

RECLAMATION

Managing Water in the West

January 12, 2016

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during December were 114 percent of average. On January 1, the Natural Resources Conservation Service (NRCS) measured the snow water content of the mountain snowpack in the Bighorn Basin at 70 percent 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 711,300 acre-feet (64 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
 January 1, 2016

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4717.25	601,455	106	81
Buffalo Bill	5363.76	424,743	99 *	66
Bighorn Lake	3628.89	901,311	108	88

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
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Water Year 2015	Inflow	Percent of Average
December	138.8	134
January	133.6	129
February	166.4	159
March	161.2	110
April	130.5	87
May	311.8	116
June	876.9	214
July	223.6	88
August	150.1	102
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
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Water Year 2015	Gains	Percent of Average
December	60.1	162
January	54.9	138
February	94.9	199
March	75.9	104
April	24.3	73
May	96.4	192
June	178.1	207
July	-50.2 (avg. -62.9)	-
August	-31.7 (avg. -54.0)	-
September	-12.6 (avg. 10.5)	-
April-July	248.6	232

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

Agency	Inflows	Percent of Average
USBR	711.3	64

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.

SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of January 1, 2016

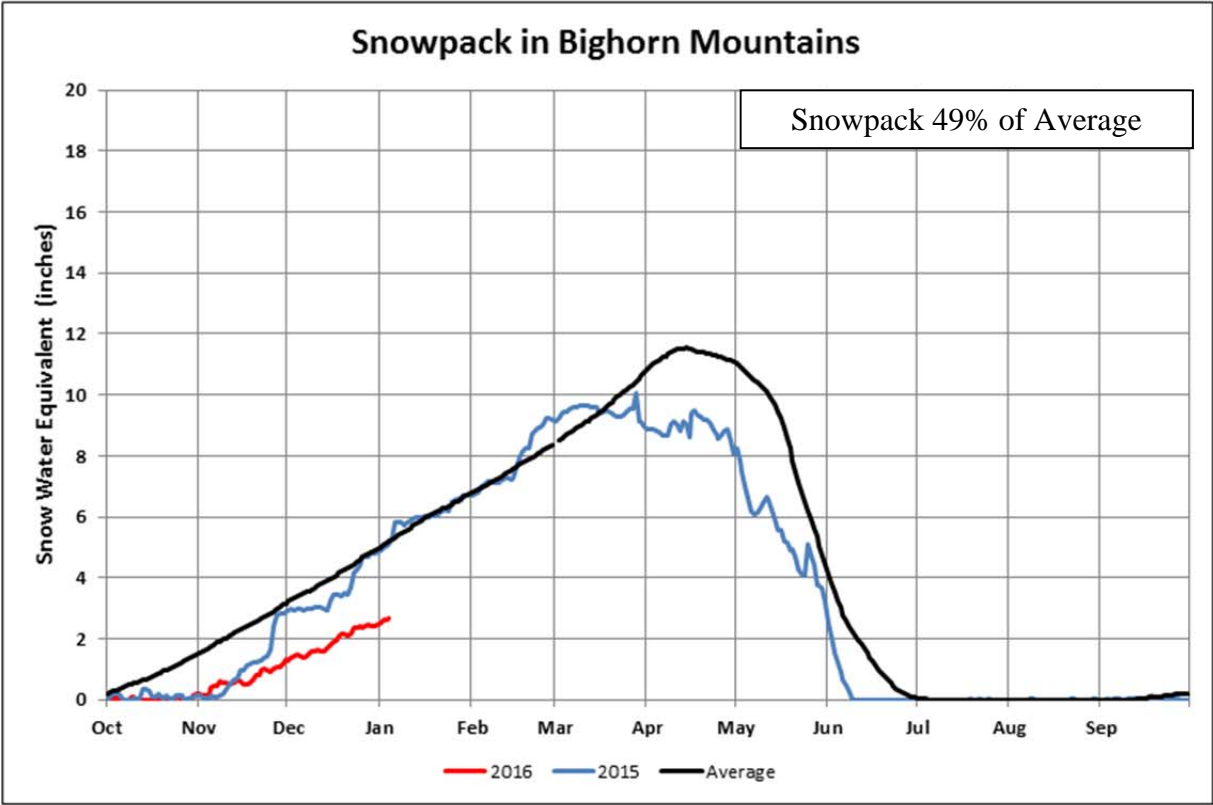
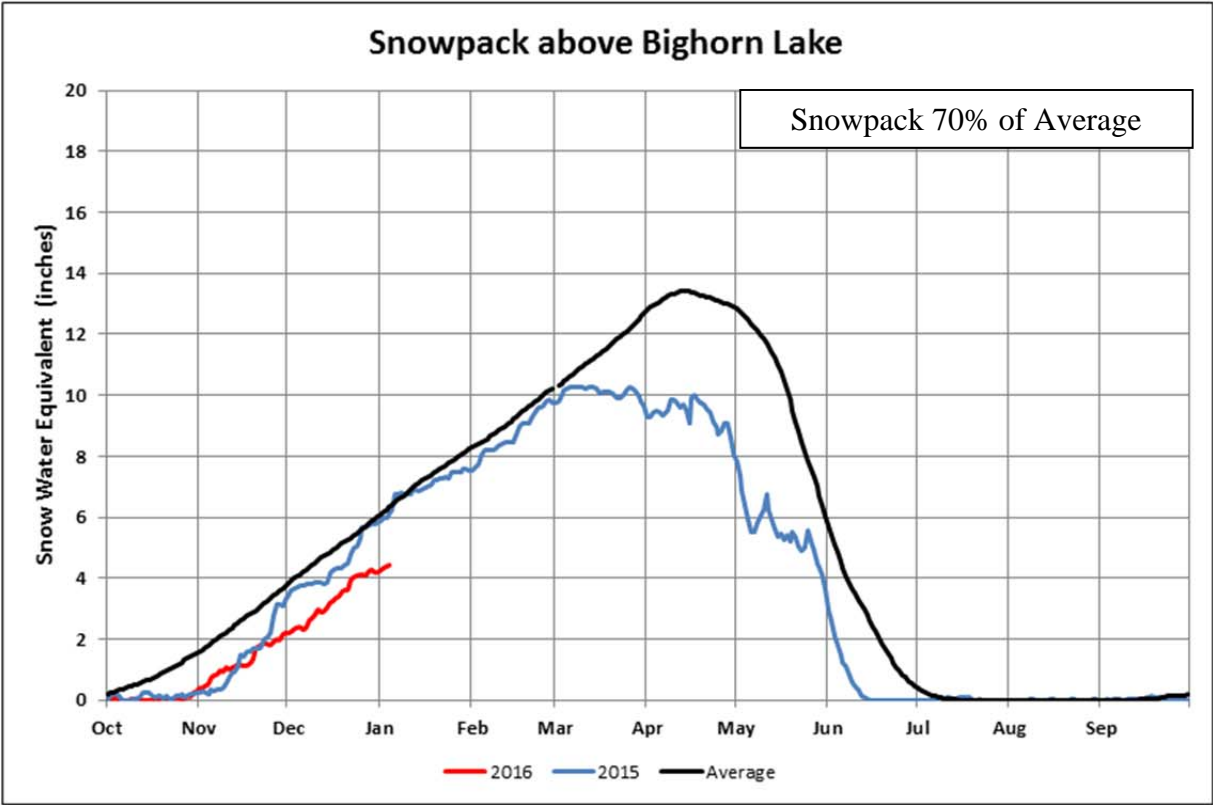
BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
	feet	Current	Median	% Median	Current	Median	% Median
UPPER YELLOWSTONE RIVER BASIN							
Beartooth Lake	9360	8.5	10.0	85	9.2	9.2	100
Box Canyon	6670	3.5	3.7	95	6.6	6.2	106
Brackett Creek	7320	7.9	7.0	113	13.5	11.9	113
Burnt Mtn Canyon	5880	2.1	1.8	117	6.6	6.8	97
Cole Creek	7870	5.7	5.5	104	7.7	7.9	97
Cole Creek	7850	3.7	6.3	59	5.3	6.4	83
East Boulder Mine	6335	2.1	-M	*	6.8	-M	*
Evening Star	9200	12.0	11.5	104	14.2	13.2	108
Fisher Creek	9100	14.3	14.7	97	13.4	15.1	89
Monument Peak	8850	8.1	8.8	92	10.7	10.4	103
Northeast Entrance	7350	3.8	4.1	93	6.5	6.2	105
Parker Peak	9400	9.5	9.9	96	11.0	8.6	128
Placer Basin	8830	5.9	8.2	72	7.8	9.2	85
Porcupine	6500	2.6	2.2	118	6.4	5.7	112
Sacajawea	6550	5.7	5.5	104	13.0	11.3	115
Shower Falls	8100	7.8	9.0	87	11.2	10.9	103
S Fork Shields	8100	4.6	6.5	71	10.9	9.4	116
Sylvan Lake	8420	8.0	9.2	87	11.9	11.2	106
Sylvan Road	7120	4.6	5.4	85	9.1	9.0	101
Thumb Divide	7980	6.4	6.2	103	8.5	8.8	97
Two Ocean Plateau	9240	12.5	12.5	100	13.3	12.7	105
White Mill	8700	11.4	9.9	115	11.5	11.3	102
Wolverine	7650	6.2	4.8	129	6.8	6.2	110
Younts Peak	8350	5.4	7.0	77	5.9	7.8	76
Basin Index (%)				94			103
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	5.5	-M	*	7.0	-M	*
Castle Creek	8400	2.5	-M	*	3.9	-M	*
Cold Springs	9630	3.1	3.2	97	4.0	5.0	80
Deer Park	9700	5.3	6.6	80	5.5	9.0	61
Hobbs Park	10100	4.6	6.6	70	5.0	6.2	81
Kirwin	9550	4.4	4.3	102	5.6	5.6	100
Little Warm	9370	4.1	4.5	91	5.9	6.2	95
Owl Creek	8975	1.5	2.6	58	2.2	2.9	76
South Pass	9040	4.1	6.7	61	3.6	8.4	43
St. Lawrence Alt	8620	1.4	3.1	45	2.7	4.3	63
Togwotee Pass	9580	9.3	11.1	84	11.8	11.6	102
Townsend Creek	8700	2.5	4.1	61	3.7	5.8	64
Younts Peak	8350	5.4	7.0	77	5.9	7.8	76
Basin Index (%)				76			77
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	10.8	10.5	103	12.6	10.0	126
Evening Star	9200	12.0	11.5	104	14.2	13.2	108
Marquette	8760	2.4	-M	*	5.8	-M	*
Sylvan Lake	8420	8.0	9.2	87	11.9	11.2	106
Sylvan Road	7120	4.6	5.4	85	9.1	9.0	101
Younts Peak	8350	5.4	7.0	77	5.9	7.8	76
Basin Index (%)				94			105

SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of January 1, 2016

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	3.6	8.5	42	4.1	7.9	52
Bear Trap Meadow	8200	2.1	2.6	81	2.7	4.2	64
Blackwater	9780	10.8	10.5	103	12.6	10.0	126
Bone Springs Div	9350	4.4	7.3	60	4.2	7.2	58
Burroughs Creek	8750	5.5	-M	*	7.0	-M	*
Castle Creek	8400	2.5	-M	*	3.9	-M	*
Cold Springs	9630	3.1	3.2	97	4.0	5.0	80
Deer Park	9700	5.3	6.6	80	5.5	9.0	61
Evening Star	9200	12.0	11.5	104	14.2	13.2	108
Grave Springs	8550	1.8	3.4	53	2.0	5.1	39
Kirwin	9550	4.4	4.3	102	5.6	5.6	100
Little Warm	9370	4.1	4.5	91	5.9	6.2	95
Marquette	8760	2.4	-M	*	5.8	-M	*
Middle Powder	7760	2.9	5.0	58	2.2	6.0	37
Owl Creek	8975	1.5	2.6	58	2.2	2.9	76
Powder River Pass	9480	2.3	4.8	48	2.4	6.0	40
Shell Creek	9580	3.6	7.2	50	3.8	6.5	58
South Pass	9040	4.1	6.7	61	3.6	8.4	43
St. Lawrence Alt	8620	1.4	3.1	45	2.7	4.3	63
Sylvan Lake	8420	8.0	9.2	87	11.9	11.2	106
Sylvan Road	7120	4.6	5.4	85	9.1	9.0	101
Timber Creek	7950	1.8	2.2	82	5.4	3.9	138
Togwotee Pass	9580	9.3	11.1	84	11.8	11.6	102
Townsend Creek	8700	2.5	4.1	61	3.7	5.8	64
Younts Peak	8350	5.4	7.0	77	5.9	7.8	76
Basin Index (%)							
				76			80

-M = Missing data

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



BHXAOP V1.16 Run: 08-Jan-2016 15:02
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3628.89 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Boysen Release	kaf	50.7	47.4	57.2	49.1	67.7	71.4	73.8	67.6	49.1	50.8	49.1	50.8	684.7
Boysen Release	cfs	825	824	930	825	1101	1200	1200	1099	825	826	825	826	
Buffalo Bill Release	kaf	12.6	11.8	12.6	31.7	101.2	149.4	139.2	121.9	105.2	40.9	21.1	21.8	769.4
Buffalo Bill Release	cfs	205	205	205	533	1646	2511	2264	1983	1768	665	355	355	
Station Gain	kaf	43.3	50.7	68.5	44.7	30.2	16.5	-63.6	-49.9	4.9	52.5	52.1	33.9	283.8
Monthly Inflow	kaf	106.6	109.9	138.3	125.5	199.1	237.3	149.4	139.6	159.2	144.2	122.3	106.5	1737.9
Monthly Inflow	cfs	1734	1911	2249	2109	3238	3988	2430	2270	2675	2345	2055	1732	
Turbine Release	kaf	149.4	139.8	143.3	116.1	130.6	137.6	146.8	145.7	147.2	152.4	151.0	156.1	1716.0
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	149.4	139.8	143.3	116.1	130.6	137.6	146.8	145.7	147.2	152.4	151.0	156.1	1716.0
Total Release	cfs	2430	2430	2331	1951	2124	2312	2387	2370	2474	2479	2538	2539	
Spring Flow	kaf	4.3	4.0	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	50.9
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	153.7	143.8	147.6	120.3	134.9	141.8	151.1	150.0	151.4	156.7	155.2	160.4	1766.9
Afterbay Rels	cfs	2500	2500	2400	2022	2194	2383	2457	2440	2544	2548	2608	2609	
River Release	kaf	153.7	143.8	147.6	119.0	123.0	119.0	123.0	123.0	133.9	153.7	155.2	160.4	1655.3
River Release	cfs	2500	2500	2400	2000	2000	2000	2000	2000	2250	2500	2608	2609	
Min Release	kaf	153.7	143.8	147.6	119.0	123.0	119.0	123.0	123.0	133.9	153.7	89.3	92.2	1521.2
End-Month Content	kaf	858.5	828.6	823.6	833.0	901.5	1001.2	1003.8	997.7	1009.7	1001.5	972.8	923.2	
End-Month Elevation	ft	3623.81	3619.91	3619.23	3620.51	3628.91	3638.43	3638.64	3638.14	3639.13	3638.45	3636.00	3631.26	
Net Change Content	kaf	-42.8	-29.9	-5.0	9.4	68.5	99.7	2.6	-6.1	12.0	-8.2	-28.7	-49.6	21.9
Yellowtail Power	2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turbine Release	kaf	149.4	139.8	143.3	116.1	130.6	137.6	146.8	145.7	147.2	152.4	151.0	156.1	1716.0
Generation	gwh	55.633	50.967	52.405	40.853	47.958	52.132	56.322	55.762	56.564	58.843	57.893	59.571	644.903
End-Month Power Cap	mw	272.1	268.4	267.8	269.0	277.0	286.0	286.2	285.8	286.7	286.1	283.7	279.2	
% Max Gen		26	25	24	20	22	25	26	26	27	27	28	28	
Ave kwh/af		372	365	366	352	367	379	384	383	384	386	383	382	376
Upstream Generation	gwh	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Generation	gwh	55.633	50.967	52.405	40.853	47.958	52.132	56.322	55.762	56.564	58.843	57.893	59.571	644.903

BHXAOP V1.16 Run: 08-Jan-2016 15:02
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3628.89 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
2016		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Boysen Release	kaf	50.7	47.4	57.2	49.1	67.7	71.4	73.8	67.7	44.6	36.9	29.8	30.7	627.0
Boysen Release	cfs	825	824	930	825	1101	1200	1200	1101	750	600	501	499	
Buffalo Bill Release	kaf	12.6	11.8	12.6	31.7	101.2	105.0	118.7	104.3	83.3	28.3	9.2	9.5	628.2
Buffalo Bill Release	cfs	205	205	205	533	1646	1765	1930	1696	1400	460	155	155	
Station Gain	kaf	35.9	41.4	59.9	18.8	-3.1	-31.4	-120.2	-52.3	-0.8	46.2	47.5	30.0	71.9
Monthly Inflow	kaf	99.2	100.6	129.7	99.6	165.8	145.0	72.3	119.7	127.1	111.4	86.5	70.2	1327.1
Monthly Inflow	cfs	1613	1749	2109	1674	2696	2437	1176	1947	2136	1812	1454	1142	
Turbine Release	kaf	149.4	125.4	118.7	101.2	115.2	122.7	131.4	130.3	117.4	106.3	92.1	95.2	1405.3
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	149.4	125.4	118.7	101.2	115.2	122.7	131.4	130.3	117.4	106.3	92.1	95.2	1405.3
Total Release	cfs	2430	2180	1930	1701	1874	2062	2137	2119	1973	1729	1548	1548	
Spring Flow	kaf	4.3	4.0	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	50.9
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	153.7	129.4	123.0	105.4	119.5	126.9	135.7	134.6	121.6	110.6	96.3	99.5	1456.2
Afterbay Rels	cfs	2500	2250	2000	1771	1943	2133	2207	2189	2044	1799	1618	1618	
River Release	kaf	153.7	129.4	123.0	104.1	107.6	104.1	107.6	107.6	104.1	107.6	96.3	99.5	1344.6
River Release	cfs	2500	2250	2000	1749	1750	1749	1750	1750	1749	1750	1618	1618	
Min Release	kaf	153.7	129.4	123.0	104.1	107.6	104.1	107.6	107.6	104.1	107.6	89.3	92.2	1330.3
End-Month Content	kaf	851.1	826.3	837.3	835.7	886.3	908.6	849.5	838.9	848.6	853.7	848.1	823.1	
End-Month Elevation	ft	3622.88	3619.60	3621.08	3620.87	3627.17	3629.70	3622.67	3621.29	3622.55	3623.21	3622.49	3619.16	
Net Change Content	kaf	-50.2	-24.8	11.0	-1.6	50.6	22.3	-59.1	-10.6	9.7	5.1	-5.6	-25.0	-78.2
Yellowtail Power	2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turbine Release	kaf	149.4	125.4	118.7	101.2	115.2	122.7	131.4	130.3	117.4	106.3	92.1	95.2	1405.3
Generation	gwh	55.516	44.726	42.012	34.637	41.086	44.579	47.635	47.010	41.597	36.954	31.019	32.043	498.814
End-Month Power Cap	mw	271.3	268.1	269.6	269.4	275.3	277.7	271.1	269.7	270.9	271.6	270.9	267.7	
% Max Gen		26	22	20	17	19	21	22	22	20	17	15	15	
Ave kwh/af		372	357	354	342	357	363	363	361	354	348	337	337	355
Upstream Generation	gwh	7.389	5.997	7.842	11.770	25.018	24.988	26.818	24.031	18.519	8.721	4.306	4.485	169.884
Total Generation	gwh	62.905	50.723	49.854	46.407	66.104	69.567	74.453	71.041	60.116	45.675	35.325	36.528	668.698

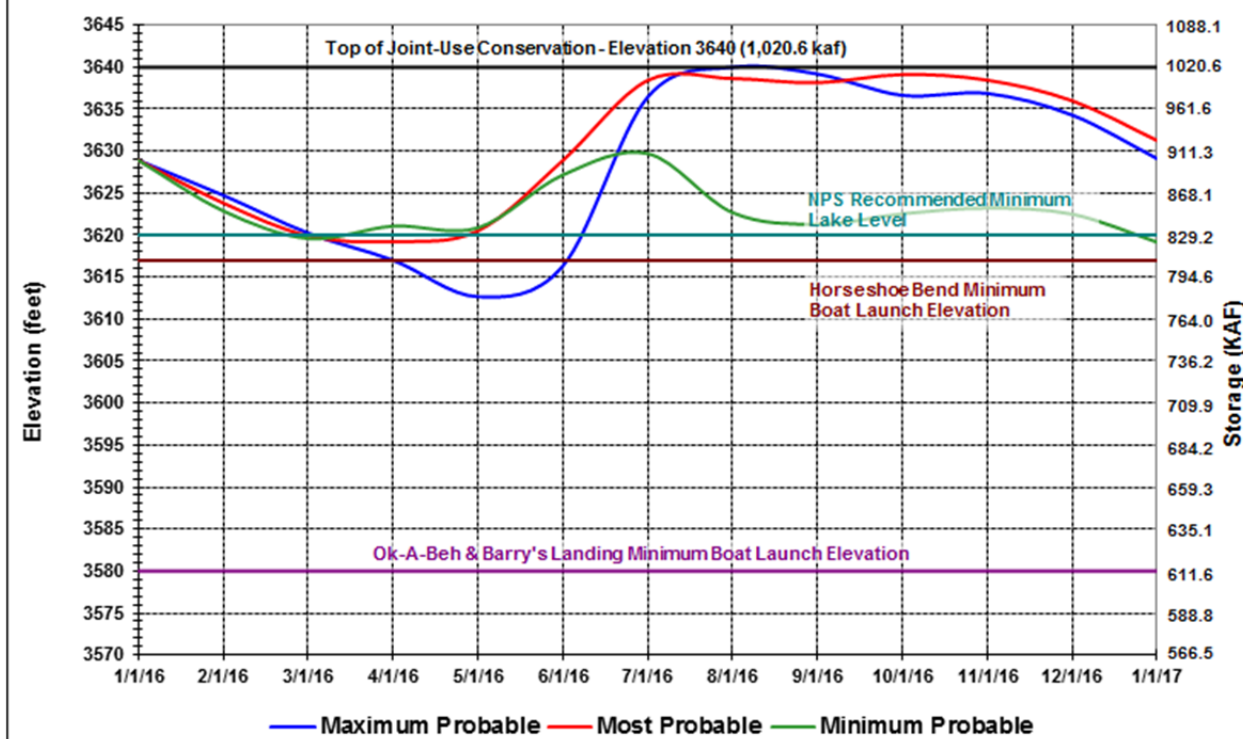
BHXAOP V1.16 Run: 08-Jan-2016 15:02
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3628.89 ft 901.3 kaf				Maximum Cont Elev 3657.00 ft 1278.9 kaf				Minimum Cont Elev 3547.00 ft 469.9 kaf				Total
2016		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Boysen Release	kaf	50.7	47.4	57.2	70.8	106.7	131.2	148.2	131.6	79.9	61.5	59.5	61.5	1006.2
Boysen Release	cfs	825	824	930	1190	1735	2205	2410	2140	1343	1000	1000	1000	
Buffalo Bill Release	kaf	12.6	11.8	12.6	53.5	157.3	201.9	216.4	152.4	104.3	54.1	21.1	21.8	1019.8
Buffalo Bill Release	cfs	205	205	205	899	2558	3393	3519	2479	1753	880	355	355	
Station Gain	kaf	50.8	60.0	77.2	42.9	80.1	158.6	-44.8	-40.9	21.9	70.3	58.5	39.5	574.1
Monthly Inflow	kaf	114.1	119.2	147.0	167.2	344.1	491.7	319.8	243.1	206.1	185.9	139.1	122.8	2600.1
Monthly Inflow	cfs	1856	2072	2391	2810	5596	8263	5201	3954	3464	3023	2338	1997	
Turbine Release	kaf	149.4	154.2	170.1	195.2	320.5	317.3	277.1	253.3	236.4	183.2	167.9	173.5	2598.1
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	149.4	154.2	170.1	195.2	320.5	317.3	277.1	253.3	236.4	183.2	167.9	173.5	2598.1
Total Release	cfs	2430	2681	2766	3280	5212	5332	4507	4120	3973	2979	2822	2822	
Spring Flow	kaf	4.3	4.0	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	50.9
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	153.7	158.2	174.4	199.4	324.8	321.5	281.4	257.6	240.6	187.5	172.1	177.8	2649.0
Afterbay Rels	cfs	2500	2750	2836	3351	5282	5403	4577	4189	4043	3049	2892	2892	
River Release	kaf	153.7	158.2	174.4	198.1	312.9	298.7	253.3	230.6	223.1	184.5	172.1	177.8	2537.4
River Release	cfs	2500	2750	2836	3329	5089	5020	4120	3750	3749	3001	2892	2892	
Min Release	kaf	153.7	158.2	169.1	148.8	153.7	119.0	172.2	230.6	223.1	184.5	89.3	92.2	1894.4
End-Month Content	kaf	866.0	831.0	807.9	779.9	803.5	977.9	1020.6	1010.4	980.1	982.8	954.0	903.3	
End-Month Elevation	ft	3624.74	3620.24	3617.00	3612.67	3616.34	3636.45	3640.00	3639.18	3636.64	3636.87	3634.29	3629.11	
Net Change Content	kaf	-35.3	-35.0	-23.1	-28.0	23.6	174.4	42.7	-10.2	-30.3	2.7	-28.8	-50.7	2.0
Yellowtail Power	2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Turbine Release	kaf	149.4	154.2	170.1	195.2	320.5	317.3	277.1	253.3	236.4	183.2	167.9	173.5	2598.1
Generation	gwh	55.750	57.278	63.755	73.872	125.242	129.791	114.391	104.113	96.250	72.612	65.300	67.050	1025.404
End-Month Power Cap	mw	273.0	268.8	265.7	261.6	265.0	284.2	287.5	286.7	284.3	284.6	282.1	277.2	
% Max Gen		26	29	30	36	58	63	53	49	46	34	31	31	
Ave kwh/af		373	371	375	378	391	409	413	411	407	396	389	386	395
Upstream Generation	gwh	7.404	6.041	7.942	19.570	31.426	33.418	35.215	35.073	28.412	19.312	10.843	11.163	245.819
Total Generation	gwh	63.154	63.319	71.697	93.442	156.668	163.209	149.606	139.186	124.662	91.924	76.143	78.213	1271.223

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

