

# RECLAMATION

## *Managing Water in the West*

September 8, 2016

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during August were 91 percent of average. Based on the September 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the September runoff into Bighorn Lake is expected to equal 158,700 acre-feet (98 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  
 September 1, 2016

**Present Elevations & Storages:**

	<b>Elevation (feet)</b>	<b>Storage (acre-feet)</b>	<b>Percent of Average</b>	<b>Percent Full</b>
Boysen	4719.15	633,484	106	85
Buffalo Bill	5371.81	481,022	94 *	74
Bighorn Lake	3628.93	901,668	103	88

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

Water Year 2016	Inflow	Percent of Average
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
August	135.9	91
<b>April-July</b>	<b>1,031.8</b>	<b>93</b>

Water Year 2015	Inflow	Percent of Average
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):**

Water Year 2016	Gains	Percent of Average
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)	-
August	-55.1 (avg. -52.7)	-
<b>April-July</b>	<b>-78.1 (avg. 117.8)</b>	<b>-</b>

Water Year 2015	Gains	Percent of Average
August	-31.7 (avg. -54.0)	-
September	-12.6 (avg. 10.5)	-
<b>April-July</b>	<b>248.6</b>	<b>232</b>

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

Agency	Inflows	Percent of Average
<b>USBR</b>	<b>158.7</b>	<b>98</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: 08-Sep-2016 14:25  
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 901.7 kaf Elev 3628.93 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
		2016	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Boysen Release	kaf	65.5	52.3	49.1	50.7	50.7	47.5	57.2	49.1	132.2	132.3	95.6	86.7	868.9
Boysen Release	cfs	1101	851	825	825	825	855	930	825	2150	2223	1555	1410	
Buffalo Bill Release	kaf	94.0	44.6	12.2	12.6	12.6	11.4	12.6	42.4	107.9	130.2	180.7	108.3	769.5
Buffalo Bill Release	cfs	1580	725	205	205	205	205	205	713	1755	2188	2939	1761	
Station Gain	kaf	-0.8	55.7	49.2	31.5	35.6	41.1	59.6	39.9	62.2	119.0	-61.3	-45.3	386.4
Monthly Inflow	kaf	158.7	152.6	110.5	94.8	98.9	100.0	129.4	131.4	302.3	381.5	215.0	149.7	2024.8
Monthly Inflow	cfs	2667	2482	1857	1542	1608	1801	2104	2208	4916	6411	3497	2435	
Turbine Release	kaf	141.0	134.0	131.8	136.3	136.3	123.0	136.3	144.4	241.2	253.5	178.4	176.4	1932.6
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	141.0	134.0	131.8	136.3	136.3	123.0	136.3	144.4	241.2	253.5	178.4	176.4	1932.6
Total Release	cfs	2370	2179	2215	2217	2217	2215	2217	2427	3923	4260	2901	2869	
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	11.3	0.0	0.0	0.0	0.0	0.0	0.0	12.5	14.9	22.8	28.1	27.0	116.6
Afterbay Rels	kaf	145.2	138.3	136.0	140.6	140.6	126.9	140.6	148.6	245.5	257.7	182.7	180.7	1983.4
Afterbay Rels	cfs	2440	2249	2286	2287	2287	2285	2287	2497	3993	4331	2971	2939	
River Release	kaf	133.9	138.3	136.0	140.6	140.6	126.9	140.6	136.1	230.6	234.9	154.6	153.7	1866.8
River Release	cfs	2250	2249	2286	2287	2287	2285	2287	2287	3750	3948	2514	2500	
Min Release	kaf	133.9	138.3	89.3	92.2	92.2	83.3	92.2	136.1	230.6	148.8	153.7	153.7	1544.3
End-Month Content	kaf	919.4	938.0	916.7	875.2	837.8	814.8	807.9	794.9	856.0	984.0	1020.6	993.9	
End-Month Elevation	ft	3630.87	3632.76	3630.58	3625.86	3621.15	3617.99	3617.00	3615.04	3623.50	3636.98	3640.00	3637.82	
Net Change Content	kaf	17.7	18.6	-21.3	-41.5	-37.4	-23.0	-6.9	-13.0	61.1	128.0	36.6	-26.7	92.2
Yellowtail Power	2016	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Turbine Release	kaf	141.0	134.0	131.8	136.3	136.3	123.0	136.3	144.4	241.2	253.5	178.4	176.4	1932.6
Generation	gwh	52.778	49.881	48.667	50.124	49.592	43.540	49.122	52.375	95.484	103.696	70.923	69.676	735.858
End-Month Power Cap	mw	278.9	280.6	278.6	274.1	269.6	266.6	265.7	263.8	271.8	284.7	287.5	285.5	
% Max Gen		25	23	23	23	23	22	23	25	45	50	33	33	
Ave kwh/af		374	372	369	368	364	354	360	363	396	409	398	395	381
Upstream Generation	gwh	24.118	16.185	7.958	8.180	8.094	6.404	8.403	15.224	27.957	30.915	31.984	28.998	214.420
Total Generation	gwh	76.896	66.066	56.625	58.304	57.686	49.944	57.525	67.599	123.441	134.611	102.907	98.674	950.278

BHXAOP V1.16 Run: 08-Sep-2016 14:25  
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 901.7 kaf Elev 3628.93 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
Boysen Release	kaf	65.5	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	64.6	700.8
Boysen Release	cfs	1101	825	825	825	825	825	930	825	1174	1200	1200	1051	
Buffalo Bill Release	kaf	94.0	29.8	12.2	12.6	12.6	11.4	12.6	31.7	101.2	105.0	118.7	108.3	650.1
Buffalo Bill Release	cfs	1580	485	205	205	205	205	205	533	1646	1765	1930	1761	
Station Gain	kaf	-18.3	43.6	48.4	30.8	34.9	40.2	58.8	20.3	10.0	1.3	-70.0	-52.3	147.7
Monthly Inflow	kaf	141.2	124.1	109.7	94.1	98.2	97.4	128.6	101.1	183.4	177.7	122.5	120.6	1498.6
Monthly Inflow	cfs	2373	2018	1844	1530	1597	1754	2091	1699	2983	2986	1992	1961	
Turbine Release	kaf	147.2	130.9	121.0	125.0	125.0	112.9	125.1	104.2	129.2	125.7	134.5	133.4	1514.1
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	147.2	130.9	121.0	125.0	125.0	112.9	125.1	104.2	129.2	125.7	134.5	133.4	1514.1
Total Release	cfs	2474	2129	2033	2033	2033	2033	2035	1751	2101	2112	2187	2170	
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	22.8	22.8	28.1	27.0	122.5
Afterbay Rels	kaf	151.4	135.2	125.2	129.3	129.3	116.8	129.4	108.4	133.5	129.9	138.8	137.7	1564.9
Afterbay Rels	cfs	2544	2199	2104	2103	2103	2103	2104	1822	2171	2183	2257	2239	
River Release	kaf	133.9	132.2	125.2	129.3	129.3	116.8	129.4	107.1	110.7	107.1	110.7	110.7	1442.4
River Release	cfs	2250	2150	2104	2103	2103	2103	2104	1800	1800	1800	1800	1800	
Min Release	kaf	133.9	132.2	89.3	92.2	92.2	83.3	92.2	107.1	110.7	107.1	110.7	110.7	1261.6
End-Month Content	kaf	895.7	888.9	877.6	846.7	819.9	804.4	807.9	804.8	859.0	911.0	899.0	886.2	
End-Month Elevation	ft	3628.25	3627.47	3626.15	3622.31	3618.71	3616.48	3617.00	3616.54	3623.87	3629.96	3628.63	3627.16	
Net Change Content	kaf	-6.0	-6.8	-11.3	-30.9	-26.8	-15.5	3.5	-3.1	54.2	52.0	-12.0	-12.8	-15.5
Yellowtail Power	2016	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Turbine Release	kaf	147.2	130.9	121.0	125.0	125.0	112.9	125.1	104.2	129.2	125.7	134.5	133.4	1514.1
Generation	gwh	55.216	47.935	43.490	44.831	44.465	39.135	44.333	35.528	46.809	45.918	49.644	48.997	546.301
End-Month Power Cap	mw	276.4	275.6	274.4	270.7	267.3	265.2	265.7	265.2	272.2	278.0	276.7	275.3	
% Max Gen		27	22	21	21	21	20	21	17	22	22	23	23	
Ave kwh/af		375	366	359	359	356	347	354	341	362	365	369	367	361
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	55.216	47.935	43.490	44.831	44.465	39.135	44.333	35.528	46.809	45.918	49.644	48.997	546.301

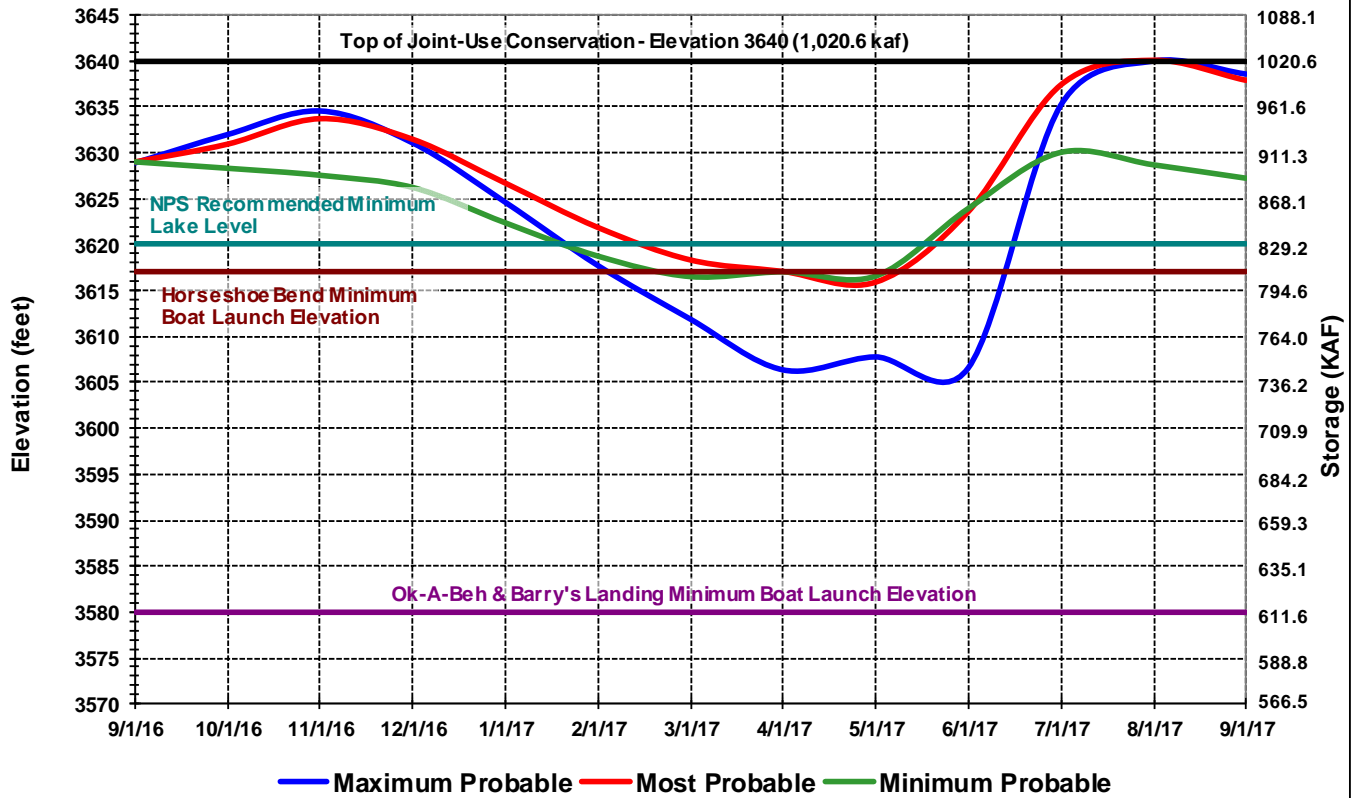
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BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 901.7 kaf Elev 3628.93 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
Boysen Release	kaf	65.5	61.5	59.5	61.5	61.5	55.6	104.5	130.9	184.5	208.3	253.5	110.2	1357.0
Boysen Release	cfs	1101	1000	1000	1000	1000	1001	1700	2200	3001	3501	4123	1792	
Buffalo Bill Release	kaf	94.0	47.6	12.2	12.6	12.6	11.4	26.6	94.7	187.0	219.6	126.7	108.3	953.3
Buffalo Bill Release	cfs	1580	774	205	205	205	205	433	1591	3041	3691	2061	1761	
Station Gain	kaf	16.4	69.9	50.0	32.1	36.4	42.0	60.5	51.0	128.9	266.4	0.1	-28.7	725.0
Monthly Inflow	kaf	175.9	179.0	121.7	106.2	110.5	109.0	191.6	276.6	500.4	694.3	380.3	189.8	3035.3
Monthly Inflow	cfs	2956	2911	2045	1727	1797	1963	3116	4648	8138	11668	6185	3087	
Turbine Release	kaf	147.2	152.4	157.2	162.5	162.5	146.8	223.2	268.8	368.9	357.0	323.3	207.2	2677.0
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	138.2	118.6	0.0	0.0	256.8
Total Release	kaf	147.2	152.4	157.2	162.5	162.5	146.8	223.2	268.8	507.1	475.6	323.3	207.2	2933.8
Total Release	cfs	2474	2479	2642	2643	2643	2643	3630	4517	8247	7993	5258	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	151.4	156.7	161.4	166.8	166.8	150.7	227.5	273.0	511.4	479.8	327.6	211.5	2984.6
Afterbay Rels	cfs	2544	2548	2712	2713	2713	2713	3700	4588	8317	8063	5328	3440	
River Release	kaf	133.9	153.7	161.4	166.8	166.8	150.7	227.5	271.7	499.5	457.0	299.5	184.5	2873.0
River Release	cfs	2250	2500	2712	2713	2713	2713	3700	4566	8124	7680	4871	3001	
Min Release	kaf	133.9	153.7	161.4	166.8	166.8	150.7	227.5	89.3	92.2	89.3	92.2	184.5	1708.3
End-Month Content	kaf	930.4	957.0	921.5	865.2	813.2	775.4	743.8	751.6	744.9	963.6	1020.6	1003.2	
End-Month Elevation	ft	3632.01	3634.57	3631.09	3624.64	3617.76	3611.93	3606.41	3607.82	3606.61	3635.18	3640.00	3638.59	
Net Change Content	kaf	28.7	26.6	-35.5	-56.3	-52.0	-37.8	-31.6	7.8	-6.7	218.7	57.0	-17.4	101.5
Yellowtail Power	2016	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Turbine Release	kaf	147.2	152.4	157.2	162.5	162.5	146.8	223.2	268.8	368.9	357.0	323.3	207.2	2677.0
Generation	gwh	55.682	58.342	60.041	61.519	60.561	53.023	84.443	103.093	150.660	145.800	133.198	83.730	1050.092
End-Month Power Cap	mw	279.9	282.4	279.1	272.9	266.4	260.9	255.6	257.0	255.8	282.9	287.5	286.2	
% Max Gen		27	27	29	29	28	27	39	50	70	70	62	39	
Ave kwh/af		378	383	382	379	373	361	378	384	408	408	412	404	392
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	55.682	58.342	60.041	61.519	60.561	53.023	84.443	103.093	150.660	145.800	133.198	83.730	1050.092

# BIGHORN LAKE

## BIGHORN LAKE ELEVATION



## BIGHORN RIVER FLOW BELOW AFTERBAY

