

# RECLAMATION

## *Managing Water in the West*

October 18, 2011

Dear Customer:

Attached are the monthly water supply outlook and projected reservoir and river operating plans prepared for Yellowtail. Streamflows into Bighorn Lake during September dropped to 115% of average. Based on current hydrologic and climatic conditions and the planned releases out of Boysen and Buffalo Bill Reservoirs, the forecasted October runoff into Bighorn Lake is estimated to be about 214,300 acre-feet (123% 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  
 October 1, 2011

**Present Elevations & Storages:**

<u>Reservoir</u>	<u>Elevation</u>	<u>Storage</u>	<u>Percent of Average</u>	<u>Percent Full</u>
Boysen	4722.38	691,545	115	93
Buffalo Bill	5372.04	482,678	110	75
Bighorn Lake	3640.35	1,025,004	106	100

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

<u>Month</u>	<u>Inflow</u>	<u>Percent of Average</u>
<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	70
November	122.6	84
December	122.7	96
January	121.8	96
February	111.9	86
March	167.4	101
April	245.8	153
May	529.4	201
June	1,004.2	235
July	792.9	275
August	279.2	177
September	196.8	115
<i>April-July, 2011</i>	<i>2,572.3</i>	<i>226</i>
<i>WY-2011 Total</i>	<i>3,817.0</i>	<i>163</i>

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

<u>Month</u>	<u>Gains</u>	<u>Percent of Average</u>
<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	54.2	89
December	52.1	121
January	50.9	110
February	47.9	90
March	95.6	128
April	47.7	137
May	168.3	280
June	391	369
July	88.4	---
August	-11.6	---
September	8.7	43
<i>April-July, 2011</i>	<i>717.7</i>	<i>460</i>
<i>WY-2011 Total</i>	<i>996.7</i>	<i>207</i>

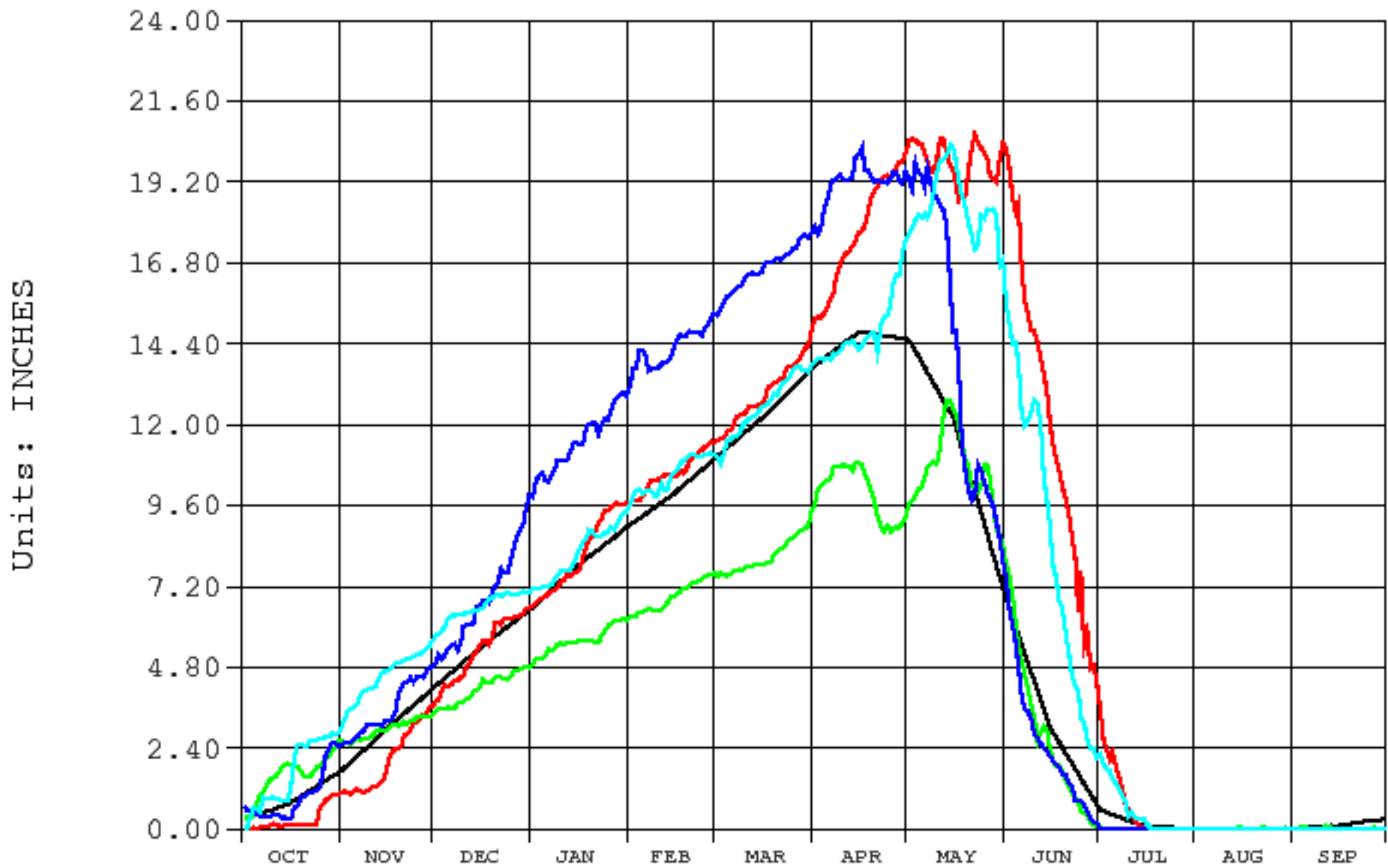
**October 1 Runoff Forecast (October Inflows - 1,000 Acre-Feet):**

<u>Agency</u>	<u>Inflows</u>	<u>Percent of Average</u>
USBR	214.3	123

**Snowpack Conditions:**

SNOW DATA UNAVAILABLE DURING AUGUST-OCTOBER

Archive Data From 1-OCT Through 30-SEP  
 Plotted 08/03/2011 15:31



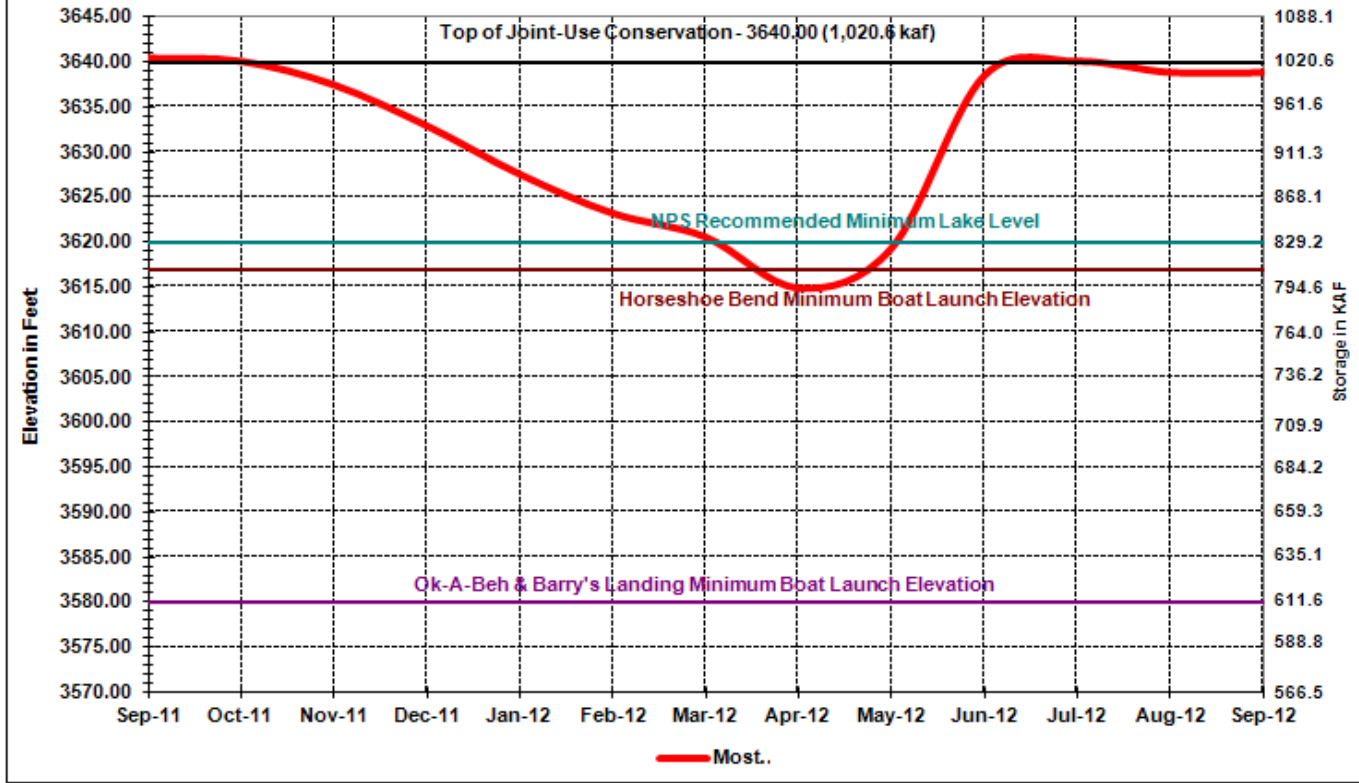
BHR Bighorn Lake (Yellowtail), Bighorn River near Fort Smith, MT  
 SE\_AVG Snow Water Equivalent Average (inches) 2011  
 SE Snow Water Equivalent (inches) 2011 2010 1997  
 1995

BIGHORN LAKE MONTHLY OPERATIONS

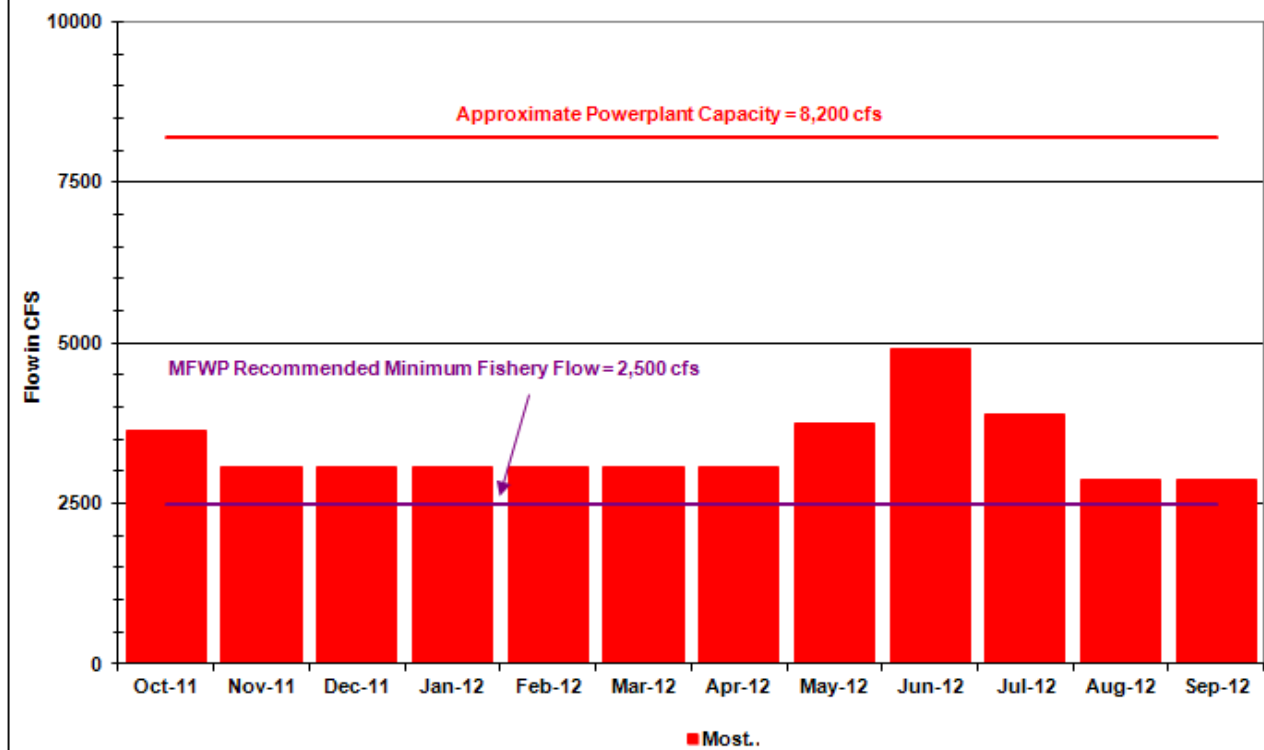
Bighorn Reservoir		Initial Cont Elev 3640.35 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total
	2011	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Boysen Release	kaf	58.4	56.5	58.4	58.4	54.7	58.4	67.4	142.2	156.5	132.2	98.3	59.5	1000.9
Boysen Release	cfs	950	950	950	950	951	950	1133	2313	2630	2150	1599	1000	
Buffalo Bill Release	kaf	61.6	21.1	21.8	21.8	20.4	21.8	31.7	109.7	162.8	168.4	121.9	102.8	865.8
Buffalo Bill Release	cfs	1002	355	355	355	355	355	533	1784	2736	2739	1983	1728	
Station Gain	kaf	94.3	68.8	54.4	54.2	61.7	84.0	40.7	16.3	168.2	-17.8	-35.7	22.8	611.9
Monthly Inflow	kaf	214.3	146.4	134.6	134.4	136.8	164.2	139.8	268.2	487.5	282.8	184.5	185.1	2478.6
Monthly Inflow	cfs	3485	2460	2189	2186	2378	2670	2349	4362	8193	4599	3001	3111	
Turbine Release	kaf	218.7	178.2	184.2	184.3	172.4	184.2	179.1	238.2	311.1	263.0	199.7	185.5	2498.6
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	218.7	178.2	184.2	184.3	172.4	184.2	179.1	238.2	311.1	263.0	199.7	185.5	2498.6
Total Release	cfs	3557	2995	2996	2997	2997	2996	3010	3874	5228	4277	3248	3117	
Spring Flow	kaf	4.3	4.2	4.3	4.3	4.0	4.3	4.2	4.3	4.2	4.3	4.3	4.2	50.9
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.9	11.6	23.2	28.2	27.4	18.8	110.1
Afterbay Rels	kaf	223.0	182.4	188.5	188.6	176.4	188.5	183.3	242.5	315.3	267.3	204.0	189.7	2549.5
Afterbay Rels	cfs	3627	3065	3066	3067	3067	3066	3080	3944	5299	4347	3318	3188	
River Release	kaf	223.0	182.4	188.5	188.6	176.4	188.5	182.4	230.9	292.1	239.1	176.6	170.9	2439.4
River Release	cfs	3627	3065	3066	3067	3067	3066	3065	3755	4909	3889	2872	2872	
Min Release	kaf	190.6	148.8	153.7	153.7	143.8	153.7	182.4	153.7	148.8	153.7	153.7	148.8	1885.4
End-Month Targets	kaf	1020.6					833.7				1020.6			
End-Month Content	kaf	1020.6	988.8	939.2	889.3	853.7	833.7	794.4	824.4	1000.8	1020.6	1005.4	1005.0	
End-Month Elevation	ft	3640.00	3637.39	3632.88	3627.52	3623.21	3620.60	3614.97	3619.34	3638.39	3640.00	3638.77	3638.74	
Net Change Content	kaf	-4.4	-31.8	-49.6	-49.9	-35.6	-20.0	-39.3	30.0	176.4	19.8	-15.2	-0.4	-20.0
Yellowtail Power	2011	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	kaf	218.7	178.2	184.2	184.3	172.4	184.2	179.1	238.2	311.1	263.0	199.7	185.5	2498.6
Generation	gwh	88.417	71.642	73.103	71.941	66.296	70.119	67.419	89.506	121.369	105.932	80.493	74.589	980.826
End-Month Power Cap	mw	283.4	280.5	275.6	270.1	265.8	263.2	257.7	261.9	281.6	283.4	282.0	282.0	
% Max Gen		41	35	34	34	33	33	33	42	59	49	38	36	
Ave kwh/af		404	402	397	390	385	381	376	376	390	403	403	402	393
Upstream Generation	gwh	13.088	2.155	5.019	5.704	5.308	5.665	13.090	32.974	33.810	35.207	32.190	26.632	210.842
Total Generation	gwh	101.505	73.797	78.122	77.645	71.604	75.784	80.509	122.480	155.179	141.139	112.683	101.221	1191.668

# BIGHORN LAKE

## BIGHORN LAKE ELEVATION



## BIGHORN RIVER FLOW BELOW AFTERBAY



# WATER YEAR 2012

# Supplemental Information

BHXAOP V1.12 Run: 18-Oct-2011 14:20  
 Based on Minimum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3640.35 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total	
		2011	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Boysen Release	kaf		58.4	56.6	58.4	58.5	54.7	58.4	44.6	67.6	69.9	76.9	69.2	59.5	732.7
Boysen Release	cfs		950	951	950	951	951	950	750	1099	1175	1251	1125	1000	
Buffalo Bill Release	kaf		61.6	21.1	21.8	21.8	20.4	21.8	31.7	101.2	105.0	118.7	104.3	82.3	711.7
Buffalo Bill Release	cfs		1002	355	355	355	355	355	533	1646	1765	1930	1696	1383	
Station Gain	kaf		70.5	61.3	48.5	48.3	55.0	74.9	26.7	26.0	50.0	-85.4	-61.8	7.8	321.8
Monthly Inflow	kaf		190.5	139.0	128.7	128.6	130.1	155.1	103.0	194.8	224.9	110.2	111.7	149.6	1766.2
Monthly Inflow	cfs		3098	2336	2093	2091	2262	2522	1731	3168	3780	1792	1817	2514	
Turbine Release	kaf		194.9	178.2	184.2	184.2	172.4	149.4	115.7	130.3	138.0	146.9	146.1	133.6	1873.9
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		194.9	178.2	184.2	184.2	172.4	149.4	115.7	130.3	138.0	146.9	146.1	133.6	1873.9
Total Release	cfs		3170	2995	2996	2996	2997	2430	1944	2119	2319	2389	2376	2245	
Spring Flow	kaf		4.3	4.2	4.3	4.3	4.0	4.3	4.2	4.3	4.2	4.3	4.3	4.2	50.9
Irrigation Reqmnt	kaf		0.0	0.0	0.0	0.0	0.0	0.0	0.9	11.6	23.2	28.2	27.4	18.8	110.1
Afterbay Rels	kaf		199.2	182.4	188.5	188.5	176.4	153.7	119.9	134.6	142.2	151.2	150.4	137.8	1924.8
Afterbay Rels	cfs		3240	3065	3066	3066	3067	2500	2015	2189	2390	2459	2446	2316	
River Release	kaf		199.2	182.4	188.5	188.5	176.4	153.7	119.0	123.0	119.0	123.0	123.0	119.0	1814.7
River Release	cfs		3240	3065	3066	3066	3067	2500	2000	2000	2000	2000	2000	2000	
Min Release	kaf		190.6	182.4	188.5	188.5	176.4	153.7	119.0	123.0	119.0	123.0	123.0	119.0	1806.1
End-Month Targets	kaf		1020.6					833.7				1020.6			
End-Month Content	kaf		1020.6	981.4	925.9	870.3	828.0	833.7	821.0	885.5	972.4	935.7	901.3	917.3	
End-Month Elevation	ft		3640.00	3636.75	3631.54	3625.27	3619.83	3620.60	3618.87	3627.08	3635.97	3632.53	3628.89	3630.64	
Net Change Content	kaf		-4.4	-39.2	-55.5	-55.6	-42.3	5.7	-12.7	64.5	86.9	-36.7	-34.4	16.0	-107.7
Yellowtail Power	2011	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	
Turbine Release	kaf		194.9	178.2	184.2	184.2	172.4	149.4	115.7	130.3	138.0	146.9	146.1	133.6	1873.9
Generation	gwh		78.795	71.560	72.857	71.502	65.759	56.600	43.775	49.776	54.137	58.111	57.113	52.062	732.047
End-Month Power Cap	mw		283.4	279.8	274.2	267.8	262.4	263.2	261.5	269.6	278.9	275.2	271.5	273.2	
% Max Gen			37	35	34	33	33	26	21	23	26	27	27	25	
Ave kwh/af			404	402	396	388	381	379	378	382	392	396	391	390	391
Upstream Generation	gwh		13.106	2.149	4.997	5.679	5.278	5.627	11.070	25.014	25.061	27.415	24.733	20.239	170.368
Total Generation	gwh		91.901	73.709	77.854	77.181	71.037	62.227	54.845	74.790	79.198	85.526	81.846	72.301	902.415

BHXAOP V1.12 Run: 18-Oct-2011 14:21  
 Based on Maximum Probable Inflow Forecast

BIGHORN LAKE MONTHLY OPERATIONS

Bighorn Reservoir		Initial Cont Elev 3640.35 ft				Maximum Cont Elev 3657.00 ft				Minimum Cont Elev 3547.00 ft				Total	
		2011	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Boysen Release	kaf		58.4	56.5	58.4	58.5	54.7	58.4	127.2	241.1	281.4	290.7	120.0	72.0	1477.3
Boysen Release	cfs		950	950	950	951	951	950	2138	3921	4729	4728	1952	1210	
Buffalo Bill Release	kaf		61.6	21.1	21.8	21.8	20.4	21.8	74.5	179.6	291.2	272.3	151.3	102.7	1240.1
Buffalo Bill Release	cfs		1002	355	355	355	355	355	1252	2921	4894	4429	2461	1726	
Station Gain	kaf		117.5	76.2	60.3	60.1	68.4	93.1	38.4	-23.6	200.9	-40.6	-38.0	20.4	633.1
Monthly Inflow	kaf		237.5	153.8	140.5	140.4	143.5	173.3	240.1	397.1	773.5	522.4	233.3	195.1	3350.5
Monthly Inflow	cfs		3863	2585	2285	2283	2495	2818	4035	6458	12999	8496	3794	3279	
Turbine Release	kaf		241.9	178.2	184.2	184.2	172.4	219.4	300.1	430.6	501.2	481.8	233.4	195.2	3322.6
Bypass/Spill/Waste	kaf		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	0.0	0.0	0.0	32.5
Total Release	kaf		241.9	178.2	184.2	184.2	172.4	219.4	300.1	430.6	533.7	481.8	233.4	195.2	3355.1
Total Release	cfs		3934	2995	2996	2996	2997	3568	5043	7003	8969	7836	3796	3280	
Spring Flow	kaf		4.3	4.2	4.3	4.3	4.0	4.3	4.2	4.3	4.2	4.3	4.3	4.2	50.9
Irrigation Reqmnt	kaf		0.0	0.0	0.0	0.0	0.0	0.0	0.9	11.6	23.2	28.2	27.4	18.8	110.1
Afterbay Rels	kaf		246.2	182.4	188.5	188.5	176.4	223.7	304.3	434.9	537.9	486.1	237.7	199.4	3406.0
Afterbay Rels	cfs		4004	3065	3066	3066	3067	3638	5114	7073	9040	7906	3866	3351	
River Release	kaf		246.2	182.4	188.5	188.5	176.4	223.7	303.4	423.3	514.7	457.9	210.3	180.6	3295.9
River Release	cfs		4004	3065	3066	3066	3067	3638	5099	6884	8650	7447	3420	3035	
Min Release	kaf		190.6	182.4	188.5	188.5	176.4	188.5	148.8	153.7	148.8	153.7	153.7	148.8	2022.4
End-Month Targets	kaf		1020.6					833.7				1020.6			
End-Month Content	kaf		1020.6	996.2	952.5	908.7	879.8	833.7	773.7	740.2	980.0	1020.6	1020.5	1020.4	
End-Month Elevation	ft		3640.00	3638.01	3634.16	3629.71	3626.41	3620.60	3611.65	3605.74	3636.63	3640.00	3639.99	3639.99	
Net Change Content	kaf		-4.4	-24.4	-43.7	-43.8	-28.9	-46.1	-60.0	-33.5	239.8	40.6	-0.1	-0.1	-4.6
Yellowtail Power	2011	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	
Turbine Release	kaf		241.9	178.2	184.2	184.2	172.4	219.4	300.1	430.6	501.2	481.8	233.4	195.2	3322.6
Generation	gwh		97.796	71.725	73.348	72.302	66.832	83.920	112.517	158.448	191.931	193.434	94.295	78.859	1295.407
End-Month Power Cap	mw		283.4	281.2	276.9	272.3	269.0	263.2	254.7	249.3	279.6	283.4	283.3	283.3	
% Max Gen			46	35	34	34	33	39	54	74	93	90	44	38	
Ave kwh/af			404	402	398	393	388	382	375	368	383	401	404	404	390
Upstream Generation	gwh		13.113	2.159	5.006	5.726	5.334	5.702	29.460	33.724	33.619	35.219	34.104	27.687	230.853
Total Generation	gwh		110.909	73.884	78.354	78.028	72.166	89.622	141.977	192.172	225.550	228.653	128.399	106.546	1526.260