

# RECLAMATION

*Managing Water in the West*

## Boysen/Buffalo Bill Reservoir Operations

**John H. Lawson**  
**Area Manager**  
**Wyoming Area Office**



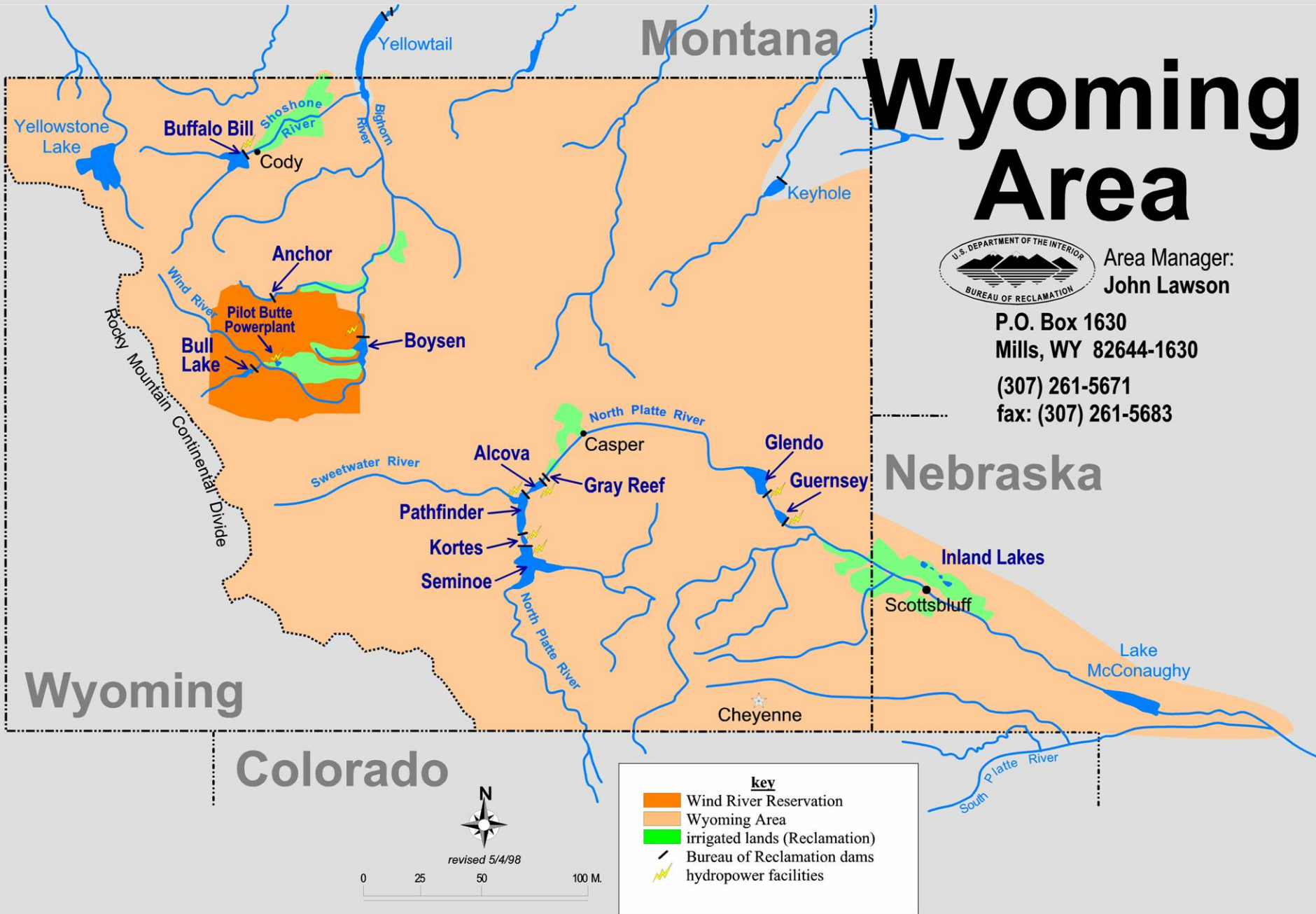
**June 8, 2007**

# Wyoming Area



Area Manager:  
**John Lawson**

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## BIGHORN WATER SUPPLY FORECAST

The June 1, 2007, water supply forecast indicates below average April - July runoff can be expected as shown below. The water supply forecasts are based on the snowpack at the Snotel stations displayed on page five of this report, along with precipitation and soil moisture data.

(1000 acre-feet)

Forecast Points	June 1, 2007 Forecast of April-July Runoff <sup>3</sup>			30 Yr. April-July Runoff Avg. <sup>2</sup>	Most Probable % of Avg.	Comparative Actual April - July Runoff			
	Reasonable Minimum <sup>1</sup>	Expected	Reasonable Maximum <sup>1</sup>			W. Yr. 2006	W. Yr. 2005	W. Yr. 2004	W. Yr. 2003
Bull Lake Reservoir	90	100	120	138.8	72	121	155	117	110
Wind River above Bull Lake Creek	175	200	250	401.6	50	282	387	294	302
Boysen Reservoir	175	225	300	551.3	41	201	589	321	262
Buffalo Bill Reservoir	360	410	500	640.1	64	546	513	387	668

<sup>1</sup> The probability is estimated to be 9 chances in 10 that the actual volume will fall between the reasonable minimum and reasonable maximum.

<sup>2</sup> Average is based on the 1977-2006 period.

<sup>3</sup> Actual Inflows are as Follows:

	April (kaf)	May (kaf)
Bull Lake	2.8	36.1
Wind River above Bull Lake Creek	17.5	70.7
Boysen	31.4	85.9
Buffalo Bill	40.9	177.1

# SNOW WATER EQUIVALENT AS PERCENT OF AVERAGE

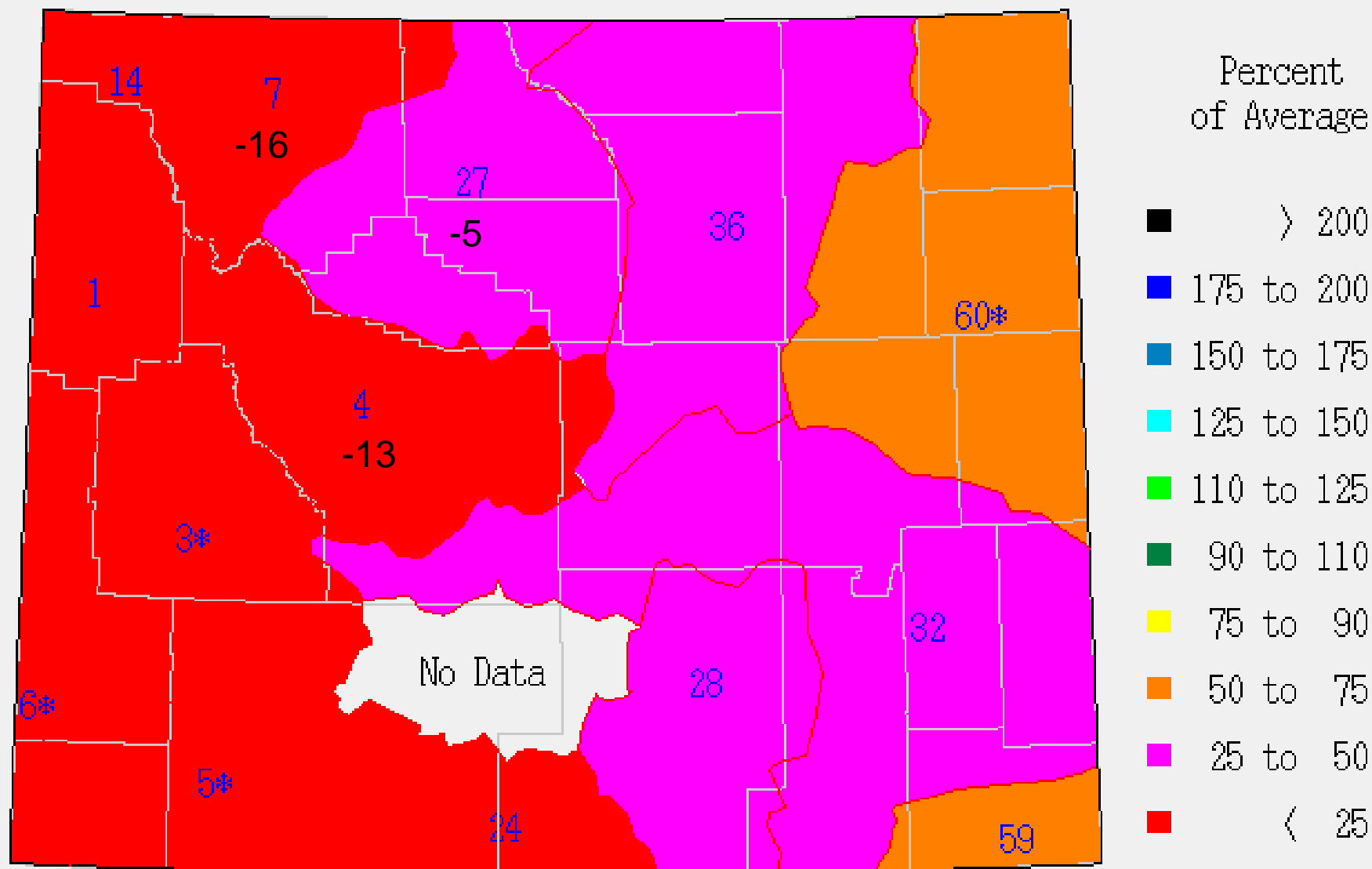
DRAINAGE BASIN	5/21/2007	5/14/2007	5/7/2007	5/21/2006	5/14/2006
SNAKE RIVER	14	30	49	68	91
UPPER YELLOWSTONE	32	45	64	79	98
WIND RIVER	17	38	65	32	53
BIGHORN BASIN	32	49	73	38	61
SHOSHONE	23	35	58	41	62
POWDER – TONGUE	39	74	100	15	52
BELLE FOURCHE	0	0	2	0	0
UPPER NORTH PLATTE	40	49	57	63	76
LOWER NORTH PLATTE	41	58	74	45	70
LITTLE SNAKE RIVER	35	47	57	84	76
UPPER GREEN RIVER	16	28	49	47	73
LOWER GREEN RIVER	21	33	50	65	79
UPPER BEAR RIVER	3	11	35	55	89
Weighted State Average	28	44	63	44	66

\* red = down

\* blue = up

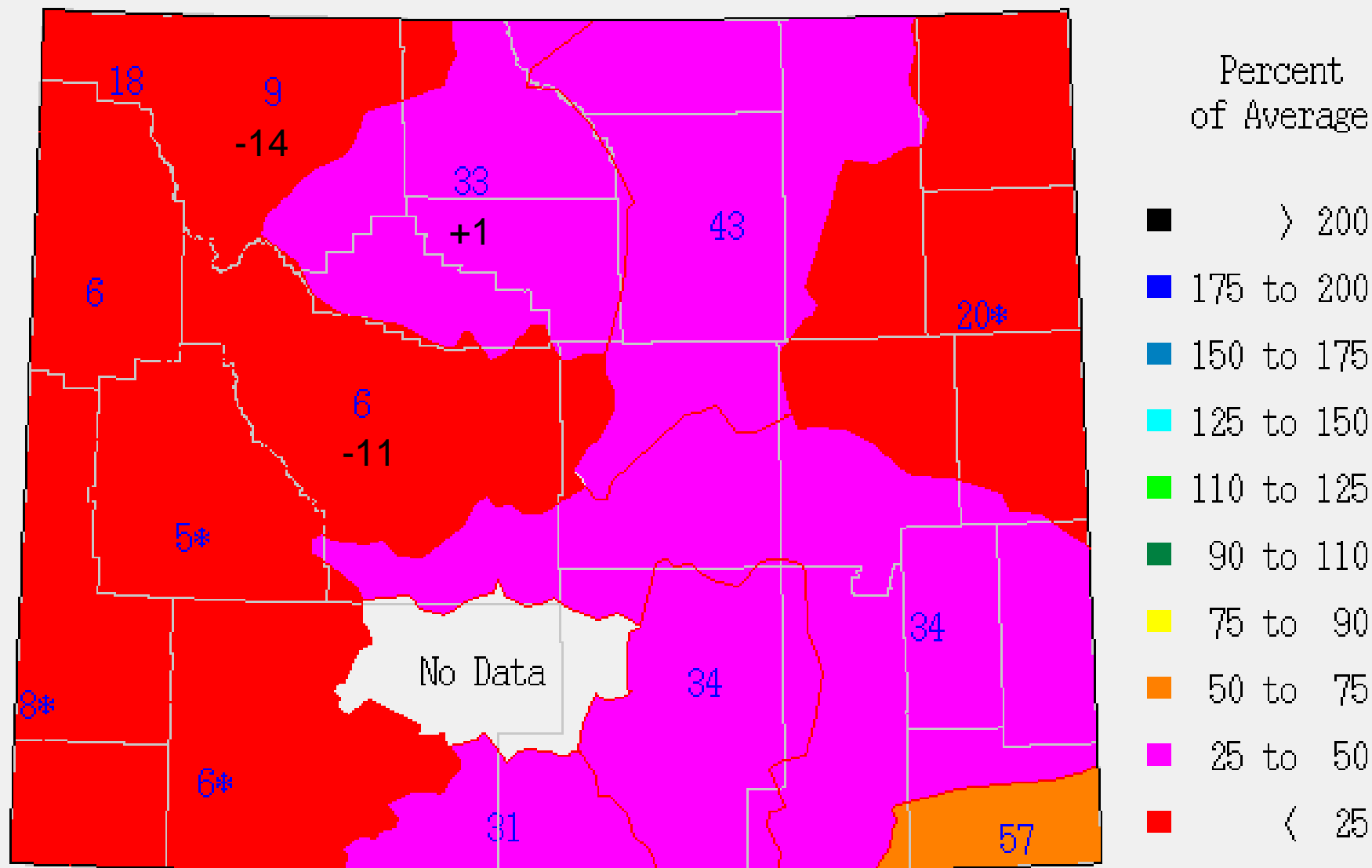
\* green = even

SWE % of Average as of Wednesday, 06 June 2007

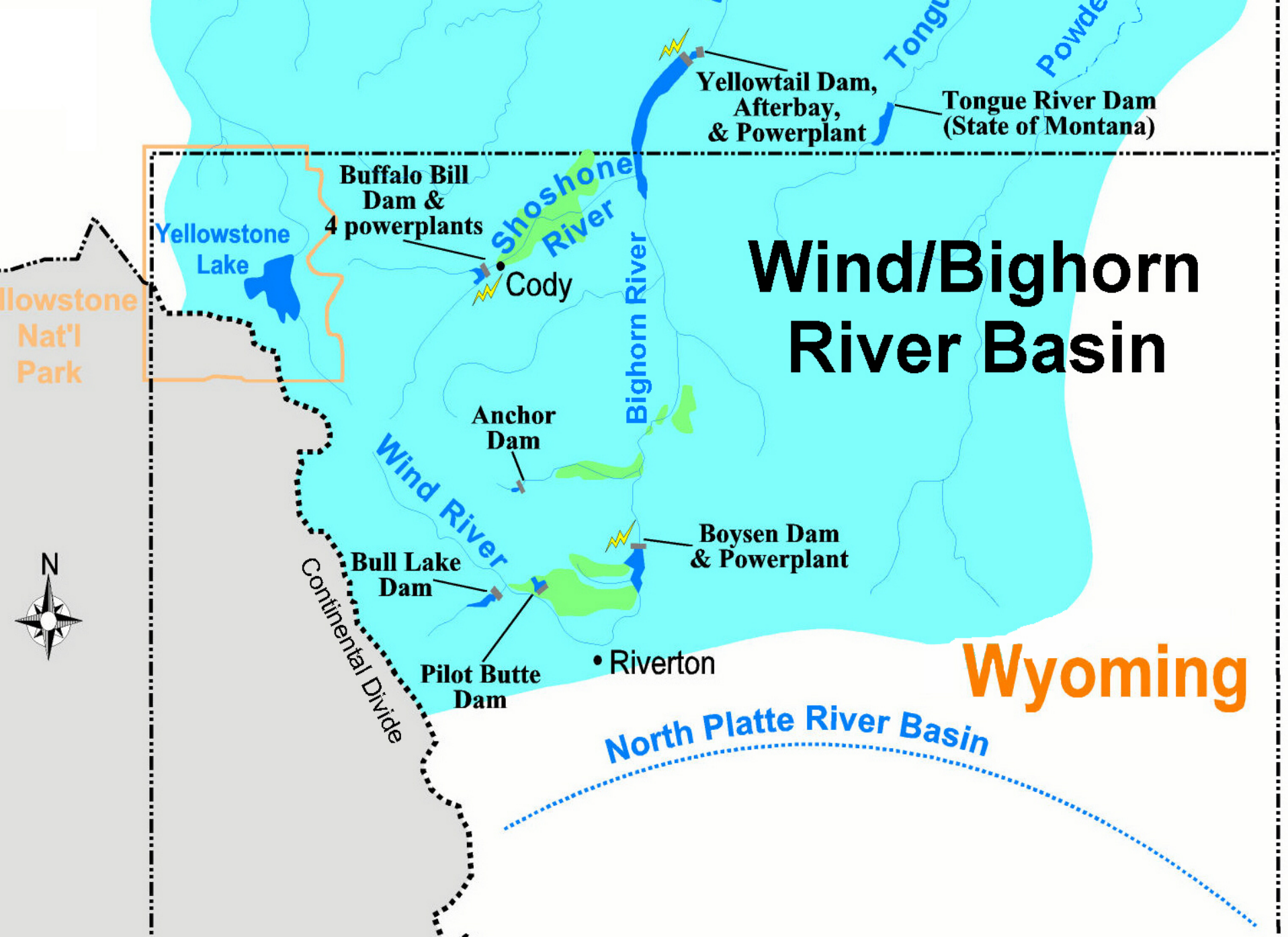


\* = Data may not provide a valid measure of conditions

SWE % of Average as of Thursday, 07 June 2007



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



# Wind/Bighorn River Basin

Wyoming

North Platte River Basin

Yellowstone Lake

Buffalo Bill Dam & 4 powerplants

Cody

Anchor Dam

Boysen Dam & Powerplant

Bull Lake Dam

Pilot Butte Dam

Riverton

Continental Divide



Yellowstone Nat'l Park

Yellowtail Dam, Afterbay, & Powerplant

Tongue River Dam (State of Montana)

Shoshone River

Bighorn River

Wind River

Tongue

Powder



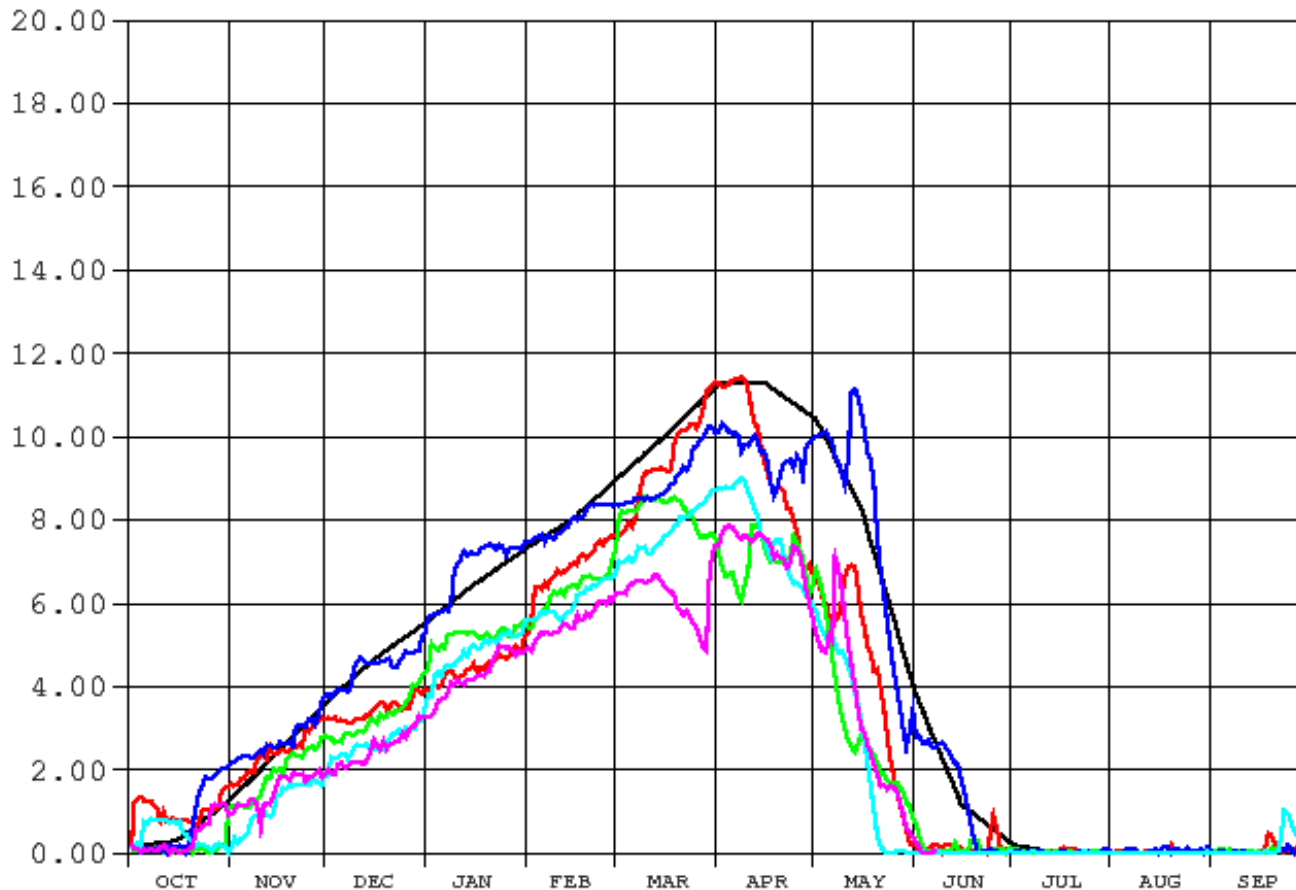
**Bull Lake Dam & Reservoir**



# Basin above Bull Lake Snow Water Equivalent

Archive Data From 1-OCT Through 30-SEP  
Plotted 06/07/2007 11:00

Units: INCHES



BLR Bull Lake Reservoir near Lenore, WY  
 — SE\_AVG Snow Water Equivalent Average (inches)  
 — SE Snow Water Equivalent (inches)

2007  
 2003 2004 2005  
 2006 2007

Water Year	April-July Inflow (acre-feet)
2003	110,200
2004	117,300
2005	154,700
2006	120,800
2007	Forecast 100,000
Avg 138,800 72% of Avg	

Forecasted Min  
90,000  
60% of Avg

# Bull Lake Forecasted April-July Inflow (acre-feet)

<b>Water Year</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>Actual Inflow</b>
<b>2000</b>	<b>100,000</b>	<b>115,000</b>	<b>125,000</b>	<b>120,000</b>	<b>100,000</b>	<b>100,000</b>	<b>115,200</b>
<b>2001</b>	<b>115,000</b>	<b>100,000</b>	<b>100,000</b>	<b>90,000</b>	<b>90,000</b>	<b>90,000</b>	<b>85,800</b>
<b>2002</b>	<b>110,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>90,000</b>	<b>98,600</b>
<b>2003</b>	<b>100,000</b>	<b>100,000</b>	<b>110,000</b>	<b>130,000</b>	<b>110,000</b>	<b>110,000</b>	<b>110,200</b>
<b>2004</b>	<b>120,000</b>	<b>110,000</b>	<b>110,000</b>	<b>100,000</b>	<b>110,000</b>	<b>100,000</b>	<b>117,300</b>
<b>2005</b>	<b>150,000</b>	<b>150,000</b>	<b>135,000</b>	<b>135,000</b>	<b>140,000</b>	<b>160,000</b>	<b>154,700</b>
<b>2006</b>	<b>115,000</b>	<b>130,000</b>	<b>130,000</b>	<b>130,000</b>	<b>110,000</b>	<b>90,000</b>	<b>120,500</b>
<b>2007</b>	<b>115,000</b>	<b>115,000</b>	<b>115,000</b>	<b>110,000</b>	<b>100,000</b>	<b>100,000</b>	<b>?????</b>

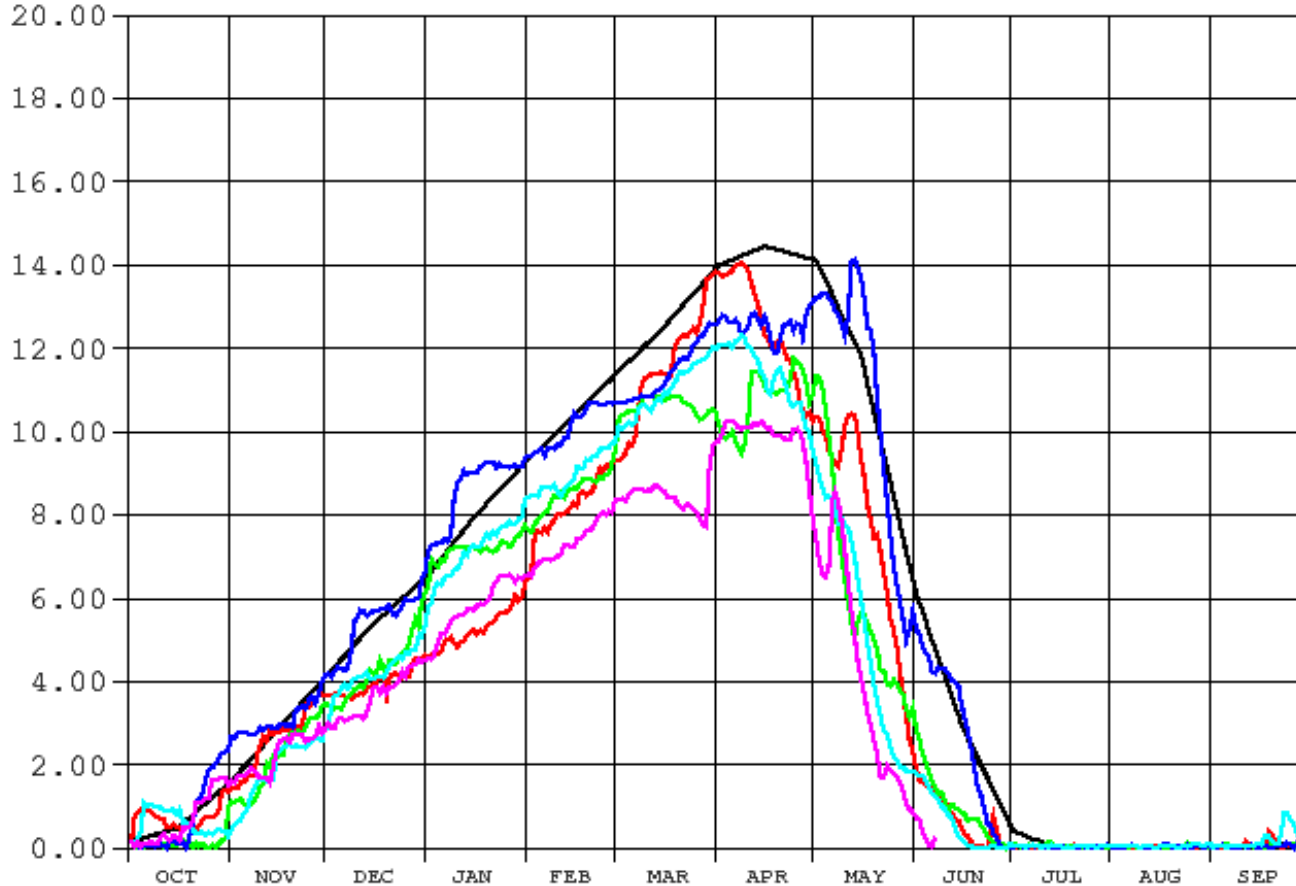


Boysen Dam, Reservoir, & Powerplant

# Basin above Boysen Reservoir Snow Water Equivalent

Archive Data From 1-OCT Through 30-SEP  
Plotted 06/07/2007 11:02

Units: INCHES



BOYR Boysen Reservoir, Wind River near Thermopolis, WY  
 SE\_AVG Snow Water Equivalent Average (inches)  
 SE Snow Water Equivalent (inches)

2007  
 2003 2004 2005  
 2006 2007

Water Year	April-July Inflow (acre-feet)
2003	262,300
2004	320,700
2005	589,300
2006	200,500
2007	Forecast 225,000
Avg 551,300 41% of Avg	

Forecasted Min  
175,000  
32% of Avg

# Boysen Reservoir Forecasted April-July Inflow (acre-feet)

Water Year	January	February	March	April	May	June	Actual Inflow
2000	460,000	490,000	500,000	450,000	300,000	300,000	<b>278,400</b>
2001	420,000	330,000	330,000	200,000	200,000	170,000	<b>118,000</b>
2002	375,000	375,000	325,000	325,000	300,000	210,000	<b>159,200</b>
2003	250,000	250,000	340,000	450,000	250,000	240,000	<b>262,300</b>
2004	440,000	350,000	400,000	200,000	250,000	250,000	<b>320,700</b>
2005	525,000	510,000	400,000	400,000	420,000	575,000	<b>589,300</b>
2006	400,000	500,000	500,000	450,000	350,000	300,000	<b>200,500</b>
<b>2007</b>	<b>350,000</b>	<b>350,000</b>	<b>350,000</b>	<b>300,000</b>	<b>250,000</b>	<b>225,000</b>	<b>???</b>

# Boysen Reservoir Inflow

Water Year	Apr-Jul Inflow (acre-feet)	Avg Apr-Jul Inflow (acre-feet)	Annual Inflow (acre-feet)	30-yr Average Annual Inflow (acre-feet)
2000	278,400	<b>551,300</b> (1977-2006 avg.)	626,000	<b>940,900</b> (1977-2006 avg.)
2001	118,000		361,700	
2002	159,200		383,800	
2003	262,300		548,200	
2004	320,700	<b>667,500</b> (1970-1999 avg.)	627,800	<b>1,094,100</b> (1970-1999 avg.)
2005	589,300		945,300	
2006	200,500		500,700	
2007	Exp. 225,000 Min. 175,000		Exp. 480,000 Min. 430,000	

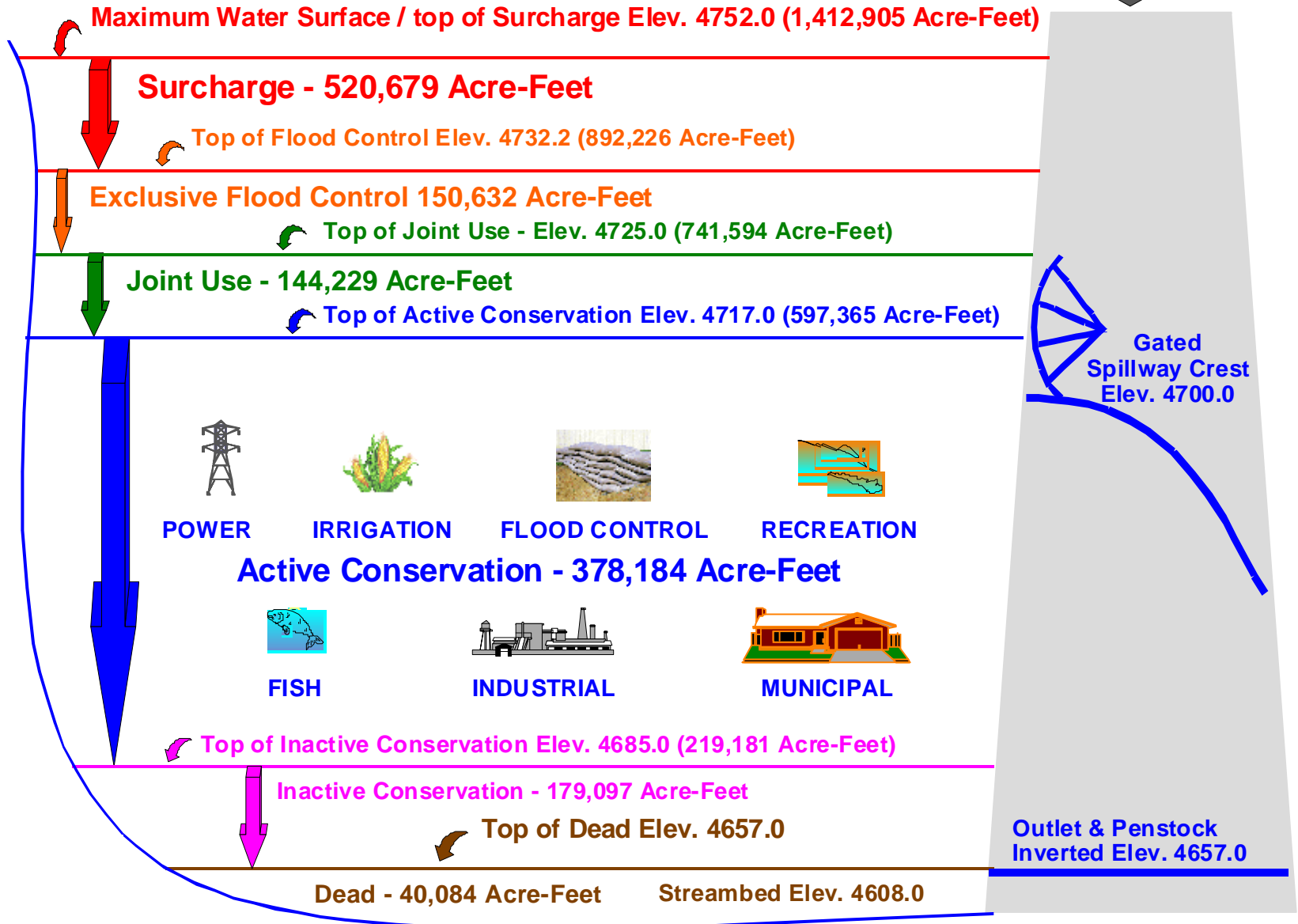
# Boysen Reservoir Outflow

Water Year	Outflow (acre-feet)			30 Year Average <sup>1</sup> Outflow (acre-feet)		
	Oct-Mar	Apr-Sep	Total	Oct-Mar	Apr-Sep	Annual
2000	338,200 <i>(wr 1000 – 750 cfs)</i>	380,200	718,400	346,000	602,900	948,900
2001	247,800 <i>(wr 700 cfs)</i>	352,100	599,900			
2002	142,900 <i>(wr 400 cfs)</i>	306,000	448,900			
2003	109,200 <i>(wr 300 cfs)</i>	326,000	435,200			
2004	130,300 <i>(wr 350 cfs)</i>	338,700	469,000			
2005	145,500 <i>(wr 400 cfs)</i>	682,800	828,300			
2006	315,500 <i>(wr 800 cfs)</i>	369,300	684,800			
2007	181,600 <i>(wr 500 cfs)</i>	<b>Exp. 353,000</b> <b>Min. 353,000</b>	???			

<sup>1</sup> 30-year averages 1977-2006    **wr** = winter release

# Boysen Reservoir Allocations

Dam Crest  
Elev. 4758.0



7/28/00

Note: Symbols represent typical reservoir uses.



Based on expected April-July inflow of 225 kaf and 2006 demand

BOYSEN RESERVOIR MONTHLY OPERATIONS

Boysen Reservoir		Initial Cont		483.0 kaf		Maximum Cont		892.2 kaf		Minimum Cont		219.2 kaf	
		Elev	4709.29 ft	Elev	4732.20 ft	Elev	4732.20 ft	Elev	4685.00 ft	Elev	4685.00 ft	Elev	4685.00 ft
	2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Monthly Inflow	kaf	68.0	39.7	26.3	30.9	40.0	51.3	39.8	36.6	38.4	50.0	49.4	152.1
Monthly Inflow	cfs	1143	646	428	519	651	862	647	595	668	813	830	2474
Turbine Release	kaf	69.6	73.2	66.4	45.5	30.7	23.8	24.6	24.6	23.0	24.6	44.6	65.8
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
Total Release	kaf	69.6	73.2	66.4	45.5	30.7	23.8	24.6	24.6	23.0	24.6	44.6	65.8
Total Release	cfs	1170	1190	1080	765	499	400	400	400	400	400	750	1070
End-Month Content	kaf	481.4	447.9	407.8	393.2	402.5	430.0	445.2	457.2	472.6	498.0	502.8	589.1
End-Month Elevation	ft	4709.17	4706.64	4703.40	4702.17	4702.96	4705.22	4706.43	4707.35	4708.52	4710.38	4710.72	4716.49

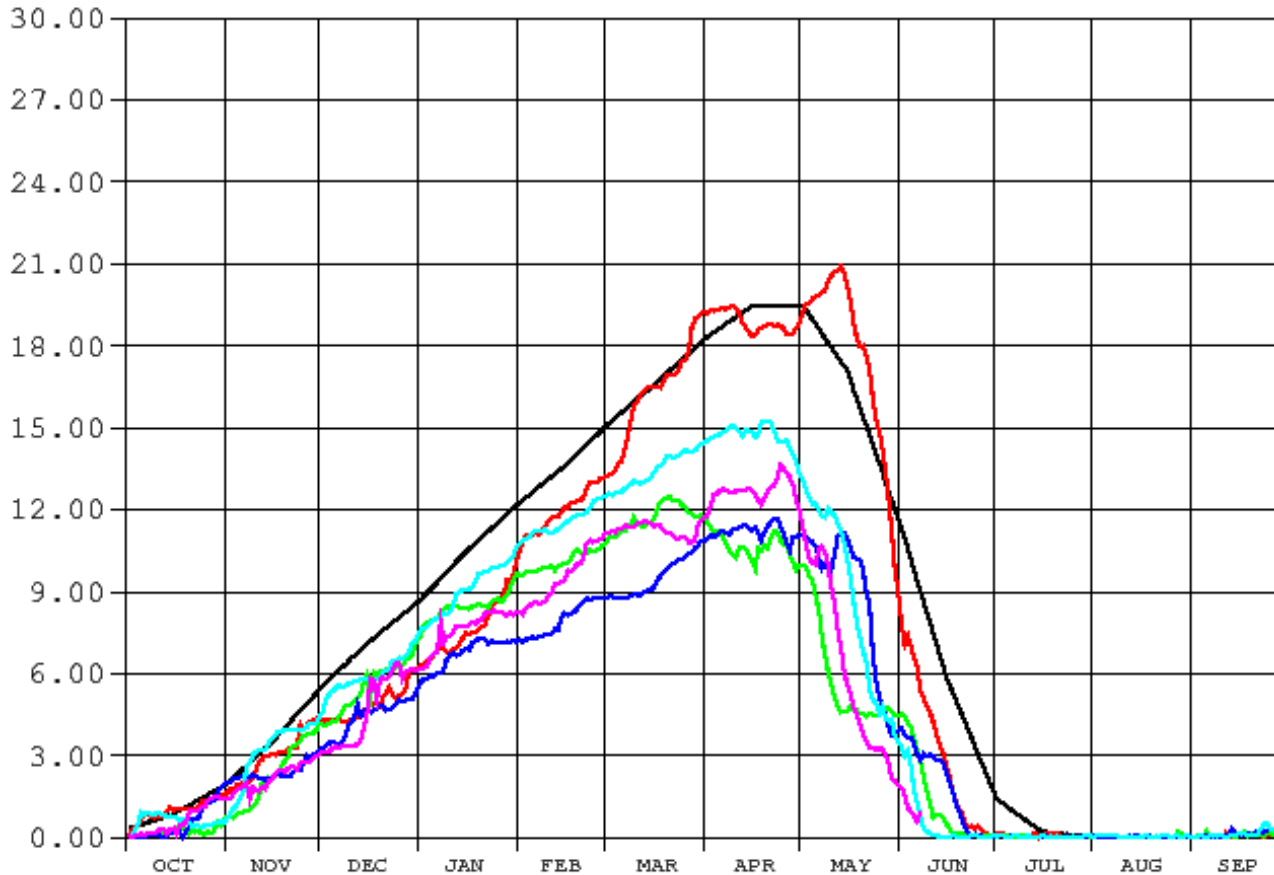


Buffalo Bill Dam, Visitor Center, & Shoshone Powerplant

# Basin above Buffalo Bill Reservoir Snow Water Equivalent

Archive Data From 1-OCT Through 30-SEP  
Plotted 06/07/2007 11:02

Units: INCHES



BBR Buffalo Bill Reservoir, Shoshone River near Cody, WY  
 SE\_AVG Snow Water Equivalent Average (inches)  
 SE Snow Water Equivalent (inches)

2007  
 2003 2004 2005  
 2006 2007

Water Year	April-July Inflow (acre-feet)
2003	657,900
2004	387,000
2005	513,400
2006	545,900
2007	Forecasted 410,000
Avg 640,100 64% of Avg	

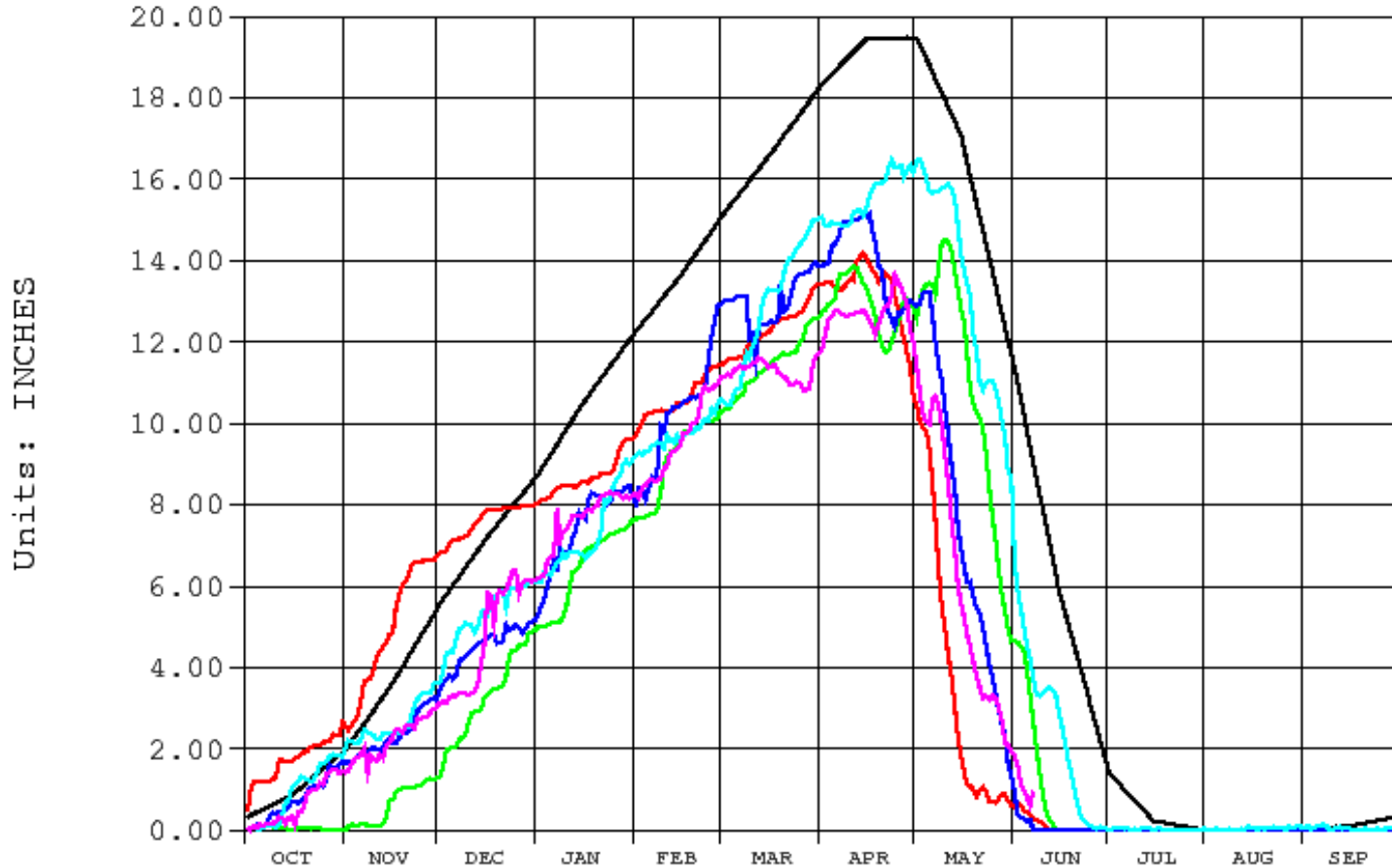
Forecasted Min  
360,000  
56% of Avg

# Buffalo Bill Reservoir Forecasted April-July Inflow (acre-feet)

Water Year	January	February	March	April	May	June	Actual Inflow
2000	500,000	540,000	550,000	550,000	500,000	500,000	536,200
2001	500,000	430,000	400,000	375,000	400,000	360,000	374,800
2002	550,000	550,000	490,000	500,000	550,000	530,000	552,500
2003	500,000	550,000	550,000	650,000	560,000	540,000	667,900
2004	630,000	530,000	530,000	400,000	350,000	400,000	387,000
2005	500,000	450,000	425,000	400,000	400,000	485,000	513,400
2006	600,000	650,000	650,000	600,000	500,000	470,000	545,900
<b>2007</b>	<b>500,000</b>	<b>500,000</b>	<b>525,000</b>	<b>425,000</b>	<b>425,000</b>	<b>410,000</b>	<b>???</b>

# Basin above Buffalo Bill Reservoir SWE Comparison to Past Years

Archive Data From 1-OCT Through 30-SEP  
Plotted 06/07/2007 11:05



BBR Buffalo Bill Reservoir, Shoshone River near Cody, WY  
 SE\_AVG Snow Water Equivalent Average (inches)  
 SE Snow Water Equivalent (inches)

2007  
 1987 1988 1994  
 2002 2007

Water Year	April-July Inflow (acre-feet)
1987	447,000
1988	394,000
1994	413,000
2002	375,000
2007	Forecast 410,000
<b>Avg 640,100</b>	

# Buffalo Bill Reservoir Inflow

Water Year	Apr-Jul Inflow (acre-feet)	Avg <sup>1</sup> Apr-Jul Inflow (acre-feet)	Annual Inflow (acre-feet)	Average <sup>1</sup> Annual Inflow (acre-feet)		
2000	536,200	<b>640,100</b> (1977-2006 avg.)	664,000	<b>819,100</b> (1977-2006 avg.)		
2001	374,800		507,100			
2002	552,500		665,700			
2003	667,900		782,700			
2004	387,000		<b>716,600</b> (1970-1999 avg.)		561,400	<b>914,000</b> (1970-1999 avg.)
2005	513,400				680,000	
2006	545,900				701,600	
<b>2007</b> Expected 410,000 Min 360,000	Expected 564,000 Min 514,000					

<sup>1</sup> 30-year average 1977-2006

# Buffalo Bill Reservoir Outflow

Water Year	Outflow (acre-feet)	Average <sup>1</sup> Outflow (acre-feet)
2000	<b>774,500</b> (wr 350 cfs)	<b>814,600</b>
2001	<b>638,100</b> (wr 350 cfs)	
2002	<b>573,600</b> (wr 100 cfs)	
2003	<b>675,400</b> (wr 100 cfs)	
2004	<b>587,800</b> (wr 100 cfs)	
2005	<b>668,300</b> (wr 150 cfs)	
2006	<b>710,200</b> (wr 200 cfs)	
<b>2007</b>	<b>Expected 610,000</b> <b>Min 610,000</b> (wr 200 cfs)	

<sup>1</sup> 30-year average 1977-2006 wr = winter release

# Exhibit A: Buffalo Bill Reservoir Winter Release Criteria

Projected for 2008 150 cfs

## Previous Water Year Total Inflow is greater than 650,000 Acre-feet

< winter release set based on previous end-of-year reservoir content  
(Go to End-of-Year Reservoir Content Criteria Below, BOX #2)

2007 Annual Inflow 579,000 AF

Sept. 30, 2007 Res Content 391,700 AF

Sept. 30, 2007 State Account 179,000 AF

## Previous Water Year Total Inflow 650,000 Acre-feet or Less (Critical Low Flow Year)

< winter release set based on previous end-of-year State Account content  
(Go to State Account end-of year content, BOX #3)

### BOX #2

#### Reservoir end-of-year Content:

Less than 375,000 AF  
375,000 - 475,000 AF  
Greater than 475,000 AF

#### Winter Release:

Go to BOX #3  
Go to BOX #4  
Go to BOX #5

### BOX #3

#### State Account end-of-year content:

Greater than 60,000 AF  
60,000 AF or less

#### Winter Release:

150 cfs  
100 cfs

### BOX #4

#### State Account end-of-year Content:

Greater than 95,000 AF  
60,001 - 95,000 AF  
60,000 AF or less

#### Winter Release:

200 cfs  
150 cfs  
100 cfs

### BOX #5

#### State Account end-of-year Content:

Greater than 150,000 AF  
95,001 - 150,000 AF  
60,001 - 95,000 AF  
60,000 AF or less

#### Winter Release:

350 cfs  
200 cfs  
150 cfs  
100 cfs

50 cfs of the winter release comes from the Shoshone Project Account.



# Buffalo Bill Reservoir Allocations

Dam Crest Elev. 5395.0

**Surcharge - 144,645 Acre-Feet at Elev. 5410.0** (Note: Dam Crest designed as emergency Spillway to be overtopped by 15 feet)

South Fork Dike Crest Elev. 5401.0

Content 2575 Acre-Feet

South Fork Ungated Spillway Crest Elev. 5394.0

**Top of Active Conservation Elev. 5393.5 (646,565 Acre-Feet)**

North Fork Dike Crest Elev. 5370.0

Content 1639 Acre-Feet

South Fork Outlet Elev. 5367.6

North Fork Ungated Spillway Crest Elev. 5365.0

North Fork Outlet Elev. 5340.0



IRRIGATION



RECREATION



POWER

**Active Conservation - 604,817 Acre-Feet**



FISH

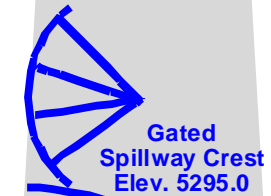


INDUSTRIAL



MUNICIPAL

FLOOD CONTROL



Gated Spillway Crest Elev. 5295.0

Invert Left Abutment Outlet Elev. 5174.84

Invert Shoshone Canyon Conduit Elev. 5252.58

Invert River Outlet & Shoshone Penstock Elev. 5132.25

Top of Inactive Conservation Elev. 5259.6 (41,748 Acre-Feet)

**Inactive Conservation - 41,748 Acre-Feet**

Top of Dead Elev. 5158.0

Dead - 0 Acre-Feet

Streambed Elev. 5125.0

# Buffalo Bill Reservoir Storage Accounts

Top of Active Conservation Elev. 5393.5 (646,565 Acre-Feet)

Dam Crest Elev. 5395.0

State Account  
189,965 Acre-Feet

Shoshone Project Account  
330,710 Acre-Feet

Polecat Bench Account  
69,081 Acre-Feet

Private Account  
15,061 Acre-Feet

Old Crest of Dam Elev. 5370.0 ft.

Active Conservation -  
604,817 Acre-Feet

Gated Spillway Crest Elev. 5295.0

Invert Left Abutment Outlet Elev. 5174.84

Invert Shoshone Canyon Conduit Elev. 5252.58

Top of Inactive Conservation Elev. 5259.6 ft.

Inactive Conservation - 41,748 Acre-Feet

Top of Dead Elev. 5158.0

Invert River Outlet & Shoshone Penstock Elev. 5132.25 ft.

Dead - 0 Acre-Feet

Streambed Elev. 5125.0

Note: Symbols represent typical reservoir uses.

Based on expected April - July inflow of 410 kaf

BUFFALO BILL RESERVOIR MONTHLY OPERATIONS

Buffalo Bill Reservoir		Initial Cont 559.1 kaf Elev 5382.89 ft				Maximum Cont 643.1 kaf Elev 5393.50 ft				Minimum Cont 41.8 kaf Elev 5259.64 ft			
2007	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
<b>Monthly Inflow</b>	kaf	141.1	50.9	25.7	21.2	27.7	22.3	17.8	15.6	13.6	16.4	34.7	143.7
Shoshone Release	kaf	6.0	6.2	6.2	6.0	9.2	8.9	9.2	9.2	8.6	9.2	8.9	6.2
Non-Power Release	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
Total Flow Below Dam	kaf	6.0	6.2	6.2	6.0	9.2	8.9	9.2	9.2	8.6	9.2	8.9	6.2
Buffalo Bill Release	kaf	48.6	51.0	52.3	38.7	0.0	0.0	0.0	0.0	0.0	0.0	6.5	52.7
Municipal Delivery	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heart Mtn Release	kaf	8.1	13.2	4.5	5.3	9.2	0.0	0.0	0.0	0.0	0.0	9.0	6.0
Heart Mtn Delivery	kaf	42.0	48.0	41.0	28.0	8.0	0.0	0.0	0.0	0.0	0.0	7.0	36.0
<b>Total Outflow</b>	kaf	105.0	118.7	104.3	78.3	26.7	9.2	9.5	9.5	8.9	9.5	31.7	101.2
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
End-Month Targets	kaf	634.2	643.1		502.0								
End-Month Content	kaf	595.2	527.4	448.8	391.7	392.7	405.8	414.1	420.2	424.9	431.8	434.8	477.3
Est Total Storage	kaf	598.6	530.8	452.2	395.1	396.1	409.2	417.5	423.6	428.3	435.2	438.2	480.7
<b>End-Month Elevation</b>	ft	5387.58	5378.69	5367.87	5359.35	5359.50	5361.52	5362.78	5363.70	5364.41	5365.43	5365.86	5371.87
Net Change Content	kaf	36.1	-67.8	-78.6	-57.1	1.0	13.1	8.3	6.1	4.7	6.9	3.0	42.5
Flow Below BB Pwr	kaf	54.6	57.2	58.5	44.7	9.2	8.9	9.2	9.2	8.6	9.2	15.4	58.9
Flow Below BB Pwr	cfs	918	930	951	751	150	150	150	150	150	150	259	958
Spring Inflow	kaf	3.6	3.7	3.7	3.6	3.7	3.6	3.7	3.7	3.5	3.7	3.6	3.7
Passing Cody Gage	kaf	66.3	74.1	66.7	53.6	22.1	12.5	12.9	12.9	12.1	12.9	28.0	68.6
Passing Cody Gage	cfs	1114	1205	1085	901	359	210	210	210	210	210	471	1116