

RECLAMATION

Managing Water in the West

October 7, 2016

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during September were 111 percent of average. Based on the October 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the October runoff into Bighorn Lake is expected to equal 197,300 acre-feet (298 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
 October 1, 2016

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4718.65	624,893	108	84
Buffalo Bill	5363.24	421,289	94 *	65
Bighorn Lake	3633.20	942,447	107	92

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
September	180.9	111
April-July	1,031.8	93
Water Year 2015	Inflow	Percent of Average
September	134.2	83
April-July	1,542.8	142

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)	-
September	47.9	504
April-July	-78.1 (avg. 117.8)	-
Water Year 2015	Gains	Percent of Average
September	-12.6 (avg. 10.5)	-
April-July	248.6	232

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

Agency	Inflows	Percent of Average
USBR	197.3	298

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: 07-Oct-2016 14:26
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	2016	Initial Cont Elev 3633.19 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Boysen Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	80.0	140.3	135.7	140.3	98.9	78.2	977.6
Boysen Release	cfs	825	825	825	825	825	930	1344	2282	2281	2282	1608	1314	
Buffalo Bill Release	kaf	44.6	12.2	12.6	12.6	11.4	12.6	45.2	107.9	143.2	180.9	132.6	96.4	812.2
Buffalo Bill Release	cfs	725	205	205	205	205	205	760	1755	2407	2942	2157	1620	
Station Gain	kaf	102.0	51.5	33.5	37.9	43.9	62.2	39.9	62.2	119.0	-61.3	-45.3	16.4	461.9
Monthly Inflow	kaf	197.3	112.8	96.8	101.2	101.1	132.0	165.1	310.4	397.9	259.9	186.2	191.0	2251.7
Monthly Inflow	cfs	3209	1896	1574	1646	1820	2147	2775	5048	6687	4227	3028	3210	
Turbine Release	kaf	147.6	144.6	149.5	149.5	135.0	149.5	164.8	241.2	297.0	217.6	207.2	185.6	2189.1
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	147.6	144.6	149.5	149.5	135.0	149.5	164.8	241.2	297.0	217.6	207.2	185.6	2189.1
Total Release	cfs	2400	2430	2431	2431	2431	2431	2770	3923	4991	3539	3370	3119	
Spring Flow	kaf	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.0	12.5	14.9	22.8	28.1	27.0	11.3	116.6
Afterbay Rels	kaf	151.9	148.8	153.8	153.8	138.9	153.8	169.0	245.5	301.2	221.9	211.5	189.8	2239.9
Afterbay Rels	cfs	2470	2501	2501	2501	2501	2501	2840	3993	5062	3609	3440	3190	
River Release	kaf	151.9	148.8	153.8	153.8	138.9	153.8	156.5	230.6	278.4	193.8	184.5	178.5	2123.3
River Release	cfs	2470	2501	2501	2501	2501	2501	2630	3750	4679	3152	3001	3000	
Min Release	kaf	151.9	89.3	92.2	92.2	83.3	92.2	156.5	230.6	148.8	153.7	184.5	178.5	1653.7
End-Month Content	kaf	992.1	960.3	907.6	859.3	825.4	807.9	808.2	877.4	978.3	1020.6	999.6	1005.0	
End-Month Elevation	ft	3637.67	3634.88	3629.59	3623.91	3619.47	3617.00	3617.04	3626.12	3636.48	3640.00	3638.30	3638.74	
Net Change Content	kaf	49.7	-31.8	-52.7	-48.3	-33.9	-17.5	0.3	69.2	100.9	42.3	-21.0	5.4	62.6
Yellowtail Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	kaf	147.6	144.6	149.5	149.5	135.0	149.5	164.8	241.2	297.0	217.6	207.2	185.6	2189.1
Generation	gwh	56.565	54.868	56.406	55.690	48.840	54.818	61.459	96.052	121.666	88.649	83.677	74.002	852.692
End-Month Power Cap	mw	285.3	282.7	277.6	272.2	268.0	265.7	265.7	274.3	284.2	287.5	285.9	286.3	
% Max Gen		26	26	26	26	25	26	30	45	59	41	39	36	
Ave kwh/af		383	379	377	373	362	367	373	398	410	407	404	399	390
Upstream Generation	gwh	15.381	7.225	7.472	7.450	5.883	7.964	18.105	32.376	33.881	35.307	32.245	26.650	229.939
Total Generation	gwh	71.946	62.093	63.878	63.140	54.723	62.782	79.564	128.428	155.547	123.956	115.922	100.652	1082.631

BHXAOP V1.16 Run: 07-Oct-2016 14:26
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	2016	Initial Cont Elev 3633.19 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Boysen Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	70.2	56.9	697.8
Boysen Release	cfs	825	825	825	825	825	930	825	1174	1200	1200	1142	956	
Buffalo Bill Release	kaf	29.8	12.2	12.6	12.6	11.4	12.6	42.5	107.3	111.1	118.7	108.3	94.0	673.1
Buffalo Bill Release	cfs	485	205	205	205	205	205	714	1745	1867	1930	1761	1580	
Station Gain	kaf	77.0	51.0	33.0	37.3	43.2	61.6	20.3	10.0	1.3	-70.0	-52.3	-0.8	211.6
Monthly Inflow	kaf	157.5	112.3	96.3	100.6	100.4	131.4	111.9	189.5	183.8	122.5	126.2	150.1	1582.5
Monthly Inflow	cfs	2561	1887	1566	1636	1808	2137	1881	3082	3089	1992	2052	2523	
Turbine Release	kaf	147.6	136.1	140.7	140.7	127.1	140.8	116.1	141.5	137.6	146.8	145.7	132.3	1653.0
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	147.6	136.1	140.7	140.7	127.1	140.8	116.1	141.5	137.6	146.8	145.7	132.3	1653.0
Total Release	cfs	2400	2287	2288	2288	2289	2290	1951	2301	2312	2387	2370	2223	
Spring Flow	kaf	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.0	1.3	22.8	22.8	28.1	27.0	17.5	119.5
Afterbay Rels	kaf	151.9	140.3	145.0	145.0	131.0	145.1	120.3	145.8	141.8	151.1	150.0	136.5	1703.8
Afterbay Rels	cfs	2470	2358	2358	2358	2359	2360	2022	2371	2383	2457	2440	2294	
River Release	kaf	151.9	140.3	145.0	145.0	131.0	145.1	119.0	123.0	119.0	123.0	123.0	119.0	1584.3
River Release	cfs	2470	2358	2358	2358	2359	2360	2000	2000	2000	2000	2000	2000	
Min Release	kaf	151.9	89.3	92.2	92.2	83.3	92.2	119.0	123.0	119.0	123.0	123.0	119.0	1327.1
End-Month Content	kaf	952.3	928.5	884.1	844.0	817.3	807.9	803.7	851.7	897.9	873.6	854.1	871.9	
End-Month Elevation	ft	3634.14	3631.81	3626.92	3621.96	3618.35	3617.00	3616.37	3622.95	3628.50	3625.67	3623.26	3625.46	
Net Change Content	kaf	9.9	-23.8	-44.4	-40.1	-26.7	-9.4	-4.2	48.0	46.2	-24.3	-19.5	17.8	-70.5
Yellowtail Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	kaf	147.6	136.1	140.7	140.7	127.1	140.8	116.1	141.5	137.6	146.8	145.7	132.3	1653.0
Generation	gwh	56.126	50.708	52.181	51.598	45.325	51.059	40.466	52.064	50.996	54.720	53.940	48.329	607.512
End-Month Power Cap	mw	282.0	279.7	275.1	270.4	267.0	265.7	265.1	271.3	276.6	273.9	271.6	273.7	
% Max Gen		26	24	24	24	23	24	20	24	25	26	25	23	
Ave kwh/af		380	373	371	367	357	363	349	368	371	373	370	365	368
Upstream Generation	gwh	10.811	7.200	7.426	7.384	5.801	7.841	14.742	26.606	26.288	26.996	25.247	21.781	188.123
Total Generation	gwh	66.937	57.908	59.607	58.982	51.126	58.900	55.208	78.670	77.284	81.716	79.187	70.110	795.635

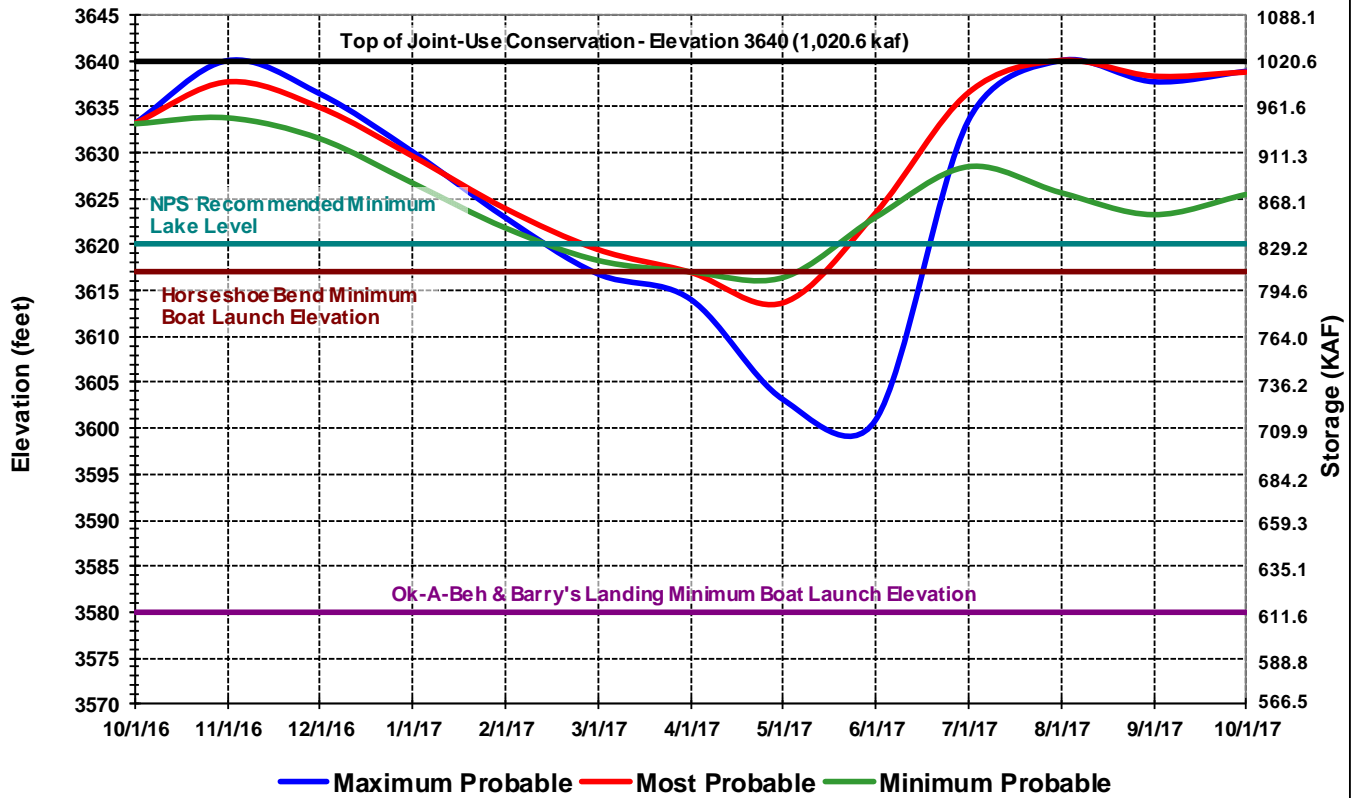
BHXAOP V1.16 Run: 07-Oct-2016 14:26
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 942.4 kaf Elev 3633.19 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total	
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug		Sep
Boysen Release	kaf	50.7	49.1	50.7	50.7	45.8	104.5	130.9	184.5	277.6	286.9	131.1	78.4	1440.9
Boysen Release	cfs	825	825	825	825	825	1700	2200	3001	4665	4666	2132	1318	
Buffalo Bill Release	kaf	47.6	12.2	12.6	12.6	11.4	25.3	94.7	187.3	220.2	305.4	153.5	105.1	1187.9
Buffalo Bill Release	cfs	774	205	205	205	205	411	1591	3046	3701	4967	2496	1766	
Station Gain	kaf	130.3	52.3	34.2	38.6	44.8	63.1	51.0	128.9	266.4	0.1	-28.7	36.7	817.7
Monthly Inflow	kaf	228.6	113.6	97.5	101.9	102.0	192.9	276.6	500.7	764.2	592.4	255.9	220.2	3446.5
Monthly Inflow	cfs	3718	1909	1586	1657	1837	3137	4648	8143	12843	9634	4162	3701	
Turbine Release	kaf	150.4	163.0	168.5	168.5	152.2	192.5	334.2	368.9	357.0	368.9	284.0	206.7	2914.8
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	143.6	176.8	147.7	0.0	0.0	468.1
Total Release	kaf	150.4	163.0	168.5	168.5	152.2	192.5	334.2	512.5	533.8	516.6	284.0	206.7	3382.9
Total Release	cfs	2446	2739	2740	2740	2741	3131	5616	8335	8971	8402	4619	3474	
Spring Flow	kaf	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	108.6
Afterbay Rels	kaf	154.7	167.2	172.8	172.8	156.1	196.8	338.4	516.8	538.0	520.9	288.3	210.9	3433.7
Afterbay Rels	cfs	2516	2810	2810	2810	2811	3201	5687	8405	9041	8472	4689	3544	
River Release	kaf	154.7	167.2	172.8	172.8	156.1	196.8	337.1	504.9	515.2	492.8	261.3	193.4	3325.1
River Release	cfs	2516	2810	2810	2810	2811	3201	5665	8211	8658	8015	4250	3250	
Min Release	kaf	151.9	167.2	172.8	172.8	156.1	196.8	89.3	92.2	89.3	92.2	261.3	193.4	1835.3
End-Month Content	kaf	1020.6	971.2	900.2	833.6	783.4	783.8	726.2	714.4	944.8	1020.6	992.5	1006.0	
End-Month Elevation	ft	3640.00	3635.86	3628.76	3620.59	3613.23	3613.30	3603.11	3600.86	3633.42	3640.00	3637.70	3638.82	
Net Change Content	kaf	78.2	-49.4	-71.0	-66.6	-50.2	0.4	-57.6	-11.8	230.4	75.8	-28.1	13.5	63.6
Yellowtail Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	kaf	150.4	163.0	168.5	168.5	152.2	192.5	334.2	368.9	357.0	368.9	284.0	206.7	2914.8
Generation	gwh	58.130	63.307	64.768	63.581	55.501	72.827	126.401	150.660	145.800	150.660	116.673	83.548	1151.856
End-Month Power Cap	mw	287.5	283.6	276.8	269.1	262.1	262.2	252.5	250.3	281.3	287.5	285.3	286.4	
% Max Gen		27	31	30	30	29	34	61	70	70	70	54	40	
Ave kwh/af		387	388	384	377	365	378	378	408	408	408	411	404	395
Upstream Generation	gwh	16.190	7.253	7.504	7.499	5.940	15.507	29.301	33.253	33.669	35.306	35.044	28.477	254.943
Total Generation	gwh	74.320	70.560	72.272	71.080	61.441	88.334	155.702	183.913	179.469	185.966	151.717	112.025	1406.799

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

