

# RECLAMATION

## *Managing Water in the West*

September 5, 2017

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during August were 147 percent of average. The September inflow into Bighorn Lake is expected to equal 198,600 acre-feet (123 percent of average). If you have any questions or concerns, please feel free to c me at 406-247-7334 or Stephanie Micek 406-247-7320.

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  
 September 1, 2017

**Present Elevations & Storages:**

	<b>Elevation (feet)</b>	<b>Storage (acre-feet)</b>	<b>Percent of Average</b>	<b>Percent Full</b>
Boysen	4722.45	692,854	117	93
Buffalo Bill	5385.58	583,844	115 *	90
Bighorn Lake	3638.54	1,002,527	115	98

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

Water Year 2017	Inflow	Percent of Average
October	202.6	127
November	139.9	116
December	109.2	106
January	120.5	117
February	212.9	200
March	306.7 (highest of record)	216
April	603.4 (highest of record)	411
May	813.0 (highest of record)	296
June	920.4 (3 <sup>rd</sup> highest of record)	217
July	616.3 (6 <sup>th</sup> highest of record)	249
August	216.4	147
<b>April-July</b>	<b>2,953.1 (highest of record)</b>	<b>270</b>
Water Year 2016	Inflow	Percent of Average
August	135.9	91
September	180.9	111
<b>April-July</b>	<b>1,031.8</b>	<b>93</b>

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

Water Year 2017	Gains	Percent of Average
October	116.9	177
November	77.5	136
December	40.2	106
January	51.8	129
February	144.0 (highest of record)	293
March	98.0	137
April	136.5 (highest of record)	411
May	143.7	272
June	162.1	184
July	-96.8 (avg. -62.1)	-
August	-37.1 (avg. -51.9)	-
Water Year 2016	Gains	Percent of Average
August	-55.1 (avg. -52.7)	-
September	47.9	504
<b>April-July</b>	<b>-78.1 (avg. 117.8)</b>	<b>-</b>

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

Inflows	Percent of Average
<b>198,600</b>	<b>123</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 2016.

## Based on Most Probable Inflow Forecast

### BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3638.53 ft				1002.5 kaf 3638.53 ft				Maximum Cont Elev 3657.00 ft				1278.9 kaf 3657.00 ft				Minimum Cont Elev 3547.00 ft				469.9 kaf 3547.00 ft	
		2017	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total								
Boysen Release	kaf		78.1	67.6	65.5	67.6	67.6	61.1	67.6	89.3	107.6	130.9	120.7	119.9	1043.5								
Boysen Release	cfs		1313	1099	1101	1099	1099	1100	1099	1501	1750	2200	1963	1950									
Buffalo Bill Release	kaf		111.8	57.1	27.9	21.8	21.8	19.8	63.9	79.6	120.5	124.9	130.1	120.6	899.8								
Buffalo Bill Release	cfs		1879	929	469	355	355	357	1039	1338	1960	2099	2116	1961									
Station Gain	kaf		8.7	63.0	60.8	41.5	46.8	55.0	72.5	39.9	62.2	119.0	-61.3	-45.3	462.8								
Monthly Inflow	kaf		198.6	187.7	154.2	130.9	136.2	135.9	204.0	208.8	290.3	374.8	189.5	195.2	2406.1								
Monthly Inflow	cfs		3338	3053	2591	2129	2215	2447	3318	3509	4721	6299	3082	3175									
Turbine Release	kaf		191.8	198.5	189.1	195.4	195.4	176.5	195.4	190.4	222.8	248.0	223.6	207.2	2434.1								
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									
Total Release	kaf		191.8	198.5	189.1	195.4	195.4	176.5	195.4	190.4	222.8	248.0	223.6	207.2	2434.1								
Total Release	cfs		3223	3228	3178	3178	3178	3178	3178	3200	3623	4168	3637	3370									
Spring Flow	kaf		4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	50.8								
Irrigation Reqmnt	kaf		17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	111.6								
Afterbay Rels	kaf		196.0	202.8	193.3	199.7	199.7	180.4	199.7	194.6	227.1	252.2	227.9	211.5	2484.9								
Afterbay Rels	cfs		3294	3298	3249	3248	3248	3248	3248	3270	3693	4238	3706	3440									
River Release	kaf		178.5	199.8	193.3	199.7	199.7	180.4	199.7	193.3	215.2	229.4	199.8	184.5	2373.3								
River Release	cfs		3000	3249	3249	3248	3248	3248	3248	3249	3500	3855	3249	3001									
Min Release	kaf		178.5	199.8	89.3	92.2	92.2	83.3	92.2	193.3	215.2	89.3	199.8	184.5	1709.6								
End-Month Content	kaf		1009.3	998.5	963.6	899.1	839.9	799.3	807.9	826.3	893.8	1020.6	986.5	974.5									
End-Month Elevation	ft		3639.09	3638.20	3635.18	3628.64	3621.42	3615.71	3617.00	3619.60	3628.04	3640.00	3637.19	3636.15									
Net Change Content	kaf		6.8	-10.8	-34.9	-64.5	-59.2	-40.6	8.6	18.4	67.5	126.8	-34.1	-12.0	-28.0								
Yellowtail Power	2017	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total									
Turbine Release	kaf		191.8	198.5	189.1	195.4	195.4	176.5	195.4	190.4	222.8	248.0	223.6	207.2	2434.1								
Generation	gwh		76.873	79.748	75.000	76.705	75.463	66.334	74.702	72.982	88.583	102.014	90.757	83.282	962.443								
End-Month Power Cap	mw		286.7	285.8	282.9	276.7	269.9	264.4	265.7	268.1	276.2	287.5	284.9	283.9									
% Max Gen			37	37	36	36	35	34	35	35	41	49	42	39									
Ave kwh/af			401	402	397	393	386	376	382	383	398	411	406	402	395								
Upstream Generation	gwh		29.444	20.718	13.279	11.642	11.533	10.340	21.240	25.842	31.116	33.325	34.129	34.031	276.639								
Total Generation	gwh		106.317	100.466	88.279	88.347	86.996	76.674	95.942	98.824	119.699	135.339	124.886	117.313	1239.082								

## Based on Minimum Probable Inflow Forecast

### BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3638.53 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2017	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Boysen Release	kaf	78.1	49.2	47.6	49.2	49.2	44.4	30.7	41.7	63.0	71.4	70.7	63.0	658.2
Boysen Release	cfs	1313	800	800	800	800	799	499	701	1025	1200	1150	1025	
Buffalo Bill Release	kaf	107.8	53.7	23.1	21.8	21.8	19.8	12.6	31.7	101.2	105.0	118.7	104.3	721.5
Buffalo Bill Release	cfs	1812	873	388	355	355	357	205	533	1646	1765	1930	1696	
Station Gain	kaf	-10.7	46.2	59.9	40.7	45.9	53.9	71.5	20.3	10.0	1.3	-70.0	-52.3	216.7
Monthly Inflow	kaf	175.2	149.1	130.6	111.7	116.9	118.1	114.8	93.7	174.2	177.7	119.4	115.0	1596.4
Monthly Inflow	cfs	2944	2425	2195	1817	1901	2127	1867	1575	2833	2986	1942	1870	
Turbine Release	kaf	185.9	167.8	150.4	155.5	155.5	140.4	155.5	116.1	130.6	122.7	131.4	130.3	1742.1
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	185.9	167.8	150.4	155.5	155.5	140.4	155.5	116.1	130.6	122.7	131.4	130.3	1742.1
Total Release	cfs	3124	2729	2528	2529	2529	2528	2529	1951	2124	2062	2137	2119	
Spring Flow	kaf	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	50.8
Irrigation Reqmnt	kaf	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	111.6
Afterbay Rels	kaf	190.1	172.1	154.6	159.8	159.8	144.3	159.8	120.3	134.9	126.9	135.7	134.6	1792.9
Afterbay Rels	cfs	3195	2799	2598	2599	2599	2598	2599	2022	2194	2133	2207	2189	
River Release	kaf	172.6	169.1	154.6	159.8	159.8	144.3	159.8	119.0	123.0	104.1	107.6	107.6	1681.3
River Release	cfs	2901	2750	2598	2599	2599	2598	2599	2000	2000	1749	1750	1750	
Min Release	kaf	172.6	169.1	89.3	92.2	92.2	83.3	92.2	119.0	123.0	104.1	107.6	107.6	1352.2
End-Month Content	kaf	991.8	973.1	953.3	909.5	870.9	848.6	807.9	785.5	829.1	884.1	872.1	856.8	
End-Month Elevation	ft	3637.64	3636.03	3634.23	3629.80	3625.34	3622.55	3617.00	3613.57	3619.98	3626.92	3625.49	3623.60	
Net Change Content	kaf	-10.7	-18.7	-19.8	-43.8	-38.6	-22.3	-40.7	-22.4	43.6	55.0	-12.0	-15.3	-145.7
Yellowtail Power	2017	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Turbine Release	kaf	185.9	167.8	150.4	155.5	155.5	140.4	155.5	116.1	130.6	122.7	131.4	130.3	1742.1
Generation	gwh	73.959	65.506	57.397	59.109	58.520	51.537	57.417	40.205	46.999	44.302	47.940	47.258	650.149
End-Month Power Cap	mw	285.3	283.8	282.0	277.8	273.6	270.9	265.7	262.4	268.5	275.1	273.7	271.9	
% Max Gen		36	31	28	28	27	27	27	19	22	21	22	22	
Ave kwh/af		398	390	382	380	376	367	369	346	360	361	365	363	373
Upstream Generation	gwh	25.012	14.482	6.903	6.525	6.477	4.221	4.890	7.710	22.664	23.179	25.099	22.233	169.395
Total Generation	gwh	98.971	79.988	64.300	65.634	64.997	55.758	62.307	47.915	69.663	67.481	73.039	69.491	819.544

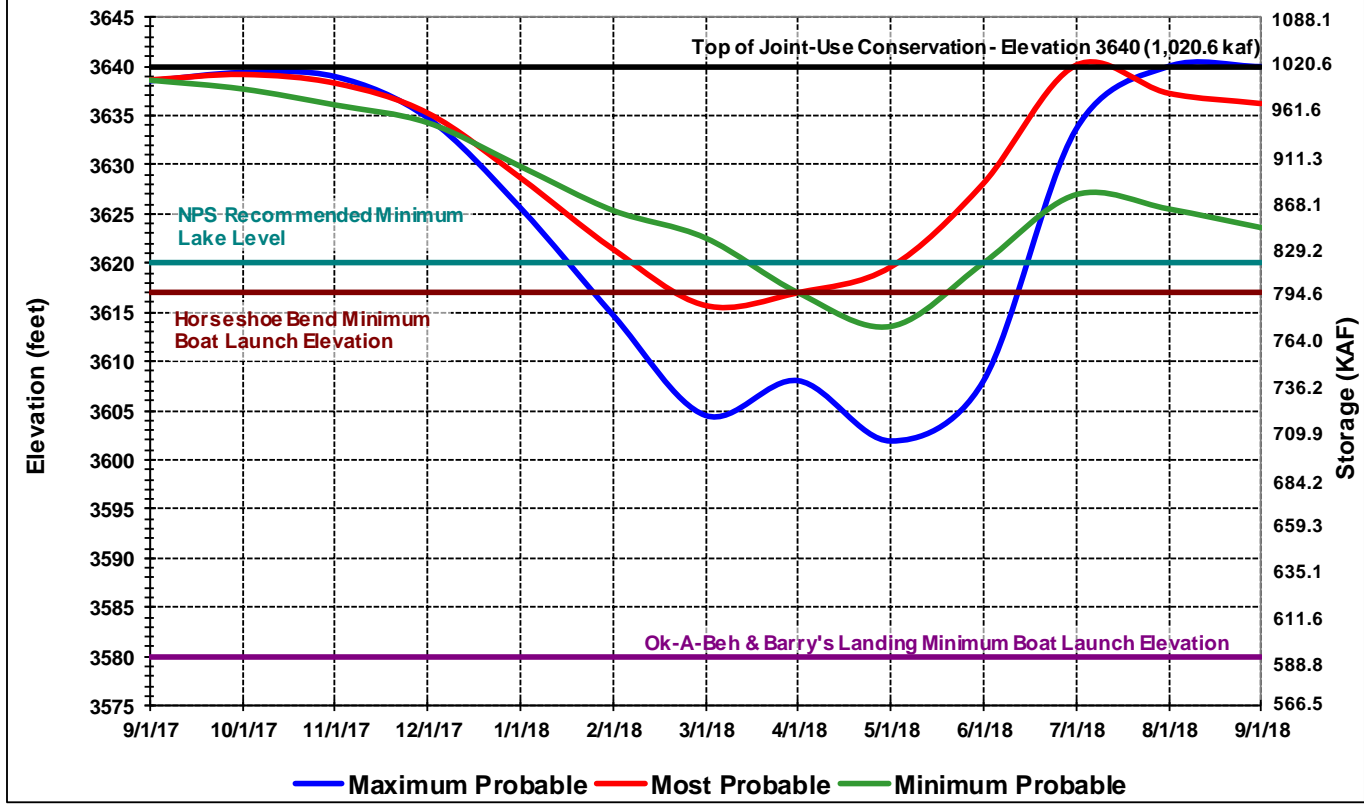
## Based on Maximum Probable Inflow Forecast

### BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3638.53 ft				1002.5 kaf 3638.53 ft				Maximum Cont Elev 3657.00 ft				1278.9 kaf 3657.00 ft				Minimum Cont Elev 3547.00 ft				469.9 kaf 3547.00 ft	
		2017	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total								
Boysen Release	kaf	78.1	67.6	65.5	67.6	67.6	61.1	138.4	133.9	215.2	223.2	249.6	132.2	1500.0									
Boysen Release	cfs	1313	1099	1101	1099	1099	1100	2251	2250	3500	3751	4059	2150										
Buffalo Bill Release	kaf	112.8	56.9	34.4	21.8	21.8	19.8	79.6	113.8	177.1	238.1	253.7	120.6	1250.4									
Buffalo Bill Release	cfs	1896	925	578	355	355	357	1295	1912	2880	4001	4126	1961										
Station Gain	kaf	26.3	84.2	61.8	42.3	47.7	56.2	73.6	51.0	128.9	266.4	0.1	-28.7	809.8									
Monthly Inflow	kaf	217.2	208.7	161.7	131.7	137.1	137.1	291.6	298.7	521.2	727.7	503.4	224.1	3560.2									
Monthly Inflow	cfs	3650	3394	2717	2142	2230	2469	4742	5020	8477	12229	8187	3645										
<hr/>																							
Turbine Release	kaf	206.7	213.9	210.4	217.4	217.4	196.4	272.4	331.7	368.9	357.0	368.9	224.1	3185.2									
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	119.8	177.1	60.0	0.0	356.9									
Total Release	kaf	206.7	213.9	210.4	217.4	217.4	196.4	272.4	331.7	488.7	534.1	428.9	224.1	3542.1									
Total Release	cfs	3474	3479	3536	3536	3536	3536	4430	5574	7948	8976	6975	3645										
<hr/>																							
Spring Flow	kaf	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	50.8									
Irrigation Reqmnt	kaf	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	111.6									
<hr/>																							
Afterbay Rels	kaf	210.9	218.2	214.6	221.7	221.7	200.3	276.7	335.9	493.0	538.3	433.2	228.4	3592.9									
Afterbay Rels	cfs	3544	3549	3606	3606	3606	3607	4500	5645	8018	9046	7045	3715										
River Release	kaf	193.4	215.2	214.6	221.7	221.7	200.3	276.7	334.6	481.1	515.5	405.1	201.4	3481.3									
River Release	cfs	3250	3500	3606	3606	3606	3607	4500	5623	7824	8663	6588	3275										
Min Release	kaf	193.4	215.2	214.6	221.7	221.7	200.3	276.7	89.3	92.2	89.3	92.2	92.2	1998.8									
<hr/>																							
End-Month Content	kaf	1013.0	1007.8	959.1	873.4	793.1	733.8	753.0	720.0	752.5	946.1	1020.6	1020.6										
End-Month Elevation	ft	3639.39	3638.97	3634.77	3625.64	3614.76	3604.54	3608.07	3601.93	3607.98	3633.55	3640.00	3640.00										
Net Change Content	kaf	10.5	-5.2	-48.7	-85.7	-80.3	-59.3	19.2	-33.0	32.5	193.6	74.5	0.0	18.1									
<hr/>																							
Yellowtail Power	2017	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total									
Turbine Release	kaf	206.7	213.9	210.4	217.4	217.4	196.4	272.4	331.7	368.9	357.0	368.9	224.1	3185.2									
Generation	gwh	83.652	86.799	84.450	85.777	83.669	72.976	104.564	125.143	150.660	145.800	150.660	91.540	1265.690									
End-Month Power Cap	mw	286.9	286.5	282.6	273.9	263.5	253.8	257.2	251.4	257.1	281.4	287.5	287.5										
% Max Gen		40	41	41	40	39	38	49	60	70	70	70	43										
Ave kwh/af		405	406	401	395	385	372	384	377	408	408	408	408	397									
<hr/>																							
Upstream Generation	gwh	29.471	20.740	15.197	11.728	11.636	9.604	26.987	28.899	31.698	32.884	35.170	35.200	289.214									
Total Generation	gwh	113.123	107.539	99.647	97.505	95.305	82.580	131.551	154.042	182.358	178.684	185.830	126.740	1554.904									

# BIGHORN LAKE

## BIGHORN LAKE ELEVATION



## BIGHORN RIVER FLOW BELOW AFTERBAY

