

RECLAMATION

Managing Water in the West

July 10, 2017

Dear Customer:

Attached is the monthly water supply outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during June were 217% of average. Based on the July 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the July inflow into Bighorn Lake is expected to equal 498,500 acre-feet (202% of average). If you have any questions or concerns, please feel free to call 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
 July 1, 2017

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4728.71	816,860	127	110
Buffalo Bill	5390.75	624,484	108 *	97
Bighorn Lake	3638.62	1,003,499	108	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 rd highest of record)	217
Water Year 2016	Inflow	Percent of Average
June	422.8	97
July	128.7	50
August	135.9	91
September	180.9	111
April-July	1,031.8	93

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
Water Year 2016	Gains	Percent of Average
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)	-

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

Inflows	Percent of Average
498,500	202

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.

SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of July 1, 2017

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
	feet	Current	Median	% Median	Current	Median	% Median
UPPER YELLOWSTONE RIVER BASIN							
Beartooth Lake	9360	2.0	.0	*	35.7	28.0	128
Box Canyon	6670	.0	.0	*	18.4	20.0	92
Brackett Creek	7320	.0	.0	*	43.4	40.5	107
Burnt Mtn Canyon	5880	.0	.0	*	25.1	24.4	103
Cole Creek	7870	.0	.0	*	31.5	23.5	134
Cole Creek	7850	.0	.0	*	20.6	24.7	83
East Boulder Mine	6335	.0	-M	*	25.8	-M	*
Evening Star	9200	.0	.0	*	55.4	38.6	144
Fisher Creek	9100	3.5	.0	*	57.5	44.3	130
Monument Peak	8850	.0	.0	*	38.4	31.5	122
Northeast Entrance	7350	.0	.0	*	26.0	19.5	133
Parker Peak	9400	.0	.0	*	44.5	26.9	165
Placer Basin	8830	.0	.0	*	31.7	30.6	104
Porcupine	6500	.0	.0	*	22.9	21.7	106
Sacajawea	6550	.0	.0	*	40.5	37.6	108
Shower Falls	8100	.0	.0	*	42.7	38.8	110
S Fork Shields	8100	.0	.0	*	40.5	34.3	118
Sylvan Lake	8420	.0	.0	*	46.6	32.7	143
Sylvan Road	7120	.0	.0	*	36.1	23.9	151
Thumb Divide	7980	.0	.0	*	33.3	26.2	127
Two Ocean Plateau	9240	-M	.0	*	-M	37.6	*
White Mill	8700	.0	.0	*	43.5	34.1	128
Wolverine	7650	.0	.0	*	27.1	18.7	145
Younts Peak	8350	.0	.0	*	39.5	23.2	170
Basin Index (%)				*			124
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	.0	-M	*	33.2	-M	*
Castle Creek	8400	.0	-M	*	21.2	-M	*
Cold Springs	9630	.0	.0	*	26.6	17.5	152
Deer Park	9700	.0	.0	*	48.7	30.0	162
Hobbs Park	10100	.0	.0	*	39.6	22.9	173
Kirwin	9550	.0	.0	*	33.4	19.6	170
Little Warm	9370	.0	.0	*	30.7	20.6	149
Owl Creek	8975	.0	.0	*	19.1	12.9	148
South Pass	9040	.0	.0	*	39.2	25.7	153
St. Lawrence Alt	8620	.0	.0	*	24.1	16.6	145
Togwotee Pass	9580	.0	.0	*	48.2	33.4	144
Townsend Creek	8700	.0	.0	*	33.3	20.3	164
Younts Peak	8350	.0	.0	*	39.5	23.2	170
Basin Index (%)				*			158
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	4.2	.0	*	51.8	30.3	171
Evening Star	9200	.0	.0	*	55.4	38.6	144
Marquette	8760	.0	-M	*	28.8	-M	*
Sylvan Lake	8420	.0	.0	*	46.6	32.7	143
Sylvan Road	7120	.0	.0	*	36.1	23.9	151
Younts Peak	8350	.0	.0	*	39.5	23.2	170
Basin Index (%)				*			154

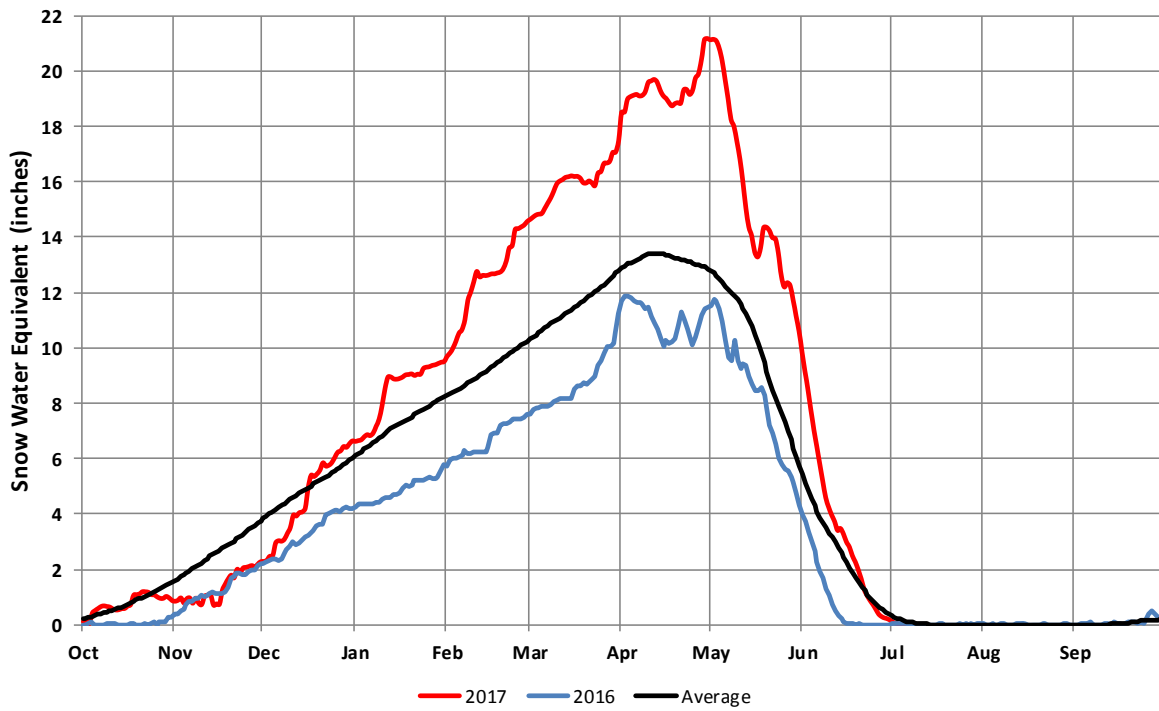
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of July 1, 2017

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	.0	.0	*	25.9	26.8	97
Bear Trap Meadow	8200	.0	.0	*	19.7	16.3	121
Blackwater	9780	4.2	.0	*	51.8	30.3	171
Bone Springs Div	9350	.0	.0	*	26.0	25.4	102
Burroughs Creek	8750	.0	-M	*	33.2	-M	*
Castle Creek	8400	.0	-M	*	21.2	-M	*
Cold Springs	9630	.0	.0	*	26.6	17.5	152
Deer Park	9700	.0	.0	*	48.7	30.0	162
Evening Star	9200	.0	.0	*	55.4	38.6	144
Grave Springs	8550	.0	.0	*	16.4	18.3	90
Kirwin	9550	.0	.0	*	33.4	19.6	170
Little Warm	9370	.0	.0	*	30.7	20.6	149
Marquette	8760	.0	-M	*	28.8	-M	*
Middle Powder	7760	.0	.0	*	18.1	20.0	90
Owl Creek	8975	.0	.0	*	19.1	12.9	148
Powder River Pass	9480	.0	.0	*	23.2	21.8	106
Shell Creek	9580	.0	.0	*	24.2	23.0	105
South Pass	9040	.0	.0	*	39.2	25.7	153
St. Lawrence Alt	8620	.0	.0	*	24.1	16.6	145
Sylvan Lake	8420	.0	.0	*	46.6	32.7	143
Sylvan Road	7120	.0	.0	*	36.1	23.9	151
Timber Creek	7950	.0	.0	*	20.5	16.1	127
Togwotee Pass	9580	.0	.0	*	48.2	33.4	144
Townsend Creek	8700	.0	.0	*	33.3	20.3	164
Younts Peak	8350	.0	.0	*	39.5	23.2	170
Basin Index (%)				*			138

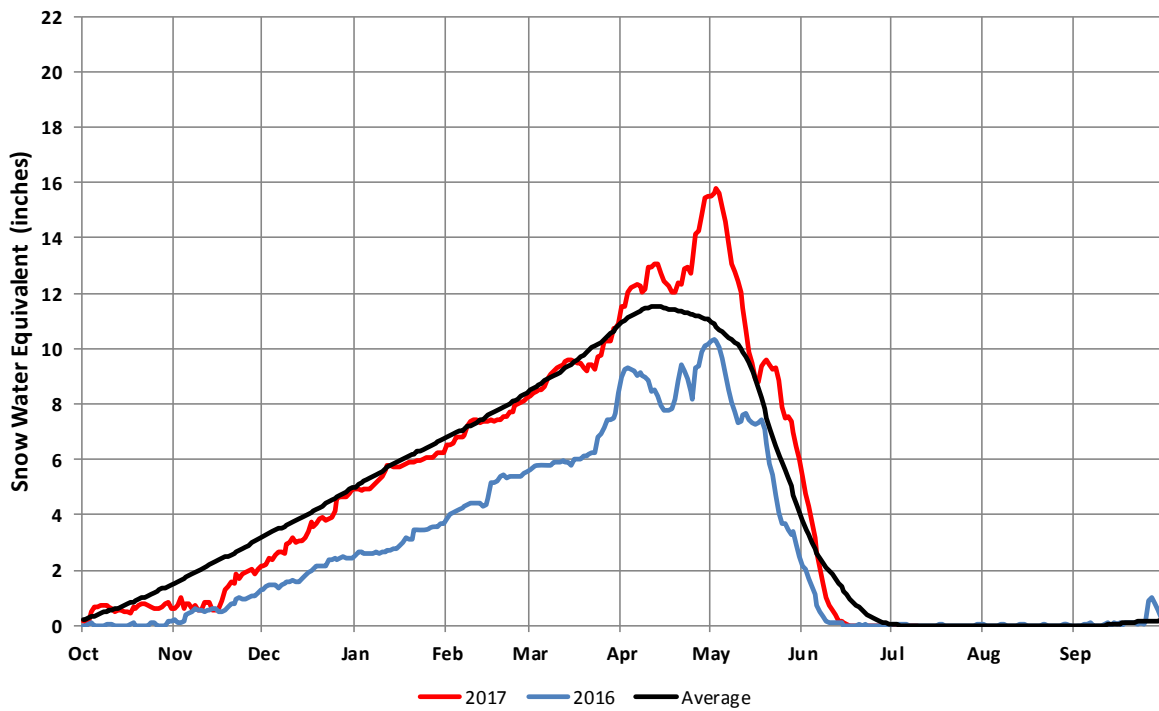
-M = Missing data

* = Data may not provide a valid measure of conditions.

Snowpack above Bighorn Lake



Snowpack in Bighorn Mountains



Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3638.62 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2017	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Boysen Release	kaf	313.0	110.2	72.0	61.5	59.5	61.5	61.5	55.5	61.5	126.2	130.4	126.1	1238.9
Boysen Release	cfs	5090	1792	1210	1000	1000	1000	1000	999	1000	2121	2121	2119	
Buffalo Bill Release	kaf	266.5	123.6	98.5	50.3	21.1	21.8	21.8	19.8	21.8	62.0	115.6	170.8	993.6
Buffalo Bill Release	cfs	4334	2010	1655	818	355	355	355	357	355	1042	1880	2870	
Station Gain	kaf	-81.0	-65.1	10.2	65.3	60.6	41.3	46.6	54.7	72.3	39.9	62.2	119.0	426.0
Monthly Inflow	kaf	498.5	168.7	180.7	177.1	141.2	124.6	129.9	130.0	155.6	228.1	308.2	415.9	2658.5
Monthly Inflow	cfs	8107	2744	3037	2880	2373	2026	2113	2341	2531	3833	5012	6989	
Turbine Release	kaf	368.9	207.2	191.8	174.3	165.7	171.2	171.3	154.7	171.2	245.7	261.9	271.6	2555.5
Bypass/Spill/Waste	kaf	125.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	125.6
Total Release	kaf	494.5	207.2	191.8	174.3	165.7	171.2	171.3	154.7	171.2	245.7	261.9	271.6	2681.1
Total Release	cfs	8042	3370	3223	2835	2785	2784	2786	2786	2784	4129	4259	4564	
Spring Flow	kaf	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	50.8
Irrigation Reqmnt	kaf	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	111.6
Afterbay Rels	kaf	498.8	211.5	196.0	178.6	169.9	175.5	175.6	158.6	175.5	249.9	266.2	275.8	2731.9
Afterbay Rels	cfs	8112	3440	3294	2905	2855	2854	2856	2856	2854	4200	4329	4635	
River Release	kaf	470.7	184.5	178.5	175.6	169.9	175.5	175.6	158.6	175.5	248.6	254.3	253.0	2620.3
River Release	cfs	7655	3001	3000	2856	2855	2854	2856	2856	2854	4178	4136	4252	
Min Release	kaf	184.5	184.5	178.5	92.2	89.3	92.2	92.2	83.3	92.2	89.3	92.2	89.3	1359.7
End-Month Content	kaf	1007.5	969.0	957.9	960.7	936.2	889.6	848.2	823.5	807.9	790.3	836.6	980.9	
End-Month Elevation	ft	3638.95	3635.66	3634.66	3634.91	3632.58	3627.55	3622.50	3619.21	3617.00	3614.33	3620.99	3636.71	
Net Change Content	kaf	4.0	-38.5	-11.1	2.8	-24.5	-46.6	-41.4	-24.7	-15.6	-17.6	46.3	144.3	-22.6
Yellowtail Power	2017	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Turbine Release	kaf	368.9	207.2	191.8	174.3	165.7	171.2	171.3	154.7	171.2	245.7	261.9	271.6	2555.5
Generation	gwh	150.660	83.192	76.127	68.282	64.063	65.793	65.090	57.361	64.232	95.343	103.487	111.278	1004.908
End-Month Power Cap	mw	286.5	283.4	282.5	282.7	280.5	275.7	270.9	267.8	265.7	263.1	269.5	284.4	
% Max Gen		70	39	37	32	31	31	30	30	30	46	48	54	
Ave kwh/af		408	402	397	392	387	384	380	371	375	388	395	410	393
Upstream Generation	gwh	35.283	32.580	26.796	18.294	10.840	11.165	11.085	9.953	10.949	26.129	32.748	32.970	258.792
Total Generation	gwh	185.943	115.772	102.923	86.576	74.903	76.958	76.175	67.314	75.181	121.472	136.235	144.248	1263.700

Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3638.62 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2017	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Boysen Release	kaf	263.0	82.3	71.9	61.5	59.5	61.5	61.5	55.6	61.5	59.5	73.9	71.4	983.1
Boysen Release	cfs	4277	1338	1208	1000	1000	1000	1000	1001	1000	1000	1202	1200	
Buffalo Bill Release	kaf	216.5	101.5	85.5	47.6	21.1	21.8	21.8	19.7	21.8	39.6	106.3	110.7	813.9
Buffalo Bill Release	cfs	3521	1651	1437	774	355	355	355	355	355	666	1729	1860	
Station Gain	kaf	-103.2	-78.2	-6.6	55.6	59.0	40.0	45.1	52.9	70.5	20.3	10.0	1.3	166.7
Monthly Inflow	kaf	376.3	105.6	150.8	164.7	139.6	123.3	128.4	128.2	153.8	119.4	190.2	183.4	1963.7
Monthly Inflow	cfs	6120	1717	2534	2679	2346	2005	2088	2308	2501	2007	3093	3082	
Turbine Release	kaf	359.2	176.4	162.1	152.4	162.1	167.6	167.6	151.3	167.6	116.1	130.6	137.6	2050.6
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	359.2	176.4	162.1	152.4	162.1	167.6	167.6	151.3	167.6	116.1	130.6	137.6	2050.6
Total Release	cfs	5842	2869	2724	2479	2724	2726	2726	2724	2726	1951	2124	2312	
Spring Flow	kaf	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	50.8
Irrigation Reqmnt	kaf	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	111.6
Afterbay Rels	kaf	363.5	180.7	166.3	156.7	166.3	171.9	171.9	155.2	171.9	120.3	134.9	141.8	2101.4
Afterbay Rels	cfs	5912	2939	2795	2548	2795	2796	2796	2795	2796	2022	2194	2383	
River Release	kaf	335.4	153.7	148.8	153.7	166.3	171.9	171.9	155.2	171.9	119.0	123.0	119.0	1989.8
River Release	cfs	5455	2500	2501	2500	2795	2796	2796	2795	2796	2000	2000	2000	
Min Release	kaf	92.2	153.7	148.8	153.7	89.3	92.2	92.2	83.3	92.2	119.0	123.0	119.0	1358.6
End-Month Content	kaf	1020.6	949.8	938.5	950.8	928.3	884.0	844.8	821.7	807.9	811.2	870.8	916.6	
End-Month Elevation	ft	3640.00	3633.90	3632.81	3634.00	3631.79	3626.91	3622.06	3618.96	3617.00	3617.47	3625.33	3630.57	
Net Change Content	kaf	17.1	-70.8	-11.3	12.3	-22.5	-44.3	-39.2	-23.1	-13.8	3.3	59.6	45.8	-86.9
Yellowtail Power	2017	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Turbine Release	kaf	359.2	176.4	162.1	152.4	162.1	167.6	167.6	151.3	167.6	116.1	130.6	137.6	2050.6
Generation	gwh	147.278	69.076	62.476	58.268	62.334	64.100	63.400	55.848	62.669	40.569	47.574	51.233	784.825
End-Month Power Cap	mw	287.5	281.7	280.7	281.8	279.7	275.1	270.5	267.5	265.7	266.1	273.6	278.6	
% Max Gen		69	32	30	27	30	30	30	29	29	20	22	25	
Ave kwh/af		410	392	385	382	385	382	378	369	374	349	364	372	383
Upstream Generation	gwh	35.291	26.798	22.584	13.743	7.262	7.449	7.349	4.938	7.190	11.383	26.356	26.019	196.362
Total Generation	gwh	182.569	95.874	85.060	72.011	69.596	71.549	70.749	60.786	69.859	51.952	73.930	77.252	981.187

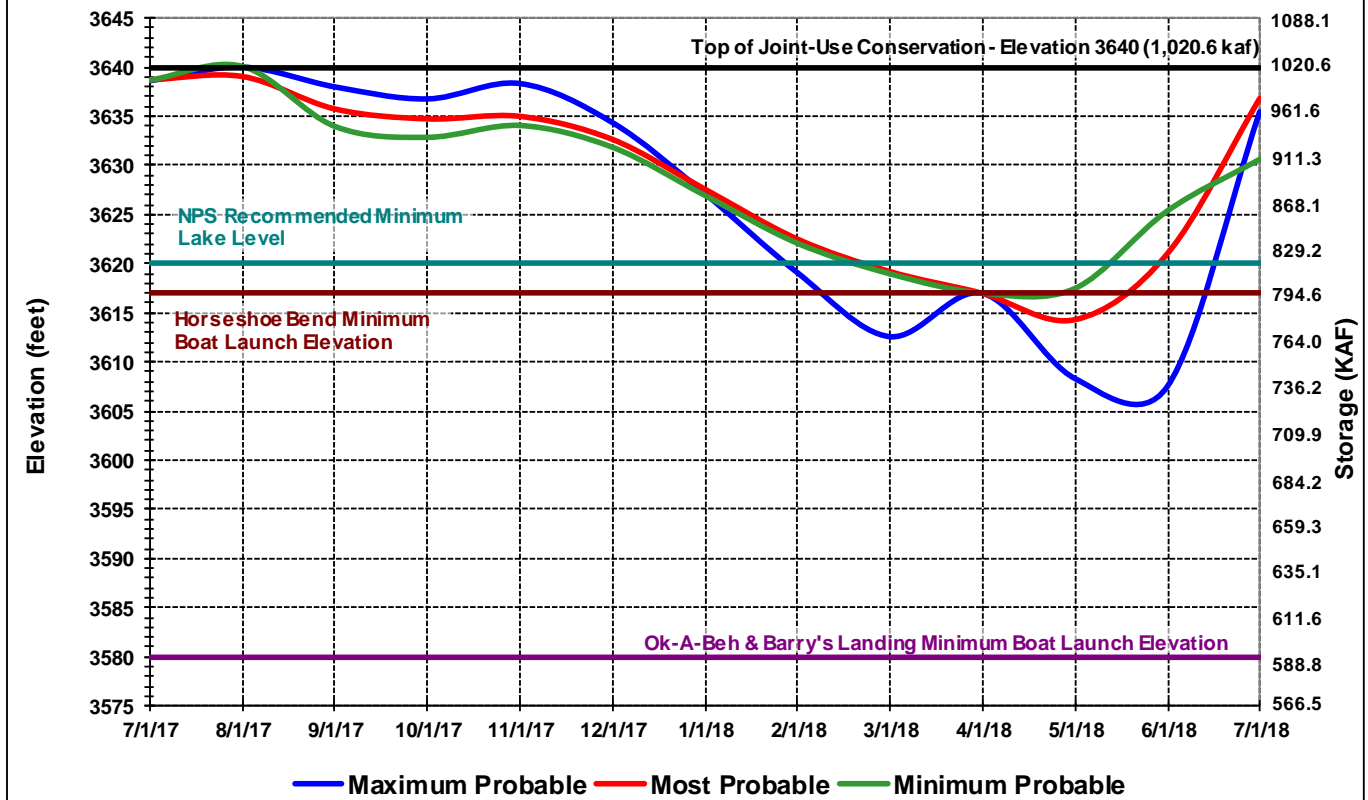
Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3638.62 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2017	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Boysen Release	kaf	363.0	131.1	88.4	61.6	59.6	61.6	61.5	55.6	90.7	171.3	228.6	221.7	1594.7
Boysen Release	cfs	5904	2132	1486	1002	1002	1002	1000	1001	1475	2879	3718	3726	
Buffalo Bill Release	kaf	316.5	147.2	92.5	65.1	21.1	21.8	21.8	19.8	58.2	78.1	195.5	249.9	1287.5
Buffalo Bill Release	cfs	5147	2394	1555	1059	355	355	355	357	947	1313	3180	4200	
Station Gain	kaf	-42.8	-34.3	26.3	90.3	63.4	43.7	49.2	58.1	75.3	51.0	128.9	266.4	775.5
Monthly Inflow	kaf	636.7	244.0	207.2	217.0	144.1	127.1	132.5	133.5	224.2	300.4	553.0	738.0	3657.7
Monthly Inflow	cfs	10355	3968	3482	3529	2422	2067	2155	2404	3646	5048	8994	12403	
Turbine Release	kaf	368.9	268.7	221.6	198.5	189.4	195.8	195.8	176.8	195.7	353.8	368.9	357.0	3090.9
Bypass/Spill/Waste	kaf	250.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	188.8	164.3	603.8
Total Release	kaf	619.6	268.7	221.6	198.5	189.4	195.8	195.8	176.8	195.7	353.8	557.7	521.3	3694.7
Total Release	cfs	10077	4370	3724	3228	3183	3184	3184	3183	3183	5946	9070	8761	
Spring Flow	kaf	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	50.8
Irrigation Reqmnt	kaf	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	111.6
Afterbay Rels	kaf	623.9	273.0	225.8	202.8	193.6	200.1	200.1	180.7	200.0	358.0	562.0	525.5	3745.5
Afterbay Rels	cfs	10147	4440	3795	3298	3254	3254	3254	3254	3253	6016	9140	8831	
River Release	kaf	595.8	246.0	208.3	199.8	193.6	200.1	200.1	180.7	200.0	356.7	550.1	502.7	3633.9
River Release	cfs	9690	4001	3501	3249	3254	3254	3254	3254	3253	5995	8947	8448	
Min Release	kaf	92.2	246.0	208.3	199.8	89.3	92.2	92.2	83.3	92.2	89.3	92.2	89.3	1466.3
End-Month Content	kaf	1020.6	995.9	981.5	1000.0	954.7	886.0	822.7	779.4	807.9	754.5	749.8	966.5	
End-Month Elevation	ft	3640.00	3637.99	3636.76	3638.33	3634.36	3627.14	3619.10	3612.59	3617.00	3608.34	3607.50	3635.44	
Net Change Content	kaf	17.1	-24.7	-14.4	18.5	-45.3	-68.7	-63.3	-43.3	28.5	-53.4	-4.7	216.7	-37.0
Yellowtail Power	2017	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Turbine Release	kaf	368.9	268.7	221.6	198.5	189.4	195.8	195.8	176.8	195.7	353.8	368.9	357.0	3090.9
Generation	gwh	150.660	110.375	89.789	79.771	74.999	76.623	75.237	65.985	74.831	135.112	150.660	145.800	1229.842
End-Month Power Cap	mw	287.5	285.6	284.4	285.9	282.2	275.3	267.7	261.5	265.7	257.4	256.6	283.2	
% Max Gen		70	52	43	37	36	36	35	34	35	65	70	70	
Ave kwh/af		408	411	405	402	396	391	384	373	382	382	408	408	398
Upstream Generation	gwh	35.275	35.048	26.820	22.304	10.881	11.213	11.137	9.176	23.146	29.564	32.268	33.188	280.020
Total Generation	gwh	185.935	145.423	116.609	102.075	85.880	87.836	86.374	75.161	97.977	164.676	182.928	178.988	1509.862

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

