

RECLAMATION

Managing Water in the West

May 6, 2016

Dear Customer:

Attached is the monthly water supply outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during April were 81% of average. On May 1, the NRCS measured the snow water content of the mountain snowpack in the Bighorn Basin at 92% of average. Based on the May 1 water supply forecast and the planned releases out of Boysen and Buffalo Bill Reservoirs, the May through July runoff into Bighorn Lake is expected to equal 933,100 acre-feet (97% of average). If you have any questions or concerns, please feel free to call 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
 May 1, 2016

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4717.89	612,060	114	83
Buffalo Bill	5367.35	449,340	112 *	69
Bighorn Lake	3617.11	808,675	108	79

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
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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
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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

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

Agency	Inflows	Percent of Average
USBR	933.1	97

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 May 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	18.5	22.8	81	19.5	21.9	89
Box Canyon	6670	.0	3.0	0	12.8	14.6	88
Brackett Creek	7320	17.1	20.1	85	29.3	29.2	100
Burnt Mtn Canyon	5880	.0	.0	*	13.8	15.9	87
Cole Creek	7870	5.9	10.4	57	14.2	18.0	79
Cole Creek	7850	12.0	16.6	72	15.3	16.4	93
East Boulder Mine	6335	.0	-M	*	13.3	-M	*
Evening Star	9200	24.9	24.9	100	30.7	30.4	101
Fisher Creek	9100	27.6	32.7	84	27.2	35.1	77
Monument Peak	8850	16.7	21.0	80	23.3	24.3	96
Northeast Entrance	7350	.0	3.0	0	12.2	13.8	88
Parker Peak	9400	19.8	21.3	93	22.8	20.0	114
Placer Basin	8830	14.7	17.6	84	18.6	22.2	84
Porcupine	6500	.0	.8	0	14.5	14.6	99
S Fork Shields	8100	16.0	17.8	90	26.7	24.4	109
Sacajawea	6550	6.6	10.3	64	27.6	25.7	107
Shower Falls	8100	22.3	23.9	93	28.4	27.6	103
Sylvan Lake	8420	13.1	19.8	66	35.2	25.1	140
Sylvan Road	7120	.0	5.8	0	16.4	18.6	88
Thumb Divide	7980	3.7	12.4	30	15.9	20.9	76
Two Ocean Plateau	9240	26.1	29.7	88	26.1	30.1	87
White Mill	8700	20.9	23.8	88	22.7	26.3	86
Wolverine	7650	.3	2.5	12	13.3	13.7	97
Younts Peak	8350	5.1	15.5	33	14.6	17.6	83
Basin Index (%)					76		95
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	7.0	-M	*	14.9	-M	*
Castle Creek	8400	.0	-M	*	8.9	-M	*
Cold Springs	9630	7.5	1.3	577	12.7	12.4	102
Deer Park	9700	19.5	16.0	122	22.7	23.4	97
Hobbs Park	10100	20.8	16.0	130	21.5	16.6	130
Kirwin	9550	13.0	10.4	125	16.2	13.8	117
Little Warm	9370	8.0	8.7	92	12.7	15.4	82
Owl Creek	8975	3.2	1.0	320	8.8	7.9	111
South Pass	9040	16.9	14.9	113	17.6	20.3	87
St. Lawrence Alt	8620	6.0	2.5	240	13.6	11.5	118
Togwotee Pass	9580	22.3	24.7	90	26.9	27.2	99
Townsend Creek	8700	13.0	7.5	173	18.1	14.9	121
Younts Peak	8350	5.1	15.5	33	14.6	17.6	83
Basin Index (%)					114		102
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	24.2	25.3	96	27.0	23.4	115
Evening Star	9200	24.9	24.9	100	30.7	30.4	101
Marquette	8760	8.7	-M	*	14.2	-M	*
Sylvan Lake	8420	13.1	19.8	66	35.2	25.1	140
Sylvan Road	7120	.0	5.8	0	16.4	18.6	88
Younts Peak	8350	5.1	15.5	33	14.6	17.6	83
Basin Index (%)					74		108

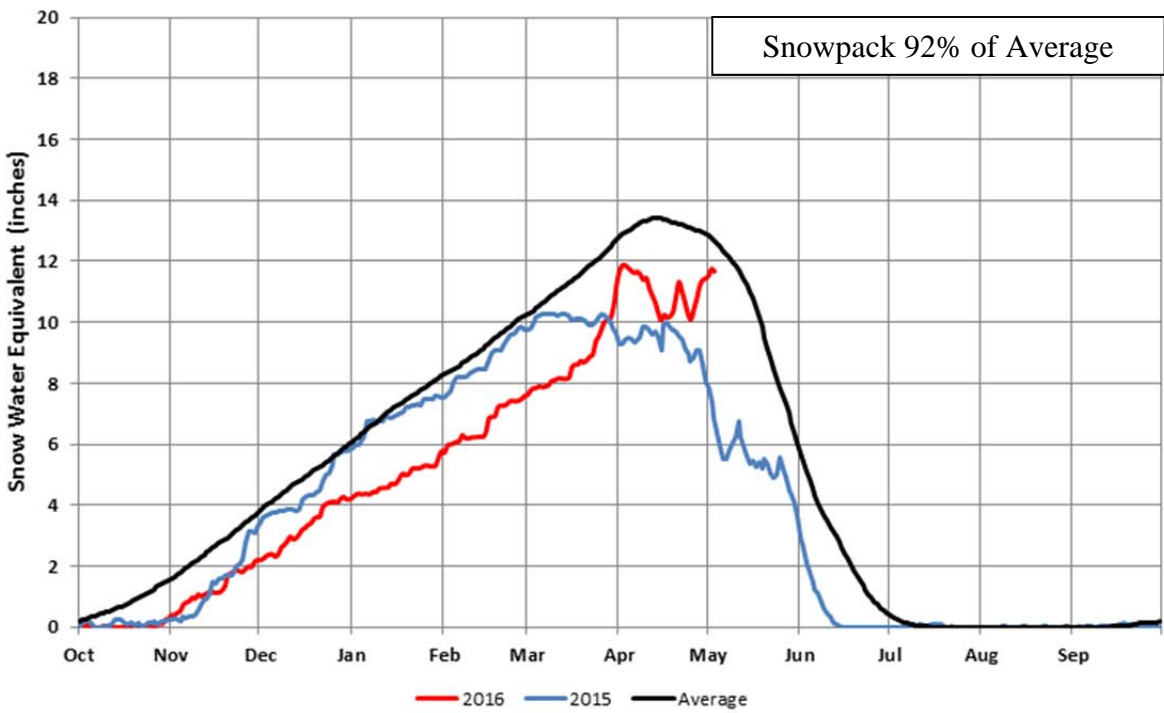
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of May 1, 2016

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	17.1	20.5	83	14.9	19.7	76
Bear Trap Meadow	8200	3.8	.9	422	9.7	10.6	92
Blackwater	9780	24.2	25.3	96	27.0	23.4	115
Bone Springs Div	9350	14.7	16.5	89	14.0	18.2	77
Burroughs Creek	8750	7.0	-M	*	14.9	-M	*
Castle Creek	8400	.0	-M	*	8.9	-M	*
Cold Springs	9630	7.5	1.3	577	12.7	12.4	102
Deer Park	9700	19.5	16.0	122	22.7	23.4	97
Evening Star	9200	24.9	24.9	100	30.7	30.4	101
Grave Springs	8550	9.4	9.4	100	10.1	12.8	79
Kirwin	9550	13.0	10.4	125	16.2	13.8	117
Little Warm	9370	8.0	8.7	92	12.7	15.4	82
Marquette	8760	8.7	-M	*	14.2	-M	*
Middle Powder	7760	13.2	11.6	114	12.0	14.1	85
Owl Creek	8975	3.2	1.0	320	8.8	7.9	111
Powder River Pass	9480	8.2	9.4	87	11.4	15.1	75
Shell Creek	9580	14.3	15.9	90	13.0	16.3	80
South Pass	9040	16.9	14.9	113	17.6	20.3	87
St. Lawrence Alt	8620	6.0	2.5	240	13.6	11.5	118
Sylvan Lake	8420	13.1	19.8	66	35.2	25.1	140
Sylvan Road	7120	.0	5.8	0	16.4	18.6	88
Timber Creek	7950	5.9	3.1	190	14.2	10.0	142
Togwotee Pass	9580	22.3	24.7	90	26.9	27.2	99
Townsend Creek	8700	13.0	7.5	173	18.1	14.9	121
Younts Peak	8350	5.1	15.5	33	14.6	17.6	83
Basin Index (%)							
				99			98

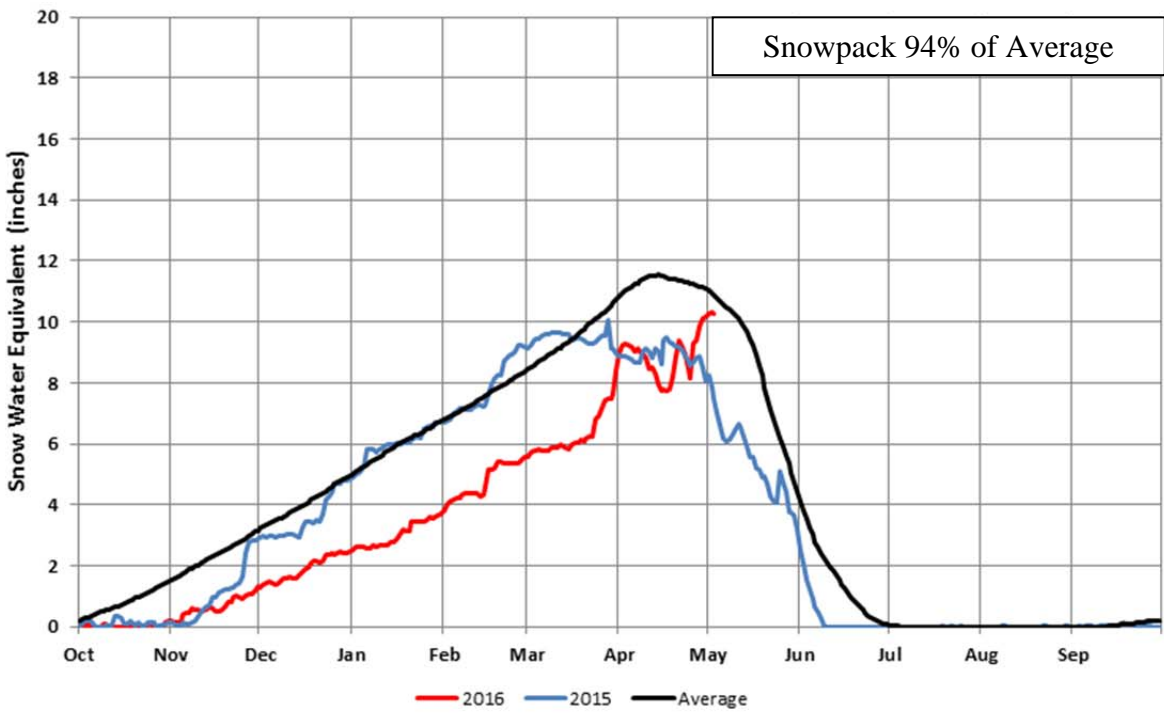
-M = Missing data

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

Snowpack above Bighorn Lake



Snowpack in Bighorn Mountains



BHXAOP V1.16 Run: 06-May-2016 13:51
Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3617.11 ft				808.7 kaf				Maximum Cont Elev 3657.00 ft				1278.9 kaf				Minimum Cont Elev 3547.00 ft				469.9 kaf		Total
2016		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr											
Boysen Release	kaf	138.6	219.0	157.9	112.5	71.3	50.7	49.1	50.7	50.7	45.8	57.2	49.1	1052.6										
Boysen Release	cfs	2254	3680	2568	1830	1198	825	825	825	825	825	930	825											
Buffalo Bill Release	kaf	111.2	114.9	141.5	116.1	105.6	53.4	21.1	21.8	21.8	19.8	21.8	49.7	798.7										
Buffalo Bill Release	cfs	1808	1931	2301	1888	1775	868	355	355	355	355	355	835											
Station Gain	kaf	68.0	46.7	-64.7	-48.0	9.7	57.7	53.7	35.4	40.0	46.5	64.6	39.9	349.5										
Monthly Inflow	kaf	317.8	380.6	234.7	180.6	186.6	161.8	123.9	107.9	112.5	112.1	143.6	138.7	2200.8										
Monthly Inflow	cfs	5169	6396	3817	2937	3136	2631	2082	1755	1830	2018	2335	2331											
Turbine Release	kaf	233.7	268.4	219.1	191.8	176.9	167.8	159.9	165.3	165.3	149.3	165.4	157.1	2220.0										
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	233.7	268.4	219.1	191.8	176.9	167.8	159.9	165.3	165.3	149.3	165.4	157.1	2220.0										
Total Release	cfs	3801	4511	3563	3119	2973	2729	2687	2688	2688	2688	2690	2640											
Spring Flow	kaf	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	50.8										
Irrigation Reqmnt	kaf	22.8	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	12.5	133.7										
Afterbay Rels	kaf	238.0	272.6	223.4	196.1	181.1	172.1	164.1	169.6	169.6	153.2	169.7	161.3	2270.8										
Afterbay Rels	cfs	3871	4581	3633	3189	3043	2799	2758	2758	2758	2759	2760	2711											
River Release	kaf	215.2	249.8	195.3	169.1	163.6	169.1	164.1	169.6	169.6	153.2	169.7	148.8	2137.1										
River Release	cfs	3500	4198	3176	2750	2749	2750	2758	2758	2758	2759	2760	2501											
Min Release	kaf	215.2	163.6	169.1	169.1	163.6	169.1	89.3	92.2	92.2	83.3	92.2	148.8	1647.7										
End-Month Content	kaf	892.8	1005.0	1020.6	1009.4	1019.1	1013.1	977.1	919.7	866.9	829.7	807.9	789.5											
End-Month Elevation	ft	3627.92	3638.74	3640.00	3639.10	3639.88	3639.40	3636.38	3630.90	3624.85	3620.06	3617.00	3614.20											
Net Change Content	kaf	84.1	112.2	15.6	-11.2	9.7	-6.0	-36.0	-57.4	-52.8	-37.2	-21.8	-18.4	-19.2										
Yellowtail Power	2016	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total										
Turbine Release	kaf	233.7	268.4	219.1	191.8	176.9	167.8	159.9	165.3	165.3	149.3	165.4	157.1	2220.0										
Generation	gwh	93.247	110.430	89.318	76.875	70.220	65.993	61.974	63.645	62.786	55.117	61.714	57.737	869.056										
End-Month Power Cap	mw	276.0	286.3	287.5	286.7	287.4	287.0	284.1	278.9	273.1	268.6	265.7	263.0											
% Max Gen		44	53	42	36	34	31	30	30	29	28	29	28											
Ave kwh/af		399	411	408	401	397	393	388	385	380	369	373	368	391										
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	93.247	110.430	89.318	76.875	70.220	65.993	61.974	63.645	62.786	55.117	61.714	57.737	869.056										

BHXAOP V1.16 Run: 06-May-2016 13:51
Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3617.11 ft				808.7 kaf				Maximum Cont Elev 3657.00 ft				1278.9 kaf				Minimum Cont Elev 3547.00 ft				469.9 kaf		Total
2016		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr											
Boysen Release	kaf	138.4	80.3	96.9	73.9	61.2	50.7	49.1	50.7	50.7	45.8	57.2	49.1					804.0						
Boysen Release	cfs	2251	1349	1576	1202	1029	825	825	825	825	825	930	825											
Buffalo Bill Release	kaf	107.9	111.6	119.9	112.9	83.3	28.3	9.2	9.5	9.5	8.7	9.5	31.7					642.0						
Buffalo Bill Release	cfs	1755	1876	1950	1836	1400	460	155	155	155	157	155	533											
Station Gain	kaf	-3.1	-23.0	-111.3	-52.3	-0.8	46.2	48.3	30.7	34.8	40.0	58.6	20.3					88.4						
Monthly Inflow	kaf	243.2	168.9	105.5	134.5	143.7	125.2	106.6	90.9	95.0	94.5	125.3	101.1					1534.4						
Monthly Inflow	cfs	3955	2838	1716	2187	2415	2036	1791	1478	1545	1702	2038	1699											
Turbine Release	kaf	187.6	137.6	140.6	139.5	126.4	115.5	116.6	120.5	120.5	108.8	120.5	101.2					1535.3						
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	187.6	137.6	140.6	139.5	126.4	115.5	116.6	120.5	120.5	108.8	120.5	101.2					1535.3						
Total Release	cfs	3051	2312	2287	2269	2124	1878	1960	1960	1960	1959	1960	1701											
Spring Flow	kaf	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2					50.8						
Irrigation Reqmnt	kaf	22.8	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3					122.5						
Afterbay Rels	kaf	191.9	141.8	144.9	143.8	130.6	119.8	120.8	124.8	124.8	112.7	124.8	105.4					1586.1						
Afterbay Rels	cfs	3121	2383	2357	2339	2195	1948	2030	2030	2030	2029	2030	1771											
River Release	kaf	169.1	119.0	116.8	116.8	113.1	116.8	120.8	124.8	124.8	112.7	124.8	104.1					1463.6						
River Release	cfs	2750	2000	1900	1900	1901	1900	2030	2030	2030	2029	2030	1749											
Min Release	kaf	169.1	119.0	116.8	116.8	113.1	116.8	89.3	92.2	92.2	83.3	92.2	104.1					1304.9						
End-Month Content	kaf	864.3	895.6	860.5	855.5	872.8	882.5	872.5	842.9	817.4	803.1	807.9	807.8											
End-Month Elevation	ft	3624.53	3628.24	3624.06	3623.43	3625.57	3626.73	3625.53	3621.82	3618.36	3616.29	3617.00	3616.98											
Net Change Content	kaf	55.6	31.3	-35.1	-5.0	17.3	9.7	-10.0	-29.6	-25.5	-14.3	4.8	-0.1					-0.9						
Yellowtail Power	2016	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr					Total						
Turbine Release	kaf	187.6	137.6	140.6	139.5	126.4	115.5	116.6	120.5	120.5	108.8	120.5	101.2					1535.3						
Generation	gwh	72.575	50.967	51.801	51.246	45.771	41.175	41.535	42.851	42.514	37.410	42.381	34.329					554.555						
End-Month Power Cap	mw	272.8	276.4	272.4	271.8	273.8	274.9	273.8	270.3	267.0	265.0	265.7	265.7											
% Max Gen		34	25	24	24	22	19	20	20	20	19	20	17											
Ave kwh/af		387	370	368	367	362	356	356	356	353	344	352	339					361						
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	72.575	50.967	51.801	51.246	45.771	41.175	41.535	42.851	42.514	37.410	42.381	34.329					554.555						

BHXAOP V1.16 Run: 06-May-2016 13:51
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 808.7 kaf Elev 3617.11 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
Boysen Release	kaf	190.1	266.7	254.8	141.8	81.8	61.5	59.5	61.5	61.5	55.6	66.7	62.2	1363.7
Boysen Release	cfs	3092	4482	4144	2306	1375	1000	1000	1000	1000	1001	1085	1045	
Buffalo Bill Release	kaf	144.9	203.9	218.7	155.6	106.5	41.8	26.7	21.8	21.8	19.8	21.8	42.7	1026.0
Buffalo Bill Release	cfs	2357	3427	3557	2531	1790	680	449	355	355	357	355	718	
Station Gain	kaf	90.0	139.5	-47.4	-41.6	21.0	69.4	57.8	38.9	43.9	51.4	69.2	51.0	543.1
Monthly Inflow	kaf	425.0	610.1	426.1	255.8	209.3	172.7	144.0	122.2	127.2	126.8	157.7	155.9	2932.8
Monthly Inflow	cfs	6912	10253	6930	4160	3517	2809	2420	1987	2069	2283	2565	2620	
Turbine Release	kaf	348.9	357.0	368.9	255.8	215.6	198.5	170.5	176.3	176.3	159.2	176.2	186.5	2789.7
Bypass/Spill/Waste	kaf	0.0	159.9	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	174.5
Total Release	kaf	348.9	516.9	383.5	255.8	215.6	198.5	170.5	176.3	176.3	159.2	176.2	186.5	2964.2
Total Release	cfs	5674	8687	6237	4160	3623	3228	2865	2867	2867	2867	2866	3134	
Spring Flow	kaf	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	4.2	50.8
Irrigation Reqmnt	kaf	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	1.3	111.6
Afterbay Rels	kaf	353.2	521.1	387.8	260.1	219.8	202.8	174.7	180.6	180.6	163.1	180.5	190.7	3015.0
Afterbay Rels	cfs	5744	8757	6307	4230	3694	3298	2936	2937	2937	2937	2936	3205	
River Release	kaf	341.3	498.3	359.7	233.1	202.3	199.8	174.7	180.6	180.6	163.1	180.5	189.4	2903.4
River Release	cfs	5551	8374	5850	3791	3400	3249	2936	2937	2937	2937	2936	3183	
Min Release	kaf	153.7	119.0	172.2	230.6	202.3	199.8	89.3	92.2	92.2	83.3	153.7	178.5	1766.8
End-Month Content	kaf	884.8	978.0	1020.6	1020.6	1014.3	988.5	962.0	907.9	858.8	826.4	807.9	777.3	
End-Month Elevation	ft	3627.00	3636.46	3640.00	3640.00	3639.50	3637.36	3635.03	3629.62	3623.85	3619.61	3617.00	3612.24	
Net Change Content	kaf	76.1	93.2	42.6	0.0	-6.3	-25.8	-26.5	-54.1	-49.1	-32.4	-18.5	-30.6	-31.4
Yellowtail Power	2016	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Turbine Release	kaf	348.9	357.0	368.9	255.8	215.6	198.5	170.5	176.3	176.3	159.2	176.2	186.5	2789.7
Generation	gwh	139.189	145.800	150.660	105.373	87.660	79.601	66.583	68.376	67.493	59.377	66.402	70.086	1106.600
End-Month Power Cap	mw	275.2	284.2	287.5	287.5	287.1	285.0	282.8	277.7	272.2	268.2	265.7	261.2	
% Max Gen		65	70	70	49	42	37	32	32	31	31	31	34	
Ave kwh/af		399	408	408	412	407	401	391	388	383	373	377	376	397
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	139.189	145.800	150.660	105.373	87.660	79.601	66.583	68.376	67.493	59.377	66.402	70.086	1106.600

BIGHORN LAKE

