

# RECLAMATION

*Managing Water in the West*

## BASIN ADVISORY GROUP MEETING

Lyle Myler  
Wyoming Area Office

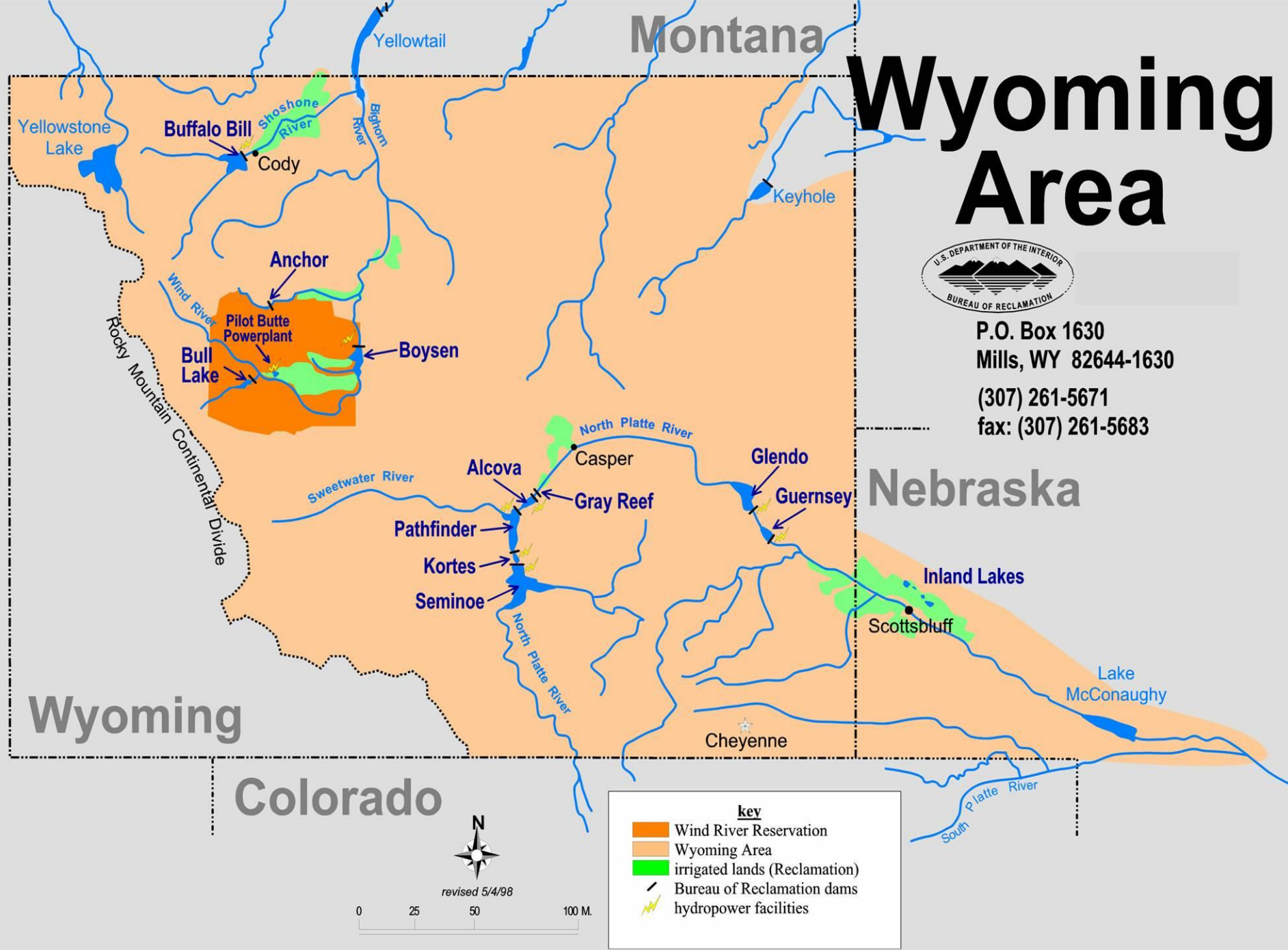


April 23, 2014

# Wyoming Area



P.O. Box 1630  
Mills, WY 82644-1630  
(307) 261-5671  
fax: (307) 261-5683



Wyoming

Colorado

Nebraska

**key**

- Wind River Reservation
- Wyoming Area
- irrigated lands (Reclamation)
- Bureau of Reclamation dams
- hydropower facilities



# Wyoming – NRCS

Report #26

Monday Morning Snow Report

Apr. 21<sup>st</sup>, 2014

This is the 26<sup>th</sup> Monday Snow Report for the 2014 Water Year. Last year at this time the state median was 105% with a low of 72% and a high of 131% of median. This year the state median is 138% with a low of 100% and a high of 165% of median. See the table and map below for more information. The map may differ slightly from the table depending on the stations reporting & date.

For those of you with INTERNET access, this report and map showing SWE percentages for the state can be found at: <http://www.wrds.uwyo.edu/wrds/nrcs/nrcs.html>. Median info at: [http://www.wcc.nrcs.usda.gov/normals/median\\_average.htm](http://www.wcc.nrcs.usda.gov/normals/median_average.htm)

**SNOW WATER EQUIVALENT (SWE) AS PERCENT OF MEDIAN - The following table shows the percent of median for 3 recent dates, and then the percent of median a year ago along with its preceding week in the last 2 columns. SWE percent of medians are for Wyoming basins. The median is based on reporting SNOTEL sites in a basin, and does not include manually measured snow courses. Medians are computed using the period 1981 through 2010.**

DRAINAGE BASIN	4/21/2014	4/14/2014	4/7/2014	4/21/2013	4/14/2013
SNAKE RIVER	142	147	144	101	96
MADISON	117	128	122	94	95
YELLOWSTONE	152	154	154	99	97
WIND RIVER	117	124	129	92	83
BIGHORN BASIN	151	154	150	105	96
SHOSHONE RIVER	148	152	155	96	92
POWDER	165	157	159	113	103
TONGUE	151	148	141	92	86
BELLE FOURCHE	*	206	147	*	94
CHEYENNE	141	138	140	144	96
UPPER N. PLATTE	125	123	127	97	82
SWEETWATER	100	99	116	72	67
LOWER N. PLATTE	125	127	129	93	72
LARAMIE	144	139	137	104	84
S. PLATTE	176	152	142	131	90
LITTLE SNAKE RIVER	122	121	126	100	76
UPPER GREEN	159	160	159	93	85
LOWER GREEN	124	133	130	120	95
UPPER BEAR	107	110	117	99	83
<b>Weighted State Average</b>	<b>138</b>	<b>142</b>	<b>140</b>	<b>105</b>	<b>89</b>

red = down

blue = up

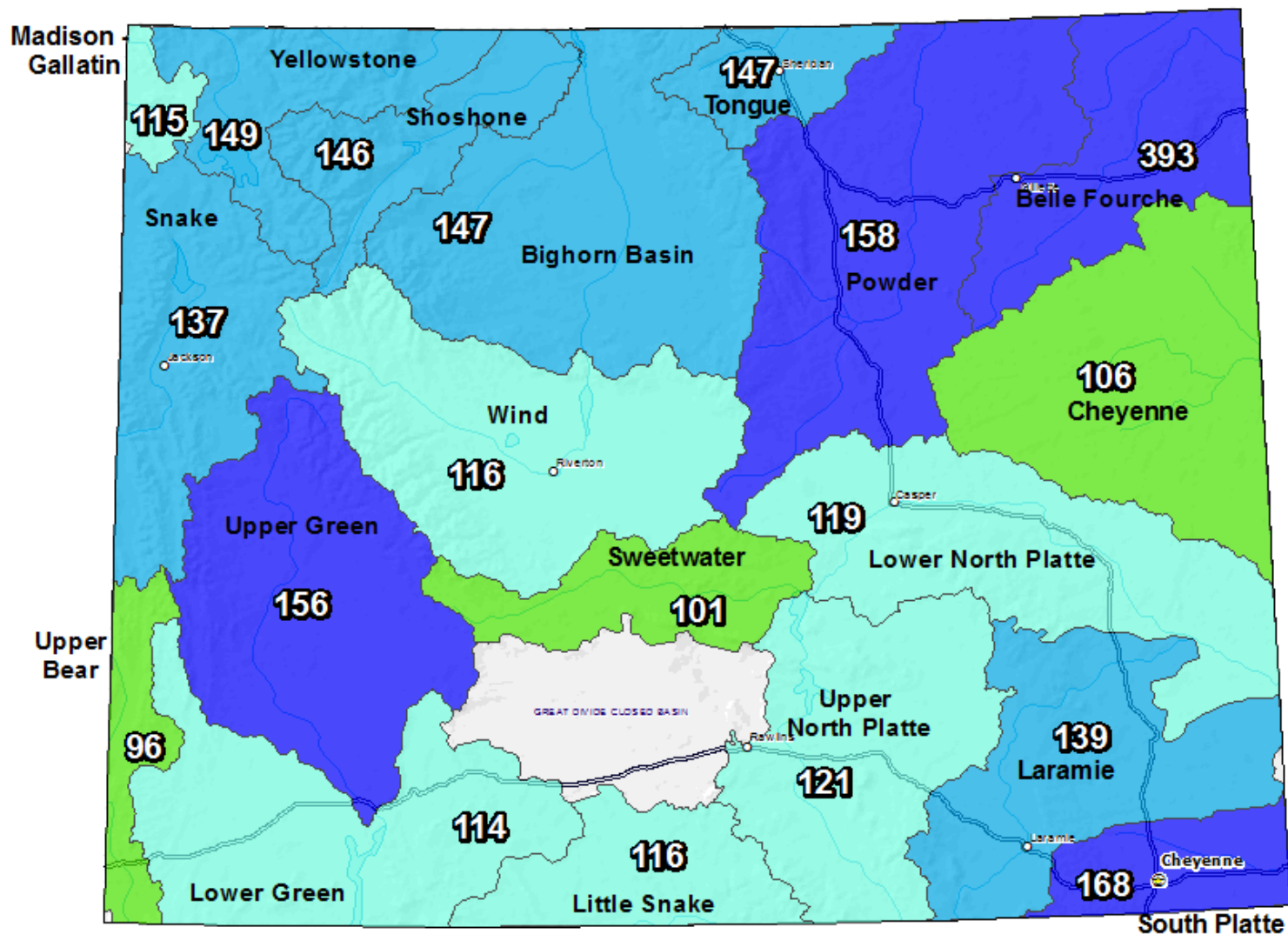
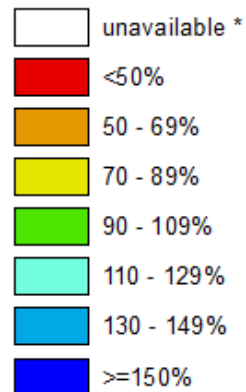
green = same

\* data is suspect

# Wyoming SNOTEL Current Snow Water Equivalent (SWE) % of Normal

**Apr 23, 2014**

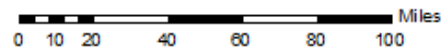
Current Snow Water Equivalent (SWE)  
Basin-wide Percent  
of 1981-2010 Median



*Provisional Data  
Subject to Revision*



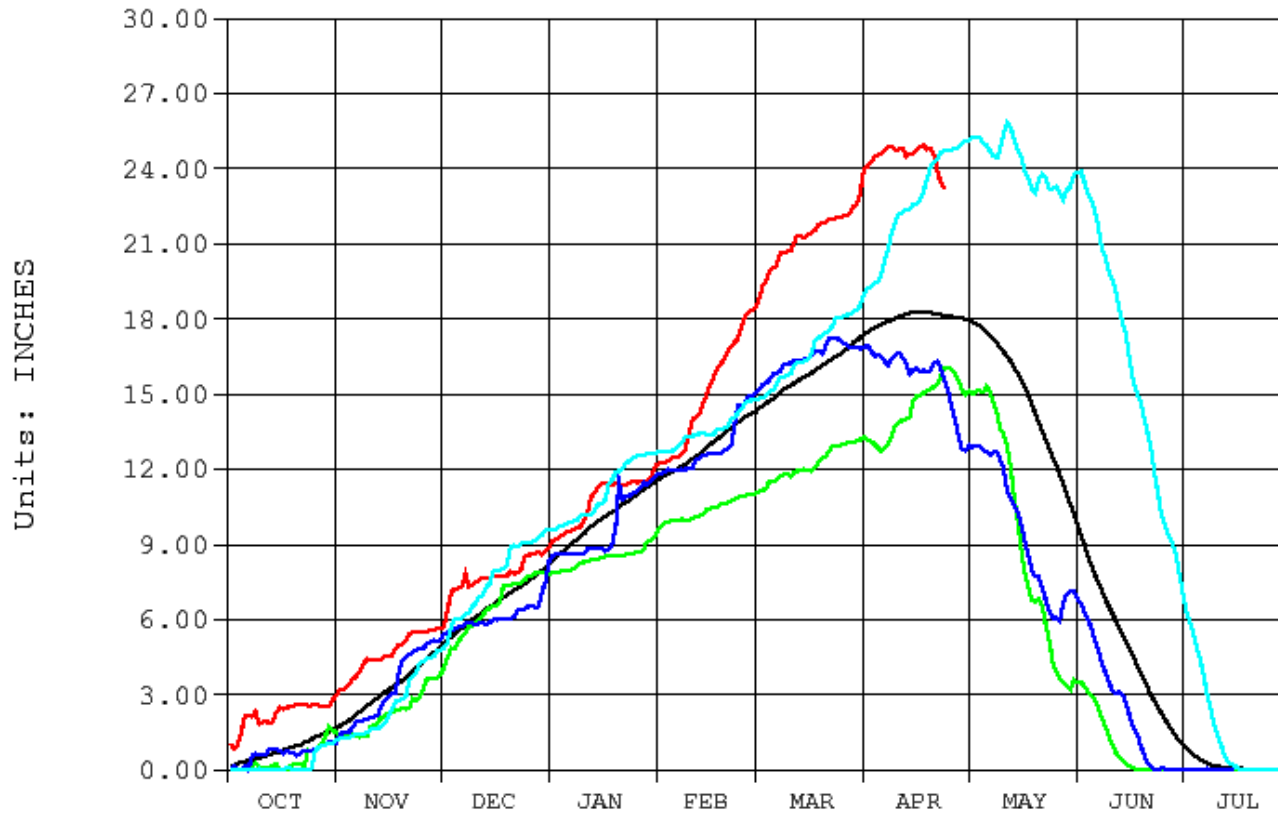
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).



Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

# Basin above Buffalo Bill Reservoir Snow Water Equivalent

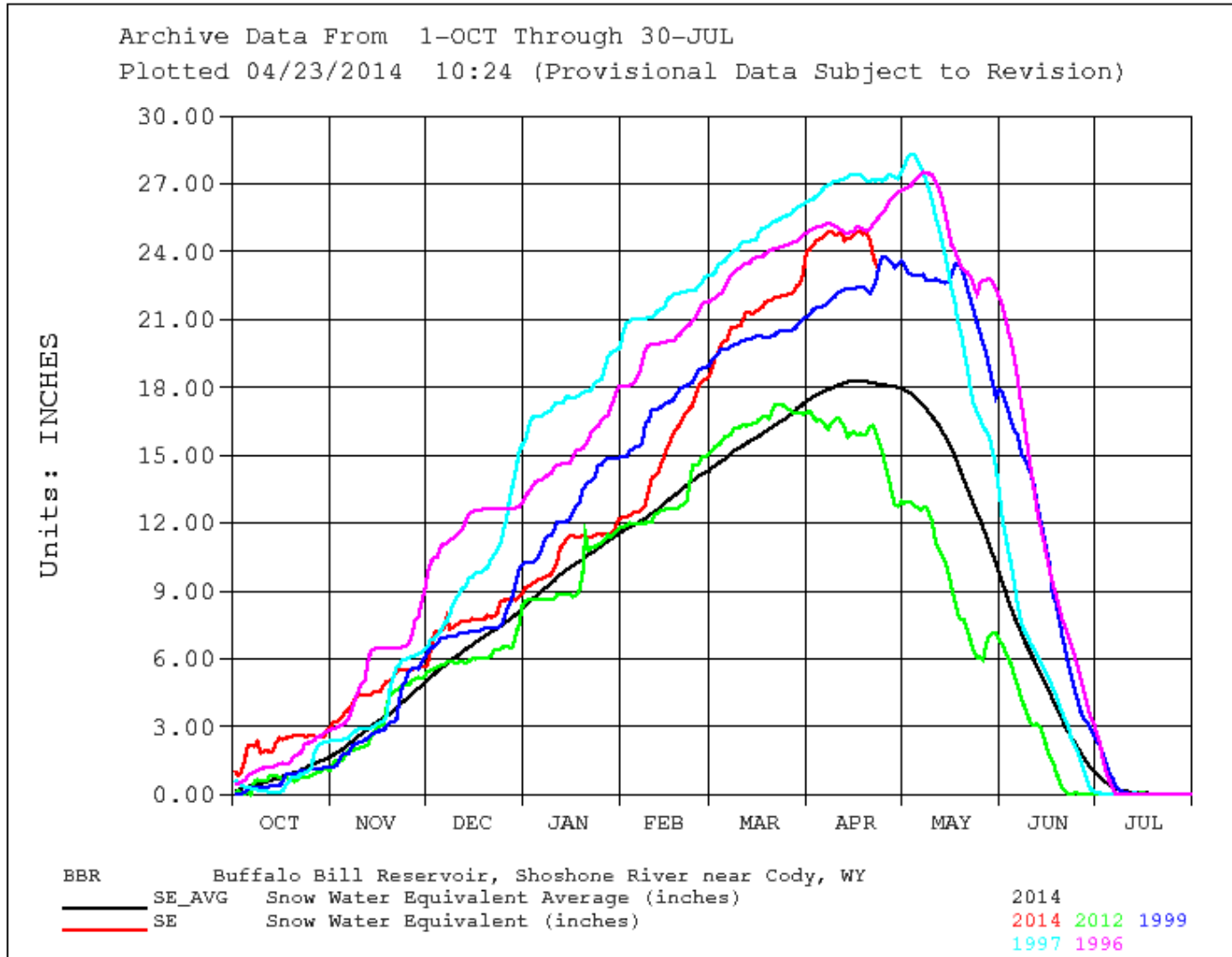
Archive Data From 1-OCT Through 30-JUL  
Plotted 04/23/2014 10:22 (Provisional Data Subject to Revision)



BBR Buffalo Bill Reservoir, Shoshone River near Cody, WY  
 SE\_AVG Snow Water Equivalent Average (inches) 2014  
 SE Snow Water Equivalent (inches) 2014 2013 2012  
 2011

Water Year	April-July Inflow (acre-feet)
2011	1,230,400
2012	591,700
2013	576,500
2014	?
Average = 665,400	

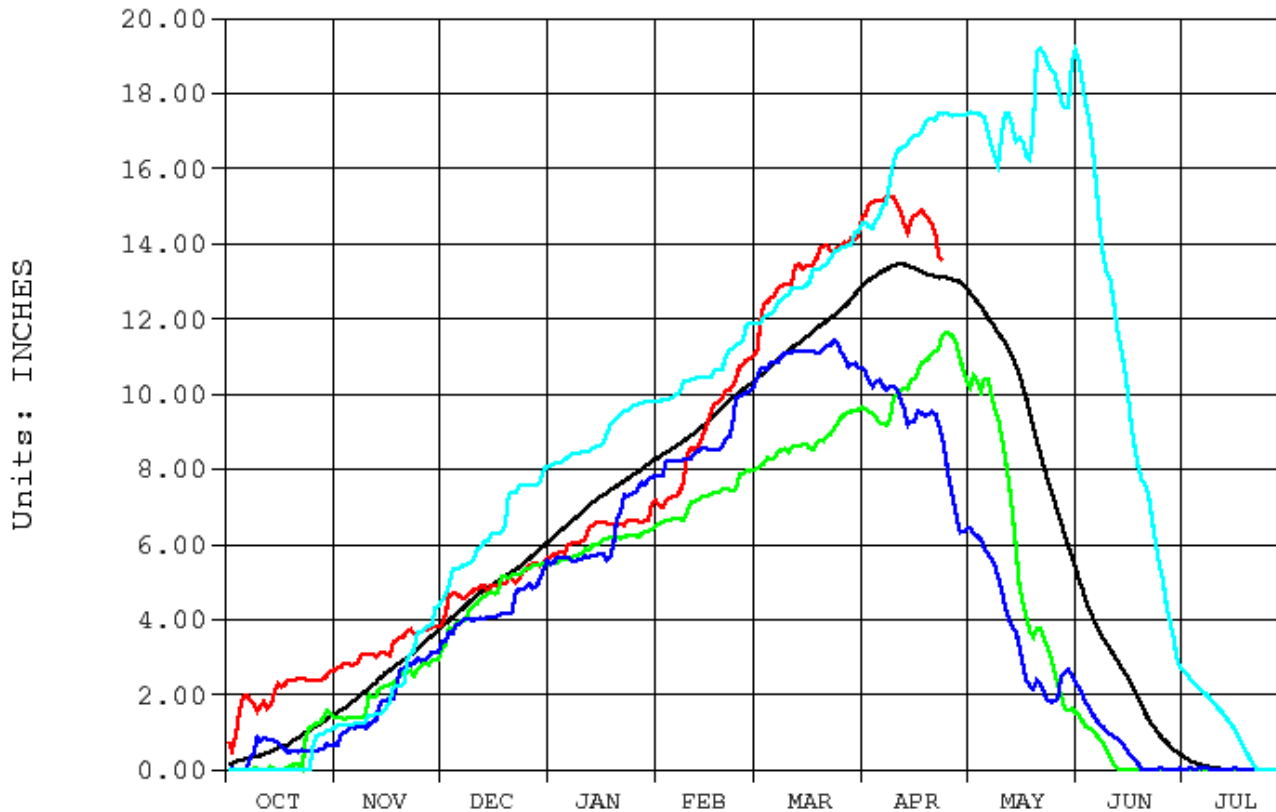
# Basin above Buffalo Bill Reservoir Snow Water Equivalent



Water Year	April-July Inflow (acre-feet)
1996	1,114,100 April 1 forecast 885,000
1997	1,136,000 April 1 forecast 1,175,000
1999	833,200 April 1 forecast 810,000
2012	591,700 April 1 forecast 700,000
2014	? April 1 forecast 1,000,000
<b>Average = 665,400</b>	

# Basin above Boysen Reservoir Snow Water Equivalent

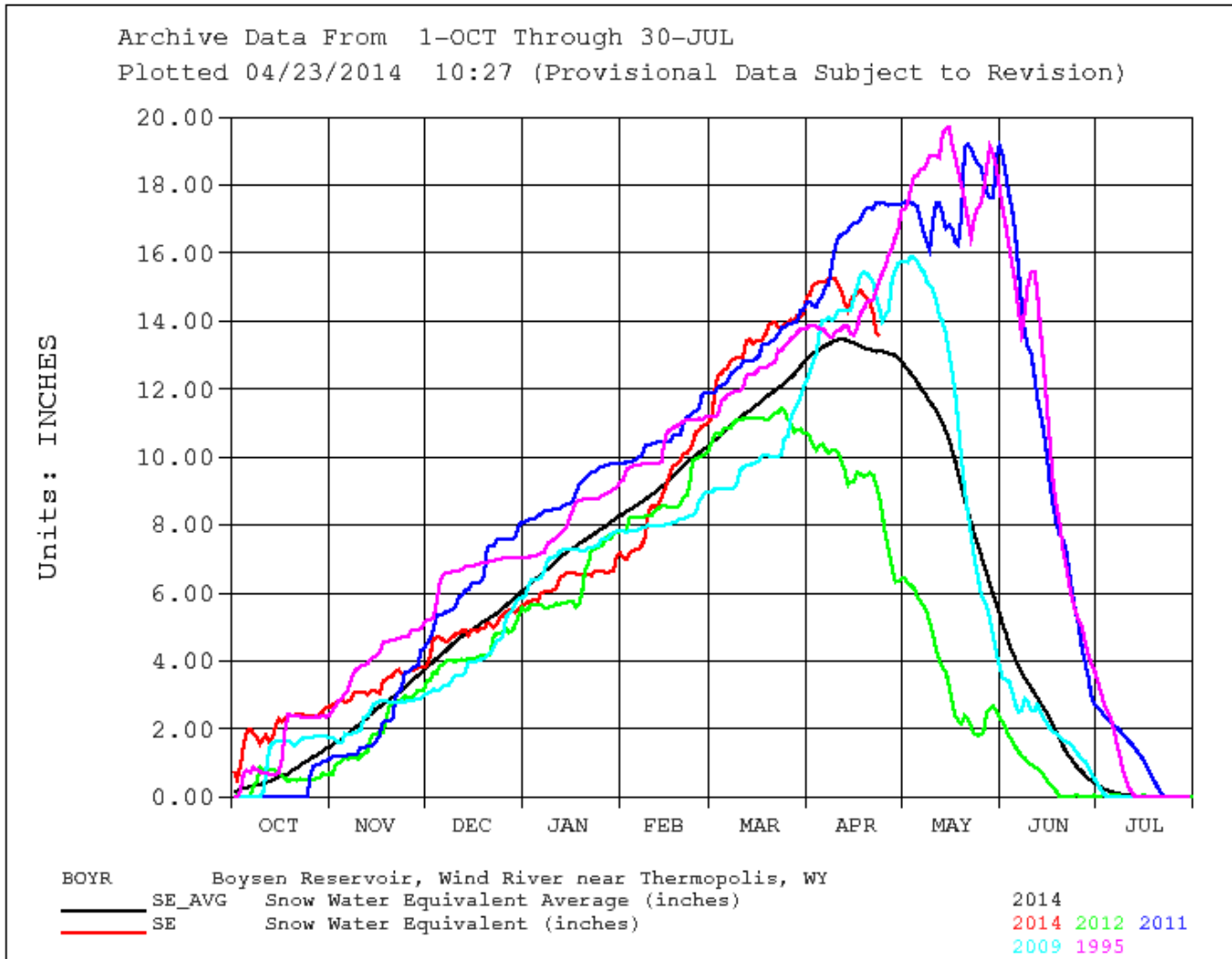
Archive Data From 1-OCT Through 30-JUL  
Plotted 04/23/2014 10:25 (Provisional Data Subject to Revision)



BOYR Boysen Reservoir, Wind River near Thermopolis, WY  
 SE\_AVG Snow Water Equivalent Average (inches) 2014  
 SE Snow Water Equivalent (inches) 2014 2013 2012  
 2011

Water Year	April-July Inflow (acre-feet)
2011	994,700
2012	219,100
2013	216,300
2014	?
<b>Average</b> <b>534,000</b>	

# Basin above Boysen Reservoir Snow Water Equivalent



Water Year	April-July Inflow (acre-feet)
1995	<b>1,129,800</b> April 1 forecast 550,000
2009	<b>803,000</b> April 1 forecast 475,000
2011	<b>994,700</b> April 1 forecast 670,000
2012	<b>219,100</b> April 1 forecast 550,000
2014	<b>?</b> April 1 forecast 850,000
<b>Average 534,000</b>	



# Water Supply Forecast

## April 1 Forecast of April – July Snowmelt Runoff

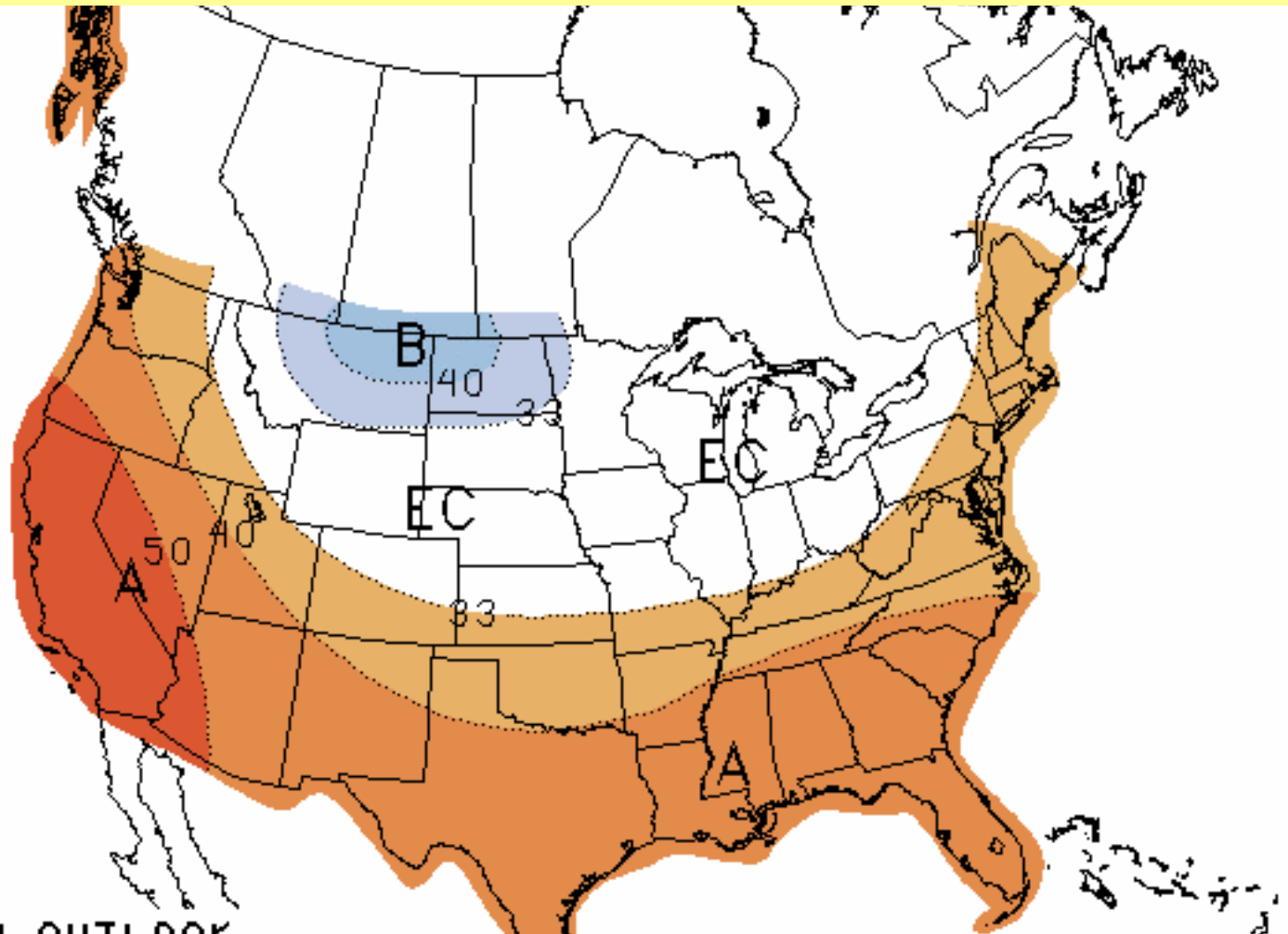
(1000 acre-feet)

Forecast Points	April 1, 2014 Forecast of April-July Runoff			30 Yr. April-July Runoff Avg. <sup>2</sup>	Expected % of Avg.	Comparative Actual April - July Runoff			
	Reasonable Minimum <sup>1</sup>	Expected	Reasonable Maximum <sup>1</sup>			W. Yr. 2013	W. Yr. 2012	W. Yr. 2011	W. Yr. 2010
Bull Lake Reservoir	145	175	205	137.2	128	106	118	187	151
Wind River above Bull Lake Creek	550	650	750	396.8	164	288	314	691	408
Boysen Reservoir	650	850	1050	534.0	159	216	219	995	861
Buffalo Bill Reservoir	850	1000	1150	665.4	150	577	592	1230	674

<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 1984-2013 period.

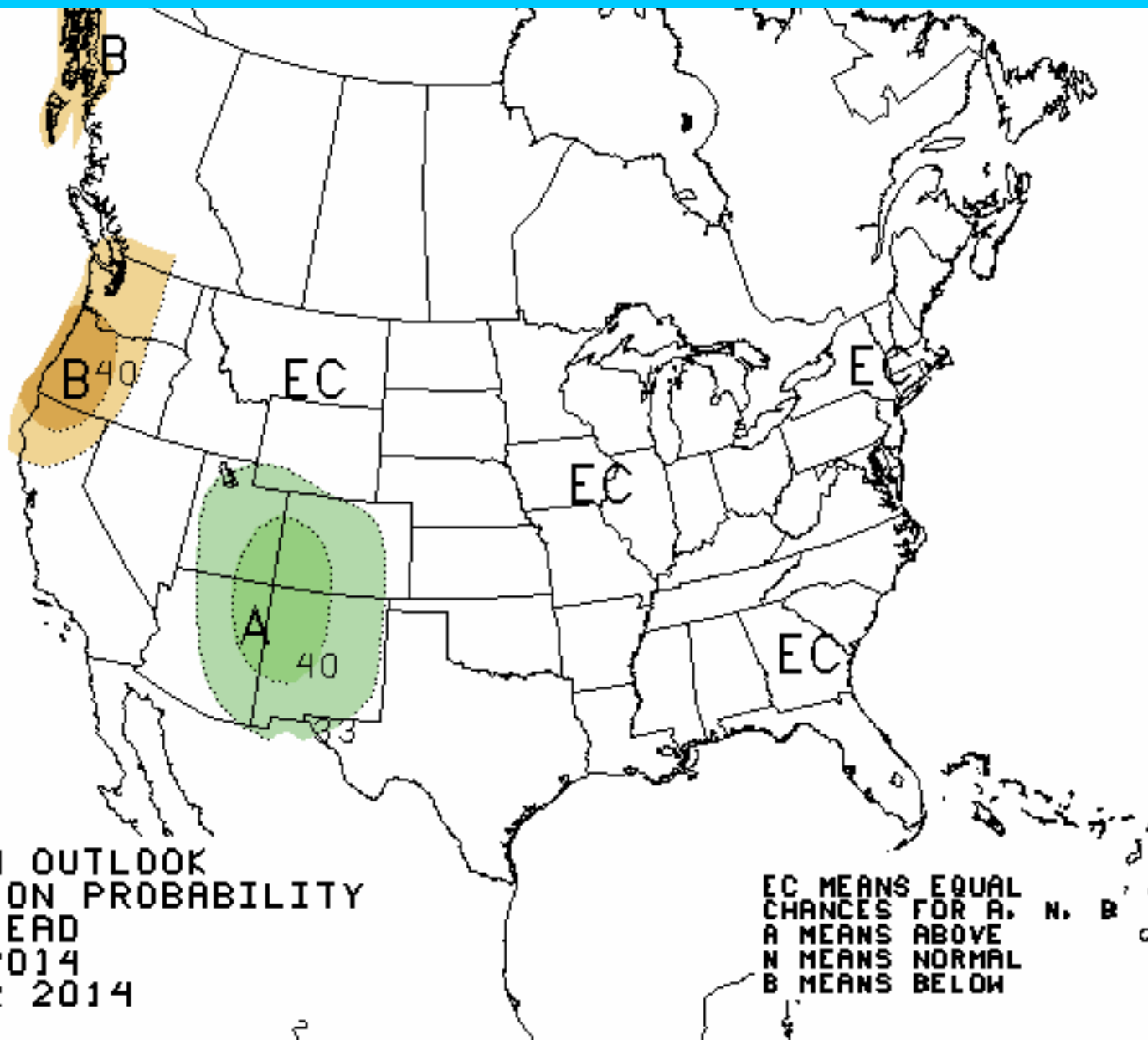
# Temperature Outlook - May, June, July



THREE-MONTH OUTLOOK  
TEMPERATURE PROBABILITY  
0.5 MONTH LEAD  
VALID MJJ 2014  
MADE 17 APR 2014

EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW

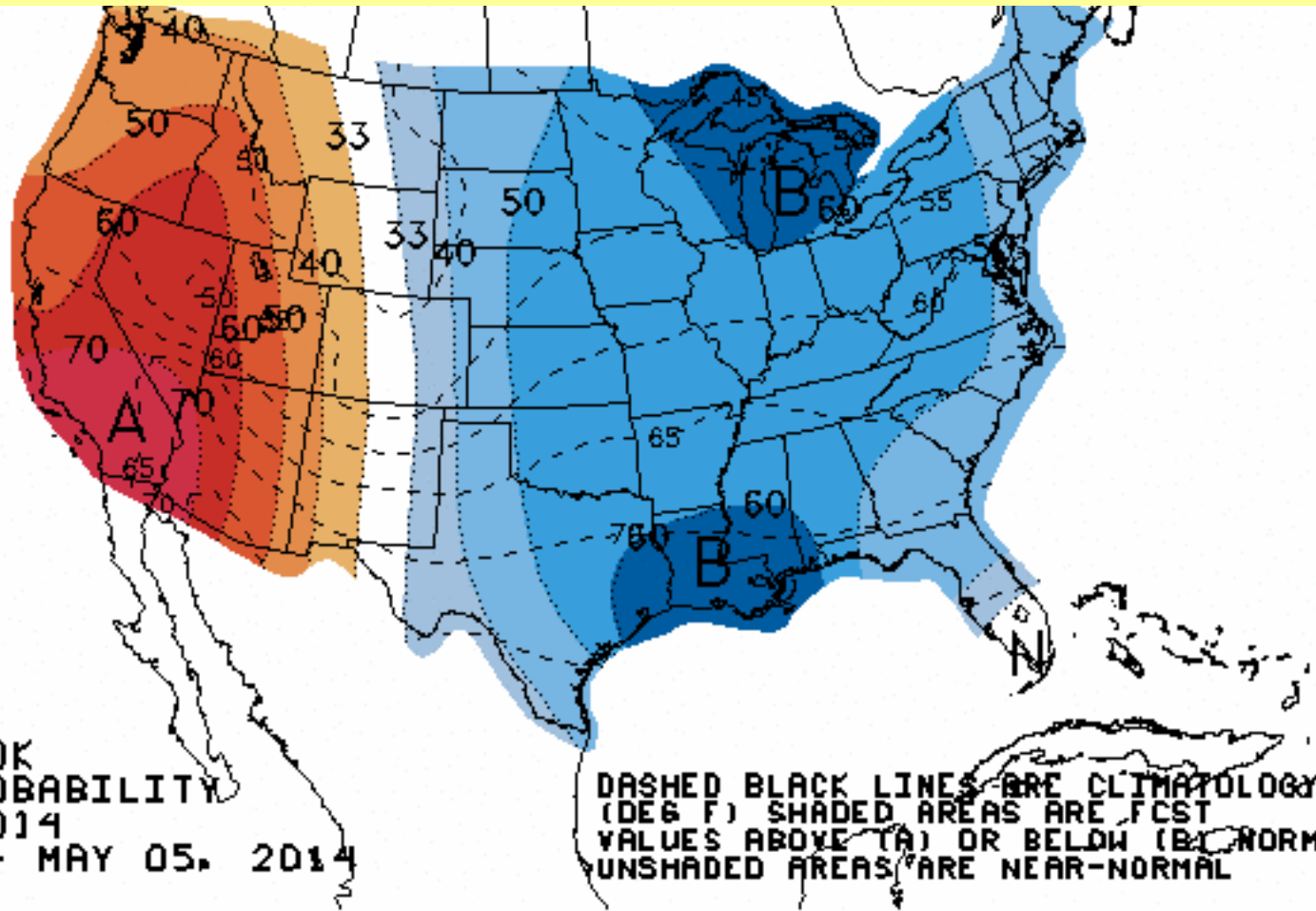
# Precipitation Outlook - May, June, July



THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
0.5 MONTH LEAD  
VALID MJJ 2014  
MADE 17 APR 2014

EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW

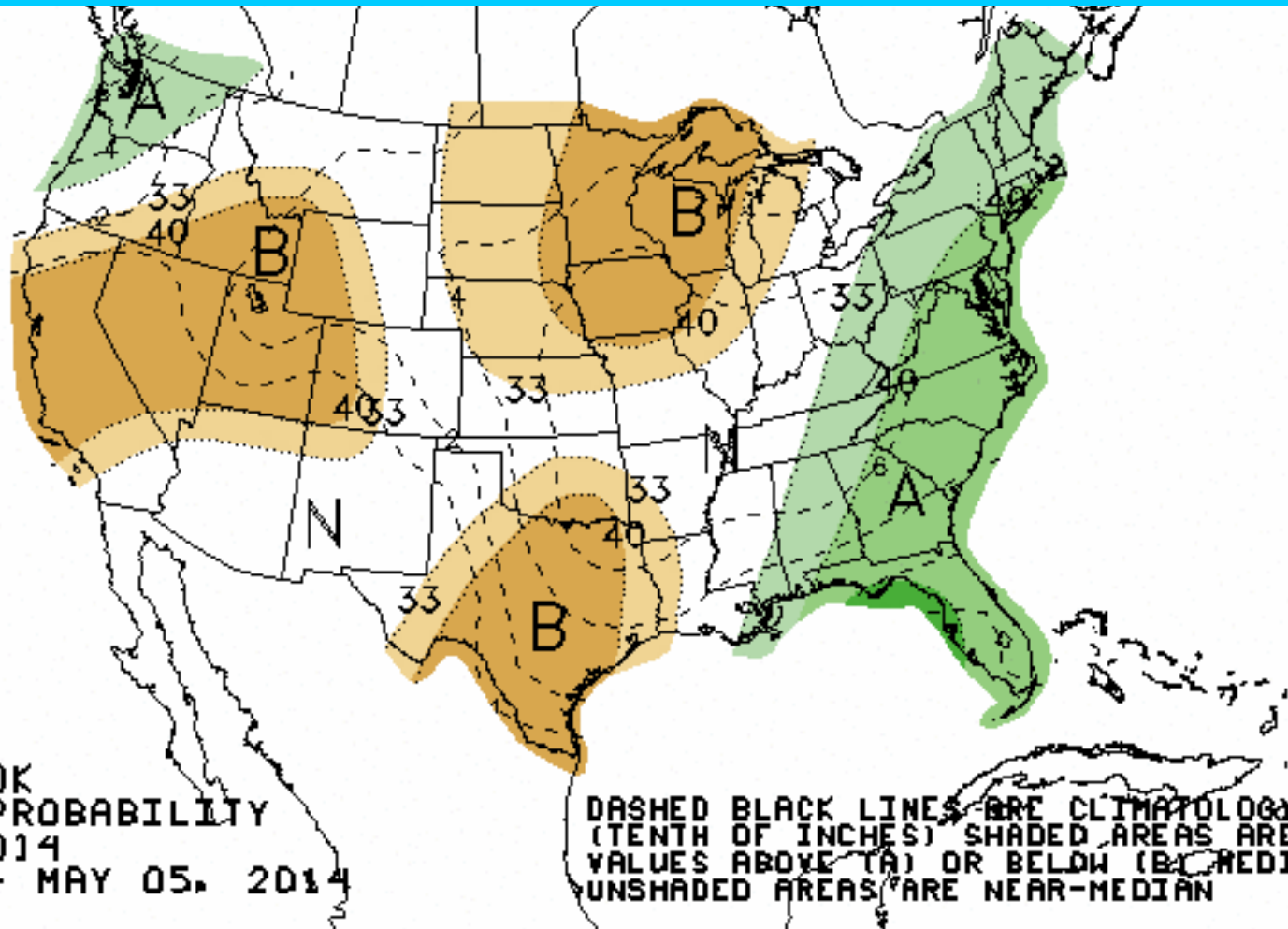
# 8-14 Day Temperature Outlook



8-14 DAY OUTLOOK  
TEMPERATURE PROBABILITY  
MADE 21 APR 2014  
VALID APR 29 - MAY 05, 2014

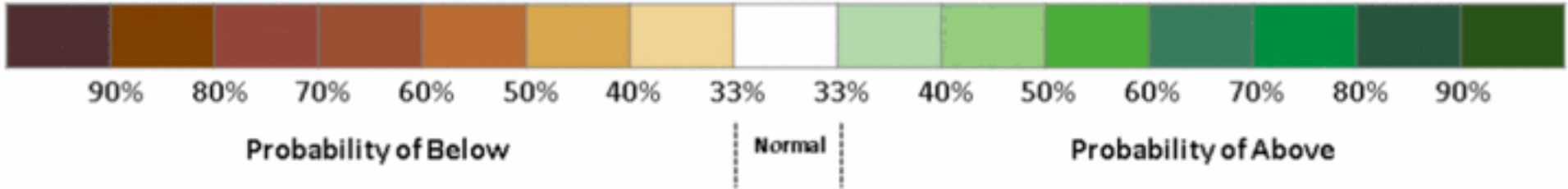
DASHED BLACK LINES ARE CLIMATOLOGY (DEG F) SHADED AREAS ARE FCST VALUES ABOVE (A) OR BELOW (B) NORMAL UNSHADED AREAS ARE NEAR-NORMAL

# 8-14 Day Precipitation Outlook



8-14 DAY OUTLOOK  
 PRECIPITATION PROBABILITY  
 MADE 21 APR 2014  
 VALID APR 29 - MAY 05, 2014

DASHED BLACK LINES ARE CLIMATOLOGY (TENTH OF INCHES) SHADED AREAS ARE FCS VALUES ABOVE (A) OR BELOW (B) MEDIAN UNSHADED AREAS ARE NEAR-MEDIAN



# Bighorn Basin Storage

(1000 acre-feet)

Reservoir	Total Storage End of March			End of March Historical Storage			Total Conservation Storage Capacity	Percent of Capacity
	W. Yr. 2014	30 Yr. Avg. <sup>1</sup>	% of Avg.	W. Yr. 2013	W. Yr. 2012	W. Yr. 2011		
Bull Lake	100.2	76.6	131	78.2	94.7	70.9	152.5	66
Boysen	607.2	545.9	111	528.1	639.4	595.4	741.6	82
Buffalo Bill	450.9	414.8 <sup>2</sup>	109	429.8	451.6	433.3	646.6	70
Pilot Butte	27.6	29.3	94	27.2	27.5	27.4	33.7	82

<sup>1</sup> Average is based on the 1984-2013 period.

<sup>2</sup> This does not reflect a long term 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 2013.

04/23/14

07:35 AM

## WYOMING AREA OFFICE RESERVOIR AND RIVER GAGE REPORT for 04/22/14

RESERVOIR	ELEVATION (feet)	TOTAL STORAGE (ac - ft)	DAILY INFLOW <sup>1</sup> (cfs)	DAILY OUTFLOW (cfs)	FEET TO FILL	SPACE TO FILL (ac - ft)	PERCENT FULL (%)	HISTORIC DAILY AVG. (%)
-----------	---------------------	-------------------------------	---------------------------------------	---------------------------	--------------------	-------------------------------	------------------------	-------------------------------

### WIND/BIGHORN RIVER BASIN

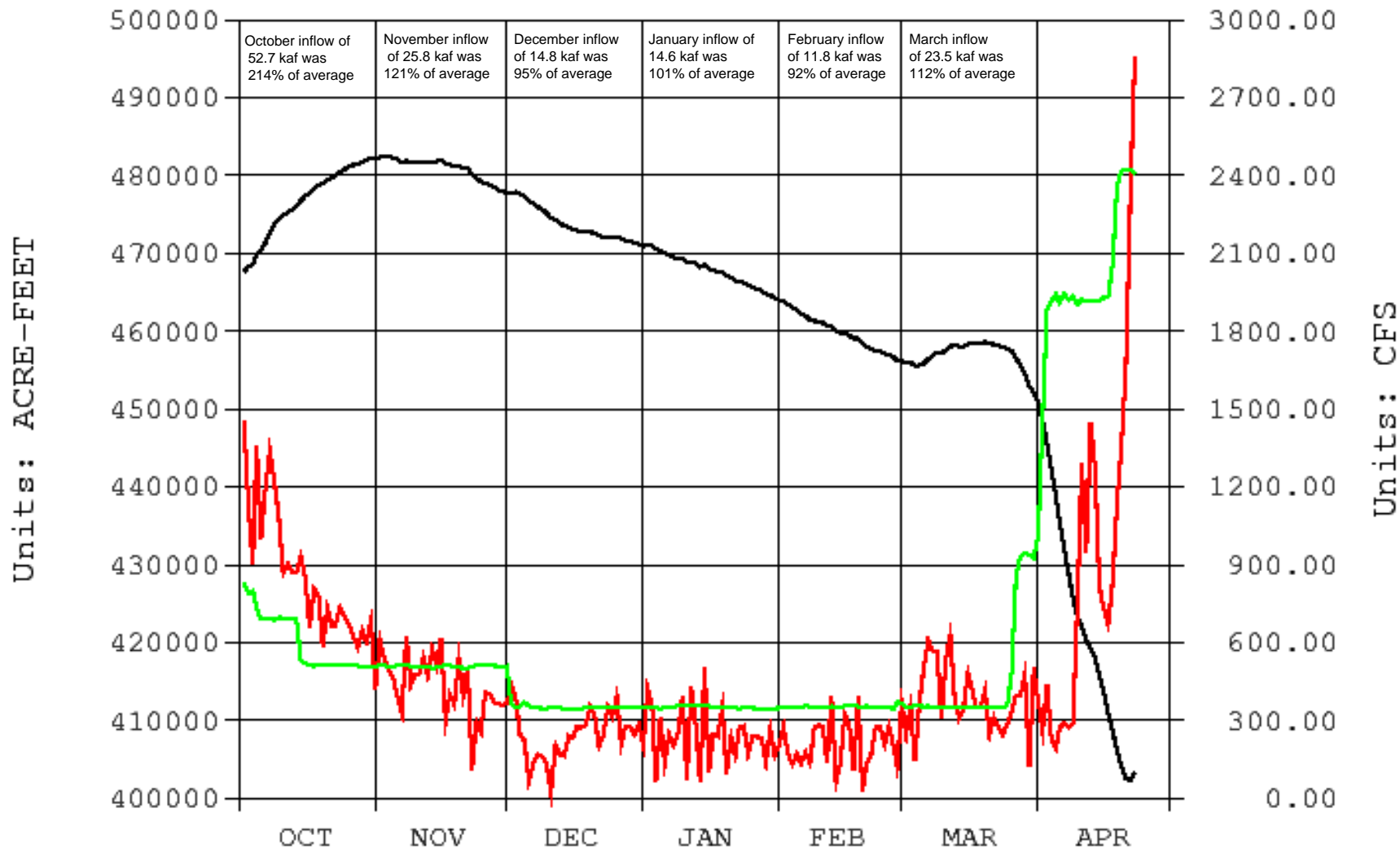
BULL LAKE RESERVOIR	5787.53	101,079	138	43	17.47	51,380	66	132
PILOT BUTTE RESERVOIR	5455.27	29,580	97	110	4.73	4,141	88	96
BOYSEN RESERVOIR	4715.45	572,655	1,222	2,006	9.55	168,939	77	107
ANCHOR RESERVOIR <sup>3</sup>							3	
BIGHORN LAKE, MT	3607.44	749,478	5,702	7,670	32.56	271,095	73	95

### SHOSHONE RIVER BASIN

BUFFALO BILL RESERVOIR	5360.51	403,241	2,859	2,404	32.99	243,324	62	99
------------------------	---------	---------	-------	-------	-------	---------	----	----

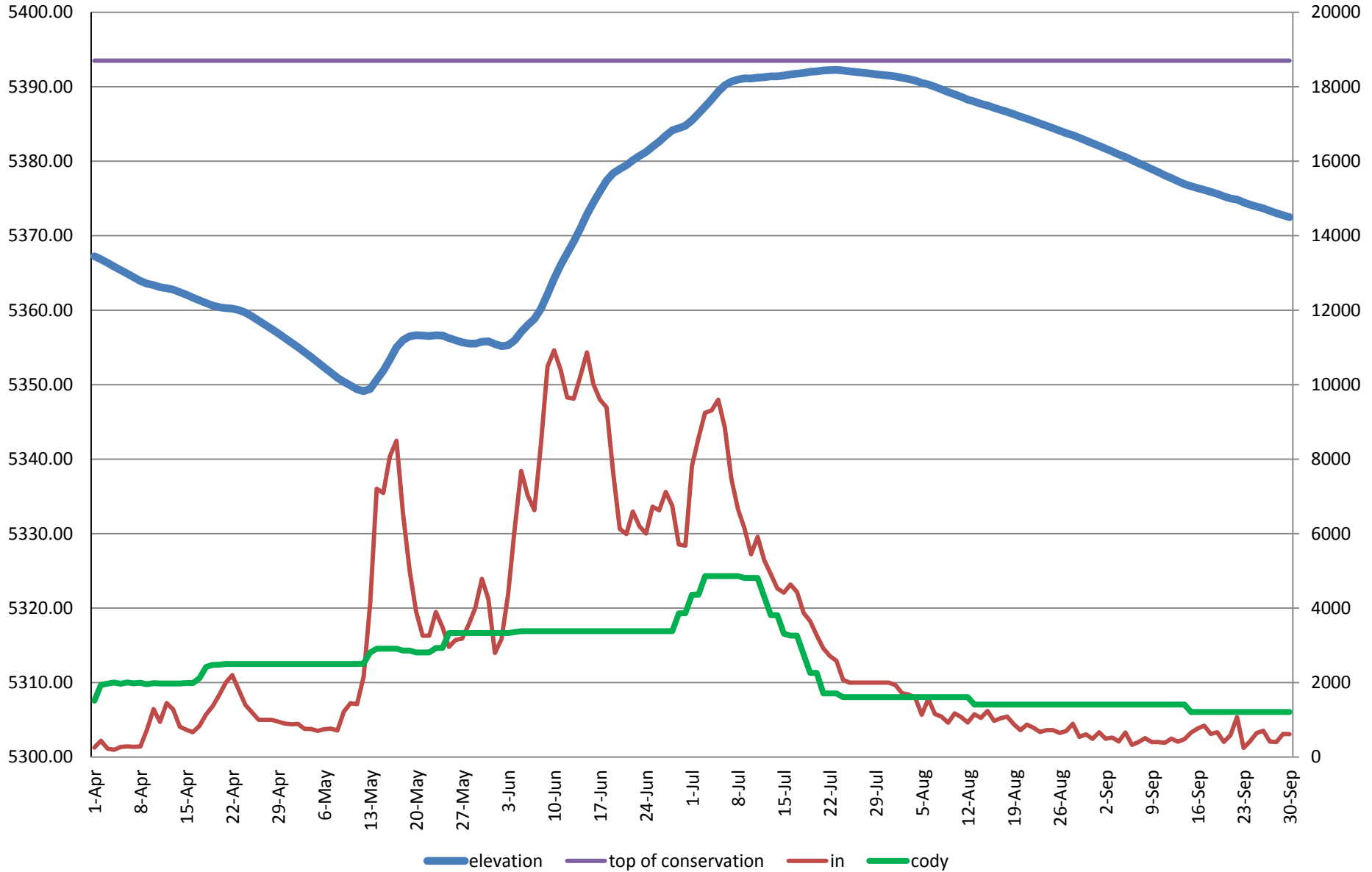
Archive Data From 1-OCT Through 30-APR

Plotted 04/23/2014 07:25 (Provisional Data Subject to Revision)



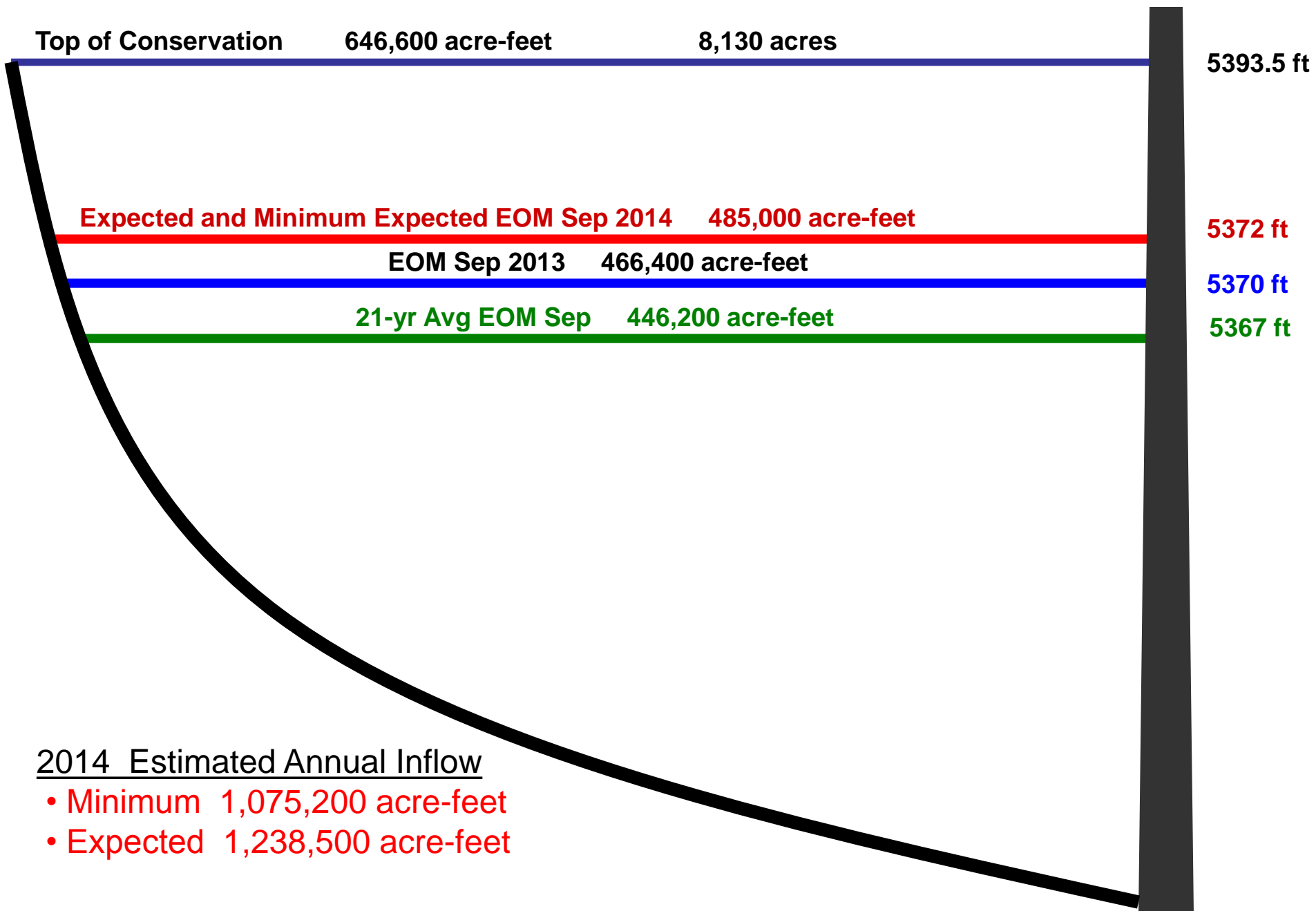
BBR Buffalo Bill Reservoir, Shoshone River near Cody, WY  
— AF Reservoir Storage Content (acre-feet) 2014  
— IN Daily Mean Computed Inflow (cfs) 2014  
— QD Daily Mean Total Discharge (cfs) 2014

# 2014 Buffalo Bill Operation with 1996 Inflow Adjusted to Match April Forecast



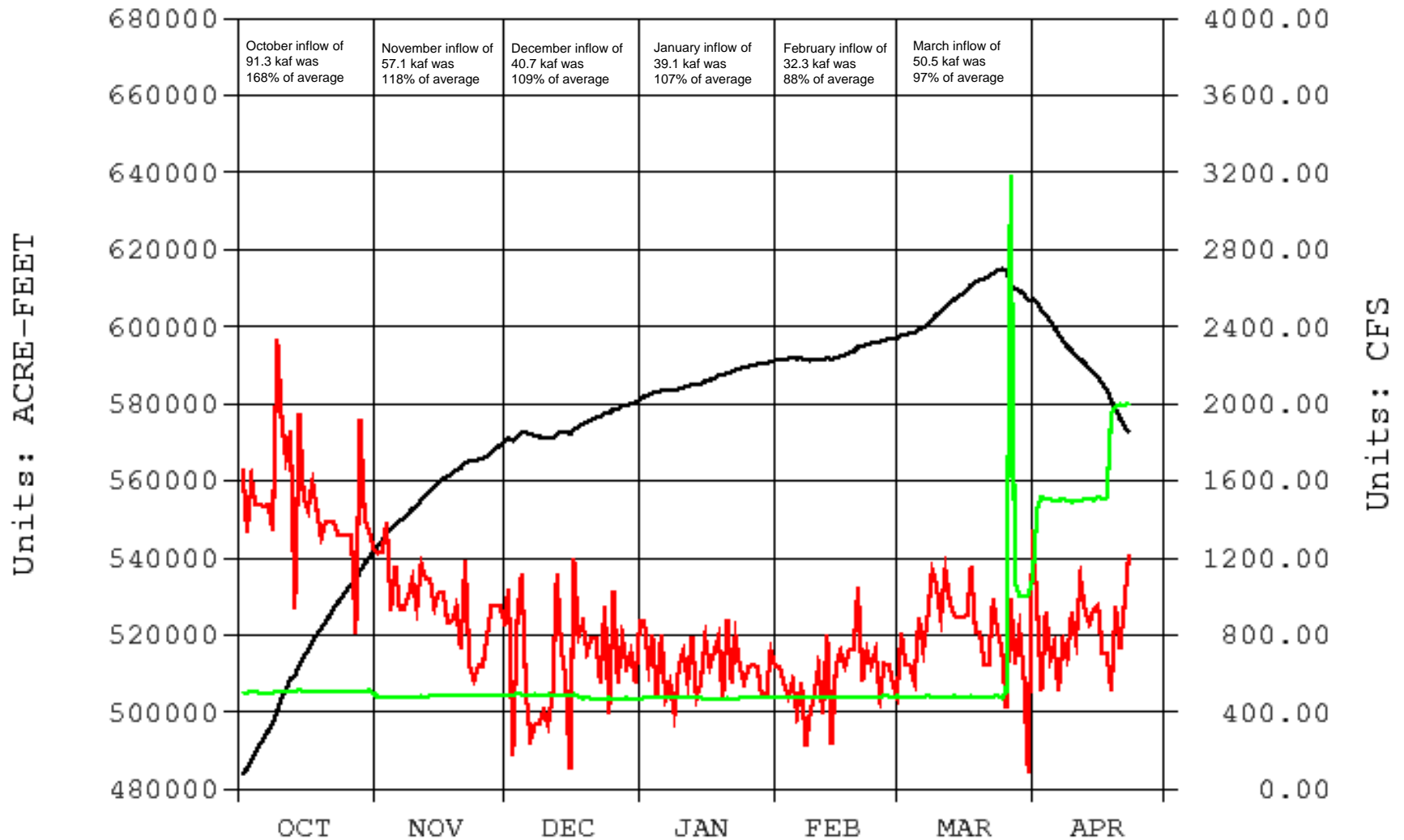


# Buffalo Bill Reservoir



Archive Data From 1-OCT Through 30-APR

Plotted 04/23/2014 07:29 (Provisional Data Subject to Revision)

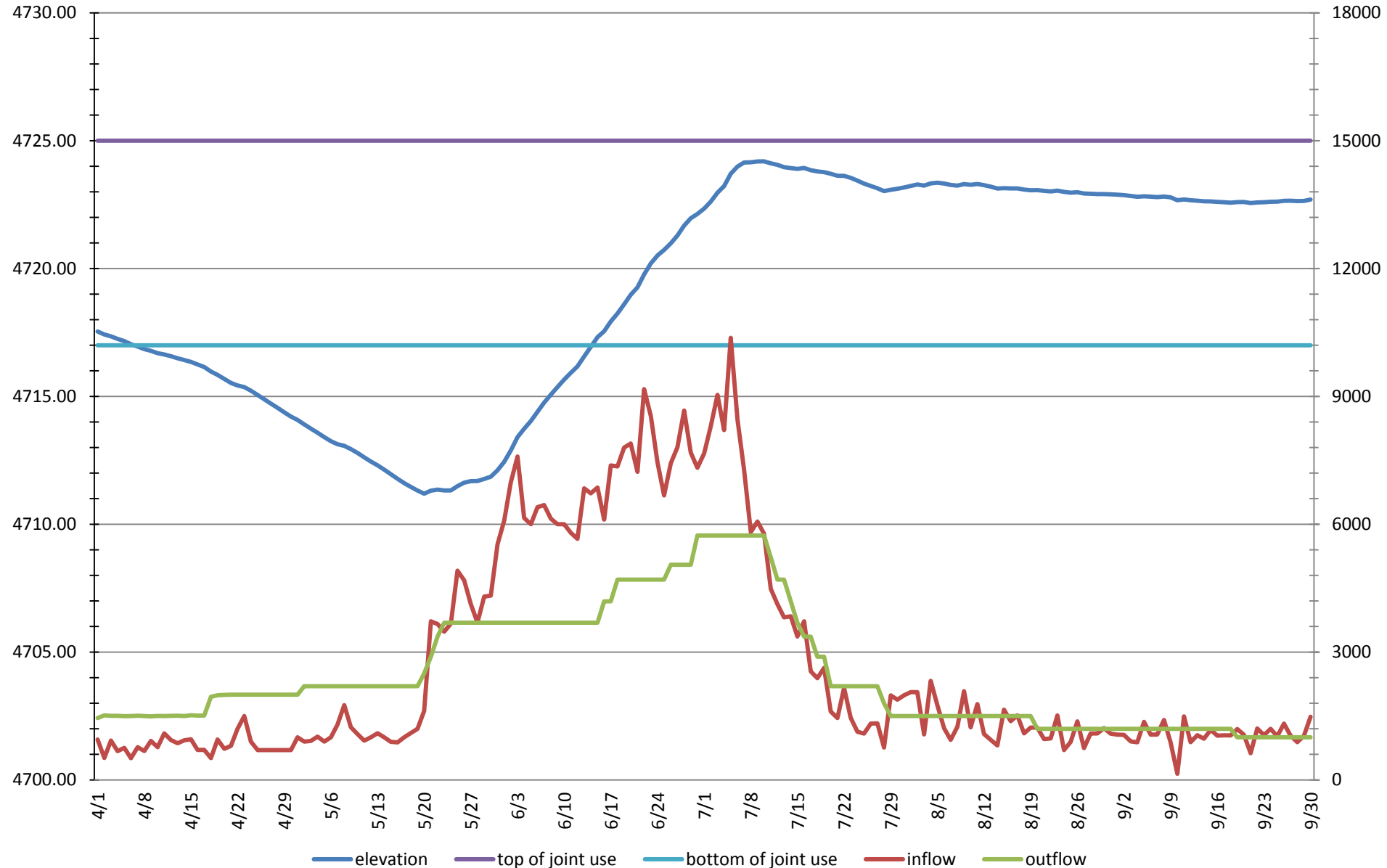


BOYR Boysen Reservoir, Wind River near Thermopolis, WY

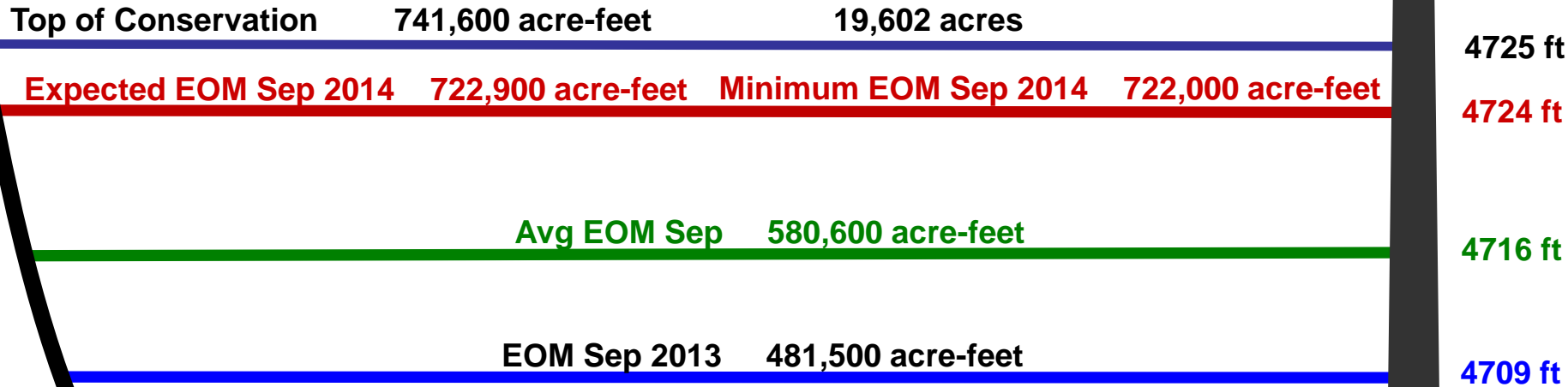
— AF Reservoir Storage Content (acre-feet)  
 — IN Daily Mean Computed Inflow (cfs)  
 — QD Daily Mean Total Discharge (cfs)

2014  
2014  
2014

# 2014 Boysen Operation with 2009 Inflow Adjusted to Match April Forecast



# Boysen Reservoir



## 2014 Estimated Annual Inflow

- Minimum 1,088,000 acre-feet
- Expected 1,303,800 acre-feet

# Reservoir Information

- Toll Free Telephone Recording

1-800-253-8737

- updated weekly
- provides information on reservoir levels and releases

- Internet

[www.usbr.gov/gp](http://www.usbr.gov/gp)

- near real-time data available through the HYDROMET data system
- summaries and plots of historical data
- annual reservoir operating plan publication
- monthly water supply reports
- project data
- snow plots
- links to related internet sites



# Bull Lake Spillway Modification

# Concrete pier and trunnion failure



# Seepage/erosion Beneath Spillway floor





- Chute floor slab failure during operation



# Bull Lake Dam Safety Modifications

Existing



Modified





# Reservoir Information

- Toll Free Telephone Recording

1-800-253-8737

- updated weekly
- provides information on reservoir levels and releases

- Internet

[www.usbr.gov/gp](http://www.usbr.gov/gp)

- near real-time data available through the HYDROMET data system
- summaries and plots of historical data
- annual reservoir operating plan publication
- monthly water supply reports
- project data
- snow plots
- links to related internet sites