

# RECLAMATION

*Managing Water in the West*

August 4, 2016

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during July were 50 percent of average. Based on the August 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the August runoff into Bighorn Lake is expected to equal 112,600 acre-feet (75 percent of average). If you have any questions or concerns, please feel free to contact Tim Felchle at 406-247-7318 or me at 406-247-7334.

Clayton R. Jordan  
Reservoir and River Operations



U. S. Department of the Interior  
Bureau of Reclamation  
Montana Area Office  
River and Reservoir Operations

**YELLOWTAIL RESERVOIR OPERATIONS**  
 Water Supply Forecasts and Reservoir Operations  
 August 1, 2016

**Present Elevations & Storages:**

	<b>Elevation (feet)</b>	<b>Storage (acre-feet)</b>	<b>Percent of Average</b>	<b>Percent Full</b>
Boysen	4721.55	676,236	107	91
Buffalo Bill	5383.83	570,366	99 *	88
Bighorn Lake	3631.55	925,928	101	91

**Actual Inflows (1,000's of Acre-Feet):**

<u>Water Year 2016</u>	<u>Inflow</u>	<u>Percent of Average</u>
October	133.5	84
November	121.1	102
December	116.1	114
January	118.1	115
February	123.8	117
March	111.5	77
April	122.0	81
May	358.3	131
June	422.8	97
July	128.7	50
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<u>Water Year 2015</u>	<u>Inflow</u>	<u>Percent of Average</u>
July	223.6	88
August	150.1	102
September	134.2	83
<b>April-July</b>	<b>1,542.8</b>	<b>142</b>

**Actual Gains between Boysen and Buffalo Bill to Yellowtail (1,000's of Acre-Feet):**

<u>Water Year 2016</u>	<u>Gains</u>	<u>Percent of Average</u>
October	34.3	51
November	58.0	103
December	51.2	136
January	52.7	132
February	64.3	130
March	53.0	74
April	32.2	98
May	21.5	40
June	-37.0 (avg. 92.6)	-
July	-97.7 (avg. -61.4)	-
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<u>Water Year 2015</u>	<u>Gains</u>	<u>Percent of Average</u>
July	-50.2 (avg. -62.9)	-
August	-31.7 (avg. -54.0)	-
September	-12.6 (avg. 10.5)	-
<b>April-July</b>	<b>248.6</b>	<b>232</b>

**August 1 Runoff Forecast (August Inflows - 1,000's of Acre-Feet):**

<u>Agency</u>	<u>Inflows</u>	<u>Percent of Average</u>
<b>USBR</b>	<b>112.6</b>	<b>75</b>

Average based on past 30 years

\*This does not reflect the 30 year average because in 1992 the capacity of the reservoir was increased to approximately 646,565 acre-feet as a result of raising the dam. The average used here reflects data from 1993 through 2015.

BHXAOP V1.16 Run: 04-Aug-2016 13:38  
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3631.54 ft					Maximum Cont Elev 3657.00 ft					Minimum Cont Elev 3547.00 ft				Total
2016		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total		
Boysen Release	kaf	79.9	65.5	61.5	59.5	61.5	61.5	55.5	67.6	59.5	92.2	103.5	95.6	863.3		
Boysen Release	cfs	1299	1101	1000	1000	1000	1000	999	1099	1000	1499	1739	1555			
Buffalo Bill Release	kaf	110.9	89.2	44.6	12.2	12.6	12.6	11.4	12.6	48.1	107.9	141.6	180.7	784.4		
Buffalo Bill Release	cfs	1804	1499	725	205	205	205	205	205	808	1755	2380	2939			
Station Gain	kaf	-78.2	-7.8	55.6	48.4	30.8	34.9	40.2	58.7	39.9	62.2	119.0	-61.3	342.4		
Monthly Inflow	kaf	112.6	146.9	161.7	120.1	104.9	109.0	107.1	138.9	147.5	262.3	364.1	215.0	1990.1		
Monthly Inflow	cfs	1831	2469	2630	2018	1706	1773	1928	2259	2479	4266	6119	3497			
Turbine Release	kaf	161.0	147.2	137.0	133.9	138.4	138.4	124.9	138.4	146.3	219.0	230.0	180.9	1895.4		
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Release	kaf	161.0	147.2	137.0	133.9	138.4	138.4	124.9	138.4	146.3	219.0	230.0	180.9	1895.4		
Total Release	cfs	2618	2474	2228	2250	2251	2251	2249	2251	2459	3562	3865	2942			
Spring Flow	kaf	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	50.8		
Irrigation Reqmnt	kaf	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	12.5	14.9	22.8	28.1	125.8		
Afterbay Rels	kaf	165.3	151.4	141.3	138.1	142.7	142.7	128.8	142.7	150.5	223.3	234.2	185.2	1946.2		
Afterbay Rels	cfs	2688	2544	2298	2321	2321	2321	2319	2321	2529	3632	3936	3012			
River Release	kaf	138.3	133.9	138.3	138.1	142.7	142.7	128.8	142.7	138.0	208.4	211.4	157.1	1820.4		
River Release	cfs	2249	2250	2249	2321	2321	2321	2319	2321	2319	3389	3553	2555			
Min Release	kaf	138.3	133.9	138.3	89.3	92.2	92.2	83.3	92.2	138.0	92.2	89.3	153.7	1332.9		
End-Month Content	kaf	877.5	877.2	901.9	888.1	854.6	825.2	807.4	807.9	809.1	852.4	986.5	1020.6			
End-Month Elevation	ft	3626.14	3626.10	3628.96	3627.38	3623.32	3619.45	3616.92	3617.00	3617.17	3623.04	3637.19	3640.00			
Net Change Content	kaf	-48.4	-0.3	24.7	-13.8	-33.5	-29.4	-17.8	0.5	1.2	43.3	134.1	34.1	94.7		
Yellowtail Power	2016	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total		
Turbine Release	kaf	161.0	147.2	137.0	133.9	138.4	138.4	124.9	138.4	146.3	219.0	230.0	180.9	1895.4		
Generation	gwh	61.062	54.950	50.784	49.241	50.753	50.308	44.240	50.025	53.454	85.960	93.571	72.064	716.412		
End-Month Power Cap	mw	274.4	274.3	277.0	275.5	271.7	268.0	265.6	265.7	265.8	271.4	284.9	287.5			
% Max Gen		28	26	24	24	24	23	23	23	26	40	45	34			
Ave kwh/af		379	373	371	368	367	363	354	361	365	393	407	398	378		
Upstream Generation	gwh	28.143	23.296	16.282	7.995	8.219	8.134	6.430	8.447	16.862	28.109	31.176	31.984	215.077		
Total Generation	gwh	89.205	78.246	67.066	57.236	58.972	58.442	50.670	58.472	70.316	114.069	124.747	104.048	931.489		

BHXAOP V1.16 Run: 04-Aug-2016 13:38  
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 925.9 kaf Elev 3631.54 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft					Minimum Cont 469.9 kaf Elev 3547.00 ft			Total
	2016	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Boysen Release	kaf	79.9	65.5	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	716.1
Boysen Release	cfs	1299	1101	825	825	825	825	825	930	825	1174	1200	1200	
Buffalo Bill Release	kaf	110.9	89.2	29.8	12.2	12.6	12.6	11.4	12.6	37.8	101.2	105.0	118.7	654.0
Buffalo Bill Release	cfs	1804	1499	485	205	205	205	205	205	635	1646	1765	1930	
Station Gain	kaf	-88.0	-18.3	41.9	47.6	30.0	34.1	39.1	57.8	20.3	10.0	1.3	-70.0	105.8
Monthly Inflow	kaf	102.8	136.4	122.4	108.9	93.3	97.4	96.3	127.6	107.2	183.4	177.7	122.5	1475.9
Monthly Inflow	cfs	1672	2292	1991	1830	1517	1584	1734	2075	1802	2983	2986	1992	
Turbine Release	kaf	161.0	132.3	121.7	116.8	120.8	120.7	109.0	120.8	104.2	129.2	125.7	134.5	1496.7
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Release	kaf	161.0	132.3	121.7	116.8	120.8	120.7	109.0	120.8	104.2	129.2	125.7	134.5	1496.7
Total Release	cfs	2618	2223	1979	1963	1965	1963	1963	1965	1751	2101	2112	2187	
Spring Flow	kaf	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	22.8	22.8	28.1	122.5
Afterbay Rels	kaf	165.3	136.5	126.0	121.0	125.1	125.0	112.9	125.1	108.4	133.5	129.9	138.8	1547.5
Afterbay Rels	cfs	2688	2294	2049	2033	2035	2033	2033	2035	1822	2171	2183	2257	
River Release	kaf	138.3	119.0	123.0	121.0	125.1	125.0	112.9	125.1	107.1	110.7	107.1	110.7	1425.0
River Release	cfs	2249	2000	2000	2033	2035	2033	2033	2035	1800	1800	1800	1800	
Min Release	kaf	138.3	119.0	123.0	89.3	92.2	92.2	83.3	92.2	107.1	110.7	107.1	110.7	1265.1
End-Month Content	kaf	867.7	871.8	872.5	864.6	837.1	813.8	801.1	807.9	810.9	865.1	917.1	905.1	
End-Month Elevation	ft	3624.95	3625.45	3625.53	3624.57	3621.05	3617.85	3615.99	3617.00	3617.43	3624.63	3630.62	3629.31	
Net Change Content	kaf	-58.2	4.1	0.7	-7.9	-27.5	-23.3	-12.7	6.8	3.0	54.2	52.0	-12.0	-20.8
Yellowtail Power	2016	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Turbine Release	kaf	161.0	132.3	121.7	116.8	120.8	120.7	109.0	120.8	104.2	129.2	125.7	134.5	1496.7
Generation	gwh	60.899	48.328	43.731	41.531	42.905	42.549	37.467	42.508	35.600	46.890	45.986	49.719	538.113
End-Month Power Cap	mw	273.2	273.7	273.8	272.9	269.5	266.5	264.7	265.7	266.1	272.9	278.6	277.4	
% Max Gen		28	23	20	20	20	20	19	20	17	22	22	23	
Ave kwh/af		378	365	359	356	355	353	344	352	342	363	366	370	360
Upstream Generation	gwh	27.966	22.679	10.690	7.084	7.304	7.259	5.687	7.692	13.322	25.223	24.977	26.951	186.834
Total Generation	gwh	88.865	71.007	54.421	48.615	50.209	49.808	43.154	50.200	48.922	72.113	70.963	76.670	724.947

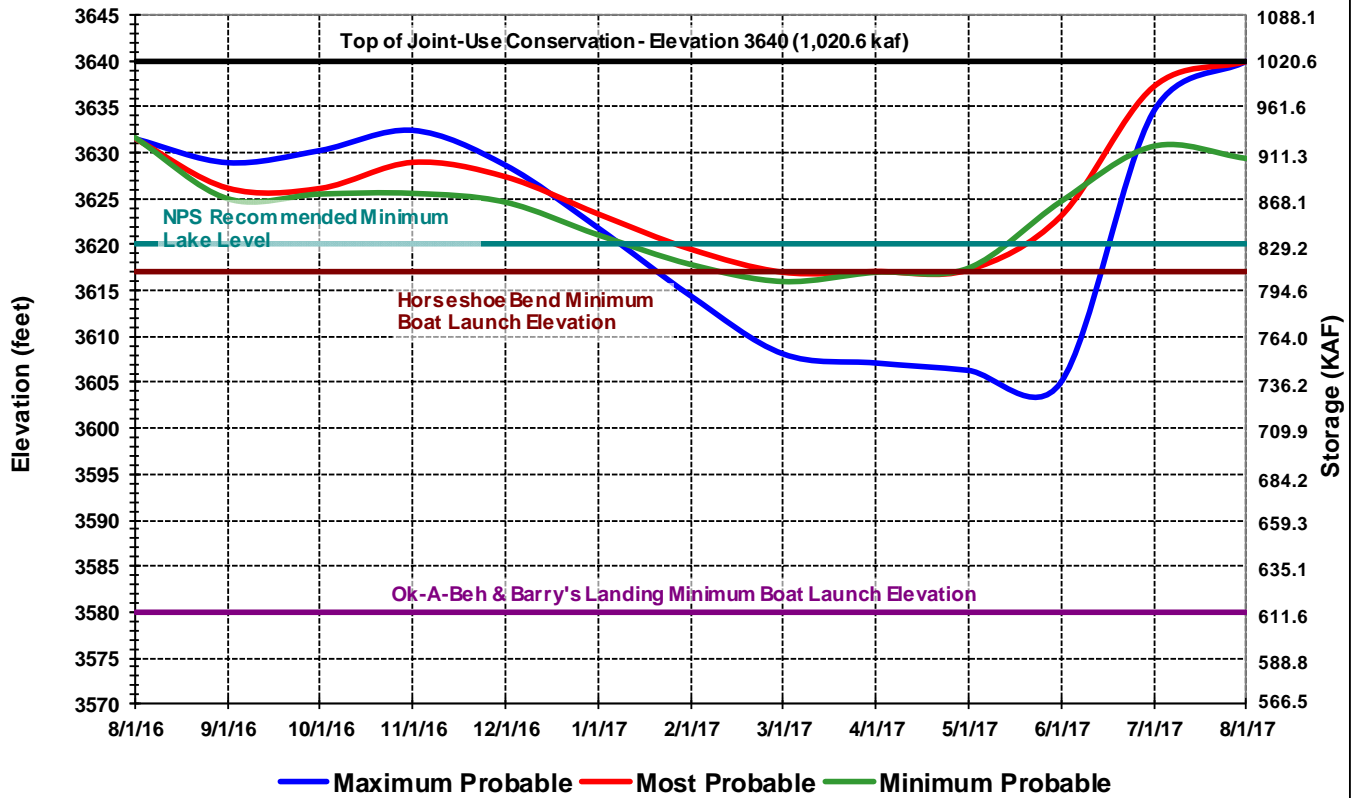
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BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 925.9 kaf Elev 3631.54 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft					Minimum Cont 469.9 kaf Elev 3547.00 ft			Total
	2016	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Boysen Release	kaf	81.0	65.5	61.5	59.5	61.5	61.5	55.6	104.5	130.9	184.5	208.3	283.5	1357.8
Boysen Release	cfs	1317	1101	1000	1000	1000	1000	1001	1700	2200	3001	3501	4611	
Buffalo Bill Release	kaf	110.9	95.2	51.5	12.2	12.6	12.6	11.4	52.9	94.7	187.0	219.6	149.2	1009.8
Buffalo Bill Release	cfs	1804	1600	838	205	205	205	205	860	1591	3041	3691	2427	
Station Gain	kaf	-55.0	13.4	66.8	49.8	32.0	36.3	41.8	60.3	51.0	128.9	266.4	0.1	691.8
Monthly Inflow	kaf	136.9	174.1	179.8	121.5	106.1	110.4	108.8	217.7	276.6	500.4	694.3	432.8	3059.4
Monthly Inflow	cfs	2226	2926	2924	2042	1726	1795	1959	3541	4648	8138	11668	7039	
Turbine Release	kaf	161.0	162.1	158.6	157.2	162.5	162.5	146.8	223.2	281.0	368.9	357.0	367.8	2708.6
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	138.7	117.4	0.0	256.1
Total Release	kaf	161.0	162.1	158.6	157.2	162.5	162.5	146.8	223.2	281.0	507.6	474.4	367.8	2964.7
Total Release	cfs	2618	2724	2579	2642	2643	2643	2643	3630	4722	8255	7973	5982	
Spring Flow	kaf	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	111.6
Afterbay Rels	kaf	165.3	166.3	162.9	161.4	166.8	166.8	150.7	227.5	285.2	511.9	478.6	372.1	3015.5
Afterbay Rels	cfs	2688	2795	2649	2712	2713	2713	2713	3700	4793	8325	8043	6052	
River Release	kaf	138.3	148.8	159.9	161.4	166.8	166.8	150.7	227.5	283.9	500.0	455.8	344.0	2903.9
River Release	cfs	2249	2501	2601	2712	2713	2713	2713	3700	4771	8132	7660	5595	
Min Release	kaf	138.3	148.8	159.9	161.4	166.8	166.8	150.7	227.5	89.3	92.2	89.3	92.2	1683.2
End-Month Content	kaf	901.8	913.8	935.0	899.3	842.9	790.8	752.8	747.3	742.9	735.7	955.6	1020.6	
End-Month Elevation	ft	3628.94	3630.27	3632.46	3628.66	3621.82	3614.41	3608.04	3607.05	3606.24	3604.90	3634.44	3640.00	
Net Change Content	kaf	-24.1	12.0	21.2	-35.7	-56.4	-52.1	-38.0	-5.5	-4.4	-7.2	219.9	65.0	94.7
Yellowtail Power	2016	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Turbine Release	kaf	161.0	162.1	158.6	157.2	162.5	162.5	146.8	223.2	281.0	368.9	357.0	367.8	2708.6
Generation	gwh	61.448	62.123	60.854	59.716	61.126	60.095	52.543	84.570	107.444	150.660	145.800	150.618	1056.997
End-Month Power Cap	mw	277.0	278.3	280.4	276.8	270.3	263.2	257.2	256.2	255.4	254.2	282.2	287.5	
% Max Gen		29	30	28	29	29	28	27	39	52	70	70	70	
Ave kwh/af		382	383	384	380	376	370	358	379	382	408	408	410	390
Upstream Generation	gwh	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Generation	gwh	61.448	62.123	60.854	59.716	61.126	60.095	52.543	84.570	107.444	150.660	145.800	150.618	1056.997

# BIGHORN LAKE

## BIGHORN LAKE ELEVATION



## BIGHORN RIVER FLOW BELOW AFTERBAY

