

RECLAMATION

Managing Water in the West

March 7, 2016

Dear Customer:

Attached is the Monthly Water Supply Outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during February were 117 percent of average. On March 1, the Natural Resources Conservation Service (NRCS) measured the snow water content of the mountain snowpack in the Bighorn Basin at 75 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 625,700 acre-feet (56 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
 March 1, 2016

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4715.99	581,139	105	78
Buffalo Bill	5364.27	428,065	101 *	66
Bighorn Lake	3623.30	854,431	111	84

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
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Water Year 2015	Inflow	Percent of Average
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
January	52.7	132
February	64.3	130
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Water Year 2015	Gains	Percent of Average
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

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

Agency	Inflows	Percent of Average
USBR	625.7	56

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 March 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	13.5	16.7	81	14.1	15.7	90
Box Canyon	6670	6.6	7.4	89	9.4	9.9	95
Brackett Creek	7320	15.7	14.4	109	20.8	19.9	105
Burnt Mtn Canyon	5880	1.9	4.0	48	7.4	9.5	78
Cole Creek	7870	8.8	10.5	84	11.1	13.0	85
Cole Creek	7850	4.9	9.9	49	6.7	9.1	74
East Boulder Mine	6335	2.5	-M	*	8.2	-M	*
Evening Star	9200	20.5	19.1	107	23.0	22.1	104
Fisher Creek	9100	23.0	25.8	89	20.5	25.5	80
Monument Peak	8850	14.0	15.2	92	16.3	17.0	96
Northeast Entrance	7350	7.0	8.2	85	9.8	9.9	99
Parker Peak	9400	16.0	16.0	100	17.0	14.0	121
Placer Basin	8830	9.5	12.8	74	11.3	14.6	77
Porcupine	6500	3.9	5.2	75	8.3	9.1	91
Sacajawea	6550	11.1	11.9	93	19.0	17.8	107
Shower Falls	8100	13.6	15.6	87	17.3	17.6	98
S Fork Shields	8100	9.1	11.8	77	15.6	15.3	102
Sylvan Lake	8420	13.6	15.9	86	18.3	18.0	102
Sylvan Road	7120	7.5	9.4	80	12.6	13.9	91
Thumb Divide	7980	10.1	12.3	82	11.6	14.6	79
Two Ocean Plateau	9240	20.2	21.6	94	19.5	21.6	90
White Mill	8700	18.3	18.3	100	17.6	18.9	93
Wolverine	7650	9.3	8.5	109	10.0	10.0	100
Younts Peak	8350	10.5	11.7	90	10.1	12.6	80
Basin Index (%)				89			94
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	8.9	-M	*	10.8	-M	*
Castle Creek	8400	3.6	-M	*	5.2	-M	*
Cold Springs	9630	5.5	5.5	100	5.9	7.5	79
Deer Park	9700	8.9	10.8	82	9.6	15.3	63
Hobbs Park	10100	8.1	9.7	84	7.5	9.5	79
Kirwin	9550	7.1	7.0	101	8.6	8.8	98
Little Warm	9370	6.8	7.9	86	8.6	9.8	88
Owl Creek	8975	2.4	3.9	62	3.2	4.3	74
South Pass	9040	7.6	11.4	67	6.3	13.4	47
St. Lawrence Alt	8620	2.9	5.2	56	4.5	6.6	68
Togwotee Pass	9580	16.6	17.7	94	19.4	19.4	100
Townsend Creek	8700	4.9	6.5	75	5.8	8.6	67
Younts Peak	8350	10.5	11.7	90	10.1	12.6	80
Basin Index (%)				84			77
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	15.8	17.2	92	18.2	16.1	113
Evening Star	9200	20.5	19.1	107	23.0	22.1	104
Marquette	8760	2.9	-M	*	6.8	-M	*
Sylvan Lake	8420	13.6	15.9	86	18.3	18.0	102
Sylvan Road	7120	7.5	9.4	80	12.6	13.9	91
Younts Peak	8350	10.5	11.7	90	10.1	12.6	80
Basin Index (%)				93			99

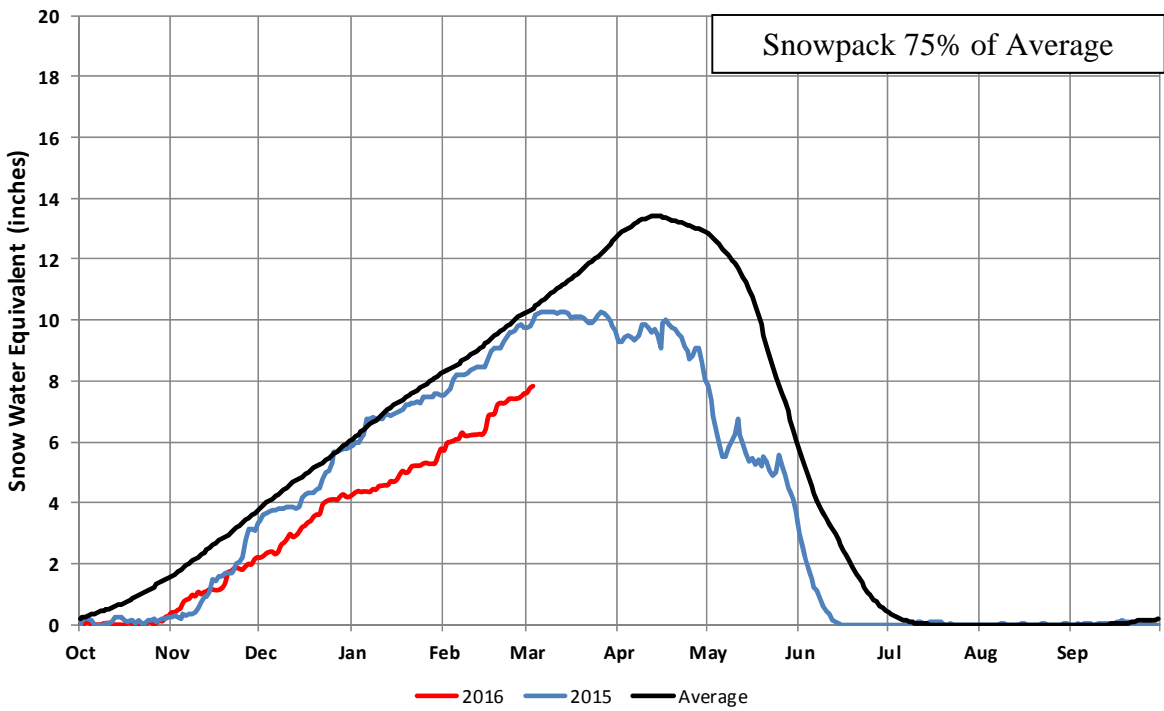
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of March 1, 2016

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	10.6	14.7	72	9.1	13.1	69
Bear Trap Meadow	8200	4.7	4.4	107	4.3	6.1	70
Blackwater	9780	15.8	17.2	92	18.2	16.1	113
Bone Springs Div	9350	9.1	12.0	76	8.0	11.7	68
Burroughs Creek	8750	8.9	-M	*	10.8	-M	*
Castle Creek	8400	3.6	-M	*	5.2	-M	*
Cold Springs	9630	5.5	5.5	100	5.9	7.5	79
Deer Park	9700	8.9	10.8	82	9.6	15.3	63
Evening Star	9200	20.5	19.1	107	23.0	22.1	104
Grave Springs	8550	4.3	6.9	62	3.6	7.9	46
Kirwin	9550	7.1	7.0	101	8.6	8.8	98
Little Warm	9370	6.8	7.9	86	8.6	9.8	88
Marquette	8760	2.9	-M	*	6.8	-M	*
Middle Powder	7760	5.8	8.0	72	3.9	8.7	45
Owl Creek	8975	2.4	3.9	62	3.2	4.3	74
Powder River Pass	9480	5.9	8.0	74	5.5	9.6	57
Shell Creek	9580	8.0	11.6	69	7.1	10.7	66
South Pass	9040	7.6	11.4	67	6.3	13.4	47
St. Lawrence Alt	8620	2.9	5.2	56	4.5	6.6	68
Sylvan Lake	8420	13.6	15.9	86	18.3	18.0	102
Sylvan Road	7120	7.5	9.4	80	12.6	13.9	91
Timber Creek	7950	3.0	3.7	81	6.9	5.3	130
Togwotee Pass	9580	16.6	17.7	94	19.4	19.4	100
Townsend Creek	8700	4.9	6.5	75	5.8	8.6	67
Younts Peak	8350	10.5	11.7	90	10.1	12.6	80
Basin Index (%)				83			

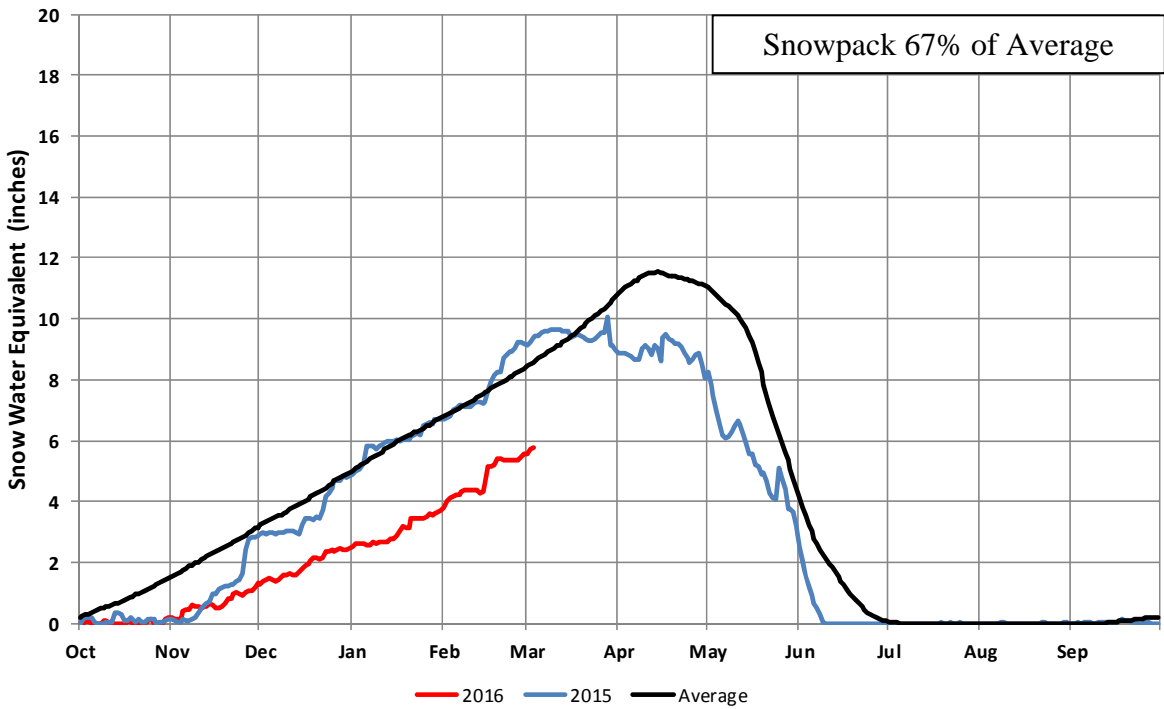
-M = Missing data

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

Snowpack above Bighorn Lake



Snowpack in Bighorn Mountains



BHXAOP V1.16 Run: 04-Mar-2016 11:31
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 854.4 kaf					Maximum Cont 1278.9 kaf				Minimum Cont 469.9 kaf				Total
	2016	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
			Elev 3623.29 ft				Elev 3657.00 ft				Elev 3547.00 ft			
Boysen Release	kaf	43.7	41.7	69.3	74.3	76.8	70.6	57.9	50.7	49.1	50.7	50.7	45.8	681.3
Boysen Release	cfs	711	701	1127	1249	1249	1148	973	825	825	825	825	825	
Buffalo Bill Release	kaf	12.6	60.1	107.1	111.2	121.6	116.1	105.6	53.4	21.1	21.8	21.8	19.8	772.2
Buffalo Bill Release	cfs	205	1010	1742	1869	1978	1888	1775	868	355	355	355	357	
Station Gain	kaf	68.5	23.5	4.6	18.9	-83.4	-50.9	2.4	49.8	50.3	32.4	36.7	42.4	195.2
Monthly Inflow	kaf	124.8	125.3	181.0	204.4	115.0	135.8	165.9	153.9	120.5	104.9	109.2	108.0	1648.7
Monthly Inflow	cfs	2030	2106	2944	3435	1870	2209	2788	2503	2025	1706	1776	1945	
Turbine Release	kaf	139.0	116.1	130.6	137.6	146.8	145.7	132.3	137.0	144.4	149.3	149.3	134.9	1663.0
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	139.0	116.1	130.6	137.6	146.8	145.7	132.3	137.0	144.4	149.3	149.3	134.9	1663.0
Total Release	cfs	2261	1951	2124	2312	2387	2370	2223	2228	2427	2428	2428	2429	
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	143.3	120.3	134.9	141.8	151.1	150.0	136.5	141.3	148.6	153.6	153.6	138.8	1713.8
Afterbay Rels	cfs	2331	2022	2194	2383	2457	2440	2294	2298	2497	2498	2498	2499	
River Release	kaf	143.3	119.0	123.0	119.0	123.0	123.0	119.0	138.3	148.6	153.6	153.6	138.8	1602.2
River Release	cfs	2331	2000	2000	2000	2000	2000	2000	2249	2497	2498	2498	2499	
Min Release	kaf	143.3	119.0	123.0	119.0	123.0	123.0	119.0	138.3	89.3	92.2	92.2	138.8	1420.1
End-Month Content	kaf	840.2	849.4	899.8	966.6	934.8	924.9	958.5	975.4	951.5	907.1	867.0	840.1	
End-Month Elevation	ft	3621.46	3622.66	3628.72	3635.45	3632.44	3631.44	3634.71	3636.23	3634.06	3629.53	3624.87	3621.45	
Net Change Content	kaf	-14.2	9.2	50.4	66.8	-31.8	-9.9	33.6	16.9	-23.9	-44.4	-40.1	-26.9	-14.3
Yellowtail Power	2016	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Turbine Release	kaf	139.0	116.1	130.6	137.6	146.8	145.7	132.3	137.0	144.4	149.3	149.3	134.9	1663.0
Generation	gwh	50.800	41.053	47.938	51.791	55.556	54.941	49.339	51.611	54.678	56.310	55.723	49.018	618.758
End-Month Power Cap	mw	269.9	271.1	276.8	283.2	280.3	279.4	282.5	283.9	281.9	277.6	273.2	269.9	
% Max Gen		24	20	22	25	26	26	24	24	26	26	26	25	
Ave kwh/af		365	354	367	376	378	377	373	377	379	377	373	363	372
Upstream Generation	gwh	6.796	18.791	26.116	26.899	29.268	29.246	26.877	18.211	9.942	10.255	10.205	8.342	220.948
Total Generation	gwh	57.596	59.844	74.054	78.690	84.824	84.187	76.216	69.822	64.620	66.565	65.928	57.360	839.706

BHXAOP V1.16 Run: 04-Mar-2016 11:32
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 854.4 kaf Elev 3623.29 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Boysen Release	kaf	43.7	41.7	67.7	71.4	73.8	67.7	44.6	36.9	29.8	30.7	30.7	27.8	566.5
Boysen Release	cfs	711	701	1101	1200	1200	1101	750	600	501	499	499	501	
Buffalo Bill Release	kaf	12.6	31.7	101.2	105.0	118.7	104.3	83.3	28.3	9.2	9.5	9.5	8.7	622.0
Buffalo Bill Release	cfs	205	533	1646	1765	1930	1696	1400	460	155	155	155	157	
Station Gain	kaf	59.9	6.2	-32.9	-30.2	-123.2	-52.3	-0.8	46.2	46.4	29.1	33.0	37.8	19.2
Monthly Inflow	kaf	116.2	79.6	136.0	146.2	69.3	119.7	127.1	111.4	85.4	69.3	73.2	74.3	1207.7
Monthly Inflow	cfs	1890	1338	2212	2457	1127	1947	2136	1812	1435	1127	1190	1338	
Turbine Release	kaf	118.7	95.3	109.1	116.8	125.3	124.2	111.5	100.2	92.5	95.7	95.7	86.4	1271.4
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	118.7	95.3	109.1	116.8	125.3	124.2	111.5	100.2	92.5	95.7	95.7	86.4	1271.4
Total Release	cfs	1930	1602	1774	1963	2038	2020	1874	1630	1555	1556	1556	1556	
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	123.0	99.5	113.4	121.0	129.6	128.5	115.7	104.5	96.7	100.0	100.0	90.3	1322.2
Afterbay Rels	cfs	2000	1672	1844	2033	2108	2090	1944	1700	1625	1626	1626	1626	
River Release	kaf	123.0	98.2	101.5	98.2	101.5	101.5	98.2	101.5	96.7	100.0	100.0	90.3	1210.6
River Release	cfs	2000	1650	1651	1650	1651	1651	1650	1651	1625	1626	1626	1626	
Min Release	kaf	123.0	98.2	101.5	98.2	101.5	101.5	98.2	101.5	89.3	92.2	92.2	83.3	1180.6
End-Month Content	kaf	851.9	836.2	863.1	892.5	836.5	832.0	847.6	858.8	851.7	825.3	802.8	790.7	
End-Month Elevation	ft	3622.98	3620.93	3624.38	3627.89	3620.97	3620.37	3622.42	3623.85	3622.95	3619.46	3616.24	3614.39	
Net Change Content	kaf	-2.5	-15.7	26.9	29.4	-56.0	-4.5	15.6	11.2	-7.1	-26.4	-22.5	-12.1	-63.7
Yellowtail Power	2016	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Turbine Release	kaf	118.7	95.3	109.1	116.8	125.3	124.2	111.5	100.2	92.5	95.7	95.7	86.4	1271.4
Generation	gwh	42.193	32.213	38.234	41.843	44.824	44.291	39.078	34.455	31.215	32.268	32.031	28.185	440.830
End-Month Power Cap	mw	271.4	269.4	272.7	276.0	269.4	268.9	270.8	272.2	271.3	268.0	265.0	263.2	
% Max Gen		20	16	18	20	21	21	19	16	15	15	15	15	
Ave kwh/af		355	338	350	358	358	357	350	344	337	337	335	326	347
Upstream Generation	gwh	6.788	11.256	25.267	25.350	27.290	24.559	18.981	8.975	4.442	4.617	4.628	3.405	165.558
Total Generation	gwh	48.981	43.469	63.501	67.193	72.114	68.850	58.059	43.430	35.657	36.885	36.659	31.590	606.388

BHXAOP V1.16 Run: 04-Mar-2016 11:32
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 854.4 kaf Elev 3623.29 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Boysen Release	kaf	50.7	70.6	118.4	126.0	140.5	141.8	81.8	61.5	59.5	61.5	61.5	55.6	1029.4
Boysen Release	cfs	825	1186	1926	2118	2285	2306	1375	1000	1000	1000	1000	1001	
Buffalo Bill Release	kaf	12.6	48.7	144.7	185.2	199.0	155.6	106.5	54.1	21.1	21.8	21.8	19.8	990.9
Buffalo Bill Release	cfs	205	818	2353	3112	3236	2531	1790	880	355	355	355	357	
Station Gain	kaf	77.2	34.9	19.6	184.0	-9.5	-40.9	21.3	69.8	58.2	39.3	44.3	51.9	550.1
Monthly Inflow	kaf	140.5	154.2	282.7	495.2	330.0	256.5	209.6	185.4	138.8	122.6	127.6	127.3	2570.4
Monthly Inflow	cfs	2285	2591	4598	8322	5367	4172	3522	3015	2333	1994	2075	2292	
Turbine Release	kaf	149.4	217.8	253.3	328.4	287.5	256.5	236.4	183.2	166.3	171.9	171.9	155.3	2577.9
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	149.4	217.8	253.3	328.4	287.5	256.5	236.4	183.2	166.3	171.9	171.9	155.3	2577.9
Total Release	cfs	2430	3660	4120	5519	4676	4172	3973	2979	2795	2796	2796	2796	
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	153.7	222.0	257.6	332.6	291.8	260.8	240.6	187.5	170.5	176.2	176.2	159.2	2628.7
Afterbay Rels	cfs	2500	3731	4189	5590	4746	4242	4043	3049	2865	2866	2866	2867	
River Release	kaf	153.7	220.7	245.7	309.8	263.7	233.8	223.1	184.5	170.5	176.2	176.2	159.2	2517.1
River Release	cfs	2500	3709	3996	5206	4289	3802	3749	3001	2865	2866	2866	2867	
Min Release	kaf	153.7	148.8	153.7	119.0	172.2	230.6	223.1	184.5	89.3	92.2	92.2	83.3	1742.6
End-Month Content	kaf	845.5	781.9	811.3	978.1	1020.6	1020.6	993.8	996.0	968.5	919.2	874.9	846.9	
End-Month Elevation	ft	3622.15	3612.99	3617.49	3636.46	3640.00	3640.00	3637.81	3638.00	3635.62	3630.84	3625.82	3622.33	
Net Change Content	kaf	-8.9	-63.6	29.4	166.8	42.5	0.0	-26.8	2.2	-27.5	-49.3	-44.3	-28.0	-7.5
Yellowtail Power	2016	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Turbine Release	kaf	149.4	217.8	253.3	328.4	287.5	256.5	236.4	183.2	166.3	171.9	171.9	155.3	2577.9
Generation	gwh	55.424	83.494	99.162	134.171	118.711	105.673	96.499	72.793	64.768	66.593	65.847	58.034	1021.169
End-Month Power Cap	mw	270.6	261.9	266.1	284.2	287.5	287.5	285.4	285.6	283.4	278.8	274.1	270.7	
% Max Gen		26	40	46	65	55	49	47	34	31	31	31	30	
Ave kwh/af		371	383	391	409	413	412	408	397	389	387	383	374	396
Upstream Generation	gwh	7.384	18.312	32.609	33.322	35.298	35.265	29.020	19.284	10.815	11.134	11.063	9.110	252.616
Total Generation	gwh	62.808	101.806	131.771	167.493	154.009	140.938	125.519	92.077	75.583	77.727	76.910	67.144	1273.785

BIGHORN LAKE

