

Yellowtail Dam Water Supply and Projected Operations



— BUREAU OF —
RECLAMATION

February 2021



Bighorn River Basin Map Source: DEMIS Mapserver

February Operating Range			
Forecast	Minimum	Median	Maximum
Monthly Average Inflow (cfs)	1,435	1,580	1,730
Monthly Average River Release (cfs)	2,120	2,220	2,220
End of February Elevation (feet)	3621.3	3621.7	3622.8
April through July 2021 Inflow Forecast (kaf)			
April through July Volume			711
Percent of Average			56
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		

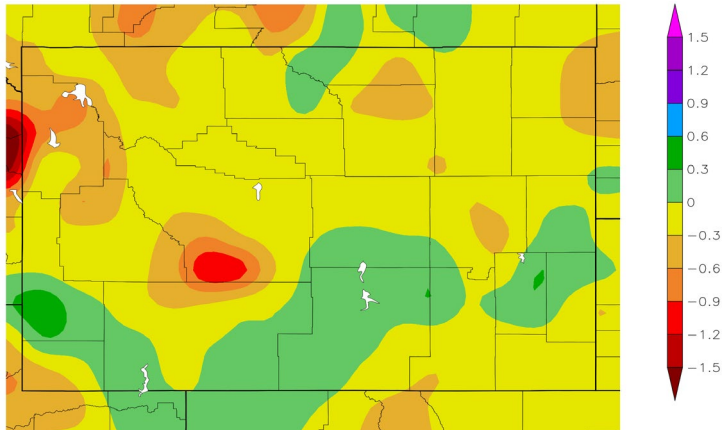


Climate Departure from Normal

January 1 through January 31, 2021

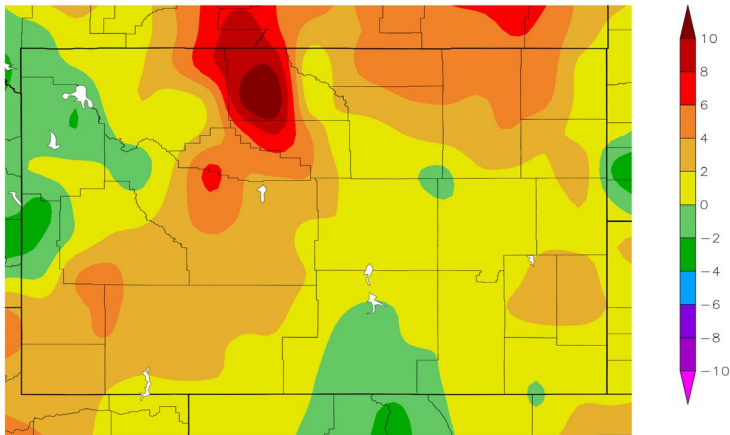
Precipitation

Departure from Normal (inches)



Temperature

Departure from Normal (°F)



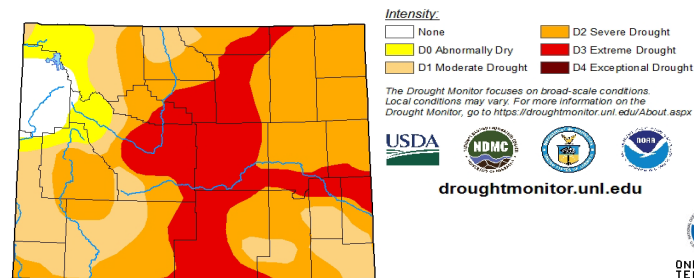
CLIMATE SUMMARY

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

The climate outlook shows there is a 33 to 40 percent chance precipitation will be greater than average during February. There is a 40 to 50 percent chance temperatures will be below average.

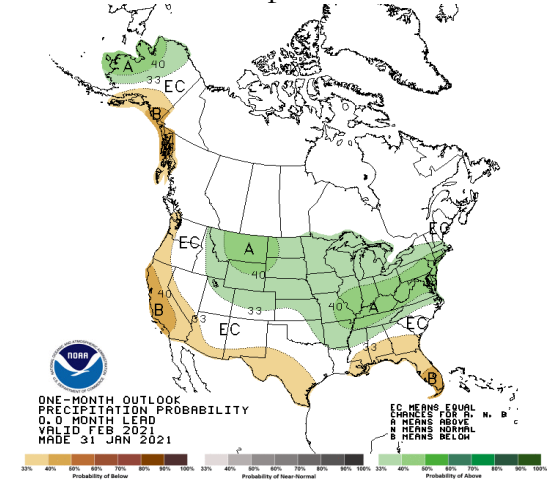
Wyoming Drought Monitor Map

January 26, 2021

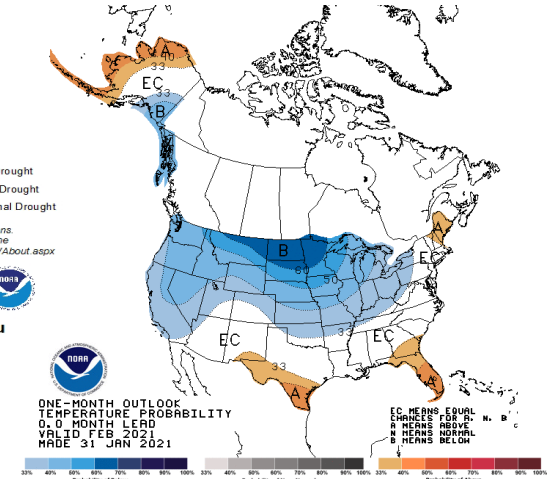


February Climate Outlook

Precipitation



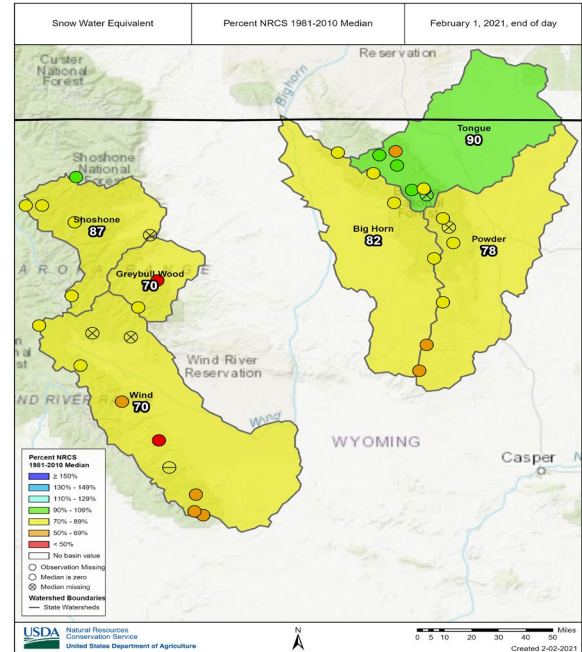
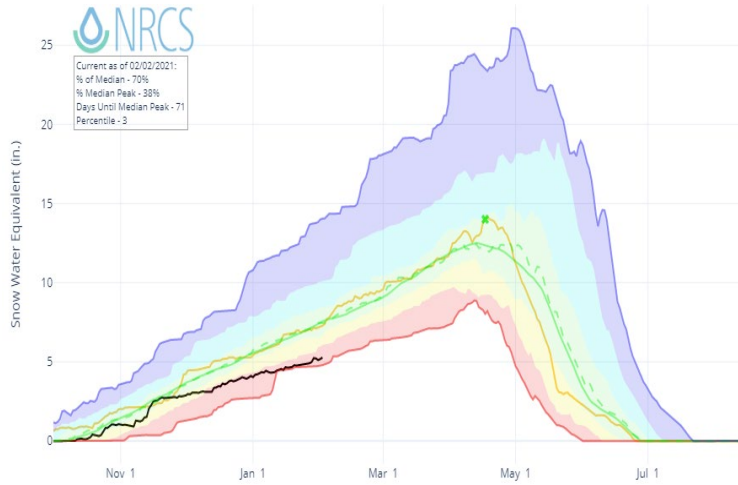
Temperature



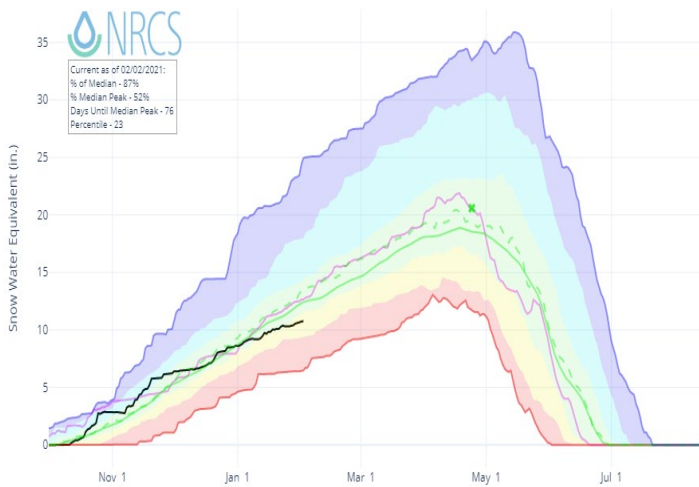
SNOWPACK SUMMARY

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).

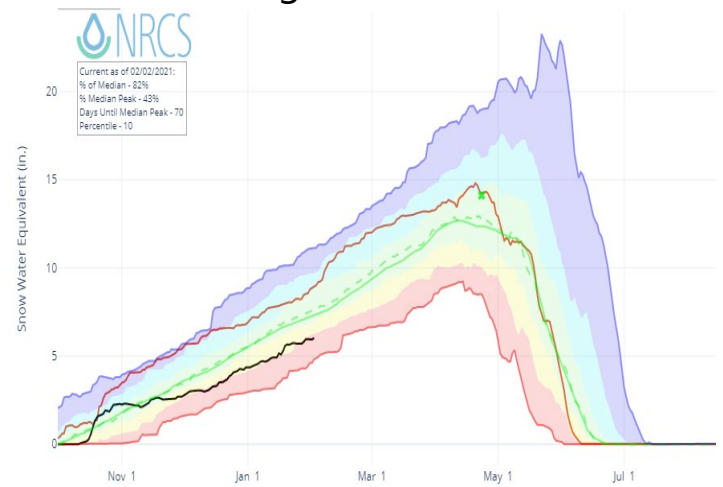
Wind River



Shoshone River



Bighorn River



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

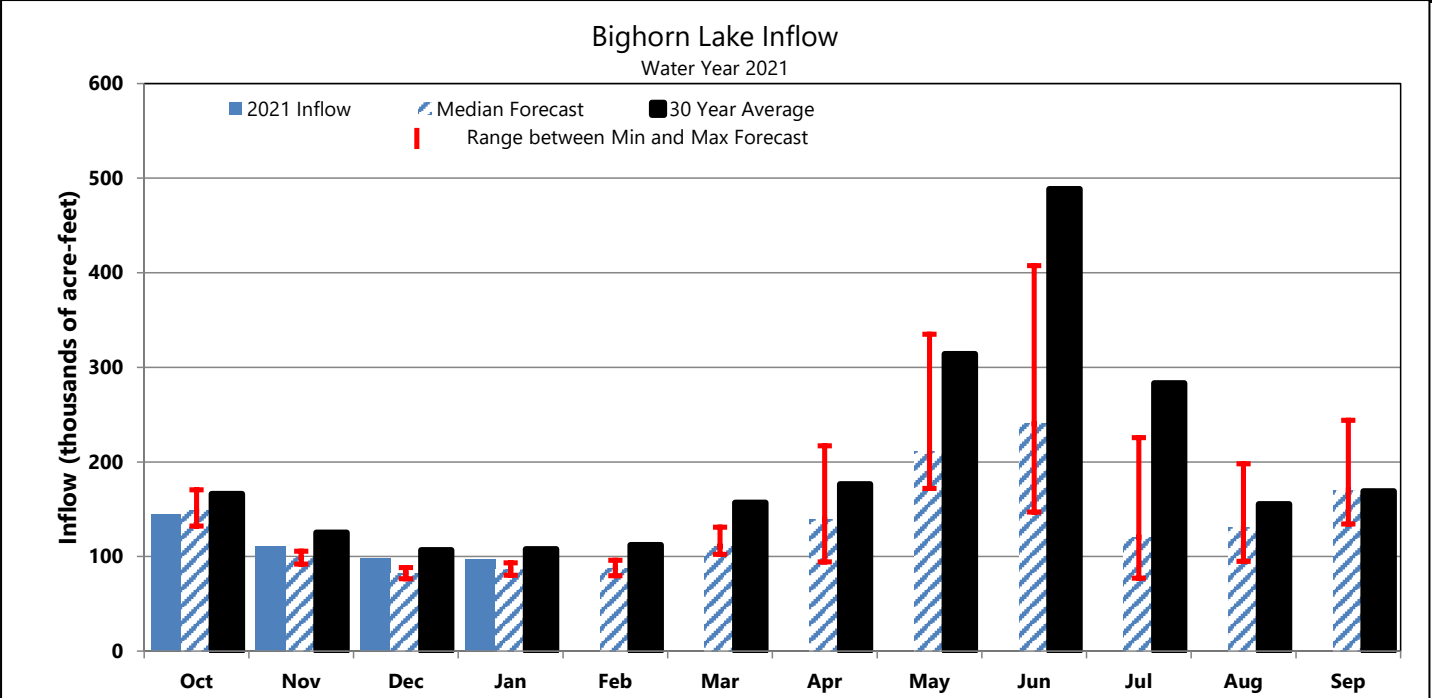
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th Percentiles
 Normal ('81-'10) – Official median calculated from 1981-2010 data
 Normal (POR) – Unofficial mean calculated from Period of Record data

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

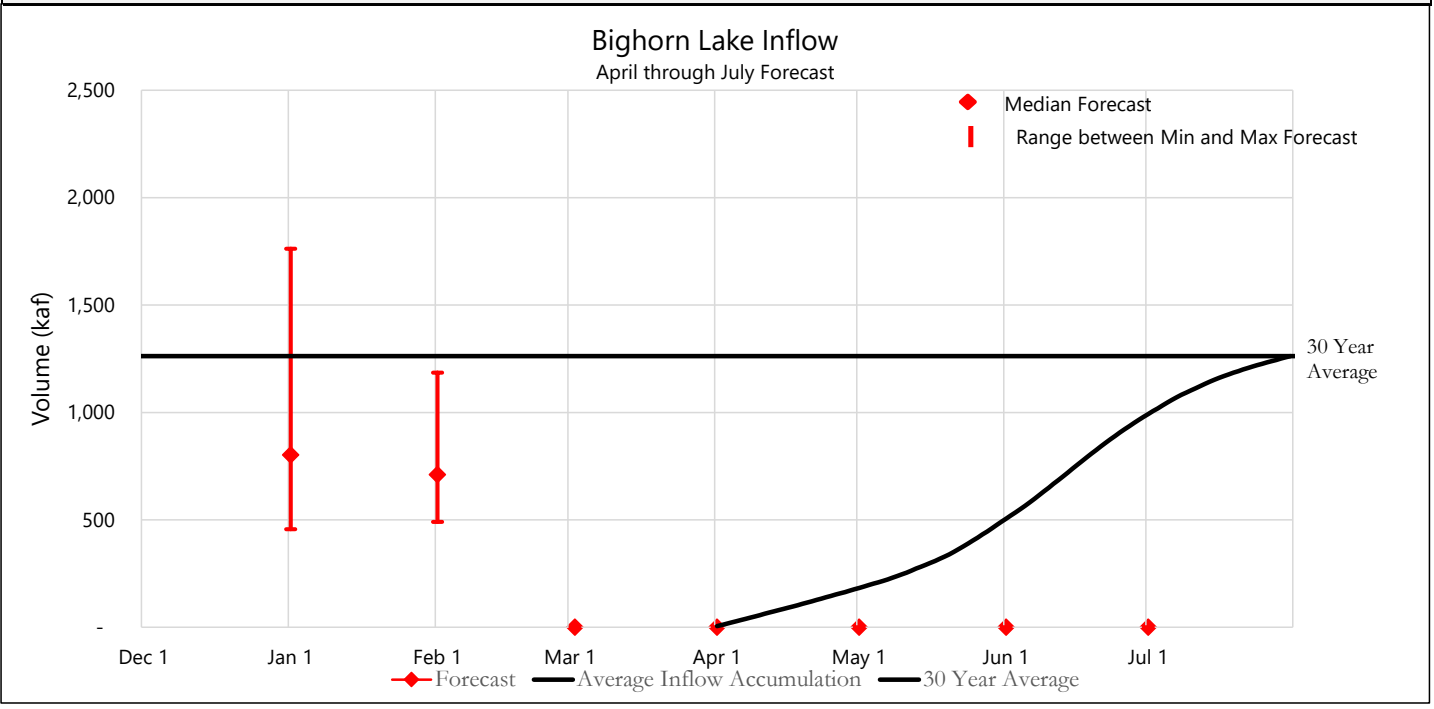
FORECAST SUMMARY

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

January Forecast Review				
	Median Forecast (kaf)	Actual (kaf)	Difference (kaf)	Actual (% of Avg)
January Inflow	86.8	96.4	9.6	89



April through July Inflow Forecast for February 1					
	Median Forecast (kaf)	% of Average	Minimum Forecast (kaf)	Maximum Forecast (kaf)	
April through July Inflow	711	56	490	1,185	
Historic Maximum (2017)	2,953 kaf	Historic Minimum (2004)	392 kaf	Average	1,262 kaf



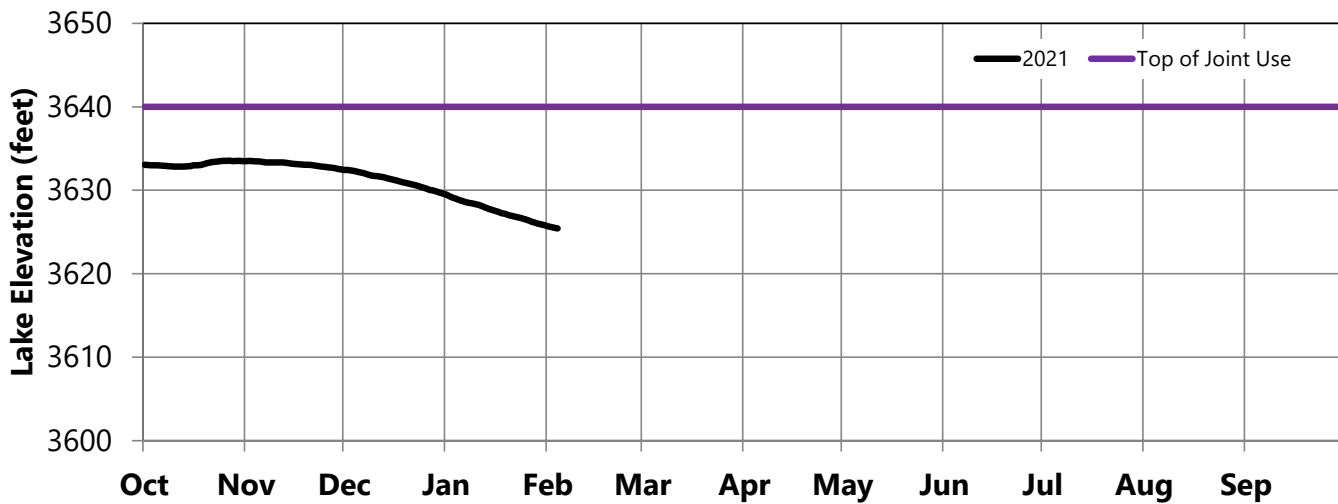
OPERATIONS REVIEW (October 1, 2020 through January 31, 2021)

River releases were increased to 2,220 cfs during January because actual December inflows were greater than the median inflow forecast. The increase was also based on forecasted January through March inflows, and the March 31, 2021 storage target of 3617 feet. The elevation of Bighorn Lake decreased by 3.8 feet during January.

February 1 Storage Conditions

	Elevation feet	Storage acre-feet	Percent of Average	Percent Full
Bighorn Lake	3625.8	859,952	107	85
Buffalo Bill	5367.5	450,403	104	70
Boysen	4714.4	556,063	99	75

Bighorn Lake Operations Water Year 2020



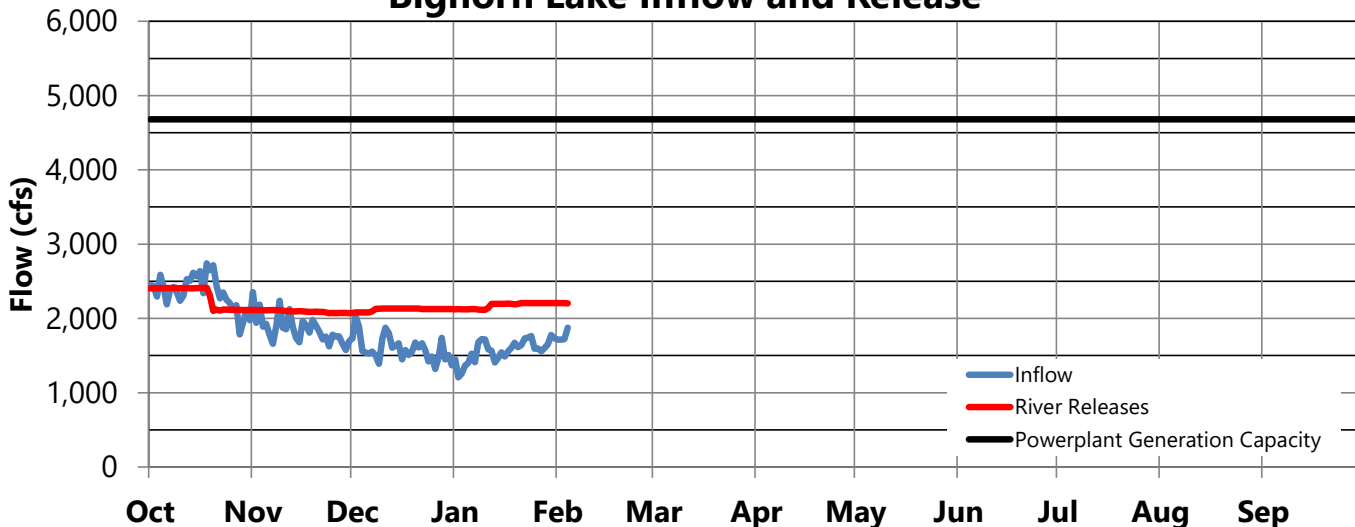
Average January Inflow

	Monthly Avg cfs	Percent of Average
Bighorn Lake	1,570	89
Buffalo Bill	235	92
Boysen	535	86

Average January Release

	Monthly Avg cfs	Percent of Average
Bighorn River	2,175	87
Buffalo Bill Total Release	195	68
Boysen Release	600	76

Bighorn Lake Inflow and Release



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

River releases are being maintained at 2,220 cfs to start February. Under the the operating criteria, the current April through July forecast of 711 kaf is 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 are being guided by long term storage targets and not the end of March target of 3617 feet.

Median Inflow Conditions (April through July Inflow: 711 kaf)

	Feb	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	600	701	1,099	1,200	1,200
Buffalo Bill Release (cfs)	205	205	1,262	1,981	2,279	2,355
Tributary Gain (cfs)	776	1,000	375	345	560	-1,595
Monthly Inflow (cfs)	1,581	1,805	2,338	3,425	4,039	1,960
Monthly Inflow (kaf)	87.8	111.0	139.1	210.6	240.3	120.5
Monthly Release (kaf)	123.3	129.1	127.9	136.8	141.9	151.3
Afterbay Release (cfs)	2,220	2,100	2,150	2,225	2,385	2,460
River Release (cfs)	2,220	2,100	2,000	2,000	2,000	2,000
End-of-Month Content (kaf)	828.4	814.5	829.9	907.9	1,010.5	984.0
End-of-Month Elevation (feet)	3621.7	3619.7	3621.9	3631.2	3640.0	3638.0

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

	Feb	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	600	701	1,099	1,250	1,251
Buffalo Bill Release (cfs)	205	205	684	1,781	1,901	1,976
Tributary Gain (cfs)	630	859	200	-83	-681	-1,973
Monthly Inflow (cfs)	1,435	1,664	1,585	2,797	2,470	1,254
Monthly Inflow (kaf)	79.7	102.3	94.3	172.0	147.0	77.1
Monthly Release (kaf)	117.6	116.8	113.1	121.4	128.2	132.8
Afterbay Release (cfs)	2,118	1,900	1,900	1,975	2,155	2,160
River Release (cfs)	2,118	1,900	1,700	1,700	1,700	1,700
End-of-Month Content (kaf)	825.9	815.7	801.1	856.0	878.9	827.5
End-of-Month Elevation (feet)	3621.3	3619.9	3617.7	3625.3	3628.1	3621.6

Maximum Inflow Conditions (April through July Inflow: 1,185 kaf)

	Feb	Mar	Apr	May	Jun	Jul
Boysen Release (cfs)	600	600	1,101	1,200	1,200	1,286
Buffalo Bill Release (cfs)	205	205	1,738	2,812	2,931	3,007
Tributary Gain (cfs)	924	1,325	808	1,436	2,717	-623
Monthly Inflow (cfs)	1,729	2,130	3,647	5,448	6,848	3,670
Monthly Inflow (kaf)	96.0	131.0	217.0	335.0	407.5	225.7
Monthly Release (kaf)	123.3	184.5	237.4	292.3	257.8	191.0
Afterbay Release (cfs)	2,220	3,000	3,990	4,753	4,333	3,106
River Release (cfs)	2,220	3,000	3,990	4,553	4,083	2,686
End-of-Month Content (kaf)	836.6	787.4	771.2	818.2	972.0	1,011.1
End-of-Month Elevation (feet)	3622.8	3615.5	3612.8	3620.2	3637.0	3640.0

OPERATIONS OUTLOOK (February 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)

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

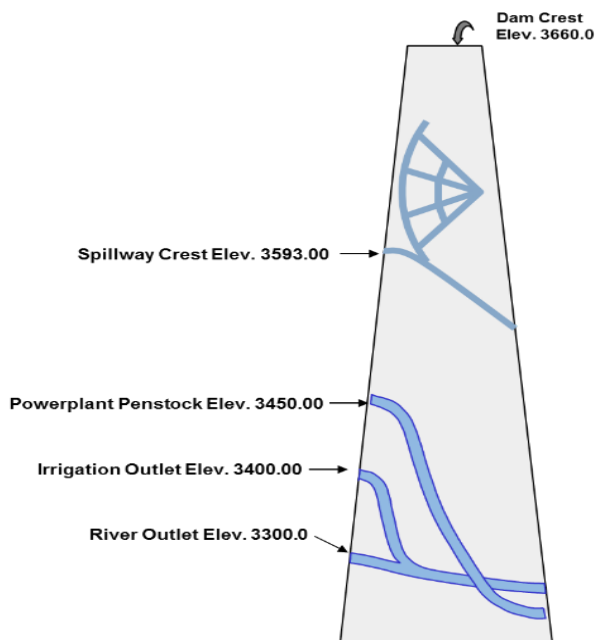
	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	2,150	2,030	2,080	2,155	2,315	2,390
Minimum Forecast	2,048	1,830	1,830	1,905	2,085	2,090
Maximum Forecast	2,150	2,930	3,920	4,683	4,263	3,036

Yellowtail Powerplant Generation (gwh)

	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	46.5	48.3	47.8	52.0	55.4	59.8
Minimum Forecast	44.4	43.8	42.2	45.6	48.7	50.2
Maximum Forecast	46.6	71.1	89.0	110.3	99.9	76.9

Yellowtail Spill (cfs)

	Feb	Mar	Apr	May	Jun	Jul
Median Forecast	0	0	0	0	0	0
Minimum Forecast	0	0	0	0	0	0
Maximum Forecast	0	0	0	0	0	0



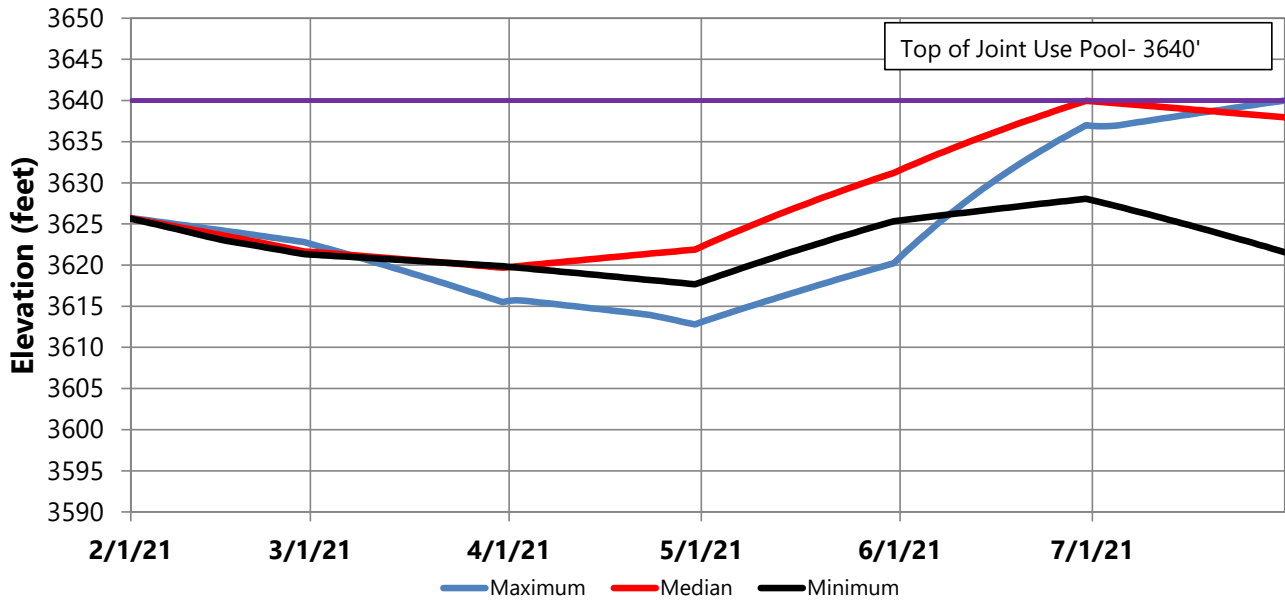
Release Outlook by Outlet

All releases are currently going through the powerplant and are expected to go through the powerplant through the end of July under all three inflow scenarios.

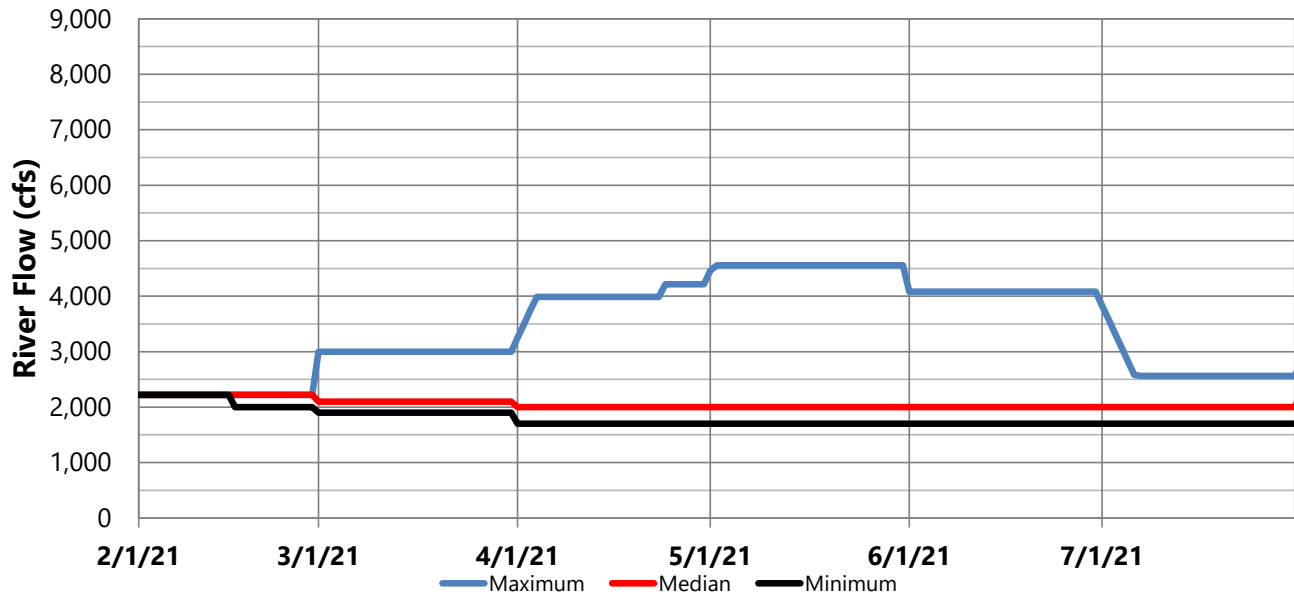
OPERATIONS OUTLOOK (February 1, 2021 through July 31, 2021)

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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