

# RECLAMATION

## *Managing Water in the West*

November 15, 2010

Dear Customer:

Attached are the monthly water supply outlook and projected reservoir and river operating plans prepared in November. Based on current hydrologic and climatic conditions and the planned releases out of Boysen and Buffalo Bill Reservoirs, the November runoff into Bighorn Lake is estimated to be about 125.2 acre-feet (82% of average). If you have any questions or concerns, please feel free to call me at (406) 247-7318.

Tim H. Felchle  
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  
 November 1, 2010

**Present Elevations & Storages:**

<u>Reservoir</u>	<u>Elevation</u>	<u>Storage</u>	<u>Percent of Normal</u>
Boysen	4718.78	627,113	105
Buffalo Bill	5368.51	457,581	110
Bighorn Lake	3627.72	938,169	93

**Actual Inflows (1,000 Acre-Feet):**

<u>Month</u>	<u>Inflow</u>	<u>Percent of Normal</u>
October	180.7	99
November	141.4	92
December	111.8	81
January	134.4	101
February	120.8	89
March	137.7	81
April	121.4	74
May	340.9	138
June	761.3	184
July	280.8	97
August	122.7	77
September	119.6	70
<i>April-July, 2010</i>	<i>1,504.4</i>	<i>135</i>
<i>WY-2010 Total</i>	<i>2,573.5</i>	<i>109</i>
October	122.2	67

**Actual Gains Between Boysen and Buffalo Bill to Yellowtail (1,000 Acre-Feet):**

<u>Month</u>	<u>Gains</u>	<u>Percent of Normal</u>
October	69.0	97
November	61.1	98
December	34.2	79
January	56.9	123
February	53.8	101
March	66.0	89
April	28.3	81
May	47.5	79
June	228.3	215
July	-50.8	---
August	-71.7	---
September	-9.7	---
<i>April-July, 2010</i>	<i>254.2</i>	<i>163</i>
<i>WY-2010 Total</i>	<i>513.9</i>	<i>107</i>
October	28.7	40

**November 1 Runoff Forecast (November Flows - 1,000 Acre-Feet):**

<u>Agency</u>	<u>Inflows</u>	<u>Percent of Normal</u>
<b>USBR</b>	<b>125.2</b>	<b>82</b>

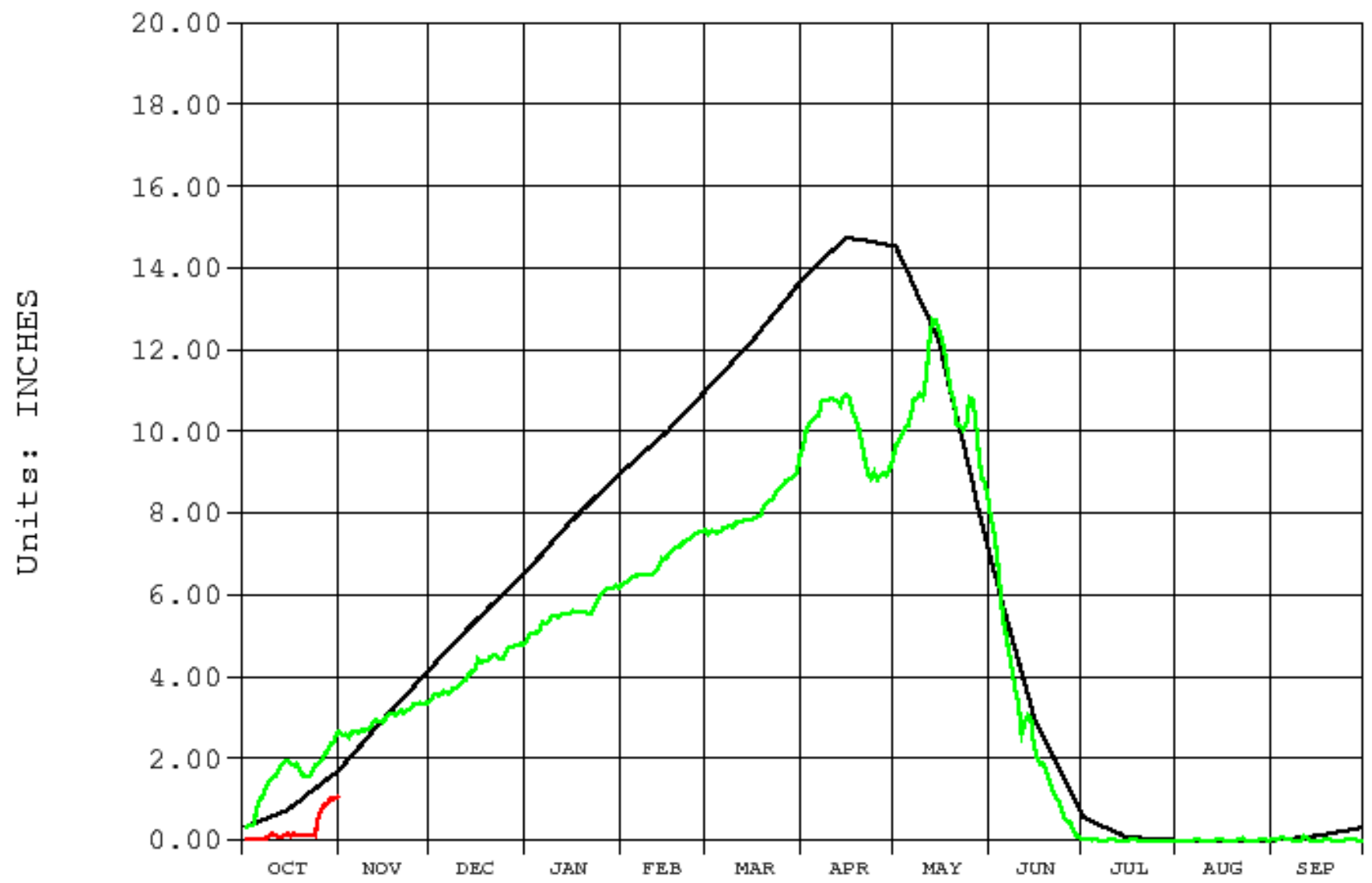
**Snowpack Conditions:**

S N O W - P R E C I P I T A T I O N    U P D A T E  
 Based on Mountain Data from NRCS SNOTEL Sites  
 As of MONDAY: NOVEMBER 1 , 2010

<u>BASIN</u> Data Site Name	<u>ELEV.</u> (Ft)	<u>SNOW WATER EQUIVALENT</u>			<u>TOTAL PRECIPITATION</u>		
		Current	Average	Avg %	Current	Average	Avg %
-----							
UPPER YELLOWSTONE RIVER BASIN							
BEARTOOTH LAKE	9360	2.1	2.7	78	2.5	2.2	114
BOX CANYON	6670	.0	.4	0*	2.2	1.7	129
BRACKETT CREEK	7320	2.9	1.2	242*	5.2	2.9	179

BURNT MTN	5880	.0	.2	0*	1.3	3.2	41
CANYON	7870	.3	.7	43*	1.8	1.9	95
COLE CREEK	7850	.0	2.9	0	1.3	3.4	38
EAST BOULDER MINE	6335	.0	-M	*	1.3	-M	*
EVENING STAR	9200	2.5	2.8	89*	3.4	2.9	117
FISHER CREEK	9100	2.2	2.8	79*	3.3	3.4	97
MONUMENT PEAK	8850	2.3	2.2	105*	3.1	2.6	119
NORTHEAST ENTRANCE	7350	.0	.3	0*	2.1	1.6	131
PARKER PEAK	9400	1.5	2.6	58	2.7	2.4	113
PLACER BASIN	8830	2.0	2.5	80	2.7	3.1	87
PORCUPINE	6500	.3	.2	150*	2.0	2.0	100
SACAJAWEA	6550	2.7	.4	675*	5.5	2.6	212
SHOWER FALLS	8100	1.9	2.7	70*	3.2	3.7	86
S FORK SHIELDS	8100	2.4	1.7	141*	4.2	2.9	145
SYLVAN LAKE	8420	1.0	2.0	50*	2.7	2.7	100
SYLVAN ROAD	7120	.0	.5	0*	2.3	2.2	105
THUMB DIVIDE	7980	1.3	.9	144*	2.3	2.1	110
TWO OCEAN PLATEAU	9240	3.9	3.2	122	3.5	3.2	109
WHITE MILL	8700	1.7	2.1	81*	2.9	2.8	104
WOLVERINE	7650	.0	.5	0*	1.7	1.9	89
YOUNTS PEAK	8350	1.4	1.4	100*	2.1	1.9	111
Basin wide percent of average				88*			108
WIND RIVER BASIN (WYOMING)							
BURROUGHS CREEK	8750	1.7	1.0	170*	2.0	1.7	118
CASTLE CREEK	8400	.3	-M	*	.9	-M	*
COLD SPRINGS	9630	.6	1.1	55	1.0	2.0	50
DEER PARK	9700	1.8	2.7	67	2.4	2.6	92
HOBBS PARK	10100	1.0	2.3	43	1.2	2.2	55
KIRWIN	9550	1.3	1.9	68	1.7	1.9	89
LITTLE WARM	9370	1.2	1.1	109*	1.2	1.8	67
OWL CREEK	8975	.0	.9	0	.6	1.2	50
SOUTH PASS	9040	.9	1.6	56*	1.8	2.2	82
ST. LAWRENCE ALT	8620	.0	.9	0	.6	1.8	33
TOGWOTEE PASS	9580	3.5	2.7	130*	4.2	2.9	145
TOWNSEND CREEK	8700	.0	1.1	0	1.8	2.2	82
YOUNTS PEAK	8350	1.4	1.4	100*	2.1	1.9	111
Basin wide percent of average				72			84
SHOSHONE RIVER BASIN (WYOMING)							
BLACKWATER	9780	2.7	3.2	84	2.8	2.8	100
EVENING STAR	9200	2.5	2.8	89*	3.4	2.9	117
MARQUETTE	8760	.0	2.0	0	.8	2.4	33
SYLVAN LAKE	8420	1.0	2.0	50*	2.7	2.7	100
SYLVAN ROAD	7120	.0	.5	0*	2.3	2.2	105
YOUNTS PEAK	8350	1.4	1.4	100*	2.1	1.9	111
Basin wide percent of average				64*			95
BIGHORN RIVER BASIN (WYOMING)							
BALD MTN.	9380	2.6	2.8	93	3.0	2.5	120
BEAR TRAP MEADOW	8200	.5	.6	83	1.9	1.8	106
BLACKWATER	9780	2.7	3.2	84	2.8	2.8	100
BONE SPRINGS DIV	9350	1.6	2.7	59	1.5	2.6	58
EVENING STAR	9200	2.5	2.8	89*	3.4	2.9	117
GRAVE SPRINGS	8550	.7	1.2	58	1.1	2.2	50
KIRWIN	9550	1.3	1.9	68	1.7	1.9	89
MARQUETTE	8760	.0	2.0	0	.8	2.4	33
MIDDLE POWDER	7760	.6	1.3	46*	1.0	2.7	37
OWL CREEK	8975	.0	.9	0	.6	1.2	50
POWDER RIVER PASS	9480	2.1	1.3	162	2.9	2.0	145
SHELL CREEK	9580	2.1	2.7	78	1.9	2.1	90
SYLVAN LAKE	8420	1.0	2.0	50*	2.7	2.7	100
SYLVAN ROAD	7120	.0	.5	0*	2.3	2.2	105
TIMBER CREEK	7950	.0	1.1	0	.5	1.7	29
YOUNTS PEAK	8350	1.4	1.4	100*	2.1	1.9	111
Basin wide percent of average				67			85

Archive Data From 1-OCT Through 30-SEP  
 Plotted 11/01/2010 14:12



BHR Bighorn Lake (Yellowtail), Bighorn River near Fort Smith, MT  
 SE\_AVG Snow Water Equivalent Average (inches) 2011  
 SE Snow Water Equivalent (inches) 2011 2010

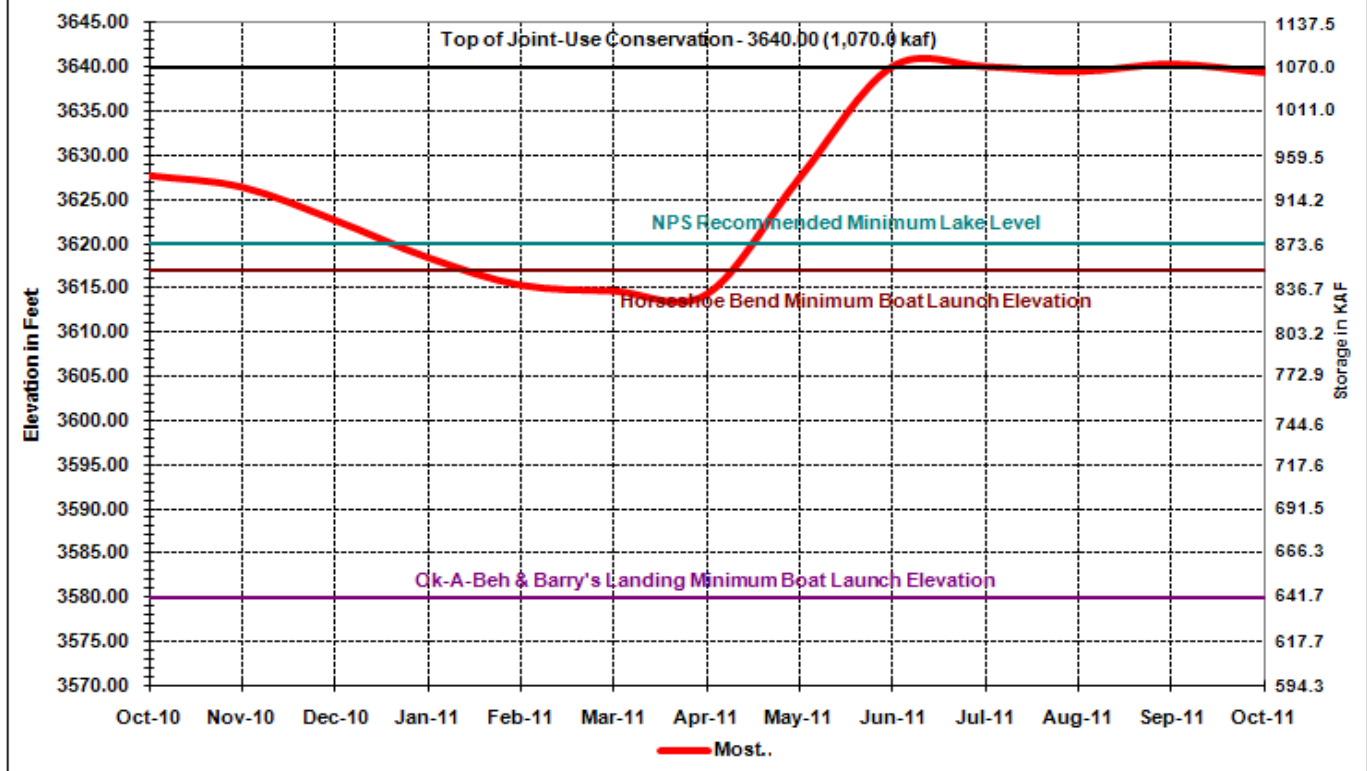
BHXAOP V1.12 Run: 09-Nov-2010 14:35  
 Based on Most Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

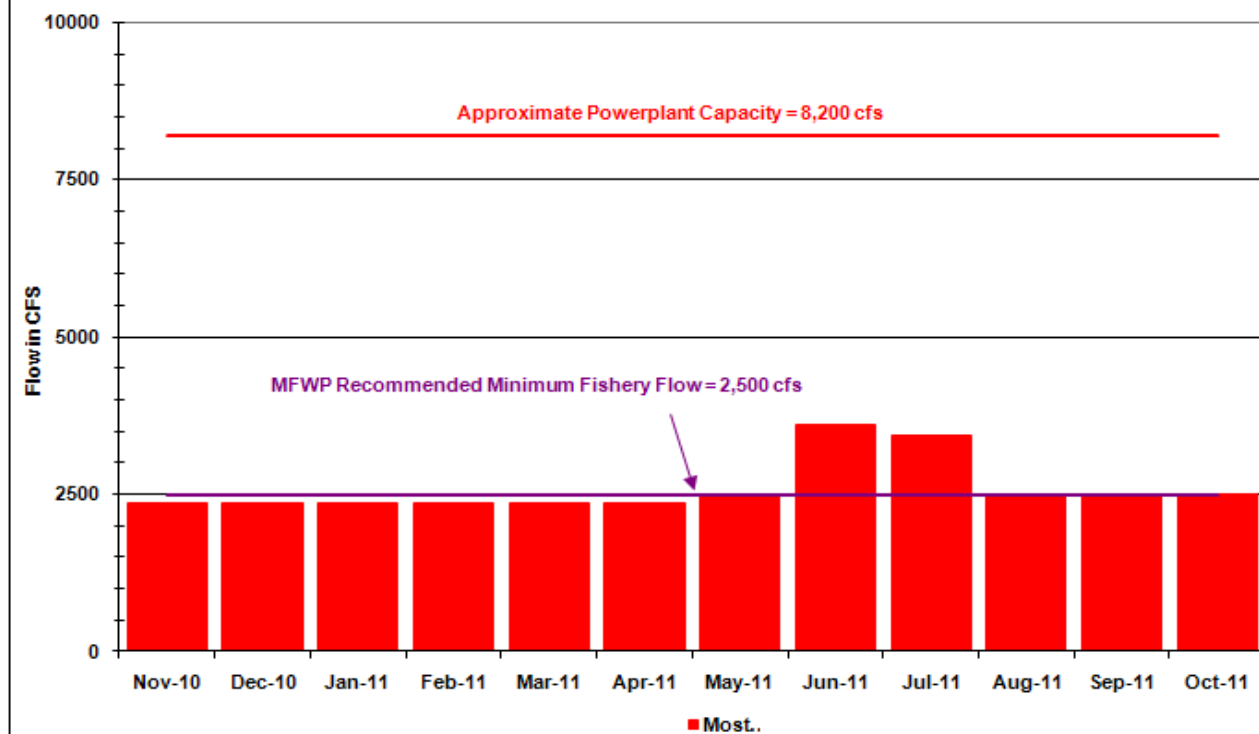
Bighorn Reservoir		Initial Cont 938.2 kaf Elev 3627.72 ft				Maximum Cont 1328.4 kaf Elev 3657.00 ft				Minimum Cont 493.6 kaf Elev 3547.00 ft				Total
	2010	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Boysen Release	kaf	47.6	49.2	49.2	44.4	49.2	74.4	130.9	132.3	120.2	96.9	59.5	49.2	903.0
Boysen Release	cfs	800	800	800	799	800	1250	2129	2223	1955	1576	1000	800	
Buffalo Bill Riv Flo	kaf	21.1	21.8	21.8	19.7	21.8	31.7	108.9	164.7	174.8	122.2	98.8	40.0	847.3
Buffalo Bill Riv Flo	cfs	355	355	355	355	355	533	1771	2768	2843	1987	1660	651	
Station Gain	kaf	56.5	38.7	37.6	40.9	65.8	28.6	38.0	74.5	-60.8	-49.8	15.7	48.3	334.0
Monthly Inflow	kaf	125.2	109.7	108.6	105.0	136.8	134.7	277.8	371.5	234.2	169.3	174.0	137.5	2084.3
Monthly Inflow	cfs	2104	1784	1766	1891	2225	2264	4518	6243	3809	2753	2924	2236	
Turbine Release	kaf	136.8	141.4	141.4	127.7	141.4	137.4	174.0	237.4	234.2	176.2	163.4	149.4	1960.7
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	136.8	141.4	141.4	127.7	141.4	137.4	174.0	237.4	234.2	176.2	163.4	149.4	1960.7
Total Release	cfs	2299	2300	2300	2299	2300	2309	2830	3990	3809	2866	2746	2430	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.6	24.6	26.8	27.7	26.8	18.8	0.0	125.3
Afterbay Rels	kaf	141.0	145.7	145.7	131.6	145.7	141.6	178.3	241.6	238.5	180.5	167.6	153.7	2011.5
Afterbay Rels	cfs	2370	2370	2370	2370	2370	2380	2900	4060	3879	2936	2817	2500	
River Release	kaf	141.0	145.7	145.7	131.6	145.7	141.0	153.7	214.8	210.8	153.7	148.8	153.7	1886.2
River Release	cfs	2370	2370	2370	2370	2370	2370	2500	3610	3428	2500	2501	2500	
Min Release	kaf	141.0	145.7	145.7	131.6	145.7	141.0	153.7	148.8	153.7	153.7	148.8	153.7	1763.1
End-Month Targets	kaf					858.5			1070.0	1070.0				1070.0
End-Month Content	kaf	926.6	894.9	862.1	839.4	834.8	832.1	935.9	1070.0	1070.0	1063.1	1073.7	1061.8	
End-Month Elevation	ft	3626.43	3622.69	3618.49	3615.38	3614.73	3614.35	3627.47	3640.00	3640.00	3639.44	3640.29	3639.34	
Net Change Content	kaf	-11.6	-31.7	-32.8	-22.7	-4.6	-2.7	103.8	134.1	0.0	-6.9	10.6	-11.9	123.6
Yellowtail Power	2010	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	136.8	141.4	141.4	127.7	141.4	137.4	174.0	237.4	234.2	176.2	163.4	149.4	1960.7
Generation	gwh	53.729	55.129	54.511	48.738	53.694	52.104	67.210	95.391	96.028	72.174	66.967	61.218	776.893
End-Month Power Cap	mw	274.2	270.7	266.8	263.9	263.3	263.0	275.2	287.5	287.5	287.0	287.8	286.8	
% Max Gen		26	26	25	25	25	25	31	46	45	34	32	29	
Ave kwh/af		393	390	386	382	380	379	386	402	410	410	410	410	396
Upstream Generation	gwh	9.701	10.023	9.983	8.419	9.921	13.714	32.052	33.835	34.182	32.064	25.839	14.452	234.185
Total Generation	gwh	63.430	65.152	64.494	57.157	63.615	65.818	99.262	129.226	130.210	104.238	92.806	75.670	1011.078

# BIGHORN LAKE

## BIGHORN LAKE ELEVATION



## BIGHORN RIVER FLOW BELOW AFTERBAY



# WATER YEAR 2011

# **Supplemental Information**

BHXAOP V1.12 Run: 10-Nov-2010 07:36  
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3627.72 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total	
		2010	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	47.6	49.2	49.2	44.5	49.2	47.6	67.6	69.9	76.9	69.2	59.5	46.1	676.5	
Boysen Release	cfs	800	800	800	801	800	800	1099	1175	1251	1125	1000	750		
Buffalo Bill Riv Flo	kaf	21.1	21.8	21.8	19.7	21.8	31.7	101.2	105.0	118.7	104.3	82.3	26.7	676.1	
Buffalo Bill Riv Flo	cfs	355	355	355	355	355	533	1646	1765	1930	1696	1383	434		
Station Gain	kaf	51.1	33.3	32.2	35.5	60.2	21.4	17.5	-3.4	-99.3	-70.0	5.1	38.4	122.0	
Monthly Inflow	kaf	119.8	104.3	103.2	99.7	131.2	100.7	186.3	171.5	96.3	103.5	146.9	111.2	1474.6	
Monthly Inflow	cfs	2013	1696	1678	1795	2134	1692	3030	2882	1566	1683	2469	1808		
Turbine Release	kaf	136.8	141.4	141.4	127.7	118.7	100.5	127.9	126.7	131.0	130.1	118.7	103.3	1504.2	
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	136.8	141.4	141.4	127.7	118.7	100.5	127.9	126.7	131.0	130.1	118.7	103.3	1504.2	
Total Release	cfs	2299	2300	2300	2299	1930	1689	2080	2129	2131	2116	1995	1680		
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8	
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.6	24.6	26.8	27.7	26.8	18.8	0.0	125.3	
Afterbay Rels	kaf	141.0	145.7	145.7	131.6	123.0	104.7	132.2	130.9	135.3	134.4	122.9	107.6	1555.0	
Afterbay Rels	cfs	2370	2370	2370	2370	2000	1760	2150	2200	2200	2186	2065	1750		
River Release	kaf	141.0	145.7	145.7	131.6	123.0	104.1	107.6	104.1	107.6	107.6	104.1	107.6	1429.7	
River Release	cfs	2370	2370	2370	2370	2000	1749	1750	1749	1750	1750	1749	1750		
Min Release	kaf	141.0	145.7	145.7	131.6	123.0	104.1	107.6	104.1	107.6	107.6	104.1	107.6	1429.7	
End-Month Targets	kaf					858.5				1070.0				1070.0	
End-Month Content	kaf	921.2	884.1	845.9	817.9	830.4	830.6	889.0	933.8	899.1	872.5	900.7	908.6		
End-Month Elevation	ft	3625.81	3621.34	3616.29	3612.26	3614.10	3614.13	3621.96	3627.24	3623.20	3619.86	3623.39	3624.34		
Net Change Content	kaf	-17.0	-37.1	-38.2	-28.0	12.5	0.2	58.4	44.8	-34.7	-26.6	28.2	7.9	-29.6	
Yellowtail Power	2010	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	
Turbine Release	kaf	136.8	141.4	141.4	127.7	118.7	100.5	127.9	126.7	131.0	130.1	118.7	103.3	1504.2	
Generation	gwh	53.680	54.975	54.248	48.398	44.855	38.069	48.976	49.409	51.174	50.285	45.891	40.190	580.150	
End-Month Power Cap	mw	273.7	269.5	264.8	261.1	262.8	262.8	270.0	275.0	271.2	268.1	271.4	272.3		
% Max Gen		26	26	25	25	21	18	23	24	24	23	22	19		
Ave kwh/af		392	389	384	379	378	379	383	390	391	387	387	389	386	
Upstream Generation	gwh	9.690	9.991	9.929	8.385	9.828	11.398	25.211	25.225	27.579	24.592	20.222	9.301	191.351	
Total Generation	gwh	63.370	64.966	64.177	56.783	54.683	49.467	74.187	74.634	78.753	74.877	66.113	49.491	771.501	



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 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont 938.2 kaf Elev 3627.72 ft				Maximum Cont 1328.4 kaf Elev 3657.00 ft				Minimum Cont 493.6 kaf Elev 3547.00 ft				Total
	2010	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Boysen Release	kaf	47.6	49.2	49.3	44.5	49.2	123.3	257.7	268.4	262.5	115.5	74.6	64.6	1406.4
Boysen Release	cfs	800	800	802	801	800	2072	4191	4511	4269	1878	1254	1051	
Buffalo Bill Riv Flo	kaf	21.1	21.8	21.8	19.7	21.8	31.7	188.7	309.3	274.9	147.4	100.2	41.6	1200.0
Buffalo Bill Riv Flo	cfs	355	355	355	355	355	533	3069	5198	4471	2397	1684	677	
Station Gain	kaf	62.8	43.0	42.0	45.8	73.1	33.3	52.6	130.1	-14.1	-37.7	23.8	60.8	515.5
Monthly Inflow	kaf	131.5	114.0	113.1	110.0	144.1	188.3	499.0	707.8	523.3	225.2	198.6	167.0	3121.9
Monthly Inflow	cfs	2210	1854	1839	1981	2344	3164	8115	11895	8511	3663	3338	2716	
Turbine Release	kaf	136.8	141.4	141.4	127.7	141.4	245.9	466.8	474.6	521.7	225.4	198.7	166.7	2988.5
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	1.6
Total Release	kaf	136.8	141.4	141.4	127.7	141.4	245.9	466.8	474.6	523.3	225.4	198.7	166.7	2990.1
Total Release	cfs	2299	2300	2300	2299	2300	4132	7592	7976	8511	3666	3339	2711	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.5	11.2	21.8	27.7	26.8	11.9	0.0	99.9
Afterbay Rels	kaf	141.0	145.7	145.7	131.6	145.7	250.1	471.1	478.8	527.6	229.7	202.9	171.0	3040.9
Afterbay Rels	cfs	2370	2370	2370	2370	2370	4203	7662	8047	8581	3736	3410	2781	
River Release	kaf	141.0	145.7	145.7	131.6	145.7	249.6	459.9	457.0	499.9	202.9	191.0	171.0	2941.0
River Release	cfs	2370	2370	2370	2370	2370	4195	7480	7680	8130	3300	3210	2781	
Min Release	kaf	141.0	145.7	145.7	131.6	145.7	148.8	153.7	148.8	153.7	153.7	148.8	153.4	1770.6
End-Month Targets	kaf					862.2			1070.0	1070.0				1070.0
End-Month Content	kaf	932.9	905.5	877.2	859.5	862.2	804.6	836.8	1070.0	1070.0	1069.8	1069.7	1070.0	
End-Month Elevation	ft	3627.14	3623.97	3620.46	3618.14	3618.50	3610.22	3615.02	3640.00	3640.00	3639.98	3639.97	3640.00	
Net Change Content	kaf	-5.3	-27.4	-28.3	-17.7	2.7	-57.6	32.2	233.2	0.0	-0.2	-0.1	0.3	131.8
Yellowtail Power	2010	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	136.8	141.4	141.4	127.7	141.4	245.9	466.8	474.6	521.7	225.4	198.7	166.7	2988.5
Generation	gwh	53.785	55.288	54.759	49.051	54.166	93.247	176.167	187.704	213.908	92.417	81.466	68.349	1180.307
End-Month Power Cap	mw	274.9	271.9	268.7	266.5	266.8	259.2	263.6	287.5	287.5	287.5	287.5	287.5	
% Max Gen		26	26	26	25	25	45	82	91	100	43	39	32	
Ave kwh/af		393	391	387	384	383	379	377	395	410	410	410	410	395
Upstream Generation	gwh	9.706	10.033	10.017	8.487	9.989	17.828	33.708	33.693	35.256	33.718	27.435	16.254	246.124
Total Generation	gwh	63.491	65.321	64.776	57.538	64.155	111.075	209.875	221.397	249.164	126.135	108.901	84.603	1426.431