

RECLAMATION

Managing Water in the West

April 8, 2016

Dear Customer:

Attached is the monthly water supply outlook and projected operations for Yellowtail Dam and Powerplant. Streamflows into Bighorn Lake during March were 77% of average. On April 1, the NRCS measured the snow water content of the mountain snowpack in the Bighorn Basin at 91% of average. Based on the April 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 873,000 acre-feet (78% 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
 April 1, 2016

Present Elevations & Storages:

	Elevation (feet)	Storage (acre-feet)	Percent of Average	Percent Full
Boysen	4716.30	586,063	107	79
Buffalo Bill	5364.96	432,718	103 *	67
Bighorn Lake	3620.24	831,008	109	81

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
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Water Year 2015	Inflow	Percent of Average
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
March	53.0	74
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Water Year 2015	Gains	Percent of Average
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

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

Agency	Inflows	Percent of Average
USBR	873.0	78

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 April 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	16.8	21.0	80	17.5	18.9	93
Box Canyon	6670	7.7	8.6	90	11.6	12.1	96
Brackett Creek	7320	20.7	19.0	109	25.4	24.1	105
Burnt Mtn Canyon	5880	2.8	4.4	64	10.9	12.1	90
Cole Creek	7870	10.7	12.3	87	13.1	15.5	85
Cole Creek	7850	10.8	13.5	80	11.7	12.0	98
East Boulder Mine	6335	3.6	-M	*	10.9	-M	*
Evening Star	9200	25.0	23.9	105	27.7	26.1	106
Fisher Creek	9100	28.5	30.1	95	25.7	30.4	85
Monument Peak	8850	18.5	18.8	98	21.0	20.6	102
Northeast Entrance	7350	7.6	9.6	79	11.4	11.7	97
Parker Peak	9400	20.0	18.8	106	20.3	16.9	120
Placer Basin	8830	14.9	16.6	90	16.1	18.0	89
Porcupine	6500	4.9	5.9	83	10.9	11.4	96
Sacajawea	6550	14.1	14.8	95	23.1	21.2	109
Shower Falls	8100	20.1	20.7	97	23.8	22.1	108
S Fork Shields	8100	14.1	15.3	92	21.0	19.2	109
Sylvan Lake	8420	17.6	19.2	92	22.7	21.3	107
Sylvan Road	7120	8.3	11.1	75	14.9	16.1	93
Thumb Divide	7980	14.3	14.9	96	15.0	17.8	84
Two Ocean Plateau	9240	26.3	25.6	103	24.6	26.2	94
White Mill	8700	22.7	21.6	105	21.4	22.7	94
Wolverine	7650	9.9	9.1	109	11.9	11.7	102
Younts Peak	8350	14.1	14.1	100	13.2	15.2	87
Basin Index (%)					95		98
WIND RIVER BASIN (WYOMING)							
Burroughs Creek	8750	10.9	-M	*	12.8	-M	*
Castle Creek	8400	4.6	-M	*	6.3	-M	*
Cold Springs	9630	9.3	7.1	131	9.8	9.5	103
Deer Park	9700	16.6	14.7	113	17.0	18.6	91
Hobbs Park	10100	16.2	13.4	121	15.2	12.5	122
Kirwin	9550	10.7	9.4	114	12.4	11.0	113
Little Warm	9370	9.4	10.2	92	11.2	12.3	91
Owl Creek	8975	5.1	5.5	93	5.3	5.7	93
South Pass	9040	14.5	14.9	97	12.7	16.6	77
St. Lawrence Alt	8620	7.2	6.8	106	9.2	8.5	108
Togwotee Pass	9580	21.3	21.6	99	24.1	23.3	103
Townsend Creek	8700	11.2	9.0	124	12.2	11.3	108
Younts Peak	8350	14.1	14.1	100	13.2	15.2	87
Basin Index (%)					107		98
SHOSHONE RIVER BASIN (WYOMING)							
Blackwater	9780	21.7	22.1	98	24.1	19.7	122
Evening Star	9200	25.0	23.9	105	27.7	26.1	106
Marquette	8760	7.6	-M	*	11.2	-M	*
Sylvan Lake	8420	17.6	19.2	92	22.7	21.3	107
Sylvan Road	7120	8.3	11.1	75	14.9	16.1	93
Younts Peak	8350	14.1	14.1	100	13.2	15.2	87
Basin Index (%)					96		104

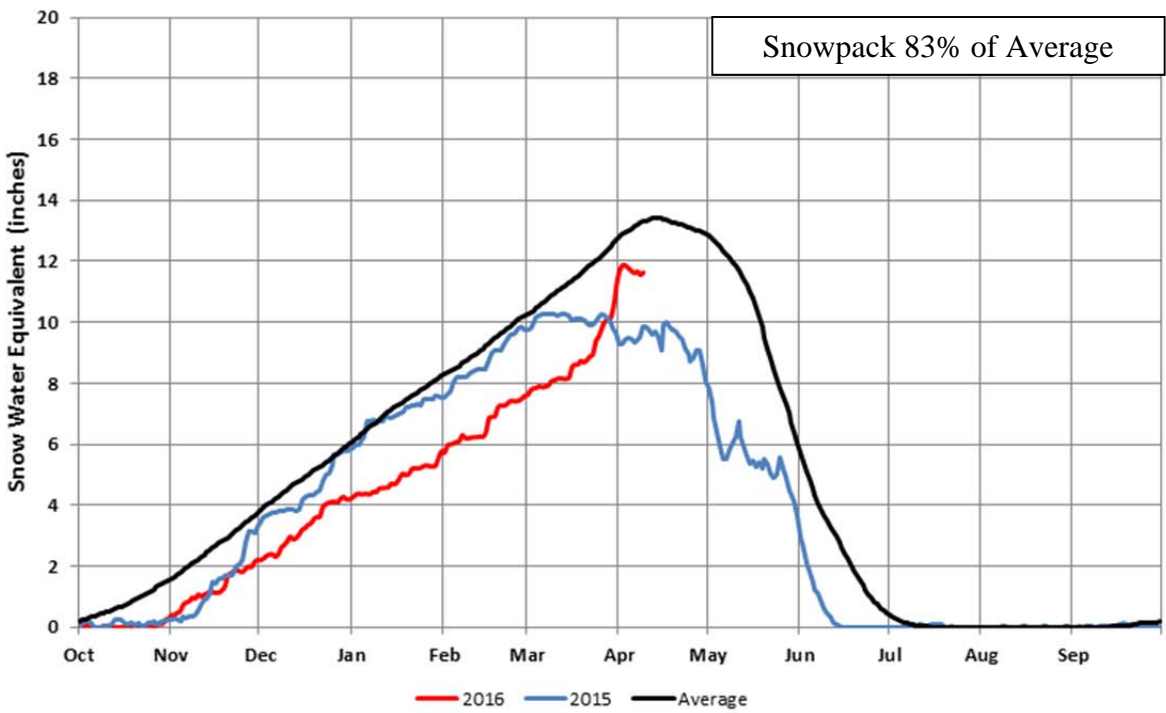
SNOW and PRECIPITATION UPDATE
Based on Mountain Data from NRCS SNOTEL Sites
As of April 1, 2016

BASIN Data Site Name	Elev.	Snow Water Equivalent			Total Precipitation		
		Current	Median	% Median	Current	Median	% Median
BIGHORN BASIN ABOVE YELLOWTAIL DAM							
Bald Mtn.	9380	14.9	18.6	80	11.9	16.3	73
Bear Trap Meadow	8200	7.4	5.1	145	6.5	8.1	80
Blackwater	9780	21.7	22.1	98	24.1	19.7	122
Bone Springs Div	9350	12.2	15.9	77	10.6	14.8	72
Burroughs Creek	8750	10.9	-M	*	12.8	-M	*
Castle Creek	8400	4.6	-M	*	6.3	-M	*
Cold Springs	9630	9.3	7.1	131	9.8	9.5	103
Deer Park	9700	16.6	14.7	113	17.0	18.6	91
Evening Star	9200	25.0	23.9	105	27.7	26.1	106
Grave Springs	8550	8.0	8.9	90	6.6	10.0	66
Kirwin	9550	10.7	9.4	114	12.4	11.0	113
Little Warm	9370	9.4	10.2	92	11.2	12.3	91
Marquette	8760	7.6	-M	*	11.2	-M	*
Middle Powder	7760	11.1	11.4	97	7.8	11.1	70
Owl Creek	8975	5.1	5.5	93	5.3	5.7	93
Powder River Pass	9480	8.1	10.0	81	8.1	12.0	68
Shell Creek	9580	11.2	14.5	77	9.8	13.2	74
South Pass	9040	14.5	14.9	97	12.7	16.6	77
St. Lawrence Alt	8620	7.2	6.8	106	9.2	8.5	108
Sylvan Lake	8420	17.6	19.2	92	22.7	21.3	107
Sylvan Road	7120	8.3	11.1	75	14.9	16.1	93
Timber Creek	7950	6.3	4.8	131	10.5	7.0	150
Togwotee Pass	9580	21.3	21.6	99	24.1	23.3	103
Townsend Creek	8700	11.2	9.0	124	12.2	11.3	108
Younts Peak	8350	14.1	14.1	100	13.2	15.2	87
Basin Index (%)							
				97			94

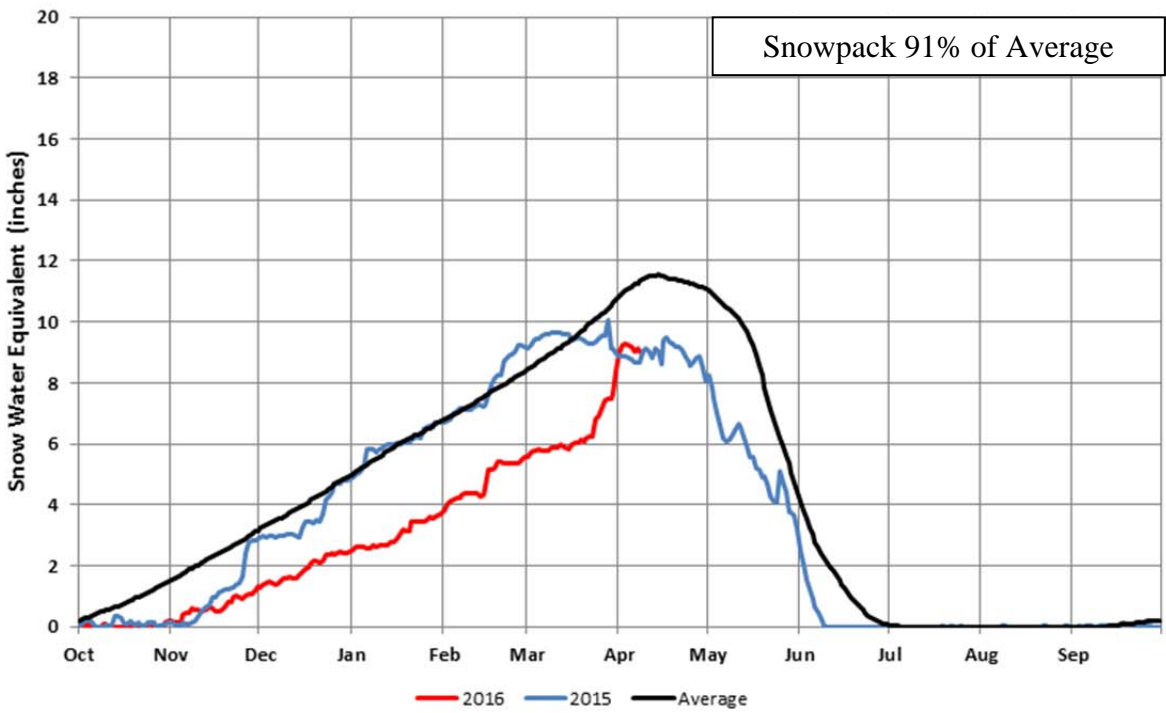
-M = Missing data

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

Snowpack above Bighorn Lake



Snowpack in Bighorn Mountains



BHXAOP V1.16 Run: 08-Apr-2016 14:09
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 831.0 kaf Elev 3620.24 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Boysen Release	kaf	49.3	88.9	130.9	135.2	101.1	84.2	50.7	49.1	50.7	50.7	45.8	57.2	893.8
Boysen Release	cfs	829	1446	2200	2199	1644	1415	825	825	825	825	825	930	
Buffalo Bill Release	kaf	47.4	110.7	125.1	136.5	116.1	105.6	53.4	21.1	21.8	21.8	19.8	21.8	801.1
Buffalo Bill Release	cfs	797	1800	2102	2220	1888	1775	868	355	355	355	357	355	
Station Gain	kaf	29.0	33.0	53.1	-66.1	-49.2	6.8	54.5	57.0	38.2	43.1	50.4	68.3	318.1
Monthly Inflow	kaf	125.7	232.6	309.1	205.6	168.0	196.6	158.6	127.2	110.7	115.6	116.0	147.3	2013.0
Monthly Inflow	cfs	2112	3783	5195	3344	2732	3304	2579	2138	1800	1880	2089	2396	
Turbine Release	kaf	148.2	172.2	170.1	192.9	191.8	176.9	167.8	162.1	167.6	167.6	151.3	167.6	2036.1
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	148.2	172.2	170.1	192.9	191.8	176.9	167.8	162.1	167.6	167.6	151.3	167.6	2036.1
Total Release	cfs	2491	2801	2859	3137	3119	2973	2729	2724	2726	2726	2724	2726	
Spring Flow	kaf	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	50.8
Irrigation Reqmnt	kaf	12.5	22.8	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	133.7
Afterbay Rels	kaf	152.4	176.5	174.3	197.2	196.1	181.1	172.1	166.3	171.9	171.9	155.2	171.9	2086.9
Afterbay Rels	cfs	2561	2870	2929	3207	3189	3043	2799	2795	2796	2796	2795	2796	
River Release	kaf	139.9	153.7	151.5	169.1	169.1	163.6	169.1	166.3	171.9	171.9	155.2	171.9	1953.2
River Release	cfs	2351	2500	2546	2750	2750	2749	2750	2795	2796	2796	2795	2796	
Min Release	kaf	119.0	153.7	148.8	169.1	169.1	163.6	169.1	89.3	92.2	92.2	83.3	92.2	1541.6
End-Month Content	kaf	808.5	868.9	1007.9	1020.6	996.8	1016.5	1007.3	972.4	915.5	863.5	828.2	807.9	
End-Month Elevation	ft	3617.08	3625.10	3638.98	3640.00	3638.06	3639.67	3638.93	3635.97	3630.45	3624.43	3619.86	3617.00	
Net Change Content	kaf	-22.5	60.4	139.0	12.7	-23.8	19.7	-9.2	-34.9	-56.9	-52.0	-35.3	-20.3	-23.1
Yellowtail Power	2016	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Turbine Release	kaf	148.2	172.2	170.1	192.9	191.8	176.9	167.8	162.1	167.6	167.6	151.3	167.6	2036.1
Generation	gwh	54.265	65.873	66.982	77.526	76.699	70.188	65.925	62.914	64.610	63.742	55.963	62.669	787.356
End-Month Power Cap	mw	265.7	273.4	286.6	287.5	285.7	287.2	286.5	283.7	278.5	272.7	268.4	265.7	
% Max Gen		26	31	32	36	36	34	31	30	30	30	29	29	
Ave kwh/af		366	383	394	402	400	397	393	388	386	380	370	374	387
Upstream Generation	gwh	16.148	28.724	33.770	35.257	32.063	29.206	18.205	9.937	10.249	10.199	8.336	10.681	242.775
Total Generation	gwh	70.413	94.597	100.752	112.783	108.762	99.394	84.130	72.851	74.859	73.941	64.299	73.350	1030.131

BHXAOP V1.16 Run: 08-Apr-2016 14:09
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3620.24 ft					Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
2016		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar		
Boysen Release	kaf	41.7	67.7	71.4	73.8	67.7	44.6	36.9	29.8	30.7	30.7	27.8	43.7	566.5	
Boysen Release	cfs	701	1101	1200	1200	1101	750	600	501	499	499	501	711		
Buffalo Bill Release	kaf	31.7	101.2	105.0	118.7	104.3	83.3	28.3	9.2	9.5	9.5	8.7	12.6	622.0	
Buffalo Bill Release	cfs	533	1646	1765	1930	1696	1400	460	155	155	155	157	205		
Station Gain	kaf	12.0	-3.1	-23.0	-111.3	-52.3	-0.8	46.2	49.9	32.1	36.4	42.0	60.4	88.5	
Monthly Inflow	kaf	85.4	165.8	153.4	81.2	119.7	127.1	111.4	88.9	72.3	76.6	78.5	116.7	1277.0	
Monthly Inflow	cfs	1435	2696	2578	1321	1947	2136	1812	1494	1176	1246	1413	1898		
Turbine Release	kaf	125.0	115.2	116.8	125.3	124.2	111.5	100.2	95.7	98.9	99.0	89.4	98.9	1300.1	
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	125.0	115.2	116.8	125.3	124.2	111.5	100.2	95.7	98.9	99.0	89.4	98.9	1300.1	
Total Release	cfs	2101	1874	1963	2038	2020	1874	1630	1608	1608	1610	1610	1608		
Spring Flow	kaf	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	50.8	
Irrigation Reqmnt	kaf	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	111.6	
Afterbay Rels	kaf	129.2	119.5	121.0	129.6	128.5	115.7	104.5	99.9	103.2	103.3	93.3	103.2	1350.9	
Afterbay Rels	cfs	2171	1943	2033	2108	2090	1944	1700	1679	1678	1680	1680	1678		
River Release	kaf	127.9	107.6	98.2	101.5	101.5	98.2	101.5	99.9	103.2	103.3	93.3	103.2	1239.3	
River Release	cfs	2149	1750	1650	1651	1651	1650	1651	1679	1678	1680	1680	1678		
Min Release	kaf	127.9	107.6	98.2	101.5	101.5	98.2	101.5	89.3	92.2	92.2	83.3	92.2	1185.6	
End-Month Content	kaf	791.4	842.0	878.6	834.5	830.0	845.6	856.8	850.0	823.4	801.0	790.1	807.9		
End-Month Elevation	ft	3614.50	3621.70	3626.27	3620.71	3620.10	3622.17	3623.60	3622.73	3619.20	3615.97	3614.30	3617.00		
Net Change Content	kaf	-39.6	50.6	36.6	-44.1	-4.5	15.6	11.2	-6.8	-26.6	-22.4	-10.9	17.8	-23.1	
Yellowtail Power	2016	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total	
Turbine Release	kaf	125.0	115.2	116.8	125.3	124.2	111.5	100.2	95.7	98.9	99.0	89.4	98.9	1300.1	
Generation	gwh	44.035	40.581	41.690	44.797	44.264	39.056	34.436	32.510	33.558	33.351	29.366	33.389	451.033	
End-Month Power Cap	mw	263.3	270.1	274.5	269.2	268.6	270.6	271.9	271.1	267.8	264.7	263.1	265.7		
% Max Gen		21	19	20	21	21	19	16	16	16	16	15	16		
Ave kwh/af		352	352	357	358	356	350	344	340	339	337	328	338	347	
Upstream Generation	gwh	11.256	25.267	25.350	27.290	24.559	18.981	8.975	4.442	4.617	4.628	3.405	-2.000	156.770	
Total Generation	gwh	55.291	65.848	67.040	72.087	68.823	58.037	43.411	36.952	38.175	37.979	32.771	31.389	607.803	

BHXAOP V1.16 Run: 08-Apr-2016 14:09
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir	Initial Cont 831.0 kaf Elev 3620.24 ft					Maximum Cont 1278.9 kaf Elev 3657.00 ft				Minimum Cont 469.9 kaf Elev 3547.00 ft				Total
	2016	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Boysen Release	kaf	70.6	118.4	126.0	140.5	141.8	81.8	61.5	59.5	61.5	61.5	55.6	50.7	1029.4
Boysen Release	cfs	1186	1926	2118	2285	2306	1375	1000	1000	1000	1000	1001	825	
Buffalo Bill Release	kaf	48.7	144.7	185.2	199.0	155.6	106.5	54.1	21.1	21.8	21.8	19.8	12.6	990.9
Buffalo Bill Release	cfs	818	2353	3112	3236	2531	1790	880	355	355	355	357	205	
Station Gain	kaf	39.6	50.1	210.3	-28.8	-38.9	24.3	72.6	65.5	45.8	51.2	60.6	77.9	630.2
Monthly Inflow	kaf	158.9	313.2	521.5	310.7	258.5	212.6	188.2	146.1	129.1	134.5	136.0	141.2	2650.5
Monthly Inflow	cfs	2670	5094	8764	5053	4204	3573	3061	2455	2100	2187	2449	2296	
Turbine Release	kaf	205.4	291.8	349.4	268.1	258.5	215.6	198.5	176.1	182.0	181.9	164.3	182.0	2673.6
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	205.4	291.8	349.4	268.1	258.5	215.6	198.5	176.1	182.0	181.9	164.3	182.0	2673.6
Total Release	cfs	3452	4746	5872	4360	4204	3623	3228	2959	2960	2958	2958	2960	
Spring Flow	kaf	4.2	4.3	4.2	4.3	4.3	4.2	4.3	4.2	4.3	4.3	3.9	4.3	50.8
Irrigation Reqmnt	kaf	1.3	11.9	22.8	28.1	27.0	17.5	3.0	0.0	0.0	0.0	0.0	0.0	111.6
Afterbay Rels	kaf	209.6	296.1	353.6	272.4	262.8	219.8	202.8	180.3	186.3	186.2	168.2	186.3	2724.4
Afterbay Rels	cfs	3522	4816	5942	4430	4274	3694	3298	3030	3030	3028	3029	3030	
River Release	kaf	208.3	284.2	330.8	244.3	235.8	202.3	199.8	180.3	186.3	186.2	168.2	186.3	2612.8
River Release	cfs	3501	4622	5559	3973	3835	3400	3249	3030	3030	3028	3029	3030	
Min Release	kaf	208.3	153.7	119.0	172.2	230.6	202.3	199.8	89.3	92.2	92.2	83.3	153.7	1796.6
End-Month Content	kaf	784.5	805.9	978.0	1020.6	1020.6	1017.6	1007.3	977.3	924.4	877.0	848.7	807.9	
End-Month Elevation	ft	3613.41	3616.70	3636.46	3640.00	3640.00	3639.76	3638.93	3636.40	3631.39	3626.08	3622.57	3617.00	
Net Change Content	kaf	-46.5	21.4	172.1	42.6	0.0	-3.0	-10.3	-30.0	-52.9	-47.4	-28.3	-40.8	-23.1
Yellowtail Power	2016	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Turbine Release	kaf	205.4	291.8	349.4	268.1	258.5	215.6	198.5	176.1	182.0	181.9	164.3	182.0	2673.6
Generation	gwh	78.340	114.337	142.351	110.609	106.529	87.710	79.876	69.323	71.199	70.312	62.022	68.915	1061.523
End-Month Power Cap	mw	262.3	265.4	284.2	287.5	287.5	287.3	286.5	284.1	279.3	274.3	271.0	265.7	
% Max Gen		38	53	69	52	50	42	37	33	33	33	32	32	
Ave kwh/af		381	392	407	413	412	407	402	394	391	387	377	379	397
Upstream Generation	gwh	18.312	32.609	33.322	35.298	35.265	29.020	19.284	10.815	11.134	11.063	9.110	-2.000	243.232
Total Generation	gwh	96.652	146.946	175.673	145.907	141.794	116.730	99.160	80.138	82.333	81.375	71.132	66.915	1304.755

BIGHORN LAKE

