

RECLAMATION

Managing Water in the West

November 6, 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
 November 1, 2017

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4722.66	696,773	121	94
Buffalo Bill	5374.55	500,860	117 *	77
Bighorn Lake	3638.44	1,001,315	112	98

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

Water Year 2018	Inflow	Percent of Average
October	277.8	174
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
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
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
July	-96.8 (avg. -62.1)	-
August	-37.1 (avg. -51.9)	-
September	31.6	319

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

Inflow	Percent of Average
195.3	164

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 November 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	4.5	2.7	167	2.9	2.3	126	
Box Canyon	6670	.0	.1	0*	.4	2.0	20	
Brackett Creek	7320	.4	1.0	40*	2.7	4.1	66	
Burnt Mtn Canyon	5880 7870	.4 .0	.0 .6	* 0*	2.2 .9	3.5 1.9	63 47	
Cole Creek	7850	2.3	2.8	82	1.8	3.1	58	
East Boulder Mine	6335	.0	-M	*	1.3	-M	*	
Evening Star	9200	4.4	2.4	183*	3.9	3.3	118	
Fisher Creek	9100	5.7	2.7	211*	3.2	3.6	89	
Monument Peak	8850	3.9	2.0	195*	2.4	2.8	86	
Northeast Entrance	7350	.2	.0	*	1.7	1.8	94	
Parker Peak	9400	6.0	2.7	222	2.3	2.6	88	
Placer Basin	8830	3.0	2.6	115	3.0	3.3	91	
Porcupine	6500	1.3	.0	*	1.8	2.0	90	
Sacajawea	6550	.4	.3	133*	2.6	4.2	62	
Shower Falls	8100	4.1	2.6	158	3.2	3.6	89	
S Fork Shields	8100	1.9	1.4	136*	4.0	3.2	125	
Sylvan Lake	8420	3.3	1.7	194*	2.2	3.1	71	
Sylvan Road	7120	.2	.3	67*	1.6	2.3	70	
Thumb Divide	7980	.1	.4	25*	1.4	2.2	64	
Two Ocean Plateau	9240	6.0	3.2	188	2.2	3.1	71	
White Mill	8700	5.5	2.2	250*	2.0	2.9	69	
Wolverine	7650	-M	.0	*	-M	1.9	*	
Younts Peak	8350	2.1	1.5	140*	2.0	2.2	91	
Basin Index (%)							168*	80
WIND RIVER BASIN (WYOMING)								
Burroughs Creek	8750	.0	-M	*	.7	-M	*	
Castle Creek	8400	.0	-M	*	1.5	-M	*	
Cold Springs	9630	.0	.8	0	.7	1.9	37	
Deer Park	9700	.2	1.7	12	1.0	3.2	31	
Hobbs Park	10100	2.4	2.0	120	2.1	2.4	88	
Kirwin	9550	3.7	1.7	218	2.1	2.0	105	
Little Warm	9370	2.0	1.2	167	1.1	1.9	58	
Owl Creek	8975	.0	.8	0	1.5	1.3	115	
South Pass	9040	.0	1.3	0*	.5	2.4	21	
St. Lawrence Alt	8620	.0	.9	0	1.8	1.8	100	
Togwotee Pass	9580	4.2	2.7	156	3.1	2.8	111	
Townsend Creek	8700	.0	1.0	0	.9	2.4	38	
Younts Peak	8350	2.1	1.5	140*	2.0	2.2	91	
Basin Index (%)							94	69
SHOSHONE RIVER BASIN (WYOMING)								
Blackwater	9780	5.6	2.8	200	3.2	2.8	114	
Evening Star	9200	4.4	2.4	183*	3.9	3.3	118	
Marquette	8760	.0	-M	*	1.8	-M	*	
Sylvan Lake	8420	3.3	1.7	194*	2.2	3.1	71	
Sylvan Road	7120	.2	.3	67*	1.6	2.3	70	
Younts Peak	8350	2.1	1.5	140*	2.0	2.2	91	
Basin Index (%)							179*	94

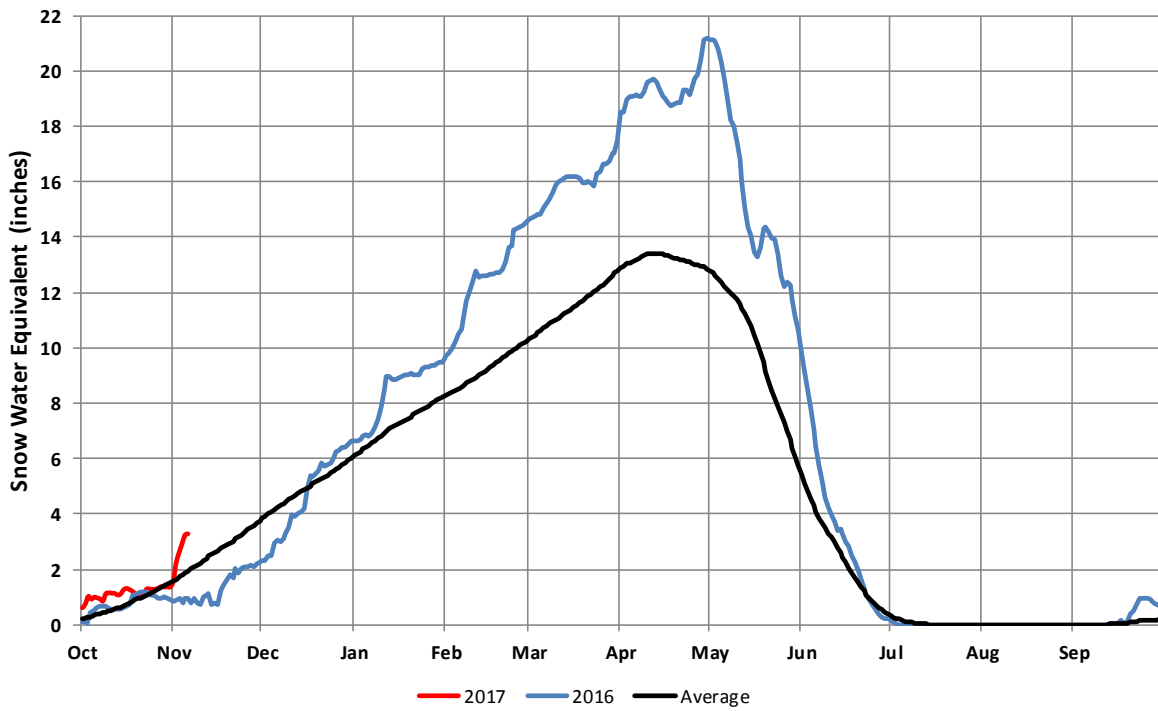
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of November 1, 2017

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	3.1	3.1	100	1.5	2.8	54
Bear Trap Meadow	8200	.3	.5	60*	1.6	1.8	89
Blackwater	9780	5.6	2.8	200	3.2	2.8	114
Bone Springs Div	9350	1.6	2.8	57	1.8	2.8	64
Burroughs Creek	8750	.0	-M	*	.7	-M	*
Castle Creek	8400	.0	-M	*	1.5	-M	*
Cold Springs	9630	.0	.8	0	.7	1.9	37
Deer Park	9700	.2	1.7	12	1.0	3.2	31
Evening Star	9200	4.4	2.4	183*	3.9	3.3	118
Grave Springs	8550	.5	.9	56*	1.2	2.3	52
Kirwin	9550	3.7	1.7	218	2.1	2.0	105
Little Warm	9370	2.0	1.2	167	1.1	1.9	58
Marquette	8760	.0	-M	*	1.8	-M	*
Middle Powder	7760	.9	1.1	82*	1.0	2.5	40
Owl Creek	8975	.0	.8	0	1.5	1.3	115
Powder River Pass	9480	2.3	1.4	164	1.6	2.2	73
Shell Creek	9580	4.1	2.9	141	1.6	2.4	67
South Pass	9040	.0	1.3	0*	.5	2.4	21
St. Lawrence Alt	8620	.0	.9	0	1.8	1.8	100
Sylvan Lake	8420	3.3	1.7	194*	2.2	3.1	71
Sylvan Road	7120	.2	.3	67*	1.6	2.3	70
Timber Creek	7950	.2	.7	29	.8	2.1	38
Togwotee Pass	9580	4.2	2.7	156	3.1	2.8	111
Townsend Creek	8700	.0	1.0	0	.9	2.4	38
Younts Peak	8350	2.1	1.5	140*	2.0	2.2	91
Basin Index (%)							
				113			70

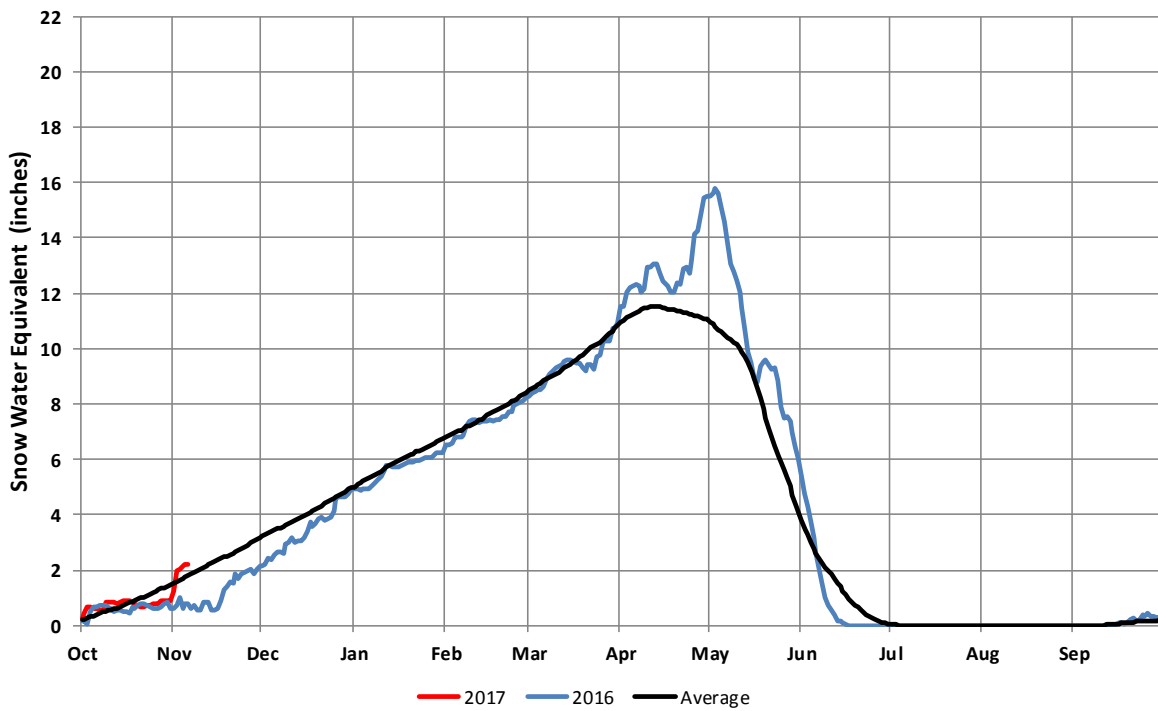
-M = Missing data

* = 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 1,001.3 acre-feet Elevation 3638.44 feet

	2017	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	84.8	67.7	67.7	61.1	70.2	75.8	142.9	133.2	130.7	107.6	74.6	67.6	1083.9
Boysen Release	cfs	1425	1101	1101	1100	1142	1274	2324	2239	2126	1750	1254	1099	
Buffalo Bill Release	kaf	49.1	36.5	21.8	19.8	63.9	80.4	121.8	124.9	129.7	120.6	88.2	62.2	918.9
Buffalo Bill Release	cfs	825	594	355	357	1039	1351	1981	2099	2109	1961	1482	1012	
Station Gain	kaf	61.4	42.0	47.4	55.7	73.2	39.9	62.2	119.0	-61.3	-45.3	16.4	65.2	475.8
Monthly Inflow	kaf	195.3	146.2	136.9	136.6	207.3	196.1	326.9	377.1	199.1	182.9	179.2	195.0	2478.6
Monthly Inflow	cfs	3282	2378	2226	2460	3371	3296	5317	6337	3238	2975	3012	3171	
Turbine Release	kaf	217.2	204.6	204.6	184.7	204.6	215.3	238.2	233.9	208.3	207.2	191.8	183.2	2493.6
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	217.2	204.6	204.6	184.7	204.6	215.3	238.2	233.9	208.3	207.2	191.8	183.2	2493.6
Total Release	cfs	3650	3328	3328	3326	3328	3618	3874	3931	3388	3370	3223	2979	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	111.6
Afterbay Rels	kaf	221.4	208.9	208.9	188.6	208.9	219.5	242.5	238.1	212.6	211.5	196.0	187.5	2544.4
Afterbay Rels	cfs	3721	3397	3397	3396	3397	3689	3944	4001	3458	3440	3294	3049	
River Release	kaf	221.4	208.9	208.9	188.6	208.9	218.2	230.6	215.3	184.5	184.5	178.5	184.5	2432.8
River Release	cfs	3721	3397	3397	3396	3397	3667	3750	3618	3001	3001	3000	3001	
Min Release	kaf	221.4	92.2	92.2	83.3	92.2	208.3	230.6	89.3	184.5	184.5	178.5	184.5	1841.5
End-Month Content	kaf	979.4	921.0	853.3	805.2	807.9	788.7	877.4	1020.6	1011.4	987.1	974.5	986.3	
End-Month Elevation	ft	3636.58	3631.04	3623.16	3616.60	3617.00	3614.08	3626.12	3640.00	3639.26	3637.24	3636.15	3637.18	
Net Change Content	kaf	-21.9	-58.4	-67.7	-48.1	2.7	-19.2	88.7	143.2	-9.2	-24.3	-12.6	11.8	-15.0
Yellowtail Power	2017	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	217.2	204.6	204.6	184.7	204.6	215.3	238.2	233.9	208.3	207.2	191.8	183.2	2493.6
Generation	gwh	87.808	81.195	79.767	70.020	78.651	82.653	94.782	95.866	84.347	83.482	76.378	72.662	987.611
End-Month Power Cap	mw	284.3	279.0	271.5	265.3	265.7	262.9	274.3	287.5	286.8	284.9	283.9	284.8	
% Max Gen		42	38	37	36	37	40	44	46	39	39	37	34	
Ave kwh/af		404	397	390	379	384	384	398	410	405	403	398	397	396
Upstream Generation	gwh	17.946	15.944	11.665	10.457	23.912	26.545	34.133	33.581	35.032	32.987	24.951	22.063	289.216
Total Generation	gwh	105.754	97.139	91.432	80.477	102.563	109.198	128.915	129.447	119.379	116.469	101.329	94.725	1276.827

Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Initial Content 1,001.3 acre-feet Elevation 3638.44 feet

	2017	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	84.8	67.6	67.6	61.1	49.2	47.6	63.0	71.4	70.7	63.0	44.6	46.1	736.7
Boysen Release	cfs	1425	1099	1099	1100	800	800	1025	1200	1150	1025	750	750	
Buffalo Bill Release	kaf	49.1	36.5	21.8	19.8	21.8	31.7	101.2	105.0	118.7	104.3	78.3	29.8	718.0
Buffalo Bill Release	cfs	825	594	355	357	355	533	1646	1765	1930	1696	1316	485	
Station Gain	kaf	53.6	35.3	39.9	46.4	64.5	20.3	10.0	1.3	-70.0	-52.3	-0.8	46.2	194.4
Monthly Inflow	kaf	187.5	139.4	129.3	127.3	135.5	99.6	174.2	177.7	119.4	115.0	122.1	122.1	1649.1
Monthly Inflow	cfs	3151	2267	2103	2292	2204	1674	2833	2986	1942	1870	2052	1986	
Turbine Release	kaf	217.2	204.8	204.8	162.7	134.0	116.1	115.2	122.7	131.4	130.3	117.4	106.3	1762.9
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	217.2	204.8	204.8	162.7	134.0	116.1	115.2	122.7	131.4	130.3	117.4	106.3	1762.9
Total Release	cfs	3650	3331	3331	2930	2179	1951	1874	2062	2137	2119	1973	1729	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	111.6
Afterbay Rels	kaf	221.4	209.1	209.1	166.6	138.3	120.3	119.5	126.9	135.7	134.6	121.6	110.6	1813.7
Afterbay Rels	cfs	3721	3401	3401	3000	2249	2022	1943	2133	2207	2189	2044	1799	
River Release	kaf	221.4	209.1	209.1	166.6	138.3	119.0	107.6	104.1	107.6	107.6	104.1	107.6	1702.1
River Release	cfs	3721	3401	3401	3000	2249	2000	1750	1749	1750	1750	1749	1750	
Min Release	kaf	221.4	209.1	209.1	166.6	138.3	119.0	107.6	104.1	107.6	107.6	104.1	107.6	1702.1
End-Month Content	kaf	971.6	906.2	830.7	795.3	796.8	780.3	839.3	894.3	882.3	867.0	871.7	887.5	
End-Month Elevation	ft	3635.90	3629.43	3620.20	3615.10	3615.33	3612.73	3621.34	3628.10	3626.70	3624.87	3625.44	3627.31	
Net Change Content	kaf	-29.7	-65.4	-75.5	-35.4	1.5	-16.5	59.0	55.0	-12.0	-15.3	4.7	15.8	-113.8
Yellowtail Power	2017	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	217.2	204.8	204.8	162.7	134.0	116.1	115.2	122.7	131.4	130.3	117.4	106.3	1762.9
Generation	gwh	87.677	80.991	79.317	60.277	47.950	40.127	40.548	44.420	48.071	47.394	41.870	37.298	655.940
End-Month Power Cap	mw	283.6	277.5	268.7	263.9	264.1	261.6	269.8	276.2	274.9	273.2	273.7	275.5	
% Max Gen		42	38	37	31	22	19	19	21	22	22	20	17	
Ave kwh/af		404	395	387	370	358	346	352	362	366	364	357	351	372
Upstream Generation	gwh	15.633	12.378	8.061	7.007	6.309	8.104	22.402	22.973	24.839	21.923	18.849	6.658	175.136
Total Generation	gwh	103.310	93.369	87.378	67.284	54.259	48.231	62.950	67.393	72.910	69.317	60.719	43.956	831.076

Based on Maximum Probable Inflow Forecast

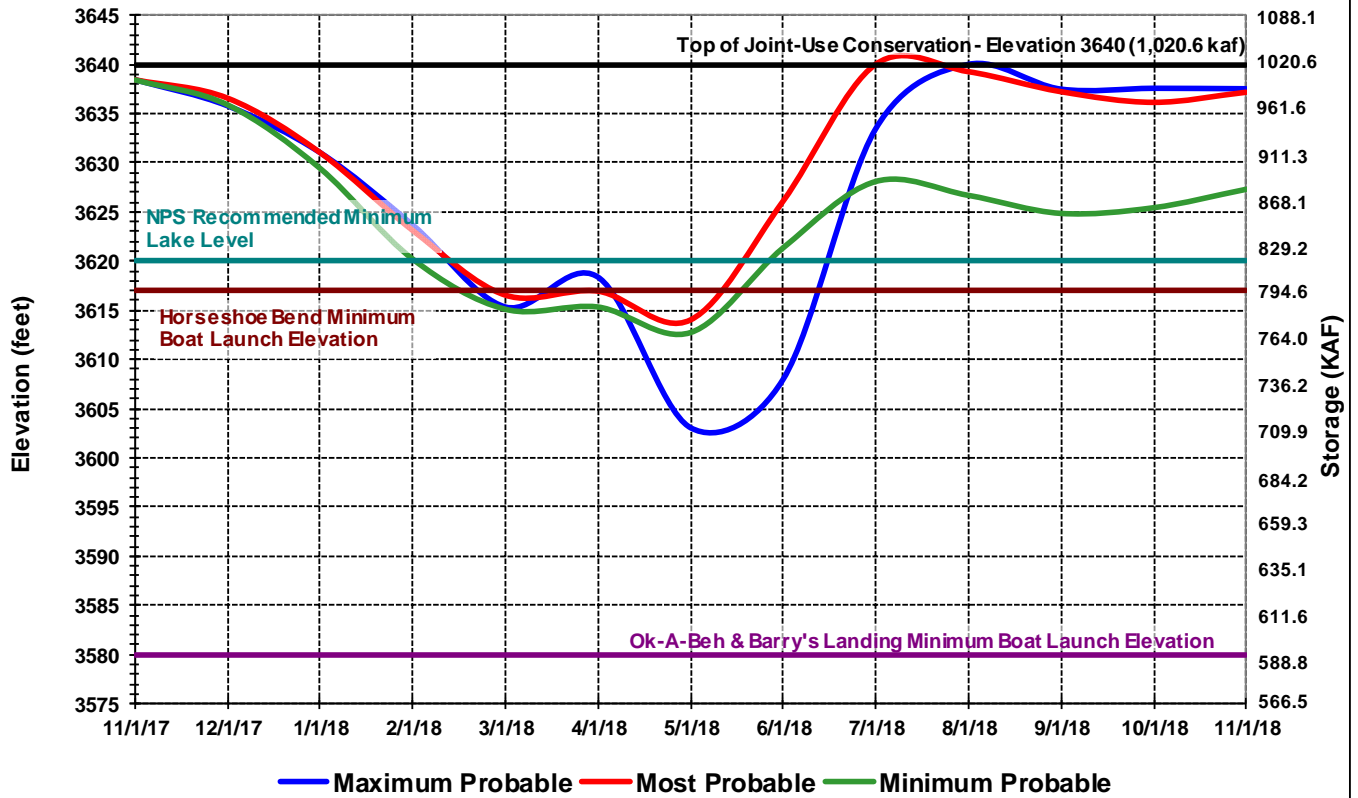
BIGHORN LAKE MONTHLY OPERATIONS

Initial Content 1,001.3 acre-feet Elevation 3638.44 feet

	2017	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	84.8	67.6	67.6	61.1	141.4	193.4	215.2	238.0	244.3	129.2	89.2	76.8	1608.6
Boysen Release	cfs	1425	1099	1099	1100	2300	3250	3500	4000	3973	2101	1499	1249	
Buffalo Bill Release	kaf	49.1	36.5	21.8	19.8	98.0	113.8	186.3	238.0	253.9	122.2	111.5	67.7	1318.6
Buffalo Bill Release	cfs	825	594	355	357	1594	1912	3030	4000	4129	1987	1874	1101	
Station Gain	kaf	69.0	51.2	52.1	63.1	84.3	51.0	128.9	266.4	0.1	-28.7	36.7	84.2	858.3
Monthly Inflow	kaf	202.9	155.3	141.5	144.0	323.7	358.2	530.4	742.4	498.3	222.7	237.4	228.7	3785.5
Monthly Inflow	cfs	3410	2526	2301	2593	5264	6020	8626	12476	8104	3622	3990	3719	
Turbine Release	kaf	233.8	204.8	204.8	204.4	303.1	357.0	368.9	357.0	368.9	253.3	236.4	229.3	3321.7
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	92.6	135.1	193.3	53.7	0.0	0.0	0.0	474.7
Total Release	kaf	233.8	204.8	204.8	204.4	303.1	449.6	504.0	550.3	422.6	253.3	236.4	229.3	3796.4
Total Release	cfs	3929	3331	3331	3680	4929	7556	8197	9248	6873	4120	3973	3729	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	111.6
Afterbay Rels	kaf	238.0	209.1	209.1	208.3	307.4	453.8	508.3	554.5	426.9	257.6	240.6	233.6	3847.2
Afterbay Rels	cfs	4000	3401	3401	3751	4999	7626	8267	9319	6943	4189	4043	3799	
River Release	kaf	238.0	209.1	209.1	208.3	307.4	452.5	496.4	531.7	398.8	230.6	223.1	230.6	3735.6
River Release	cfs	4000	3401	3401	3751	4999	7605	8073	8936	6486	3750	3749	3750	
Min Release	kaf	238.0	209.1	209.1	208.3	307.4	89.3	92.2	89.3	92.2	230.6	223.1	230.6	2219.2
End-Month Content	kaf	970.4	920.9	857.6	797.2	817.8	726.4	752.8	944.9	1020.6	990.0	991.0	990.4	
End-Month Elevation	ft	3635.79	3631.03	3623.70	3615.39	3618.42	3603.15	3608.04	3633.43	3640.00	3637.49	3637.57	3637.52	
Net Change Content	kaf	-30.9	-49.5	-63.3	-60.4	20.6	-91.4	26.4	192.1	75.7	-30.6	1.0	-0.6	-10.9
Yellowtail Power	2017	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	233.8	204.8	204.8	204.4	303.1	357.0	368.9	357.0	368.9	253.3	236.4	229.3	3321.7
Generation	gwh	94.940	81.282	79.952	78.274	119.183	145.800	150.660	145.800	150.660	103.727	96.448	93.332	1340.058
End-Month Power Cap	mw	283.5	279.0	272.0	264.1	267.0	252.5	257.2	281.3	287.5	285.1	285.2	285.2	
% Max Gen		46	38	37	40	56	70	70	70	70	48	47	44	
Ave kwh/af		406	397	390	383	393	408	408	408	408	410	408	407	403
Upstream Generation	gwh	17.931	16.025	11.749	10.570	26.516	26.728	31.305	32.694	35.182	34.934	30.416	25.006	299.056
Total Generation	gwh	112.871	97.307	91.701	88.844	145.699	172.528	181.965	178.494	185.842	138.661	126.864	118.338	1639.114

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

