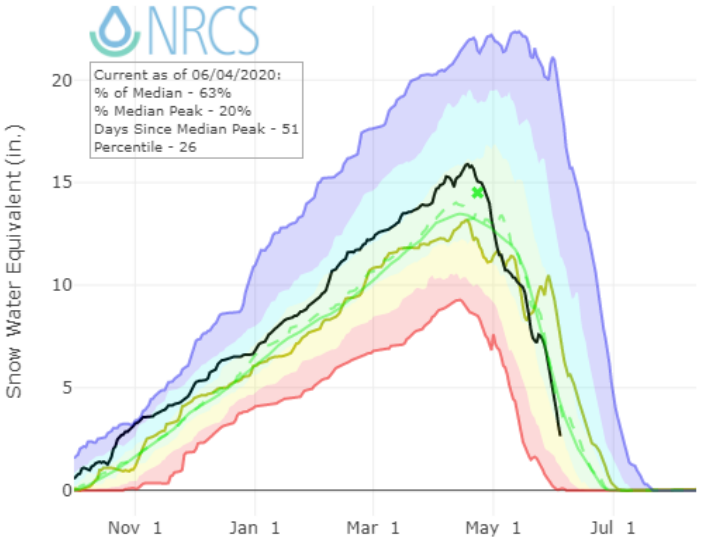


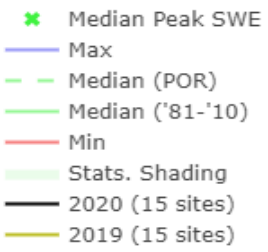


Shoshone River



Bighorn River





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

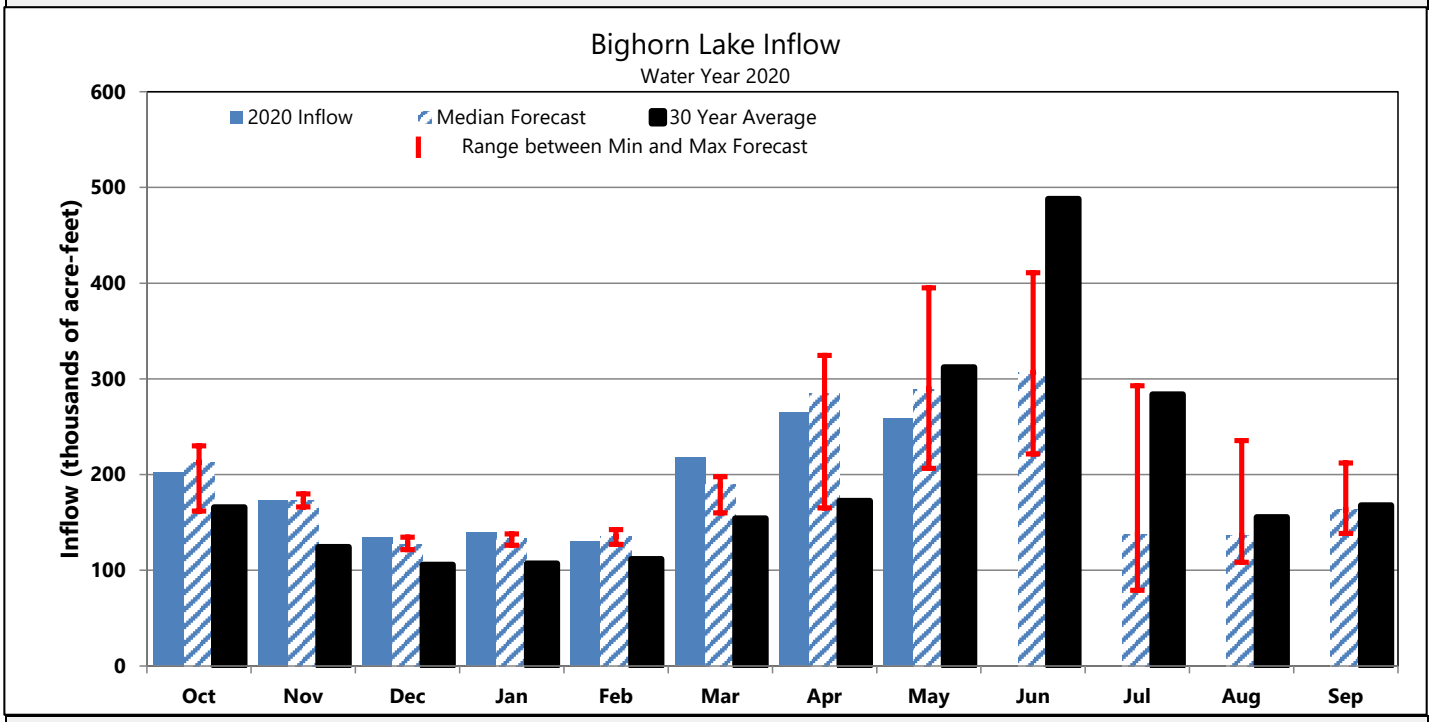
Statistical shading breaks at 10th, 30th,50th, 70th, and 90th Percentiles
Normal ('81-'10) – Official median calculated from 1981-2010 data
Normal (POR) – Unofficial mean calculated from Period of Record data

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.

May Forecast Review

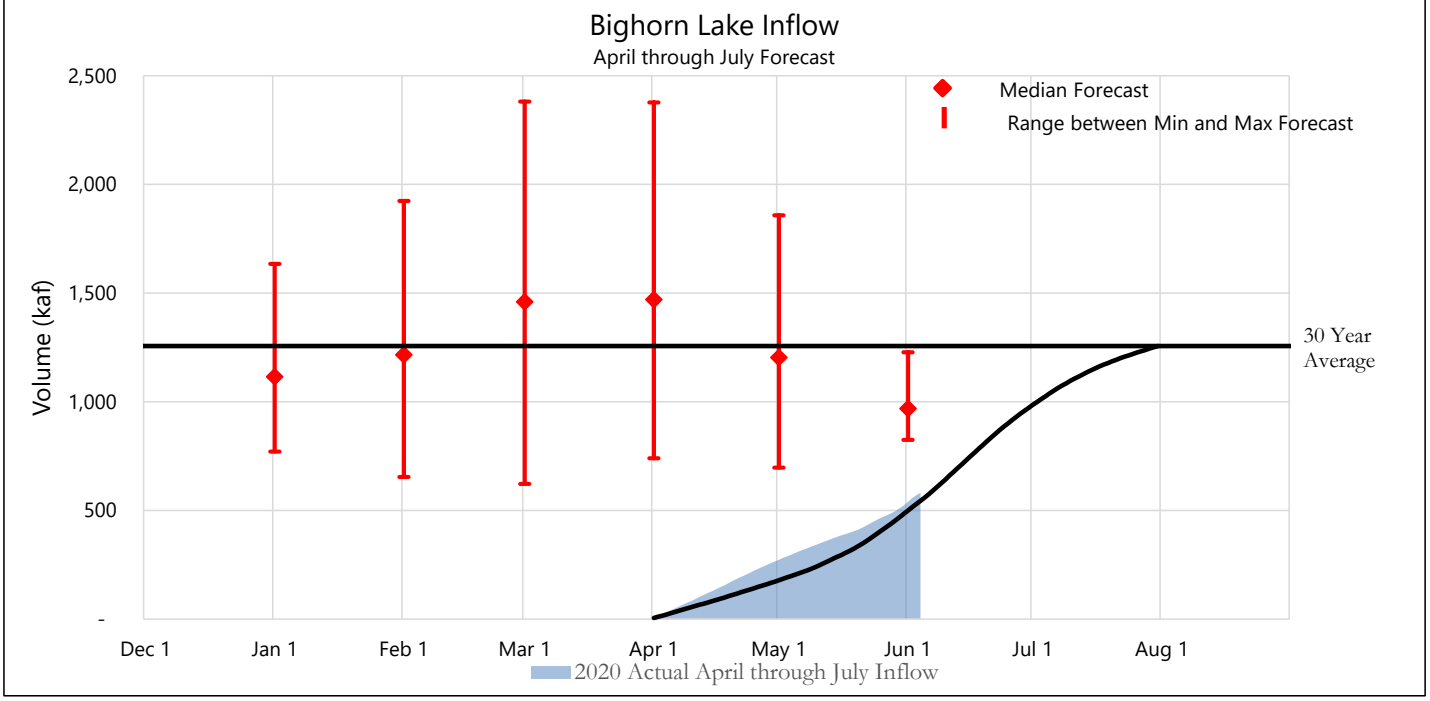
	Median Forecast (kaf)	Actual (kaf)	Difference (kaf)	Actual (% of Avg)
May Inflow	289.5	259.1	(30.4)	83



June through July Inflow Forecast for June 1

	Median Forecast (kaf)	% of Average	Minimum Forecast (kaf)	Maximum Forecast (kaf)
June through July Inflow	443.9	58	300.7	703.7

Actual April-May Inflow	524.0 kaf	**April through July Inflow**	968 kaf	**30 Year Averag**	1,256.4 kaf

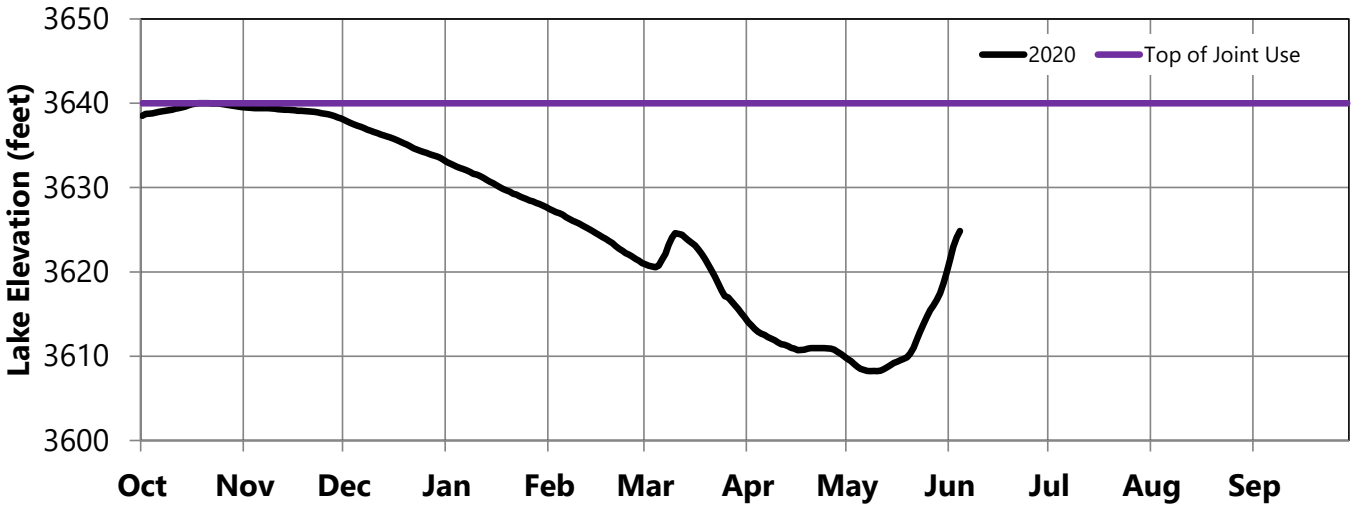


OPERATIONS REVIEW (October 1 through June 1)

River releases were decreased to 2,000 cfs during May due to lower than forecasted inflows. Storage in Bighorn Lake increased by 9.9 feet or 64,700 AF during May. The reservoir elevation on May 31 was approximately 1 foot lower than what forecasted under median inflow conditions.

June 1 Storage Conditions

	Elevation feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3619.9	828,644	101	81
Buffalo Bill	5372.5	485,988	105	75
Boysen	4712.6	530,410	99	72

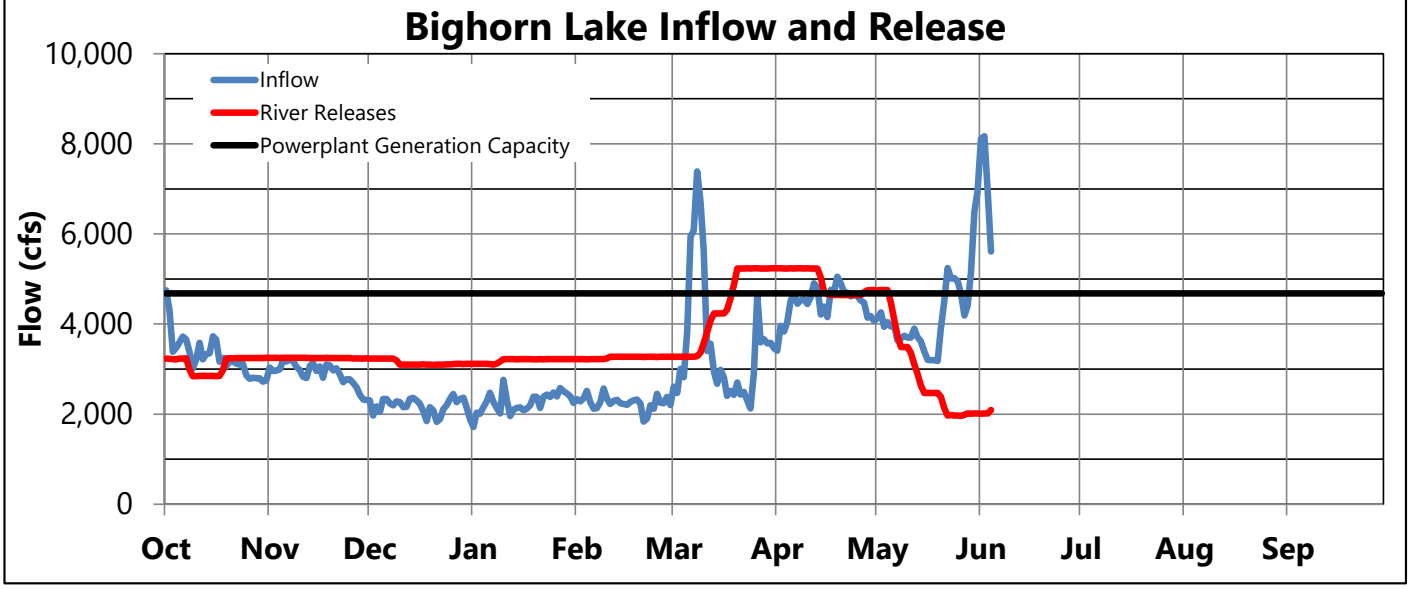


Average May Release

	Monthly Avg cfs	Percent of Average
Bighorn River	2,920	79
Buffalo Bill Total Release	2,320	103
Boysen Release	1,575	81

Average May Inflow

	Monthly Avg cfs	Percent of Average
Bighorn Lake	4,215	83
Buffalo Bill	3,810	126
Boysen	1,640	71



OPERATIONS OUTLOOK (June 1 through October 31)

The river release rate from Yellowtail Dam was increased to 2,250 cfs by June 4. Releases may decrease or increase during the rest of June based on actual conditions. In accordance with current criteria, releases from Yellowtail Dam are adjusted as needed based on actual and revised forecasted inflows to stay on track with the June 30 elevation target while maintaining a release of 2,000 cfs or more. The end of June elevation target based on the current June through July inflow forecast, 444 kaf, is 3638.2 feet.

Median Inflow Conditions (June through July Inflow 444 kaf)

	Jun	Jul	Aug	Sep	Oct
Boysen Release (cfs)	1,400	1,400	1,251	1,000	950
Buffalo Bill Release (cfs)	3,050	2,326	2,062	1,692	696
Tributary Gain (cfs)	702	-1,493	-1,099	50	953
Monthly Inflow (cfs)	5,152	2,233	2,214	2,742	2,599
Monthly Inflow (kaf)	306.6	137.3	136.1	163.2	159.8
Monthly Release (kaf)	151.4	153.7	165.3	150.8	141.3
Afterbay Release (cfs)	2,544	2,500	2,689	2,535	2,299
River Release (cfs)	2,054	2,000	2,250	2,250	2,250
End-of-Month Content (kaf)	988.0	975.9	951.0	967.5	990.3
End-of-Month Elevation (feet)	3637.3	3636.3	3634.0	3635.5	3637.5

Minimum Inflow Conditions (June through July Inflow 301 kaf)

	Jun	Jul	Aug	Sep	Oct
Boysen Release (cfs)	1,250	1,251	1,251	1,050	600
Buffalo Bill Release (cfs)	3,050	1,976	1,862	1,499	696
Tributary Gain (cfs)	-576	-1,940	-1,350	-222	729
Monthly Inflow (cfs)	3,724	1,287	1,763	2,327	2,025
Monthly Inflow (kaf)	221.6	79.1	108.4	138.5	124.5
Monthly Release (kaf)	140.5	135.3	130.7	115.1	104.5
Afterbay Release (cfs)	2,361	2,200	2,125	1,935	1,699
River Release (cfs)	1,836	1,650	1,650	1,650	1,650
End-of-Month Content (kaf)	913.9	862.0	844.1	871.6	896.0
End-of-Month Elevation (feet)	3630.3	3624.3	3622.0	3625.4	3628.3

Maximum Inflow Conditions (June through July Inflow 704 kaf)

	Jun	Jul	Aug	Sep	Oct
Boysen Release (cfs)	1,400	2,363	2,249	1,395	1,000
Buffalo Bill Release (cfs)	3,469	3,542	2,482	1,949	709
Tributary Gain (cfs)	2,037	-1,143	-901	220	1,073
Monthly Inflow (cfs)	6,906	4,762	3,830	3,564	2,782
Monthly Inflow (kaf)	410.9	292.8	235.5	212.1	171.1
Monthly Release (kaf)	258.6	261.4	240.1	216.2	206.0
Afterbay Release (cfs)	4,346	4,251	3,904	3,634	3,350
River Release (cfs)	3,896	3,831	3,498	3,475	3,350
End-of-Month Content (kaf)	985.1	1,020.8	1,020.6	1,020.6	990.0
End-of-Month Elevation (feet)	3637.1	3640.0	3640.0	3640.0	3637.5

OPERATIONS OUTLOOK (June 1 through October 31)

There is approximately 70 cfs of gain between Yellowtail Dam and Yellowtail Afterbay Dam from spring 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 diversions started on April 16.

Irrigation Demands Outlook

Bighorn Canal (cfs)

	Jun	Jul	Aug	Sep	Oct
Median Forecast	490	500	439	285	49
Minimum Forecast	525	550	475	285	49
Maximum Forecast	450	420	407	159	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)

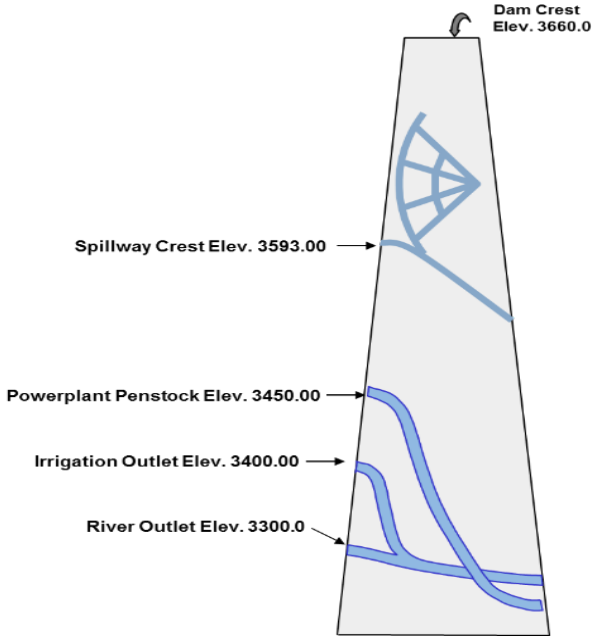
	Jun	Jul	Aug	Sep	Oct
Median Forecast	2,474	2,430	2,619	2,465	2,229
Minimum Forecast	2,291	2,130	2,055	1,865	1,629
Maximum Forecast	3,601	4,082	3,834	3,564	3,280

Yellowtail Powerplant Generation (gwh)

	Jun	Jul	Aug	Sep	Oct
Median Forecast	82.0	81.5	88.5	82.5	73.7
Minimum Forecast	74.6	69.0	66.1	60.5	53.9
Maximum Forecast	119.0	135.7	128.6	120.2	111.0

Yellowtail Spill (cfs)

	Jun	Jul	Aug	Sep	Oct
Median Forecast	0	0	0	0	0
Minimum Forecast	0	0	0	0	0
Maximum Forecast	676	99	0	0	0



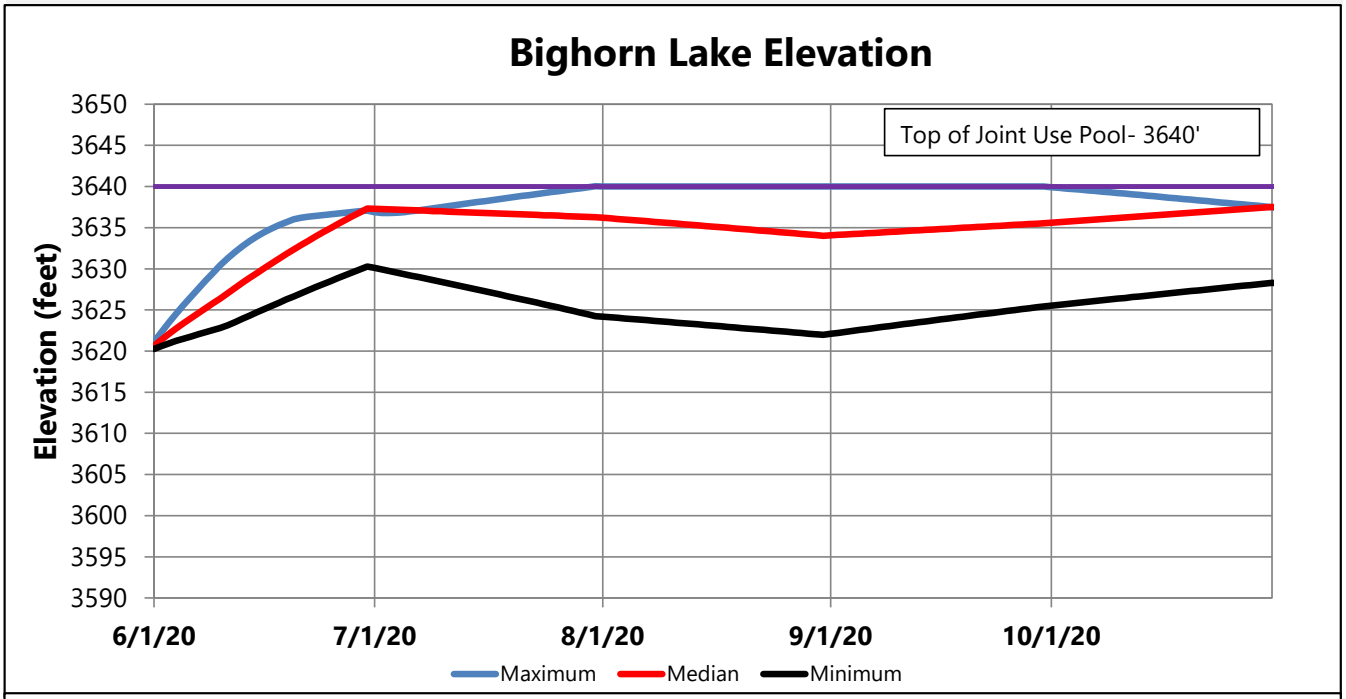
Release Outlook by Outlet

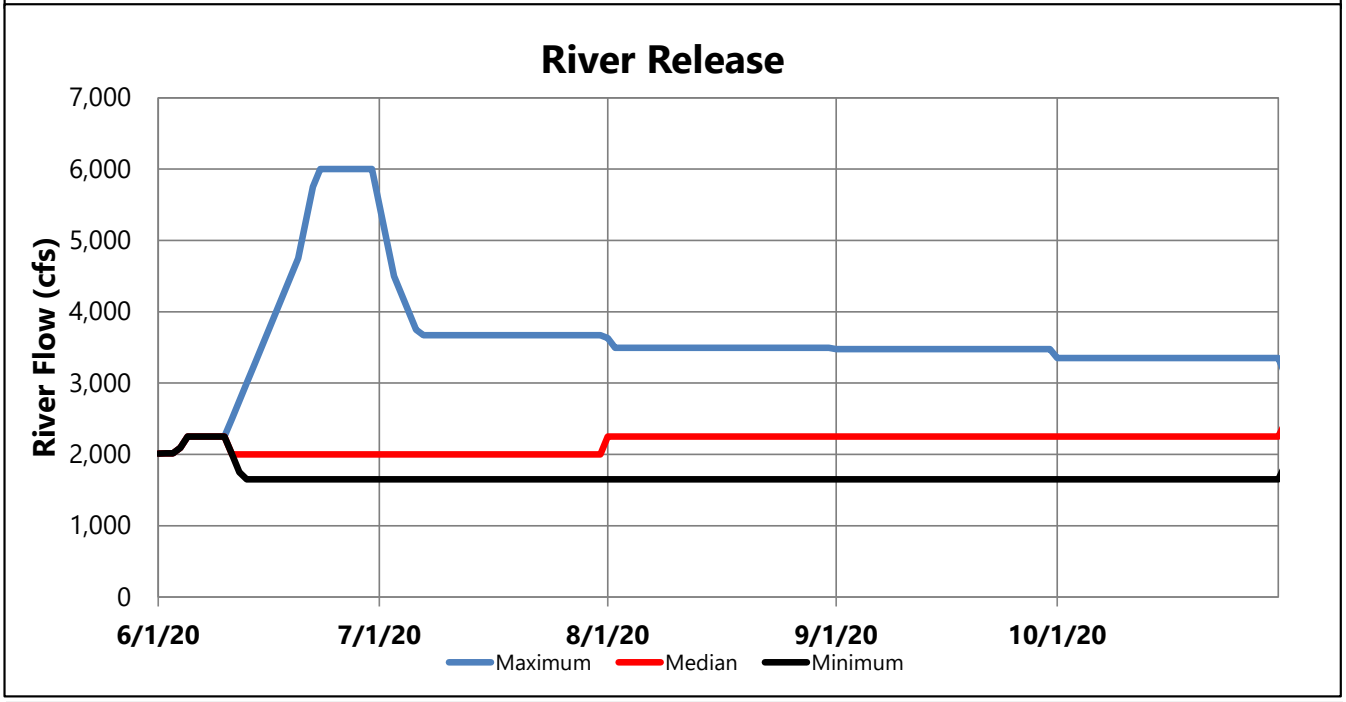
Currently all releases are through the powerplant. Powerplant bypass releases would only be expected under maximum inflow conditions during June and July.

OPERATIONS OUTLOOK (June 1 through October 31)

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 elevation of Bighorn Lake at the end of June is expected to be between 3630 and 3637 feet. Bighorn Lake is expected to fill to normal full pool, elevation 3640 feet, under maximum inflow conditions.





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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