

RECLAMATION

Managing Water in the West

December 5, 2017

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. If you have any questions or concerns, please feel free to contact 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
 December 1, 2017

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4721.72	679,357	118	92
Buffalo Bill	5374.44	500,227	116 *	77
Bighorn Lake	3636.79	981,802	112	96

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

Water Year 2018	Inflow	Percent of Average
October	277.8	(3 rd highest or record) 174
November	229.8	(3 rd highest of record) 193
Water Year 2017	Inflow	Percent of Average
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
July	616.3	(6 th highest of record) 249
August	216.4	147
September	219.0	135
April-July	2,953.1	(highest of record) 270

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

Water Year 2018	Gains	Percent of Average
October	64.2	94
November	72.5	126
Water Year 2017	Gains	Percent of Average
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) -
September	31.6	319

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

Inflow	Percent of Average
158.5	156

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 2017.

SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of December 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	12.4	6.1	203	10.7	5.5	195
Box Canyon	6670	2.9	1.7	171	4.5	4.1	110
Brackett Creek	7320	5.9	3.7	159	9.0	8.0	112
Burnt Mtn Canyon	5880	.2	1.3	15	5.6	5.1	110
	7870	4.3	3.0	143	5.6	4.8	117
Cole Creek	7850	4.6	4.1	112	3.6	5.0	72
East Boulder Mine	6335	.7	-M	*	5.3	-M	*
Evening Star	9200	13.6	7.2	189	14.1	8.3	170
Fisher Creek	9100	16.3	8.8	185	13.6	9.1	149
Monument Peak	8850	10.5	5.3	198	8.9	6.4	139
Northeast Entrance	7350	2.1	1.7	124	5.7	4.1	139
Parker Peak	9400	12.4	6.1	203	10.0	5.6	179
Placer Basin	8830	7.9	5.2	152	8.9	6.3	141
Porcupine	6500	2.6	1.0	260	5.5	3.9	141
Sacajawea	6550	2.9	2.9	100	8.4	7.5	112
Shower Falls	8100	9.1	6.1	149	8.9	7.4	120
S Fork Shields	8100	5.7	4.0	142	10.2	6.4	159
Sylvan Lake	8420	9.0	5.2	173	9.4	7.2	131
Sylvan Road	7120	4.0	2.8	143	7.6	5.9	129
Thumb Divide	7980	6.4	3.2	200	7.6	5.4	141
Two Ocean Plateau	9240	16.2	8.6	188	11.0	8.1	136
White Mill	8700	13.3	6.0	222	8.7	7.1	123
Wolverine	7650	3.2	2.0	160	6.7	4.1	163
Younts Peak	8350	-M	4.3	*	-M	5.0	*
Basin Index (%)					172		136
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	5.1	-M	*	6.4	-M	*
Castle Creek	8400	2.5	-M	*	4.1	-M	*
Cold Springs	9630	3.1	2.5	124	3.7	3.7	100
Deer Park	9700	5.2	4.1	127	6.0	5.6	107
Hobbs Park	10100	7.9	4.5	176	6.4	4.5	142
Kirwin	9550	7.9	3.4	232	6.4	4.0	160
Little Warm	9370	7.3	2.9	252	6.9	4.2	164
Owl Creek	8975	1.4	1.6	88	3.0	2.2	136
South Pass	9040	4.3	3.9	110	3.6	5.3	68
St. Lawrence Alt	8620	1.6	2.1	76	3.9	3.2	122
Togwotee Pass	9580	12.3	7.2	171	11.8	7.3	162
Townsend Creek	8700	2.6	2.5	104	3.9	4.3	91
Younts Peak	8350	-M	4.3	*	-M	5.0	*
Basin Index (%)					154		126
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	13.9	7.1	196	11.4	6.6	173
Evening Star	9200	13.6	7.2	189	14.1	8.3	170
Marquette	8760	2.0	-M	*	4.5	-M	*
Sylvan Lake	8420	9.0	5.2	173	9.4	7.2	131
Sylvan Road	7120	4.0	2.8	143	7.6	5.9	129
Younts Peak	8350	-M	4.3	*	-M	5.0	*
Basin Index (%)					182		152

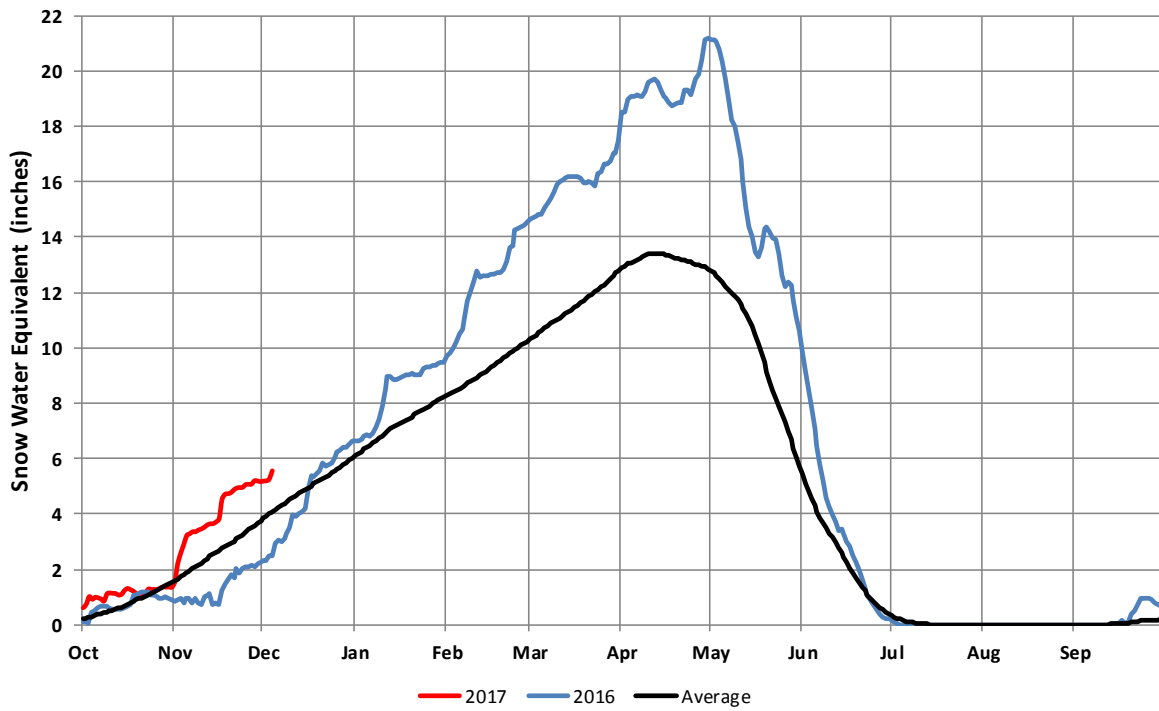
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of December 1, 2017

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	6.5	5.8	112	4.1	5.2	79
Bear Trap Meadow	8200	2.5	1.4	179	3.8	3.2	119
Blackwater	9780	13.9	7.1	196	11.4	6.6	173
Bone Springs Div	9350	4.7	5.1	92	3.9	4.9	80
Burroughs Creek	8750	5.1	-M	*	6.4	-M	*
Castle Creek	8400	2.5	-M	*	4.1	-M	*
Cold Springs	9630	3.1	2.5	124	3.7	3.7	100
Deer Park	9700	5.2	4.1	127	6.0	5.6	107
Evening Star	9200	13.6	7.2	189	14.1	8.3	170
Grave Springs	8550	1.5	1.9	79	1.9	3.7	51
Kirwin	9550	7.9	3.4	232	6.4	4.0	160
Little Warm	9370	7.3	2.9	252	6.9	4.2	164
Marquette	8760	2.0	-M	*	4.5	-M	*
Middle Powder	7760	2.1	3.1	68	1.8	4.4	41
Owl Creek	8975	1.4	1.6	88	3.0	2.2	136
Powder River Pass	9480	5.6	2.9	193	4.7	4.1	115
Shell Creek	9580	7.7	5.0	154	4.8	4.6	104
South Pass	9040	4.3	3.9	110	3.6	5.3	68
St. Lawrence Alt	8620	1.6	2.1	76	3.9	3.2	122
Sylvan Lake	8420	9.0	5.2	173	9.4	7.2	131
Sylvan Road	7120	4.0	2.8	143	7.6	5.9	129
Timber Creek	7950	.9	1.7	53	1.2	3.2	38
Togwotee Pass	9580	12.3	7.2	171	11.8	7.3	162
Townsend Creek	8700	2.6	2.5	104	3.9	4.3	91
Younts Peak	8350	-M	4.3	*	-M	5.0	*
Basin Index (%)					148		117

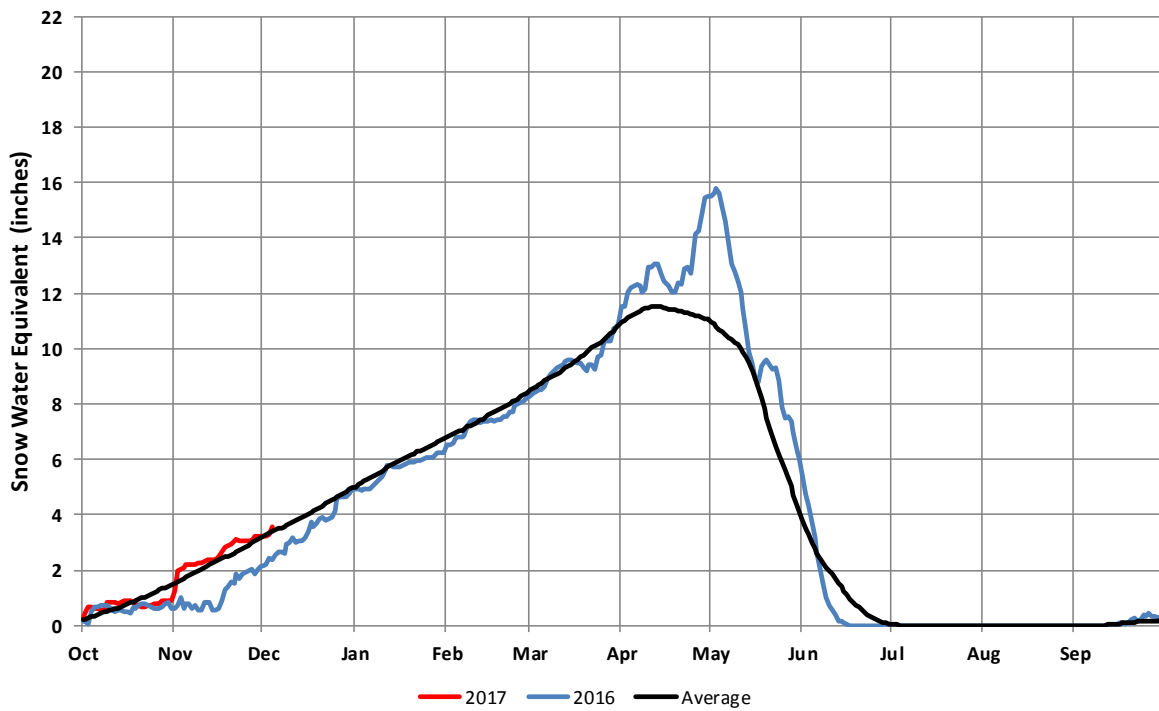
-M = Missing data

* = 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

Initial Content 981,800 acre-feet Elevation 3636.79 feet

	2017	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Boysen Release	kaf	78.4	76.9	69.5	76.9	74.4	133.8	133.6	125.8	92.2	85.6	64.9	62.5	1074.5
Boysen Release	cfs	1275	1251	1251	1251	1250	2176	2245	2046	1499	1439	1055	1050	
Buffalo Bill Release	kaf	38.1	31.1	28.2	73.4	84.8	121.8	124.9	129.7	120.6	88.2	62.2	22.5	925.5
Buffalo Bill Release	cfs	620	506	508	1194	1425	1981	2099	2109	1961	1482	1012	378	
Station Gain	kaf	42.0	47.4	55.7	73.2	39.9	62.2	119.0	-61.3	-45.3	16.4	65.2	56.1	470.5
Monthly Inflow	kaf	158.5	155.4	153.4	223.5	199.1	317.8	377.5	194.2	167.5	190.2	192.3	141.1	2470.5
Monthly Inflow	cfs	2578	2527	2762	3635	3346	5169	6344	3158	2724	3196	3127	2371	
Turbine Release	kaf	227.5	219.5	198.2	219.5	217.4	238.2	226.1	208.3	207.2	191.8	183.2	164.7	2501.6
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	227.5	219.5	198.2	219.5	217.4	238.2	226.1	208.3	207.2	191.8	183.2	164.7	2501.6
Total Release	cfs	3700	3570	3569	3570	3654	3874	3800	3388	3370	3223	2979	2768	
Spring Flow	kaf	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	111.6
Afterbay Rels	kaf	231.8	223.8	202.1	223.8	221.6	242.5	230.3	212.6	211.5	196.0	187.5	168.9	2552.4
Afterbay Rels	cfs	3770	3640	3639	3640	3724	3944	3870	3458	3440	3294	3049	2838	
River Release	kaf	231.8	223.8	202.1	223.8	220.3	230.6	207.5	184.5	184.5	178.5	184.5	168.9	2440.8
River Release	cfs	3770	3640	3639	3640	3702	3750	3487	3001	3001	3000	3001	2838	
Min Release	kaf	231.8	92.2	83.3	92.2	208.3	230.6	89.3	184.5	184.5	178.5	184.5	89.3	1849.0
End-Month Content	kaf	912.8	848.7	803.9	807.9	789.6	869.2	1020.6	1006.5	966.8	965.2	974.3	950.7	
End-Month Elevation	ft	3630.16	3622.57	3616.40	3617.00	3614.22	3625.13	3640.00	3638.86	3635.46	3635.32	3636.13	3633.99	
Net Change Content	kaf	-69.0	-64.1	-44.8	4.0	-18.3	79.6	151.4	-14.1	-39.7	-1.6	9.1	-23.6	-31.1
Yellowtail Power	2017	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Turbine Release	kaf	227.5	219.5	198.2	219.5	217.4	238.2	226.1	208.3	207.2	191.8	183.2	164.7	2501.6
Generation	gwh	91.043	86.083	75.802	84.992	83.565	94.570	92.427	84.273	83.155	76.238	72.494	63.813	988.455
End-Month Power Cap	mw	278.2	271.0	265.1	265.7	263.0	273.4	287.5	286.4	283.2	283.1	283.9	281.8	
% Max Gen		42	40	39	40	40	44	45	39	39	37	34	31	
Ave kwh/af		400	392	382	387	384	397	409	405	401	397	396	387	395
Upstream Generation	gwh	17.403	12.894	8.789	26.289	27.321	33.339	33.586	34.588	31.666	25.944	21.845	11.500	285.164
Total Generation	gwh	108.446	98.977	84.591	111.281	110.886	127.909	126.013	118.861	114.821	102.182	94.339	75.313	1273.619

Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Initial Content 981,800 acre-feet Elevation 3636.79 feet

	2017	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Boysen Release	kaf	78.4	64.6	58.3	49.2	47.6	63.0	71.4	70.7	63.0	44.6	36.9	35.7	683.4
Boysen Release	cfs	1275	1051	1050	800	800	1025	1200	1150	1025	750	600	600	
Buffalo Bill Release	kaf	38.1	31.1	28.1	21.8	31.7	101.2	105.0	118.7	104.3	78.3	44.6	12.2	715.1
Buffalo Bill Release	cfs	620	506	506	355	533	1646	1765	1930	1696	1316	725	205	
Station Gain	kaf	35.3	39.9	46.4	64.5	20.3	10.0	1.3	-70.0	-52.3	-0.8	46.2	50.0	190.8
Monthly Inflow	kaf	151.8	135.6	132.8	135.5	99.6	174.2	177.7	119.4	115.0	122.1	127.7	97.9	1589.3
Monthly Inflow	cfs	2469	2205	2391	2204	1674	2833	2986	1942	1870	2052	2077	1645	
Turbine Release	kaf	227.5	204.8	162.7	134.6	116.1	115.2	122.7	131.4	130.3	117.4	106.3	106.0	1675.0
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	227.5	204.8	162.7	134.6	116.1	115.2	122.7	131.4	130.3	117.4	106.3	106.0	1675.0
Total Release	cfs	3700	3331	2930	2189	1951	1874	2062	2137	2119	1973	1729	1781	
Spring Flow	kaf	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	111.6
Afterbay Rels	kaf	231.8	209.1	166.6	138.9	120.3	119.5	126.9	135.7	134.6	121.6	110.6	110.2	1725.8
Afterbay Rels	cfs	3770	3401	3000	2259	2022	1943	2133	2207	2189	2044	1799	1852	
River Release	kaf	231.8	209.1	166.6	138.9	119.0	107.6	104.1	107.6	107.6	104.1	107.6	110.2	1614.2
River Release	cfs	3770	3401	3000	2259	2000	1750	1749	1750	1750	1749	1750	1852	
Min Release	kaf	231.8	209.1	166.6	138.3	119.0	107.6	104.1	107.6	107.6	104.1	107.6	89.3	1592.7
End-Month Content	kaf	906.1	836.9	807.0	807.9	791.4	850.4	905.4	893.4	878.1	882.8	904.2	896.1	
End-Month Elevation	ft	3629.42	3621.03	3616.86	3617.00	3614.50	3622.79	3629.34	3627.99	3626.21	3626.76	3629.21	3628.30	
Net Change Content	kaf	-75.7	-69.2	-29.9	0.9	-16.5	59.0	55.0	-12.0	-15.3	4.7	21.4	-8.1	-85.7
Yellowtail Power	2017	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Turbine Release	kaf	227.5	204.8	162.7	134.6	116.1	115.2	122.7	131.4	130.3	117.4	106.3	106.0	1675.0
Generation	gwh	90.892	79.468	60.522	48.392	40.292	40.682	44.543	48.210	47.537	41.995	37.457	37.253	617.243
End-Month Power Cap	mw	277.5	269.5	265.5	265.7	263.3	271.2	277.4	276.1	274.4	274.9	277.3	276.4	
% Max Gen		42	37	31	23	19	19	21	22	22	20	17	18	
Ave kwh/af		400	388	372	360	347	353	363	367	365	358	352	351	369
Upstream Generation	gwh	13.845	9.334	5.356	6.359	8.175	22.632	23.124	25.044	22.148	19.006	13.692	5.070	173.785
Total Generation	gwh	104.737	88.802	65.878	54.751	48.467	63.314	67.667	73.254	69.685	61.001	51.149	42.323	791.028

Based on Maximum Probable Inflow Forecast

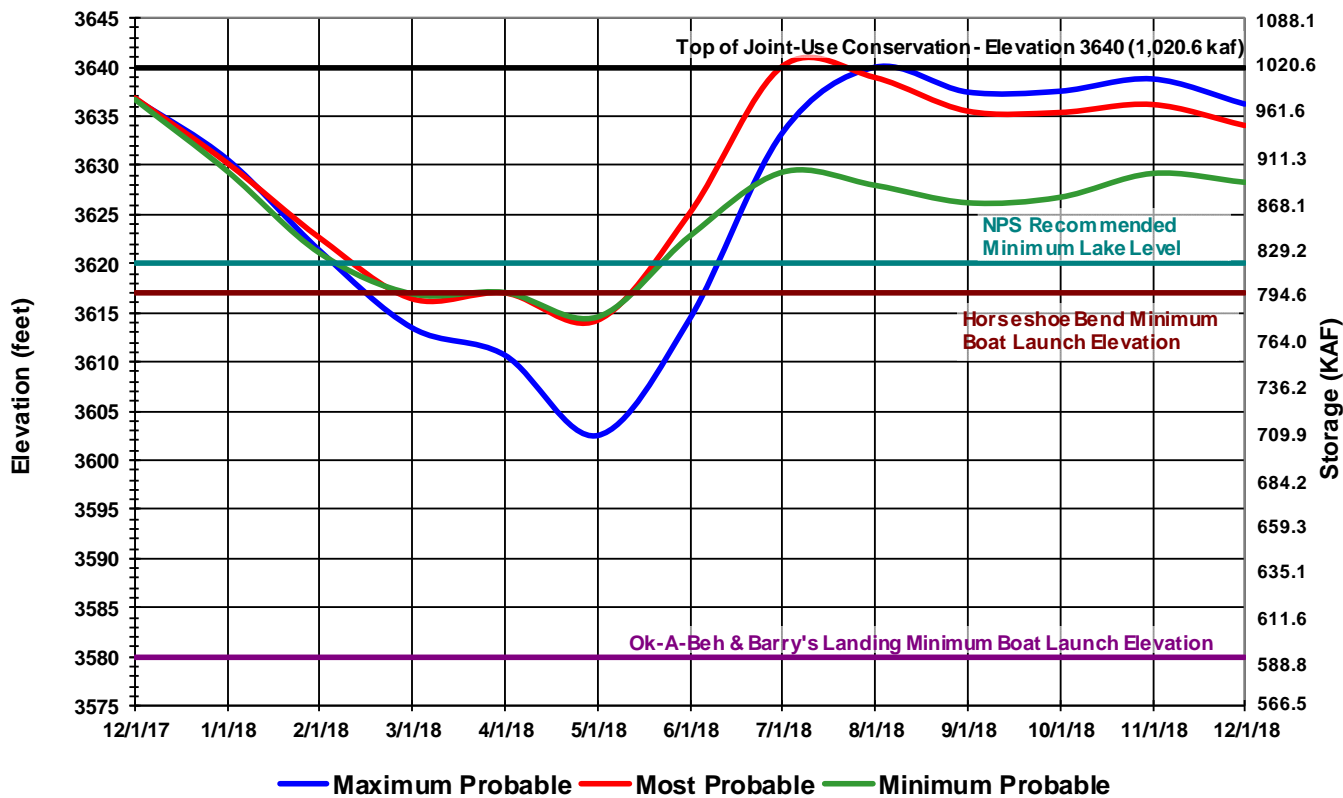
BIGHORN LAKE MONTHLY OPERATIONS

Initial Content 981,800 acre-feet Elevation 3636.79 feet

	2017	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Boysen Release	kaf	78.4	76.9	69.4	92.2	232.1	239.9	232.1	240.3	129.2	89.2	76.8	65.5	1622.0
Boysen Release	cfs	1275	1251	1250	1499	3901	3902	3901	3908	2101	1499	1249	1101	
Buffalo Bill Release	kaf	47.3	34.8	31.5	79.1	131.7	220.2	223.2	236.2	122.2	111.5	67.7	25.3	1330.7
Buffalo Bill Release	cfs	769	566	567	1286	2213	3581	3751	3841	1987	1874	1101	425	
Station Gain	kaf	51.2	52.1	63.1	84.3	51.0	128.9	266.4	0.1	-28.7	36.7	84.2	64.8	854.1
Monthly Inflow	kaf	176.9	163.8	164.0	255.6	414.8	589.0	721.7	476.6	222.7	237.4	228.7	155.6	3806.8
Monthly Inflow	cfs	2877	2664	2953	4157	6971	9579	12129	7751	3622	3990	3719	2615	
Turbine Release	kaf	241.7	241.7	218.2	272.4	357.0	368.9	357.0	368.9	253.3	236.4	213.9	185.7	3315.1
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	102.7	152.3	211.9	30.9	0.0	0.0	0.0	0.0	497.8
Total Release	kaf	241.7	241.7	218.2	272.4	459.7	521.2	568.9	399.8	253.3	236.4	213.9	185.7	3812.9
Total Release	cfs	3931	3931	3929	4430	7726	8477	9561	6502	4120	3973	3479	3121	
Spring Flow	kaf	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	111.6
Afterbay Rels	kaf	246.0	246.0	222.1	276.7	463.9	525.5	573.1	404.1	257.6	240.6	218.2	189.9	3863.7
Afterbay Rels	cfs	4001	4001	3999	4500	7796	8546	9631	6572	4189	4043	3549	3191	
River Release	kaf	246.0	246.0	222.1	276.7	462.6	513.6	550.3	376.0	230.6	223.1	215.2	189.9	3752.1
River Release	cfs	4001	4001	3999	4500	7774	8353	9248	6115	3750	3749	3500	3191	
Min Release	kaf	246.0	246.0	222.1	276.7	89.3	92.2	89.3	92.2	230.6	223.1	215.2	89.3	2112.0
End-Month Content	kaf	917.0	839.1	784.9	768.1	723.2	791.0	943.8	1020.6	990.0	991.0	1005.8	975.7	
End-Month Elevation	ft	3630.61	3621.32	3613.47	3610.70	3602.54	3614.44	3633.33	3640.00	3637.49	3637.57	3638.81	3636.26	
Net Change Content	kaf	-64.8	-77.9	-54.2	-16.8	-44.9	67.8	152.8	76.8	-30.6	1.0	14.8	-30.1	-6.1
Yellowtail Power	2017	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Turbine Release	kaf	241.7	241.7	218.2	272.4	357.0	368.9	357.0	368.9	253.3	236.4	213.9	185.7	3315.1
Generation	gwh	97.239	95.221	83.755	105.212	145.800	150.660	145.800	150.660	103.727	96.448	86.769	73.645	1334.936
End-Month Power Cap	mw	278.6	269.8	262.3	259.7	251.9	263.2	281.2	287.5	285.1	285.2	286.4	284.0	
% Max Gen		45	44	43	49	70	70	70	70	48	47	40	36	
Ave kwh/af		402	394	384	386	408	408	408	408	410	408	406	397	403
Upstream Generation	gwh	18.911	13.929	9.725	26.538	27.015	31.203	32.471	35.134	34.934	30.416	25.006	12.540	297.822
Total Generation	gwh	116.150	109.150	93.480	131.750	172.815	181.863	178.271	185.794	138.661	126.864	111.775	86.185	1632.758

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

