

RECLAMATION

Managing Water in the West

March 7, 2017

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during February were 200 percent of average. On March 1, the Natural Resources Conservation Service (NRCS) measured the snow water content of the mountain snowpack in the Bighorn River Basin at 142 percent of average. Based on the March 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 2,099,200 acre-feet (192 percent of average). 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
March 1, 2017

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4720.67	660,295	120	89
Buffalo Bill	5372.11	483,249	114 *	75
Bighorn Lake	3630.79	918,659	118	90

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
Water Year 2016	Inflow	Percent of Average
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
January	51.8	129
February	144.0	293
Water Year 2016	Gains	Percent of Average
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)	-

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

Inflows	Percent of Average
2,099,200	192

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 March 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	25.4	16.7	152	20.8	15.7	132
Box Canyon	6670	7.8	7.4	105	9.7	9.9	98
Brackett Creek	7320	14.7	14.4	102	21.5	19.9	108
Burnt Mtn	5880	5.2	4.0	130	11.2	9.5	118
Canyon	7870	15.3	10.5	146	21.5	13.0	165
Cole Creek	7850	8.4	9.9	85	6.1	9.1	67
East Boulder Mine	6335	5.4	-M	*	12.8	-M	*
Evening Star	9200	30.0	19.1	157	35.5	22.1	161
Fisher Creek	9100	32.6	25.8	126	36.7	25.5	144
Monument Peak	8850	17.6	15.2	116	23.7	17.0	139
Northeast Entrance	7350	10.3	8.2	126	15.9	9.9	161
Parker Peak	9400	26.2	16.0	164	24.7	14.0	176
Placer Basin	8830	12.3	12.8	96	16.3	14.6	112
Porcupine	6500	3.7	5.2	71	7.8	9.1	86
Sacajawea	6550	10.3	11.9	87	20.0	17.8	112
Shower Falls	8100	13.2	15.6	85	22.1	17.6	126
S Fork Shields	8100	7.9	11.8	67	16.2	15.3	106
Sylvan Lake	8420	20.5	15.9	129	31.4	18.0	174
Sylvan Road	7120	14.4	9.4	153	25.6	13.9	184
Thumb Divide	7980	19.8	12.3	161	23.9	14.6	164
Two Ocean Plateau	9240	35.1	21.6	162	34.2	21.6	158
White Mill	8700	25.0	18.3	137	26.7	18.9	141
Wolverine	7650	13.9	8.5	164	17.6	10.0	176
Younts Peak	8350	22.5	11.7	192	25.3	12.6	201
Basin Index (%)				130	141		
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	20.6	-M	*	22.6	-M	*
Castle Creek	8400	11.2	-M	*	13.4	-M	*
Cold Springs	9630	11.6	5.5	211	13.8	7.5	184
Deer Park	9700	27.8	10.8	257	29.0	15.3	190
Hobbs Park	10100	21.3	9.7	220	19.6	9.5	206
Kirwin	9550	15.8	7.0	226	18.6	8.8	211
Little Warm	9370	13.8	7.9	175	19.3	9.8	197
Owl Creek	8975	6.7	3.9	172	8.3	4.3	193
South Pass	9040	25.4	11.4	223	23.2	13.5	172
St. Lawrence Alt	8620	7.4	5.2	142	11.8	6.5	182
Togwotee Pass	9580	27.7	17.7	156	31.6	19.4	163
Townsend Creek	8700	12.3	6.5	189	15.2	8.6	177
Younts Peak	8350	22.5	11.7	192	25.3	12.6	201
Basin Index (%)				198	186		
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	29.9	17.2	174	33.1	16.1	206
Evening Star	9200	30.0	19.1	157	35.5	22.1	161
Marquette	8760	7.2	-M	*	11.0	-M	*
Sylvan Lake	8420	20.5	15.9	129	31.4	18.0	174
Sylvan Road	7120	14.4	9.4	153	25.6	13.9	184
Younts Peak	8350	22.5	11.7	192	25.3	12.6	201
Basin Index (%)				160	182		

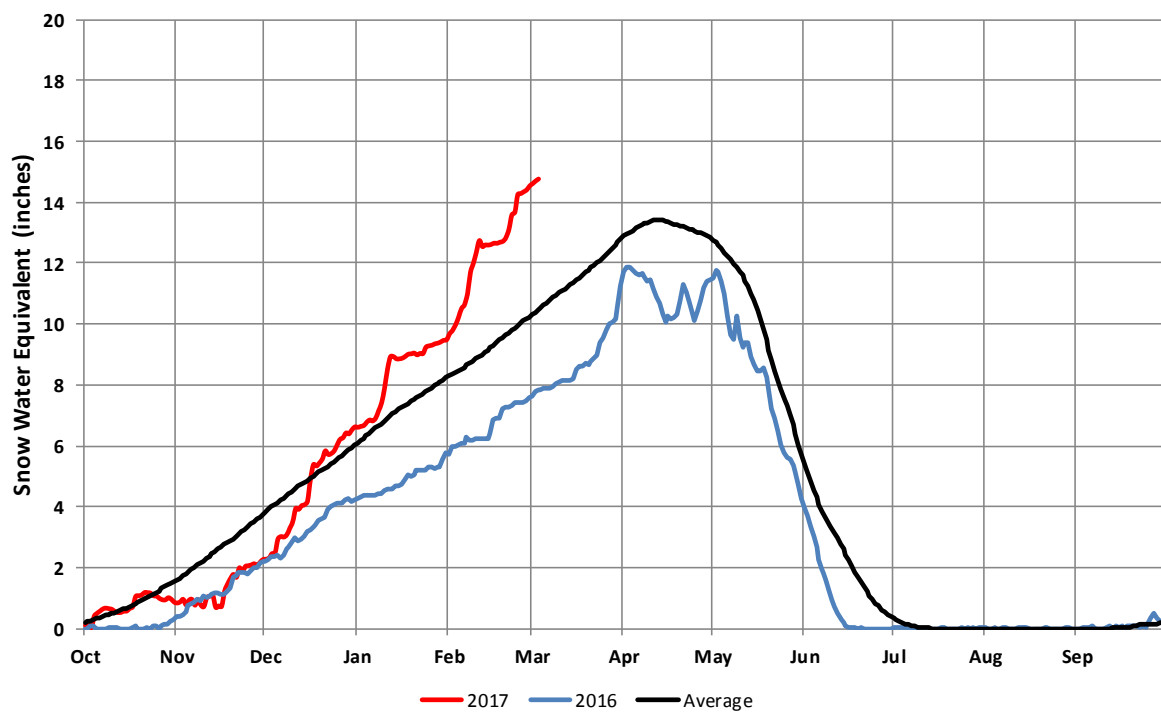
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of March 1, 2017

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	15.1	14.7	103	13.0	13.1	99
Bear Trap Meadow	8200	4.4	4.4	100	5.6	6.1	92
Blackwater	9780	29.9	17.2	174	33.1	16.1	206
Bone Springs Div	9350	13.4	12.0	112	12.7	11.7	109
Burroughs Creek	8750	20.6	-M	*	22.6	-M	*
Castle Creek	8400	11.2	-M	*	13.4	-M	*
Cold Springs	9630	11.6	5.5	211	13.8	7.5	184
Deer Park	9700	27.8	10.8	257	29.0	15.3	190
Evening Star	9200	30.0	19.1	157	35.5	22.1	161
Grave Springs	8550	5.1	6.9	74	5.7	7.9	72
Kirwin	9550	15.8	7.0	226	18.6	8.8	211
Little Warm	9370	13.8	7.9	175	19.3	9.8	197
Marquette	8760	7.2	-M	*	11.0	-M	*
Middle Powder	7760	5.9	8.0	74	6.0	8.7	69
Owl Creek	8975	6.7	3.9	172	8.3	4.3	193
Powder River Pass	9480	6.2	8.0	78	8.8	9.6	92
Shell Creek	9580	12.8	11.6	110	9.9	10.7	93
South Pass	9040	25.4	11.4	223	23.2	13.5	172
St. Lawrence Alt	8620	7.4	5.2	142	11.8	6.5	182
Sylvan Lake	8420	20.5	15.9	129	31.4	18.0	174
Sylvan Road	7120	14.4	9.4	153	25.6	13.9	184
Timber Creek	7950	5.2	3.7	141	6.6	5.3	125
Togwotee Pass	9580	27.7	17.7	156	31.6	19.4	163
Townsend Creek	8700	12.3	6.5	189	15.2	8.6	177
Younts Peak	8350	22.5	11.7	192	25.3	12.6	201
Basin Index (%)				153	156		

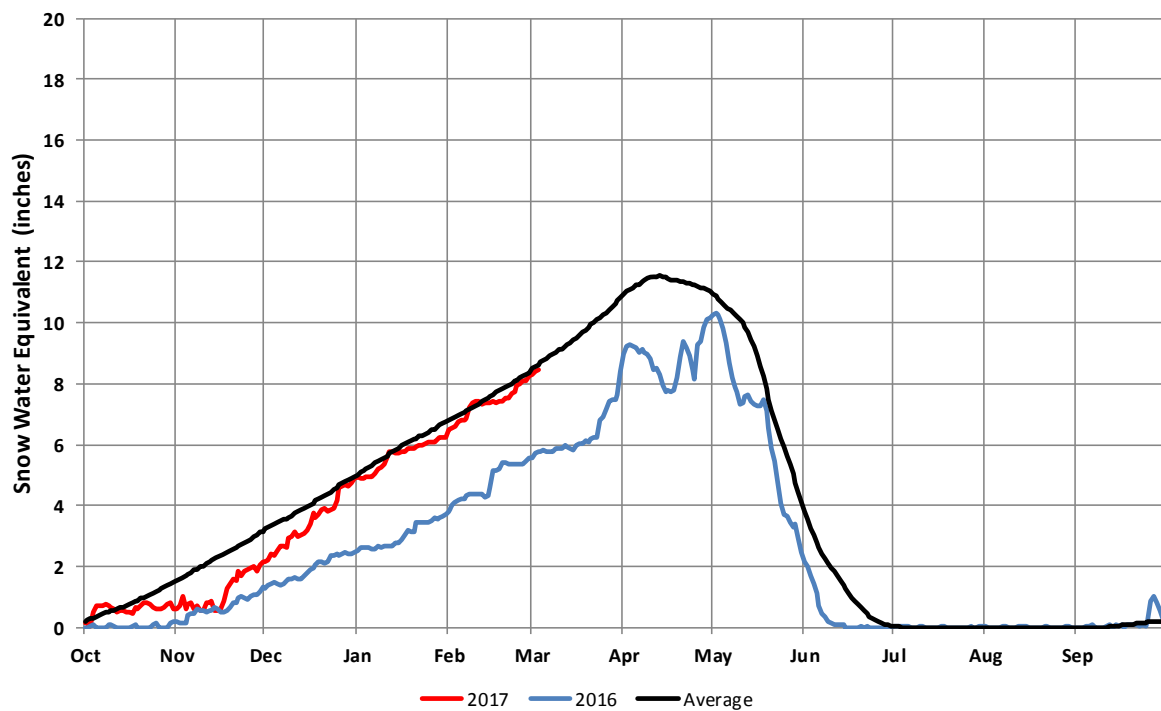
-M = Missing data

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

Snowpack above Bighorn Lake



Snowpack in Bighorn Mountains



Based on Most Probable Inflow Forecast (April-July Inflow: 2,099.2 KAF)

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 918.7 kaf 3630.79 ft				Maximum Cont Elev 1278.9 kaf 3657.00 ft		Minimum Cont Elev 469.9 kaf 3547.00 ft						
	2017	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Boysen Release	kaf	123.0	190.2	261.6	253.2	261.6	135.1	95.4	64.7	59.5	61.5	61.5	55.5	1622.8
Boysen Release	cfs	2000	3196	4255	4255	4255	2197	1603	1052	1000	1000	1000	999	
Buffalo Bill Release	kaf	107.4	170.3	228.5	228.3	240.4	128.9	117.5	94.4	21.1	21.8	21.8	19.8	1400.2
Buffalo Bill Release	cfs	1747	2862	3716	3837	3910	2096	1975	1535	355	355	355	357	
Station Gain	kaf	79.6	44.0	86.7	173.1	-38.7	-39.2	23.9	72.1	59.3	40.2	45.4	53.2	599.6
Monthly Inflow	kaf	310.0	404.5	576.8	654.6	463.3	224.8	236.8	231.2	139.9	123.5	128.7	128.5	3622.6
Monthly Inflow	cfs	5042	6798	9381	11001	7535	3656	3980	3760	2351	2009	2093	2314	
Turbine Release	kaf	368.9	357.0	368.9	357.0	368.9	256.4	239.4	198.5	176.2	182.1	182.1	164.5	3219.9
Bypass/Spill/Waste	kaf	78.4	116.1	130.6	142.4	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	486.6
Total Release	kaf	447.3	473.1	499.5	499.4	388.0	256.4	239.4	198.5	176.2	182.1	182.1	164.5	3706.5
Total Release	cfs	7275	7951	8124	8393	6310	4170	4023	3228	2961	2962	2962	2962	
Spring Flow	kaf	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	50.8
Irrigation Reqmnt	kaf	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	111.6
Afterbay Rels	kaf	451.6	477.3	503.8	503.6	392.3	260.7	243.6	202.8	180.4	186.4	186.4	168.4	3757.3
Afterbay Rels	cfs	7345	8021	8194	8463	6380	4240	4094	3298	3032	3032	3032	3032	
River Release	kaf	451.6	476.0	491.9	480.8	364.2	233.7	226.1	199.8	180.4	186.4	186.4	168.4	3645.7
River Release	cfs	7345	7999	8000	8080	5923	3801	3800	3249	3032	3032	3032	3032	
Min Release	kaf	451.6	476.0	491.9	89.3	92.2	233.7	226.1	199.8	89.3	92.2	92.2	83.3	2617.6
End-Month Content	kaf	781.4	712.8	790.1	945.3	1020.6	989.0	986.4	1019.1	982.8	924.2	870.8	834.8	
End-Month Elevation	ft	3612.91	3600.56	3614.30	3633.47	3640.00	3637.40	3637.18	3639.88	3636.87	3631.37	3625.33	3620.75	
Net Change Content	kaf	-137.3	-68.6	77.3	155.2	75.3	-31.6	-2.6	32.7	-36.3	-58.6	-53.4	-36.0	-83.9
Yellowtail Power	2017	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Turbine Release	kaf	368.9	357.0	368.9	357.0	368.9	256.4	239.4	198.5	176.2	182.1	182.1	164.5	3219.9
Generation	gwh	150.660	145.800	150.660	145.800	150.660	105.030	97.669	80.043	69.440	71.241	70.282	61.853	1299.138
End-Month Power Cap	mw	261.8	250.1	263.1	281.3	287.5	285.1	284.8	287.4	284.6	279.3	273.6	269.2	
% Max Gen		70	70	70	70	70	49	47	37	33	33	33	32	
Ave kwh/af		408	408	408	408	408	410	408	403	394	391	386	376	403
Upstream Generation	gwh	26.151	25.039	30.917	32.317	35.094	35.319	31.029	25.249	10.819	11.143	11.075	9.125	283.277
Total Generation	gwh	176.811	170.839	181.577	178.117	185.754	140.349	128.698	105.292	80.259	82.384	81.357	70.978	1582.415

Based on Minimum Probable Inflow Forecast (April-July Inflow: 1,571.0 KAF)

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 918.7 kaf 3630.79 ft				Maximum Cont Elev 1278.9 kaf 3657.00 ft				Minimum Cont Elev 469.9 kaf 3547.00 ft				Total
	2017	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Boysen Release	kaf	122.9	150.4	221.5	214.4	221.5	135.3	67.5	64.7	59.6	61.6	61.6	55.6	1436.6
Boysen Release	cfs	1999	2528	3602	3603	3602	2200	1134	1052	1002	1002	1002	1001	
Buffalo Bill Release	kaf	107.3	170.3	161.1	163.1	173.1	129.3	95.3	51.4	42.1	21.9	21.8	19.8	1156.5
Buffalo Bill Release	cfs	1745	2862	2620	2741	2815	2103	1602	836	708	356	355	357	
Station Gain	kaf	56.8	33.6	45.3	80.8	-64.1	-47.6	10.8	59.0	54.1	35.7	40.4	47.0	351.8
Monthly Inflow	kaf	287.0	354.3	427.9	458.3	330.5	217.0	173.6	175.1	155.8	119.2	123.8	122.4	2944.9
Monthly Inflow	cfs	4668	5954	6959	7702	5375	3529	2917	2848	2618	1939	2013	2204	
Turbine Release	kaf	368.9	377.8	321.2	315.9	330.5	237.9	191.8	183.2	165.9	171.5	171.5	154.8	2990.9
Bypass/Spill/Waste	kaf	41.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.8
Total Release	kaf	410.7	377.8	321.2	315.9	330.5	237.9	191.8	183.2	165.9	171.5	171.5	154.8	3032.7
Total Release	cfs	6679	6349	5224	5309	5375	3869	3223	2979	2788	2789	2789	2787	
Spring Flow	kaf	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	50.8
Irrigation Reqmnt	kaf	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	111.6
Afterbay Rels	kaf	415.0	382.0	325.5	320.1	334.8	242.2	196.0	187.5	170.1	175.8	175.8	158.7	3083.5
Afterbay Rels	cfs	6749	6420	5294	5379	5445	3939	3294	3049	2859	2859	2859	2858	
River Release	kaf	415.0	380.7	313.6	297.3	306.7	215.2	178.5	184.5	170.1	175.8	175.8	158.7	2971.9
River Release	cfs	6749	6398	5100	4996	4988	3500	3000	3001	2859	2859	2859	2858	
Min Release	kaf	415.0	89.3	313.6	89.3	92.2	215.2	178.5	184.5	89.3	92.2	92.2	83.3	1934.6
End-Month Content	kaf	795.0	771.5	878.2	1020.6	1020.6	999.7	981.5	973.4	963.3	911.0	863.3	830.9	
End-Month Elevation	ft	3615.06	3611.28	3626.22	3640.00	3640.00	3638.30	3636.76	3636.06	3635.15	3629.96	3624.41	3620.22	
Net Change Content	kaf	-123.7	-23.5	106.7	142.4	0.0	-20.9	-18.2	-8.1	-10.1	-52.3	-47.7	-32.4	-87.8
Yellowtail Power	2017	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Turbine Release	kaf	368.9	377.8	321.2	315.9	330.5	237.9	191.8	183.2	165.9	171.5	171.5	154.8	2990.9
Generation	gwh	150.660	144.782	128.369	130.248	136.049	97.257	76.480	72.483	64.520	66.283	65.461	57.537	1190.129
End-Month Power Cap	mw	263.8	260.2	274.4	287.5	287.5	285.9	284.4	283.8	282.9	278.0	272.7	268.7	
% Max Gen		70	70	60	63	63	45	37	34	31	31	31	30	
Ave kwh/af		408	383	400	412	412	409	399	396	389	386	382	372	398
Upstream Generation	gwh	12.778	29.862	32.895	32.782	35.158	35.249	25.651	18.973	16.736	11.110	10.979	9.857	272.030
Total Generation	gwh	163.438	174.644	161.264	163.030	171.207	132.506	102.131	91.456	81.256	77.393	76.440	67.394	1462.159

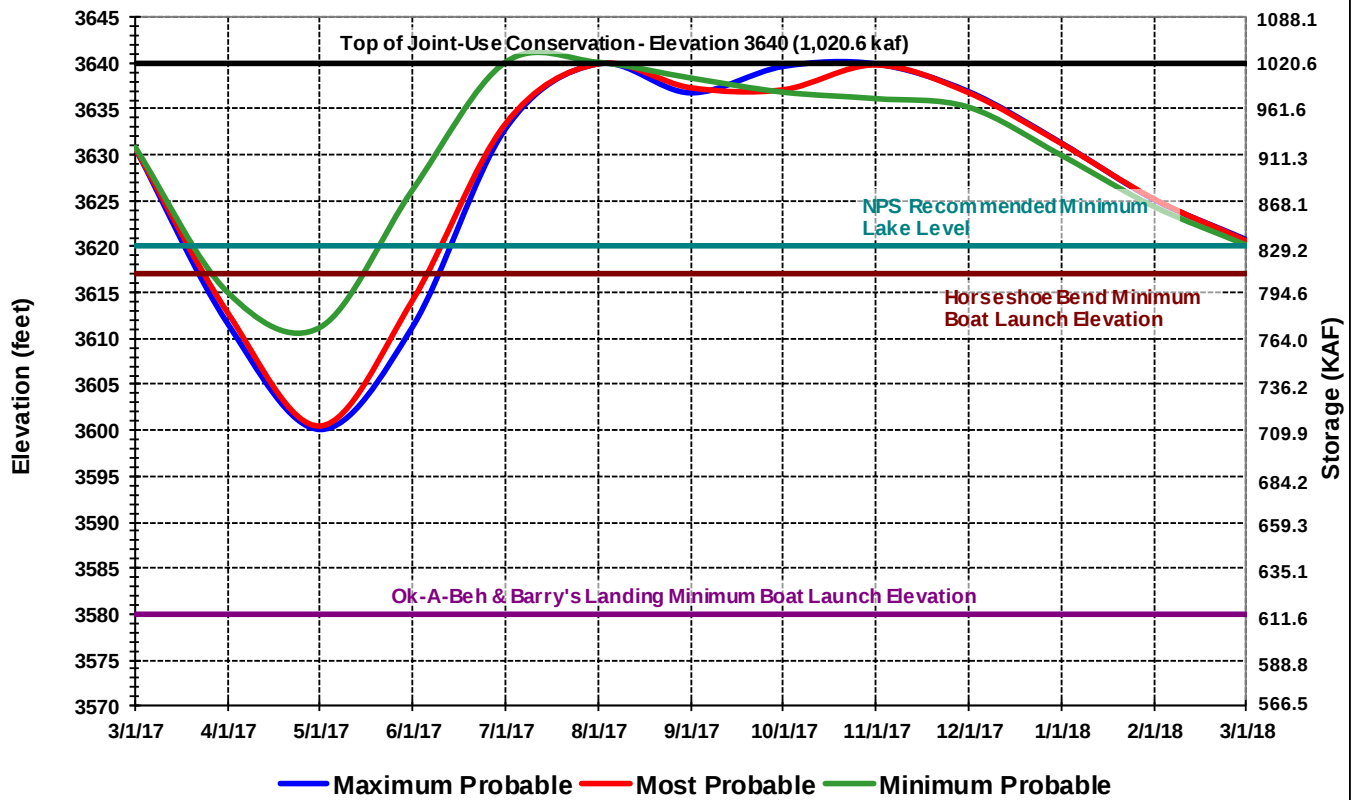
Based on Maximum Probable Inflow Forecast (April-July Inflow: 2,731.7 KAF)

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 918.7 kaf 3630.79 ft				Maximum Cont Elev 1278.9 kaf 3657.00 ft		Minimum Cont Elev 469.9 kaf 3547.00 ft						
	2017	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Boysen Release	kaf	123.1	267.8	306.5	296.7	306.5	132.8	128.5	65.1	59.5	61.5	61.5	55.5	1865.0
Boysen Release	cfs	2002	4501	4985	4986	4985	2160	2160	1059	1000	1000	1000	999	
Buffalo Bill Release	kaf	107.4	170.3	297.3	294.8	309.3	128.8	117.7	95.1	21.1	21.8	21.8	19.8	1605.2
Buffalo Bill Release	cfs	1747	2862	4835	4954	5030	2095	1978	1547	355	355	355	357	
Station Gain	kaf	90.4	55.1	139.3	288.0	0.1	-31.1	39.7	91.0	65.9	46.3	51.3	60.8	896.8
Monthly Inflow	kaf	320.9	493.2	743.1	879.5	615.9	230.5	285.9	251.2	146.5	129.6	134.6	136.1	4367.0
Monthly Inflow	cfs	5219	8289	12085	14780	10017	3749	4805	4085	2462	2108	2189	2451	
Turbine Release	kaf	368.9	357.0	368.9	357.0	368.9	268.7	251.3	247.6	183.0	189.2	189.2	170.8	3320.5
Bypass/Spill/Waste	kaf	97.2	199.7	312.6	354.8	165.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1130.0
Total Release	kaf	466.1	556.7	681.5	711.8	534.6	268.7	251.3	247.6	183.0	189.2	189.2	170.8	4450.5
Total Release	cfs	7580	9356	11084	11962	8694	4370	4223	4027	3075	3077	3077	3075	
Spring Flow	kaf	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	50.8
Irrigation Reqmnt	kaf	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	111.6
Afterbay Rels	kaf	470.4	560.9	685.8	716.0	538.9	273.0	255.5	251.9	187.2	193.5	193.5	174.7	4501.3
Afterbay Rels	cfs	7650	9426	11153	12033	8764	4440	4294	4097	3146	3147	3147	3146	
River Release	kaf	470.4	559.6	673.9	693.2	510.8	246.0	238.0	248.9	187.2	193.5	193.5	174.7	4389.7
River Release	cfs	7650	9404	10960	11650	8307	4001	4000	4048	3146	3147	3147	3146	
Min Release	kaf	470.4	89.3	92.2	89.3	92.2	246.0	238.0	230.6	89.3	92.2	92.2	83.3	1905.0
End-Month Content	kaf	773.5	710.0	771.6	939.3	1020.6	982.4	1017.0	1020.6	984.1	924.5	869.9	835.2	
End-Month Elevation	ft	3611.61	3600.02	3611.30	3632.89	3640.00	3636.84	3639.71	3640.00	3636.99	3631.40	3625.22	3620.80	
Net Change Content	kaf	-145.2	-63.5	61.6	167.7	81.3	-38.2	34.6	3.6	-36.5	-59.6	-54.6	-34.7	-83.5
Yellowtail Power	2017	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Turbine Release	kaf	368.9	357.0	368.9	357.0	368.9	268.7	251.3	247.6	183.0	189.2	189.2	170.8	3320.5
Generation	gwh	150.660	145.800	150.660	145.800	150.660	110.096	103.373	101.841	72.541	74.418	73.393	64.619	1343.861
End-Month Power Cap	mw	260.6	249.5	260.3	280.8	287.5	284.5	287.3	287.5	284.7	279.4	273.5	269.3	
% Max Gen		70	70	70	70	70	51	50	48	35	35	34	33	
Ave kwh/af		408	408	408	408	408	410	411	411	396	393	388	378	405
Upstream Generation	gwh	12.799	24.733	29.768	31.602	35.103	35.311	33.936	25.298	10.852	11.184	11.117	9.998	271.701
Total Generation	gwh	163.459	170.533	180.428	177.402	185.763	145.407	137.309	127.139	83.393	85.602	84.510	74.617	1615.562

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

