

RECLAMATION

Managing Water in the West

January 10, 2017

Dear Customer:

Attached is the monthly water supply outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during December were 106% of average. On January 1, the NRCS measured the snow water content of the mountain snowpack in the Bighorn River Basin at 109% of average. Based on the January 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the April through July runoff into Bighorn Lake is expected to equal 1,383,800 acre-feet (127% 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
 January 1, 2017

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4719.79	644,653	113	87
Buffalo Bill	5371.09	475,863	111 *	74
Bighorn Lake	3632.70	937,335	111	92

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
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

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
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)	-

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

Inflows	Percent of Average
1,383,800	127

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 January 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	11.9	10.0	119	9.8	9.2	107	
Box Canyon	6670	2.9	3.7	78	6.0	6.2	97	
Brackett Creek	7320	5.2	7.0	74	12.9	11.9	108	
Burnt Mtn Canyon	5880	3.7	1.8	206	7.5	6.8	110	
Cole Creek	7870	6.7	5.5	122	12.8	7.9	162	
Cole Creek	7850	5.2	6.3	83	4.9	6.4	77	
East Boulder Mine	6335	3.0	-M	*	9.3	-M	*	
Evening Star	9200	14.3	11.5	124	20.2	13.2	153	
Fisher Creek	9100	13.6	14.7	93	19.0	15.1	126	
Monument Peak	8850	7.2	8.8	82	13.7	10.4	132	
Northeast Entrance	7350	4.6	4.1	112	9.9	6.2	160	
Parker Peak	9400	12.2	9.9	123	15.2	8.6	177	
Placer Basin	8830	5.9	8.2	72	10.1	9.2	110	
Porcupine	6500	1.6	2.2	73	5.5	5.7	96	
Sacajawea	6550	4.6	5.5	84	13.4	11.3	119	
Shower Falls	8100	7.2	9.0	80	15.6	10.9	143	
S Fork Shields	8100	2.0	6.5	31	10.9	9.4	116	
Sylvan Lake	8420	9.5	9.2	103	19.7	11.2	176	
Sylvan Road	7120	6.7	5.4	124	16.6	9.0	184	
Thumb Divide	7980	6.5	6.2	105	12.5	8.8	142	
Two Ocean Plateau	9240	17.9	12.5	143	19.2	12.7	151	
White Mill	8700	11.3	9.9	114	14.7	11.3	130	
Wolverine	7650	7.1	4.8	148	10.6	6.2	171	
Younts Peak	8350	8.0	7.0	114	12.8	7.8	164	
Basin Index (%)							104	136
WIND RIVER BASIN (WYOMING)								
Burroughs Creek	8750	8.1	-M	*	10.6	-M	*	
Castle Creek	8400	4.7	-M	*	6.8	-M	*	
Cold Springs	9630	4.2	3.2	131	6.6	5.0	132	
Deer Park	9700	9.7	6.6	147	13.7	9.0	152	
Hobbs Park	10100	8.1	6.6	123	8.8	6.2	142	
Kirwin	9550	6.8	4.3	158	9.8	5.6	175	
Little Warm	9370	4.2	4.5	93	9.0	6.2	145	
Owl Creek	8975	2.6	2.6	100	4.0	2.9	138	
South Pass	9040	9.2	6.7	137	9.6	8.4	114	
St. Lawrence Alt	8620	1.6	3.1	52	5.6	4.3	130	
Togwotee Pass	9580	13.9	11.1	125	17.6	11.6	152	
Townsend Creek	8700	3.8	4.1	93	6.7	5.8	116	
Younts Peak	8350	8.0	7.0	114	12.8	7.8	164	
Basin Index (%)							121	143
SHOSHONE RIVER BASIN (WYOMING)								
Blackwater	9780	15.2	10.5	145	18.2	10.0	182	
Evening Star	9200	14.3	11.5	124	20.2	13.2	153	
Marquette	8760	3.5	-M	*	6.7	-M	*	
Sylvan Lake	8420	9.5	9.2	103	19.7	11.2	176	
Sylvan Road	7120	6.7	5.4	124	16.6	9.0	184	
Younts Peak	8350	8.0	7.0	114	12.8	7.8	164	
Basin Index (%)							123	171

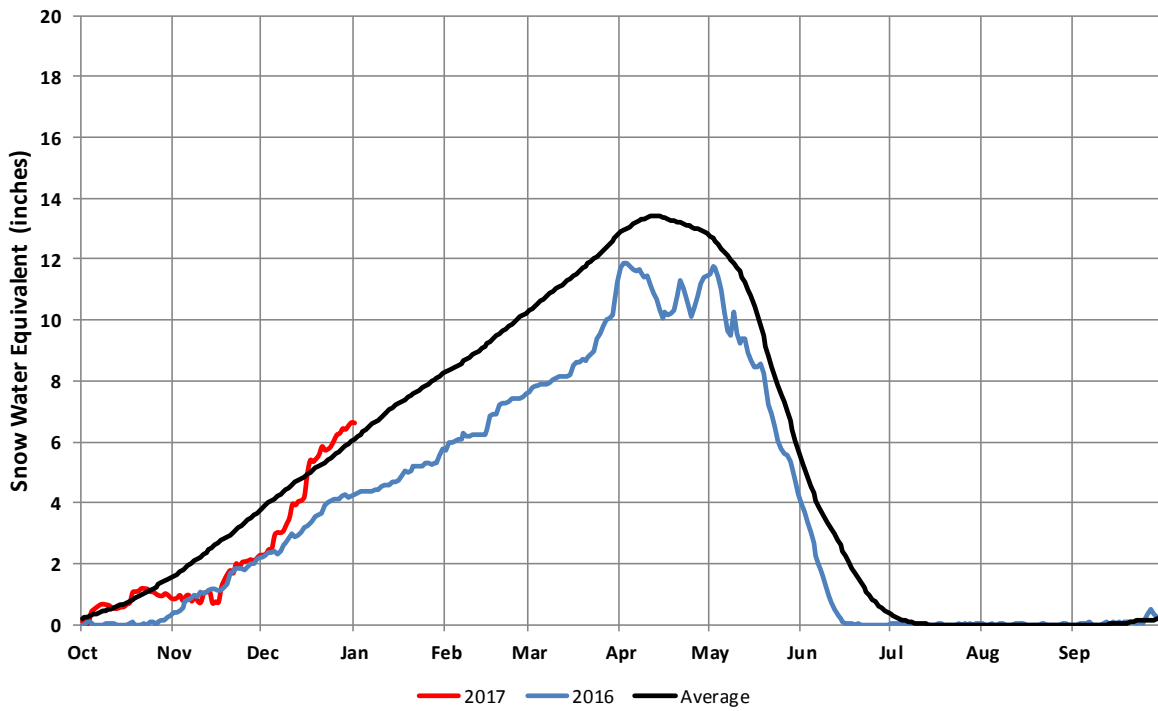
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of January 1, 2017

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation				
		Current	Median	% Median	Current	Median	% Median		
BIGHORN BASIN ABOVE YELLOWTAIL DAM									
Bald Mtn.	9380	10.4	8.5	122	9.1	7.9	115		
Bear Trap Meadow	8200	2.3	2.6	88	3.8	4.2	90		
Blackwater	9780	15.2	10.5	145	18.2	10.0	182		
Bone Springs Div	9350	7.6	7.3	104	8.2	7.2	114		
Burroughs Creek	8750	8.1	-M	*	10.6	-M	*		
Castle Creek	8400	4.7	-M	*	6.8	-M	*		
Cold Springs	9630	4.2	3.2	131	6.6	5.0	132		
Deer Park	9700	9.7	6.6	147	13.7	9.0	152		
Evening Star	9200	14.3	11.5	124	20.2	13.2	153		
Grave Springs	8550	2.9	3.4	85	4.1	5.1	80		
Kirwin	9550	6.8	4.3	158	9.8	5.6	175		
Little Warm	9370	4.2	4.5	93	9.0	6.2	145		
Marquette	8760	3.5	-M	*	6.7	-M	*		
Middle Powder	7760	3.7	5.0	74	4.3	6.0	72		
Owl Creek	8975	2.6	2.6	100	4.0	2.9	138		
Powder River Pass	9480	2.7	4.8	56	5.3	6.0	88		
Shell Creek	9580	8.5	7.2	118	7.0	6.5	108		
South Pass	9040	9.2	6.7	137	9.6	8.4	114		
St. Lawrence Alt	8620	1.6	3.1	52	5.6	4.3	130		
Sylvan Lake	8420	9.5	9.2	103	19.7	11.2	176		
Sylvan Road	7120	6.7	5.4	124	16.6	9.0	184		
Timber Creek	7950	2.8	2.2	127	4.2	3.9	108		
Togwotee Pass	9580	13.9	11.1	125	17.6	11.6	152		
Townsend Creek	8700	3.8	4.1	93	6.7	5.8	116		
Younts Peak	8350	8.0	7.0	114	12.8	7.8	164		
Basin Index (%)								115	138

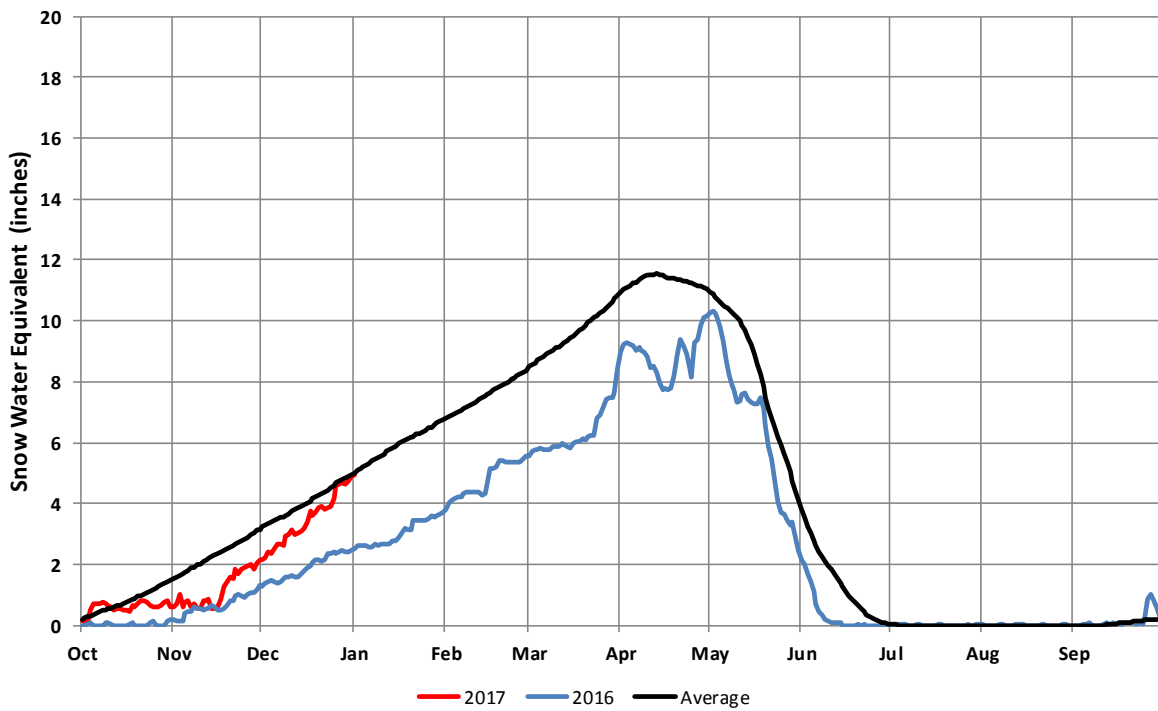
-M = Missing data

* = 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 3632.69 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Boysen Release	kaf	56.9	51.4	104.5	130.9	159.9	154.7	130.4	130.1	70.9	61.6	55.0	56.8	1163.1
Boysen Release	cfs	925	926	1700	2200	2601	2600	2121	2116	1192	1002	924	924	
Buffalo Bill Release	kaf	12.6	11.4	39.6	94.8	168.8	170.6	180.8	109.2	99.1	54.2	44.8	21.8	1007.7
Buffalo Bill Release	cfs	205	205	644	1593	2745	2867	2940	1776	1665	881	753	355	
Station Gain	kaf	38.3	44.4	62.7	33.2	52.9	161.0	-54.2	-43.4	18.8	67.4	57.1	38.3	476.5
Monthly Inflow	kaf	107.8	107.2	206.8	258.9	381.6	486.3	257.0	195.9	188.8	183.2	156.9	116.9	2647.3
Monthly Inflow	cfs	1753	1930	3363	4351	6206	8173	4180	3186	3173	2979	2637	1901	
Turbine Release	kaf	163.9	162.7	224.6	289.0	363.7	304.2	214.2	207.2	191.8	183.2	180.9	187.0	2672.4
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	163.9	162.7	224.6	289.0	363.7	304.2	214.2	207.2	191.8	183.2	180.9	187.0	2672.4
Total Release	cfs	2666	2930	3653	4857	5915	5112	3484	3370	3223	2979	3040	3041	
Spring Flow	kaf	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	111.6
Afterbay Rels	kaf	168.2	166.6	228.9	293.2	368.0	308.4	218.5	211.5	196.0	187.5	185.1	191.3	2723.2
Afterbay Rels	cfs	2736	3000	3723	4927	5985	5183	3554	3440	3294	3049	3111	3111	
River Release	kaf	168.2	166.6	228.9	291.9	356.1	285.6	190.4	184.5	178.5	184.5	185.1	191.3	2611.6
River Release	cfs	2736	3000	3723	4906	5791	4800	3097	3001	3000	3001	3111	3111	
Min Release	kaf	168.2	166.6	92.2	148.8	153.7	148.8	153.7	184.5	178.5	184.5	89.3	160.5	1829.3
End-Month Content	kaf	881.2	825.7	807.9	777.8	795.7	977.8	1020.6	1009.3	1006.3	1006.3	982.3	912.2	
End-Month Elevation	ft	3626.57	3619.51	3617.00	3612.32	3615.17	3636.44	3640.00	3639.09	3638.85	3638.85	3636.83	3630.09	
Net Change Content	kaf	-56.1	-55.5	-17.8	-30.1	17.9	182.1	42.8	-11.3	-3.0	0.0	-24.0	-70.1	-25.1
Yellowtail Power	2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turbine Release	kaf	163.9	162.7	224.6	289.0	363.7	304.2	214.2	207.2	191.8	183.2	180.9	187.0	2672.4
Generation	gwh	62.408	60.892	87.144	112.099	140.923	124.560	87.130	83.822	76.832	72.929	71.565	73.222	1053.526
End-Month Power Cap	mw	274.8	268.1	265.7	261.2	263.9	284.1	287.5	286.7	286.4	286.4	284.5	278.1	
% Max Gen		29	31	41	54	66	60	41	39	37	34	35	34	
Ave kwh/af		381	374	388	388	387	409	407	405	401	398	396	392	394
Upstream Generation	gwh	7.184	6.437	11.054	29.359	33.697	33.689	35.000	33.021	26.822	19.509	17.154	7.251	260.177
Total Generation	gwh	69.592	67.329	98.198	141.458	174.620	158.249	122.130	116.843	103.654	92.438	88.719	80.473	1313.703

Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 937.3 kaf Elev 3632.69 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Boysen Release	kaf	56.9	51.4	62.5	85.0	92.2	130.6	73.8	70.7	68.4	50.7	49.1	50.7	842.0
Boysen Release	cfs	925	926	1016	1428	1499	2195	1200	1150	1150	825	825	825	
Buffalo Bill Release	kaf	12.6	11.4	12.6	46.2	115.8	186.3	111.9	104.9	94.8	50.3	12.2	12.6	771.6
Buffalo Bill Release	cfs	205	205	205	776	1883	3131	1820	1706	1593	818	205	205	
Station Gain	kaf	30.8	35.1	54.0	27.1	28.1	41.9	-67.0	-49.9	5.1	52.7	52.1	34.0	244.0
Monthly Inflow	kaf	100.3	97.9	129.1	158.3	236.1	358.8	118.7	125.7	168.3	153.7	113.4	97.3	1857.6
Monthly Inflow	cfs	1631	1763	2100	2660	3840	6030	1930	2044	2828	2500	1906	1582	
Turbine Release	kaf	163.9	151.6	155.6	151.8	167.5	206.8	177.5	176.4	156.1	146.3	136.4	141.0	1930.9
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	163.9	151.6	155.6	151.8	167.5	206.8	177.5	176.4	156.1	146.3	136.4	141.0	1930.9
Total Release	cfs	2666	2730	2531	2551	2724	3475	2887	2869	2623	2379	2292	2293	
Spring Flow	kaf	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	111.6
Afterbay Rels	kaf	168.2	155.5	159.9	156.0	171.8	211.0	181.8	180.7	160.3	150.6	140.6	145.3	1981.7
Afterbay Rels	cfs	2736	2800	2601	2622	2794	3546	2957	2939	2694	2449	2363	2363	
River Release	kaf	168.2	155.5	159.9	154.7	159.9	188.2	153.7	153.7	142.8	147.6	140.6	145.3	1870.1
River Release	cfs	2736	2800	2601	2600	2601	3163	2500	2500	2400	2400	2363	2363	
Min Release	kaf	168.2	155.5	159.9	154.7	159.9	181.8	153.7	153.7	142.8	147.6	89.3	92.2	1759.3
End-Month Content	kaf	873.7	820.0	793.5	800.0	868.6	1020.6	961.8	911.1	923.3	930.7	907.7	864.0	
End-Month Elevation	ft	3625.68	3618.73	3614.83	3615.82	3625.06	3640.00	3635.02	3629.97	3631.27	3632.04	3629.60	3624.49	
Net Change Content	kaf	-63.6	-53.7	-26.5	6.5	68.6	152.0	-58.8	-50.7	12.2	7.4	-23.0	-43.7	-73.3
Yellowtail Power	2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turbine Release	kaf	163.9	151.6	155.6	151.8	167.5	206.8	177.5	176.4	156.1	146.3	136.4	141.0	1930.9
Generation	gwh	62.283	55.949	57.174	55.662	63.788	83.809	69.745	68.474	59.573	55.283	50.591	52.027	734.358
End-Month Power Cap	mw	273.9	267.3	263.6	264.6	273.3	287.5	282.8	278.0	279.2	280.0	277.6	272.8	
% Max Gen		29	29	27	27	30	40	33	32	29	26	24	24	
Ave kwh/af		380	369	367	367	381	405	393	388	382	378	371	369	380
Upstream Generation	gwh	7.192	6.393	7.535	19.153	31.104	34.087	27.162	26.455	24.103	16.915	7.303	6.648	214.050
Total Generation	gwh	69.475	62.342	64.709	74.815	94.892	117.896	96.907	94.929	83.676	72.198	57.894	58.675	948.408

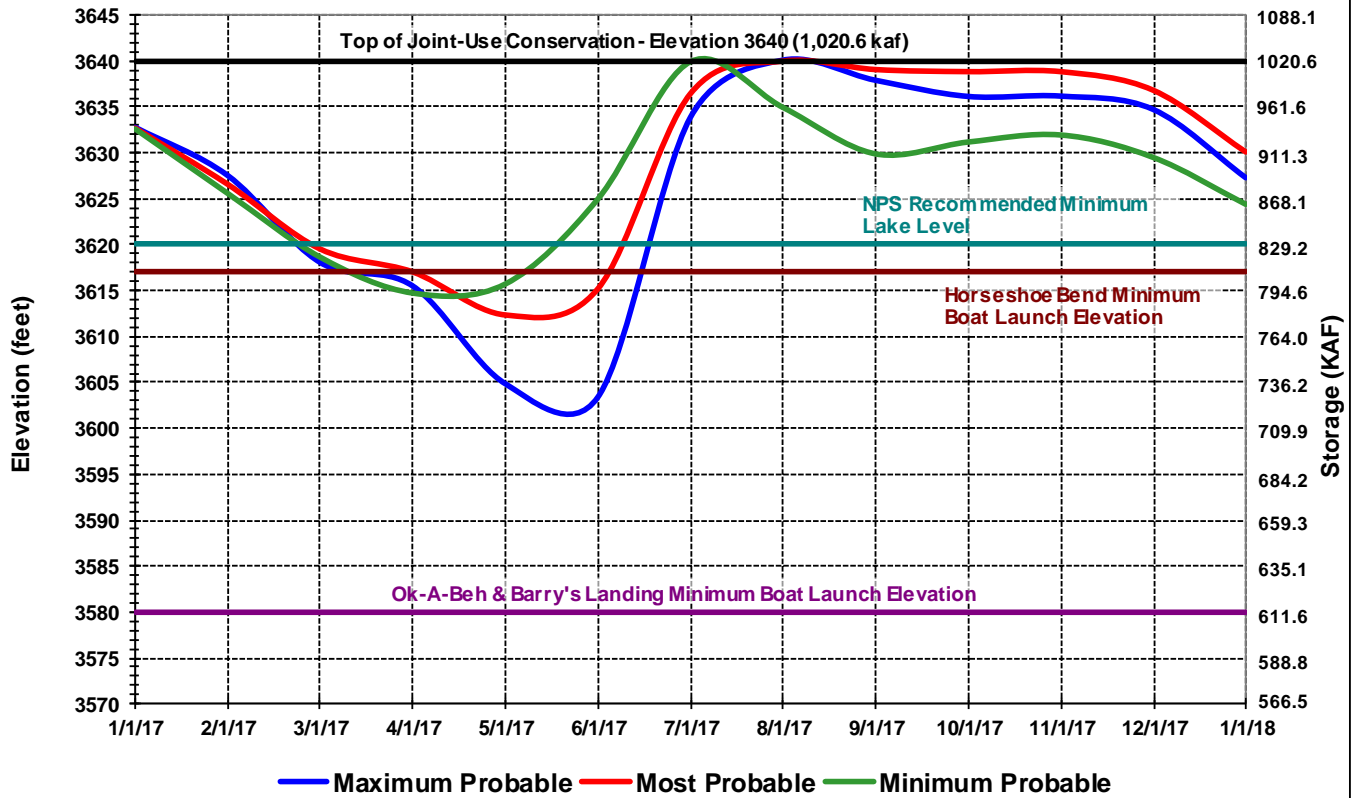
Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 937.3 kaf Elev 3632.69 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Boysen Release	kaf	56.9	51.5	104.5	130.9	184.5	218.4	225.6	134.7	71.4	62.2	55.0	56.9	1352.5
Boysen Release	cfs	925	927	1700	2200	3001	3670	3669	2191	1200	1012	924	925	
Buffalo Bill Release	kaf	12.6	11.4	63.9	93.7	202.0	227.1	266.8	107.8	96.1	70.9	52.9	21.8	1227.0
Buffalo Bill Release	cfs	205	205	1039	1575	3285	3817	4339	1753	1615	1153	889	355	
Station Gain	kaf	45.8	53.7	71.3	49.3	118.6	243.6	-9.4	-31.3	33.5	81.3	63.5	43.8	763.7
Monthly Inflow	kaf	115.3	116.6	239.7	273.9	505.1	689.1	483.0	211.2	201.0	214.4	171.4	122.5	3343.2
Monthly Inflow	cfs	1875	2099	3898	4603	8215	11581	7855	3435	3378	3487	2880	1992	
Turbine Release	kaf	163.9	190.5	257.0	336.3	368.9	357.0	368.9	237.9	221.6	213.9	187.4	193.7	3097.0
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	143.8	111.2	41.9	0.0	0.0	0.0	0.0	0.0	296.9
Total Release	kaf	163.9	190.5	257.0	336.3	512.7	468.2	410.8	237.9	221.6	213.9	187.4	193.7	3393.9
Total Release	cfs	2666	3430	4180	5652	8338	7868	6681	3869	3724	3479	3149	3150	
Spring Flow	kaf	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	111.6
Afterbay Rels	kaf	168.2	194.4	261.3	340.5	517.0	472.4	415.1	242.2	225.8	218.2	191.6	198.0	3444.7
Afterbay Rels	cfs	2736	3500	4250	5722	8408	7939	6751	3939	3795	3549	3220	3220	
River Release	kaf	168.2	194.4	261.3	339.2	505.1	449.6	387.0	215.2	208.3	215.2	191.6	198.0	3333.1
River Release	cfs	2736	3500	4250	5700	8215	7556	6294	3500	3501	3500	3220	3220	
Min Release	kaf	168.2	194.4	261.3	89.3	92.2	89.3	92.2	215.2	208.3	215.2	89.3	92.2	1807.1
End-Month Content	kaf	888.7	814.8	797.5	735.1	727.5	948.4	1020.6	993.9	973.3	973.8	957.8	886.6	
End-Month Elevation	ft	3627.45	3617.99	3615.44	3604.79	3603.36	3633.77	3640.00	3637.82	3636.05	3636.09	3634.65	3627.21	
Net Change Content	kaf	-48.6	-73.9	-17.3	-62.4	-7.6	220.9	72.2	-26.7	-20.6	0.5	-16.0	-71.2	-50.7
Yellowtail Power	2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turbine Release	kaf	163.9	190.5	257.0	336.3	368.9	357.0	368.9	237.9	221.6	213.9	187.4	193.7	3097.0
Generation	gwh	62.532	72.756	100.196	127.669	150.660	145.800	150.660	97.154	89.649	86.251	74.148	75.710	1233.185
End-Month Power Cap	mw	275.6	266.6	264.2	254.1	252.7	281.6	287.5	285.5	283.8	283.8	282.4	275.4	
% Max Gen		29	38	47	62	70	70	70	45	43	40	36	35	
Ave kwh/af		382	382	390	380	408	408	408	408	405	403	396	391	398
Upstream Generation	gwh	7.199	6.426	10.984	29.154	32.693	33.303	35.225	33.114	26.374	24.148	19.355	7.270	265.245
Total Generation	gwh	69.731	79.182	111.180	156.823	183.353	179.103	185.885	130.268	116.023	110.399	93.503	82.980	1498.430

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

