

RECLAMATION

Managing Water in the West

June 7, 2016

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during May were 131 percent of average. On June 1, the Natural Resources Conservation Services (NRCS) measured the snow water content of the mountain snowpack in the Bighorn Basin at 69 percent of average. Based on the June 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the June through July runoff into Bighorn Lake is expected to equal 608,000 acre-feet (88 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
 June 1, 2016

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4719.60	641,319	116	86
Buffalo Bill	5375.66	509,069	114 *	79
Bighorn Lake	3624.65	865,236	106	85

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
January	118.1	115
February	123.8	117
March	111.5	77
April	122.0	81
May	358.3	131

Water Year 2015	Inflow	Percent of Average
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
January	52.7	132
February	64.3	130
March	53.0	74
April	32.2	98
May	21.5	40

Water Year 2015	Gains	Percent of Average
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

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

Agency	Inflows	Percent of Average
USBR	608.0	88

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 June 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	12.9	17.1	75	21.7	25.2	86
Box Canyon	6670	.0	.0	*	14.2	17.6	81
Brackett Creek	7320	1.0	3.1	32	34.2	34.9	98
Burnt Mtn Canyon	5880	.0	.0	*	18.2	20.8	88
	7870	.0	.0	*	16.7	21.0	80
Cole Creek	7850	4.9	9.2	53	20.3	21.3	95
East Boulder Mine	6335	.0	-M	*	16.1	-M	*
Evening Star	9200	13.7	17.8	77	33.1	34.9	95
Fisher Creek	9100	21.1	28.1	75	31.3	40.1	78
Monument Peak	8850	3.6	15.3	24	25.8	28.3	91
Northeast Entrance	7350	.0	.0	*	14.6	16.7	87
Parker Peak	9400	6.2	13.8	45	25.2	23.8	106
Placer Basin	8830	5.3	13.1	40	21.3	26.8	79
Porcupine	6500	.0	.0	*	17.8	18.3	97
Sacajawea	6550	.0	.0	*	32.4	31.3	104
Shower Falls	8100	12.1	17.0	71	32.9	33.5	98
S Fork Shields	8100	5.2	9.0	58	31.5	29.6	106
Sylvan Lake	8420	.0	6.6	0	29.0	29.3	99
Sylvan Road	7120	.0	.0	*	18.8	21.3	88
Thumb Divide	7980	.0	.0	*	18.4	23.8	77
Two Ocean Plateau	9240	-M	24.9	*	-M	34.4	*
White Mill	8700	10.4	16.9	62	25.7	30.4	85
Wolverine	7650	.0	.0	*	14.6	16.5	88
Younts Peak	8350	.0	3.2	0	17.4	20.7	84
Basin Index (%)					57		91
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	.0	-M	*	19.6	-M	*
Castle Creek	8400	.0	-M	*	11.2	-M	*
Cold Springs	9630	.0	.0	*	18.0	15.4	117
Deer Park	9700	12.2	3.1	394	28.2	27.0	104
Hobbs Park	10100	16.8	6.1	275	28.0	20.5	137
Kirwin	9550	.0	1.7	0	19.6	17.0	115
Little Warm	9370	.0	.0	*	16.1	18.4	88
Owl Creek	8975	.0	.0	*	13.3	10.7	124
South Pass	9040	6.7	.2	3350*	22.5	23.6	95
St. Lawrence Alt	8620	.0	.0	*	19.7	14.5	136
Togwotee Pass	9580	15.1	19.0	79	30.5	31.0	98
Townsend Creek	8700	.0	.0	*	24.7	18.2	136
Younts Peak	8350	.0	3.2	0	17.4	20.7	84
Basin Index (%)					153*		110
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	18.4	19.6	94	30.0	27.4	109
Evening Star	9200	13.7	17.8	77	33.1	34.9	95
Marquette	8760	.0	-M	*	16.3	-M	*
Sylvan Lake	8420	.0	6.6	0	29.0	29.3	99
Sylvan Road	7120	.0	.0	*	18.8	21.3	88
Younts Peak	8350	.0	3.2	0	17.4	20.7	84
Basin Index (%)					68		96

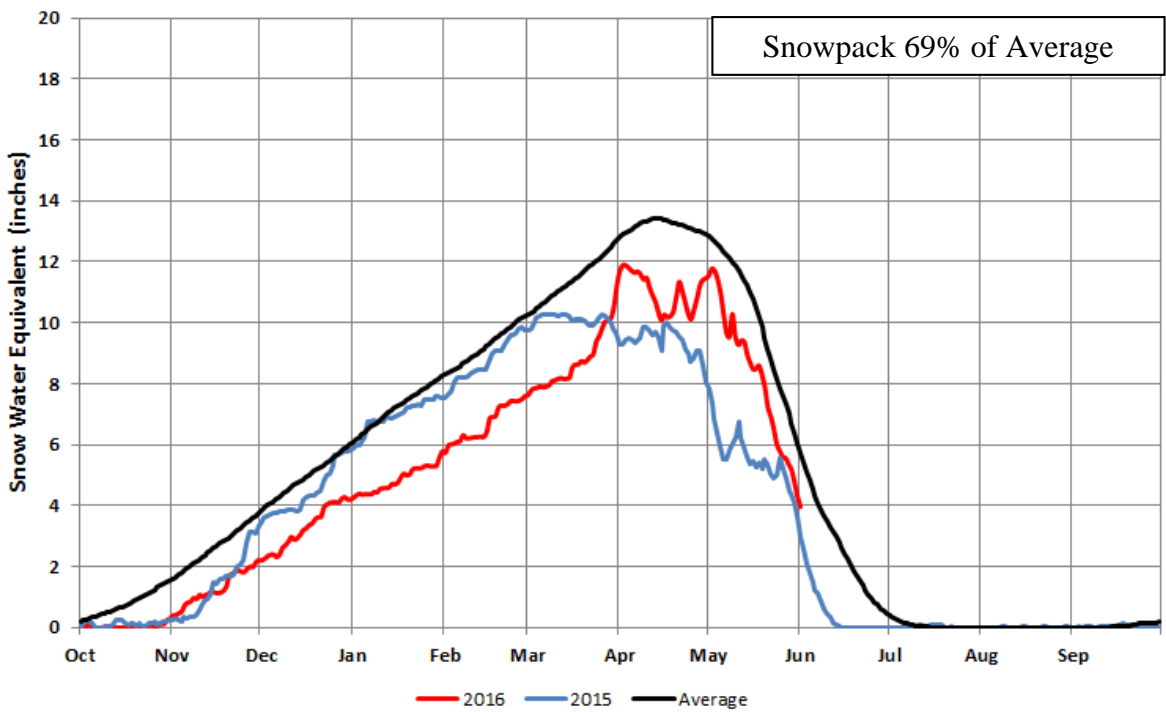
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of June 1, 2016

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	9.3	13.7	68	17.9	23.5	76
Bear Trap Meadow	8200	.0	.0	*	12.5	13.8	91
Blackwater	9780	18.4	19.6	94	30.0	27.4	109
Bone Springs Div	9350	5.0	8.6	58	17.0	22.2	77
Burroughs Creek	8750	.0	-M	*	19.6	-M	*
Castle Creek	8400	.0	-M	*	11.2	-M	*
Cold Springs	9630	.0	.0	*	18.0	15.4	117
Deer Park	9700	12.2	3.1	394	28.2	27.0	104
Evening Star	9200	13.7	17.8	77	33.1	34.9	95
Grave Springs	8550	.0	.0	*	12.1	16.2	75
Kirwin	9550	.0	1.7	0	19.6	17.0	115
Little Warm	9370	.0	.0	*	16.1	18.4	88
Marquette	8760	.0	-M	*	16.3	-M	*
Middle Powder	7760	.0	.0	*	14.7	17.4	84
Owl Creek	8975	.0	.0	*	13.3	10.7	124
Powder River Pass	9480	.0	.0	*	14.1	18.7	75
Shell Creek	9580	7.1	8.9	80	15.2	19.9	76
South Pass	9040	6.7	.2	3350*	22.5	23.6	95
St. Lawrence Alt	8620	.0	.0	*	19.7	14.5	136
Sylvan Lake	8420	.0	6.6	0	29.0	29.3	99
Sylvan Road	7120	.0	.0	*	18.8	21.3	88
Timber Creek	7950	.0	.0	*	17.9	13.6	132
Togwotee Pass	9580	15.1	19.0	79	30.5	31.0	98
Townsend Creek	8700	.0	.0	*	24.7	18.2	136
Younts Peak	8350	.0	3.2	0	17.4	20.7	84
Basin Index (%)					85*		97

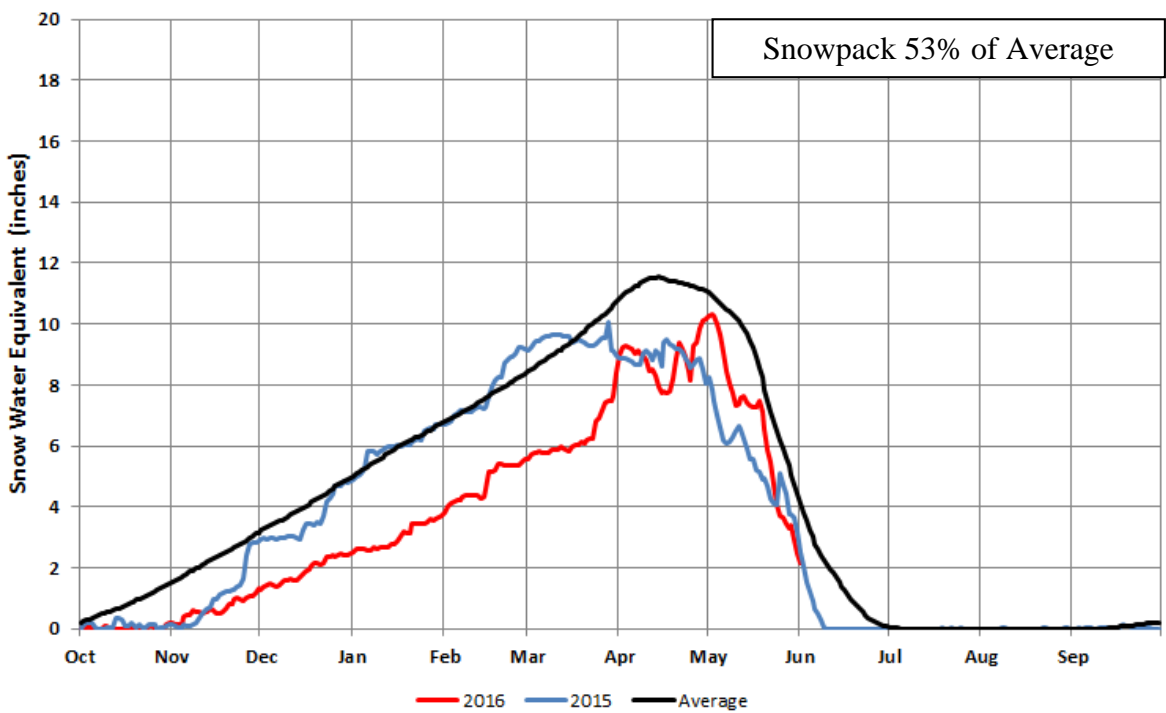
-M = Missing data

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

Snowpack above Bighorn Lake



Snowpack in Bighorn Mountains



BHXAOP V1.16 Run: 08-Jun-2016 16:44
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 865.2 kaf Elev 3624.64 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Boysen Release	kaf	250.0	93.0	93.0	71.3	61.5	59.5	61.5	61.5	55.5	67.6	59.5	72.2	1006.1
Boysen Release	cfs	4201	1513	1513	1198	1000	1000	1000	1000	999	1099	1000	1174	
Buffalo Bill Release	kaf	181.5	119.9	112.9	89.9	53.4	21.1	21.8	21.8	19.8	21.8	35.8	126.9	826.6
Buffalo Bill Release	cfs	3050	1950	1836	1511	868	355	355	355	357	355	602	2064	
Station Gain	kaf	31.3	-67.7	-50.5	3.6	51.0	51.7	33.7	38.1	44.1	62.4	39.9	62.2	299.8
Monthly Inflow	kaf	462.8	145.2	155.4	164.8	165.9	132.3	117.0	121.4	119.4	151.8	135.2	261.3	2132.5
Monthly Inflow	cfs	7778	2361	2527	2770	2698	2223	1903	1974	2150	2469	2272	4250	
Turbine Release	kaf	307.4	177.5	176.4	162.1	152.4	162.4	167.8	167.9	151.6	167.8	157.1	218.0	2168.4
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	307.4	177.5	176.4	162.1	152.4	162.4	167.8	167.9	151.6	167.8	157.1	218.0	2168.4
Total Release	cfs	5166	2887	2869	2724	2479	2729	2729	2731	2730	2729	2640	3545	
Spring Flow	kaf	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	12.5	14.9	125.8
Afterbay Rels	kaf	311.6	181.8	180.7	166.3	156.7	166.6	172.1	172.2	155.5	172.1	161.3	222.3	2219.2
Afterbay Rels	cfs	5237	2957	2939	2795	2548	2800	2799	2801	2800	2799	2711	3615	
River Release	kaf	288.8	153.7	153.7	148.8	153.7	166.6	172.1	172.2	155.5	172.1	148.8	207.4	2093.4
River Release	cfs	4853	2500	2500	2501	2500	2800	2799	2801	2800	2799	2501	3373	
Min Release	kaf	163.6	153.7	153.7	148.8	153.7	89.3	92.2	92.2	83.3	92.2	148.8	123.0	1494.5
End-Month Targets	kaf	1020.6	1020.6			1020.6					807.9		829.3	
End-Month Content	kaf	1020.6	988.3	967.3	970.0	983.5	953.4	902.6	856.1	823.9	807.9	786.0	829.3	
End-Month Elevation	ft	3640.00	3637.34	3635.51	3635.75	3636.94	3634.24	3629.03	3623.51	3619.27	3617.00	3613.65	3620.01	
Net Change Content	kaf	155.4	-32.3	-21.0	2.7	13.5	-30.1	-50.8	-46.5	-32.2	-16.0	-21.9	43.3	-35.9
Yellowtail Power	2016	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
Turbine Release	kaf	307.4	177.5	176.4	162.1	152.4	162.4	167.8	167.9	151.6	167.8	157.1	218.0	2168.4
Generation	gwh	126.833	70.102	69.323	62.884	58.648	62.810	64.495	63.741	56.018	62.756	57.663	84.942	840.215
End-Month Power Cap	mw	287.5	285.0	283.3	283.5	284.6	282.1	277.1	271.9	267.8	265.7	262.5	268.5	
% Max Gen		61	33	32	30	27	30	30	30	29	29	28	40	
Ave kwh/af		413	395	393	388	385	387	384	380	370	374	367	390	387
Upstream Generation	gwh	33.974	30.576	30.360	24.713	19.127	10.793	11.103	11.011	9.027	11.356	13.758	28.879	234.677
Total Generation	gwh	160.807	100.678	99.683	87.597	77.775	73.603	75.598	74.752	65.045	74.112	71.421	113.821	1074.892

BHXAOP V1.16 Run: 08-Jun-2016 16:45
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 865.5 kaf Elev 3624.68 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Boysen Release	kaf	166.9	73.8	67.7	50.4	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	784.3
Boysen Release	cfs	2805	1200	1101	847	825	825	825	825	825	930	825	1174	
Buffalo Bill Release	kaf	111.6	119.9	112.9	83.3	28.3	12.2	12.6	12.6	11.4	12.6	56.8	107.9	682.1
Buffalo Bill Release	cfs	1876	1950	1836	1400	460	205	205	205	205	205	955	1755	
Station Gain	kaf	-23.0	-111.3	-52.3	-6.6	46.2	48.8	31.1	35.3	40.7	59.2	20.3	10.0	98.4
Monthly Inflow	kaf	255.5	82.4	128.3	127.1	125.2	110.1	94.4	98.6	97.9	129.0	126.2	190.1	1564.8
Monthly Inflow	cfs	4294	1340	2087	2136	2036	1850	1535	1604	1763	2098	2121	3092	
Turbine Release	kaf	250.7	131.4	130.3	117.4	106.3	113.3	117.1	117.1	105.8	116.7	114.6	139.9	1560.6
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	250.7	131.4	130.3	117.4	106.3	113.3	117.1	117.1	105.8	116.7	114.6	139.9	1560.6
Total Release	cfs	4213	2137	2119	1973	1729	1904	1904	1904	1905	1898	1926	2275	
Spring Flow	kaf	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	22.8	122.5
Afterbay Rels	kaf	254.9	135.7	134.6	121.6	110.6	117.5	121.4	121.4	109.7	121.0	118.8	144.2	1611.4
Afterbay Rels	cfs	4284	2207	2189	2044	1799	1975	1974	1974	1975	1968	1997	2345	
River Release	kaf	232.1	107.6	107.6	104.1	107.6	117.5	121.4	121.4	109.7	121.0	117.5	121.4	1488.9
River Release	cfs	3901	1750	1750	1749	1750	1975	1974	1974	1975	1968	1975	1974	
Min Release	kaf	232.1	107.6	107.6	104.1	107.6	117.5	121.4	121.4	109.7	107.6	117.5	121.4	1475.5
End-Month Targets	kaf	1020.6	1020.6			1020.6					807.9			
End-Month Content	kaf	870.3	821.3	819.3	829.0	847.9	844.7	822.0	803.5	795.6	807.9	819.5	869.7	
End-Month Elevation	ft	3625.27	3618.91	3618.63	3619.97	3622.46	3622.05	3619.01	3616.34	3615.15	3617.00	3618.66	3625.20	
Net Change Content	kaf	4.8	-49.0	-2.0	9.7	18.9	-3.2	-22.7	-18.5	-7.9	12.3	11.6	50.2	4.2
Yellowtail Power	2016	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
Turbine Release	kaf	250.7	131.4	130.3	117.4	106.3	113.3	117.1	117.1	105.8	116.7	114.6	139.9	1560.6
Generation	gwh	99.854	47.228	46.725	41.353	36.891	39.807	41.136	40.884	36.072	40.778	40.047	51.628	562.403
End-Month Power Cap	mw	273.5	267.5	267.2	268.5	270.9	270.5	267.6	265.0	263.9	265.7	267.3	273.5	
% Max Gen		48	22	22	20	17	19	19	19	19	19	19	24	
Ave kwh/af		398	359	359	352	347	351	351	349	341	349	349	369	360
Upstream Generation	gwh	32.625	28.688	27.288	20.375	10.716	7.268	7.495	7.454	5.858	7.919	18.658	26.796	201.140
Total Generation	gwh	132.479	75.916	74.013	61.728	47.607	47.075	48.631	48.338	41.930	48.697	58.705	78.424	763.543

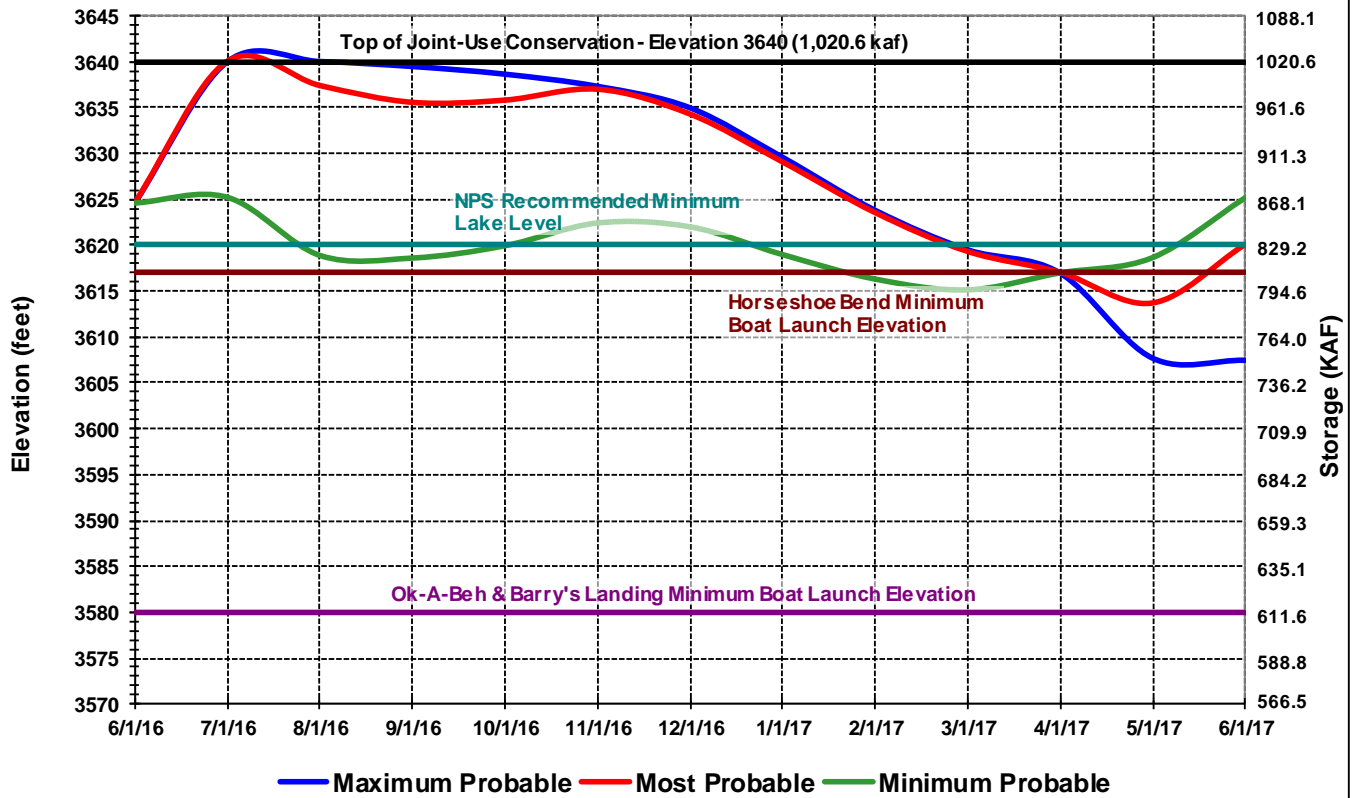
BHXAOP V1.16 Run: 08-Jun-2016 16:45
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 865.2 kaf Elev 3624.64 ft				Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Boysen Release	kaf	329.6	134.9	121.7	71.4	61.5	59.5	61.5	61.5	55.6	67.6	71.4	169.3	1265.5
Boysen Release	cfs	5539	2194	1979	1200	1000	1000	1000	1000	1001	1099	1200	2753	
Buffalo Bill Release	kaf	255.8	149.2	135.5	104.1	41.8	26.8	21.8	21.8	19.8	21.8	32.1	212.8	1043.3
Buffalo Bill Release	cfs	4299	2427	2204	1749	680	450	355	355	357	355	539	3461	
Station Gain	kaf	152.2	-47.4	-41.6	21.0	64.2	56.3	37.6	42.5	49.6	67.5	51.0	128.9	581.8
Monthly Inflow	kaf	737.6	236.7	215.6	196.5	167.5	142.6	120.9	125.8	125.0	156.9	154.5	511.0	2890.6
Monthly Inflow	cfs	12396	3850	3506	3302	2724	2396	1966	2046	2251	2552	2596	8311	
Turbine Release	kaf	357.0	236.7	222.5	206.7	183.2	169.1	174.7	174.7	157.8	174.8	211.3	368.9	2637.4
Bypass/Spill/Waste	kaf	225.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	143.4	368.6
Total Release	kaf	582.2	236.7	222.5	206.7	183.2	169.1	174.7	174.7	157.8	174.8	211.3	512.3	3006.0
Total Release	cfs	9784	3850	3619	3474	2979	2842	2841	2841	2841	2843	3551	8332	
Spring Flow	kaf	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	11.9	111.6
Afterbay Rels	kaf	586.4	241.0	226.8	210.9	187.5	173.3	179.0	179.0	161.7	179.1	215.5	516.6	3056.8
Afterbay Rels	cfs	9855	3919	3689	3544	3049	2912	2911	2911	2912	2913	3622	8402	
River Release	kaf	563.6	212.9	199.8	193.4	184.5	173.3	179.0	179.0	161.7	179.1	214.2	504.7	2945.2
River Release	cfs	9472	3462	3249	3250	3001	2912	2911	2911	2912	2913	3600	8208	
Min Release	kaf	119.0	199.8	199.8	193.4	184.5	89.3	92.2	92.2	83.3	92.2	214.2	153.7	1713.6
End-Month Targets	kaf	1020.6	1020.6	1020.6	1020.6	1020.6					807.9	755.5	749.8	
End-Month Content	kaf	1020.6	1020.6	1013.7	1003.5	987.8	961.3	907.5	858.6	825.8	807.9	751.1	749.8	
End-Month Elevation	ft	3640.00	3640.00	3639.45	3638.62	3637.30	3634.97	3629.58	3623.82	3619.53	3617.00	3607.73	3607.50	
Net Change Content	kaf	155.4	0.0	-6.9	-10.2	-15.7	-26.5	-53.8	-48.9	-32.8	-17.9	-56.8	-1.3	-115.4
Yellowtail Power	2016	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
Turbine Release	kaf	357.0	236.7	222.5	206.7	183.2	169.1	174.7	174.7	157.8	174.8	211.3	368.9	2637.4
Generation	gwh	145.800	97.095	90.721	83.511	72.681	65.941	67.656	66.784	58.755	65.795	79.771	150.660	1045.170
End-Month Power Cap	mw	287.5	287.5	287.0	286.2	285.0	282.7	277.6	272.2	268.1	265.7	256.9	256.6	
% Max Gen		70	45	42	40	34	32	32	31	30	31	38	70	
Ave kwh/af		408	410	408	404	397	390	387	382	372	376	378	408	396
Upstream Generation	gwh	33.975	35.265	33.935	27.500	15.891	12.423	11.117	11.052	9.090	11.454	13.646	34.533	249.881
Total Generation	gwh	179.775	132.360	124.656	111.011	88.572	78.364	78.773	77.836	67.845	77.249	93.417	185.193	1295.051

BIGHORN LAKE

BIGHORN LAKE ELEVATION



BIGHORN RIVER FLOW BELOW AFTERBAY

