RECLAMATION

Managing Water in the West

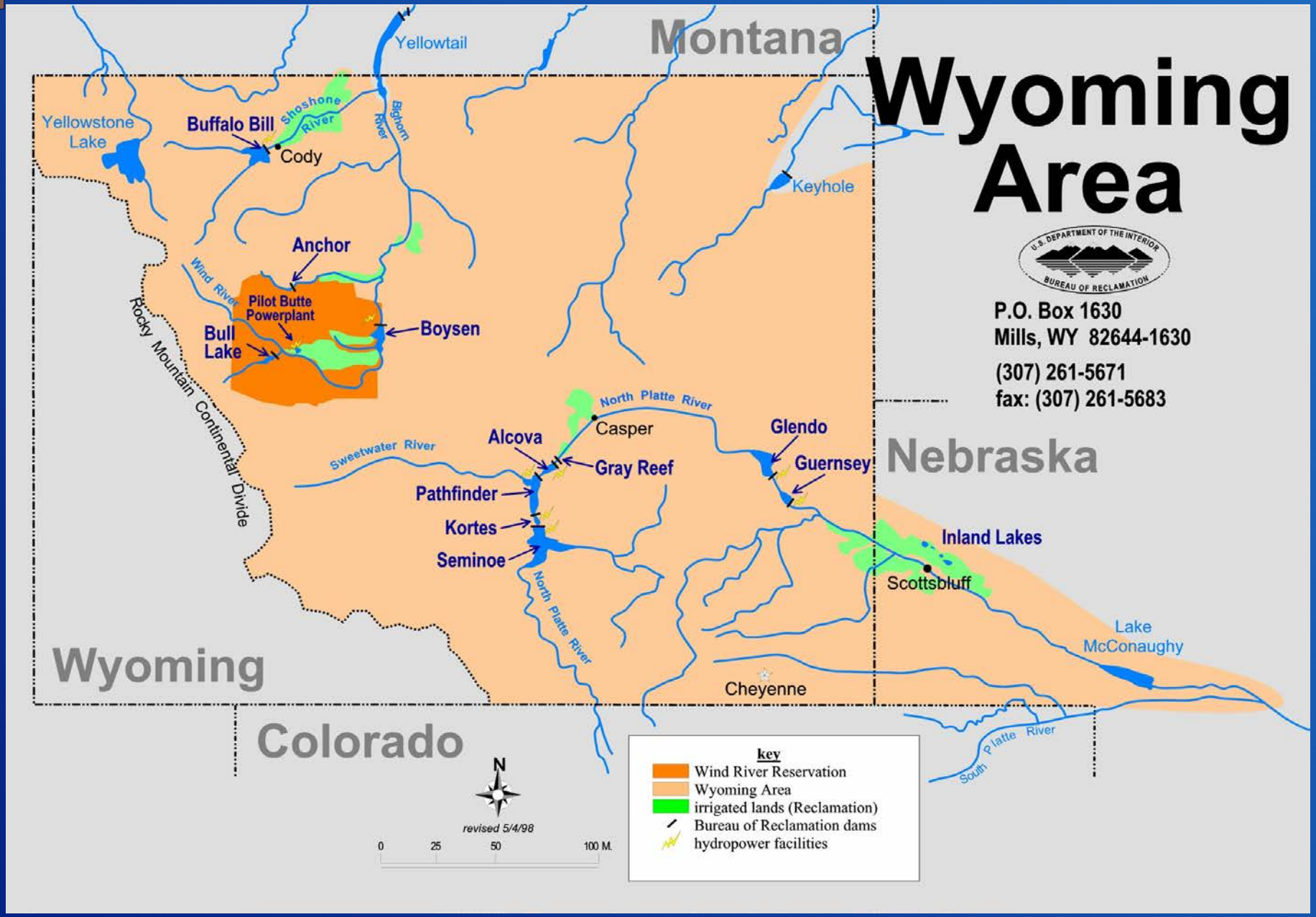
Bighorn Basin Operations and Water Supply Meeting

April 14, 2016

U.S. Department of the Interior
Bureau of Reclamation

Boysen Dam
And
Buffalo Bill Dam
Operations

RECLAMATION



RECLAMATION

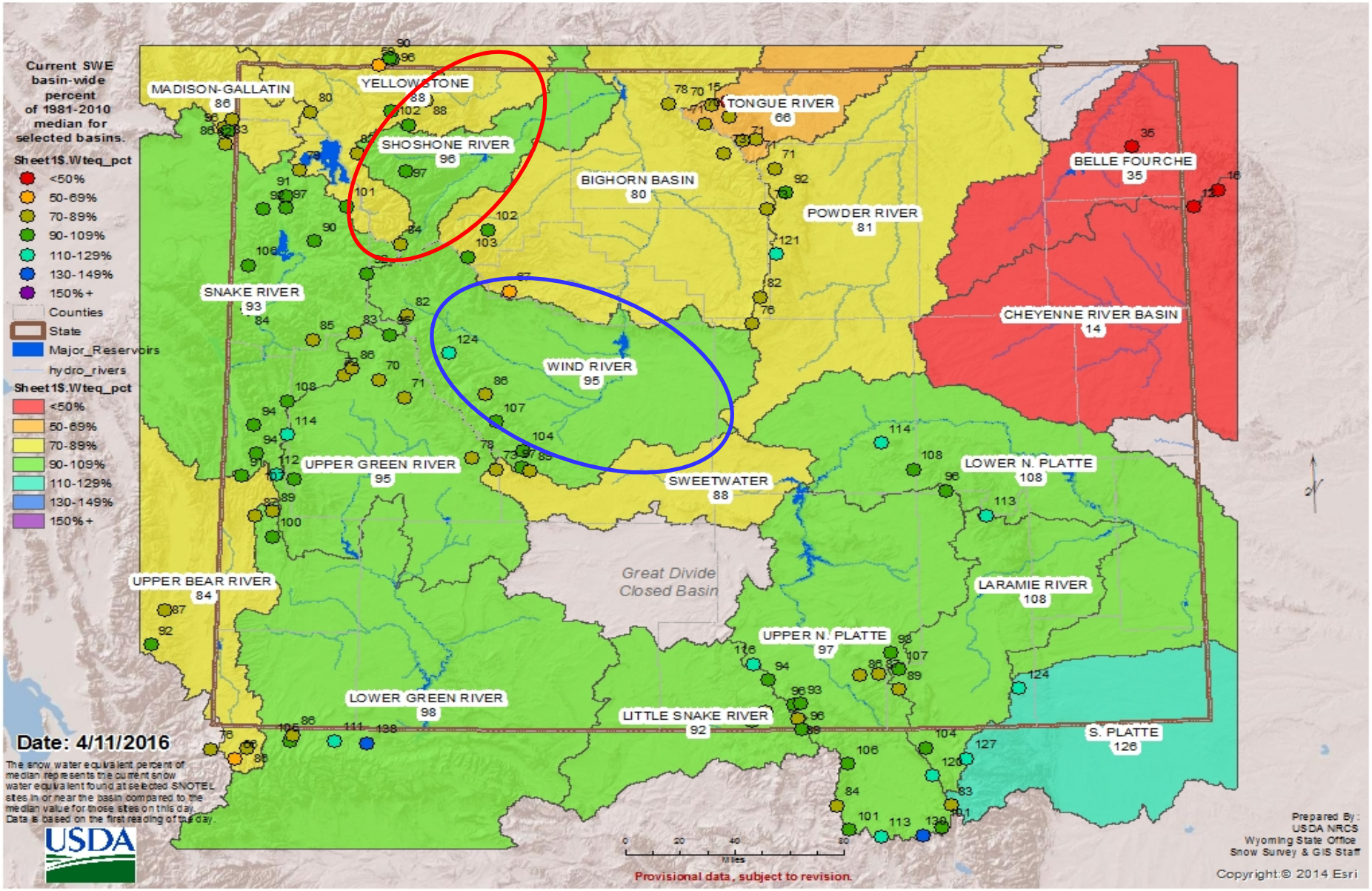
Current Reservoir Conditions

As of April 11, 2016

Reservoir	Content	% of Full	% of Avg
Boysen	590,882	80%	109%
Bull Lake	71,924	47%	93%
Buffalo Bill	440,857	68%	106%

RECLAMATION

Wyoming SNOTEL Current Snow Water Equivalent (SWE) % of Median



RECLAMATION

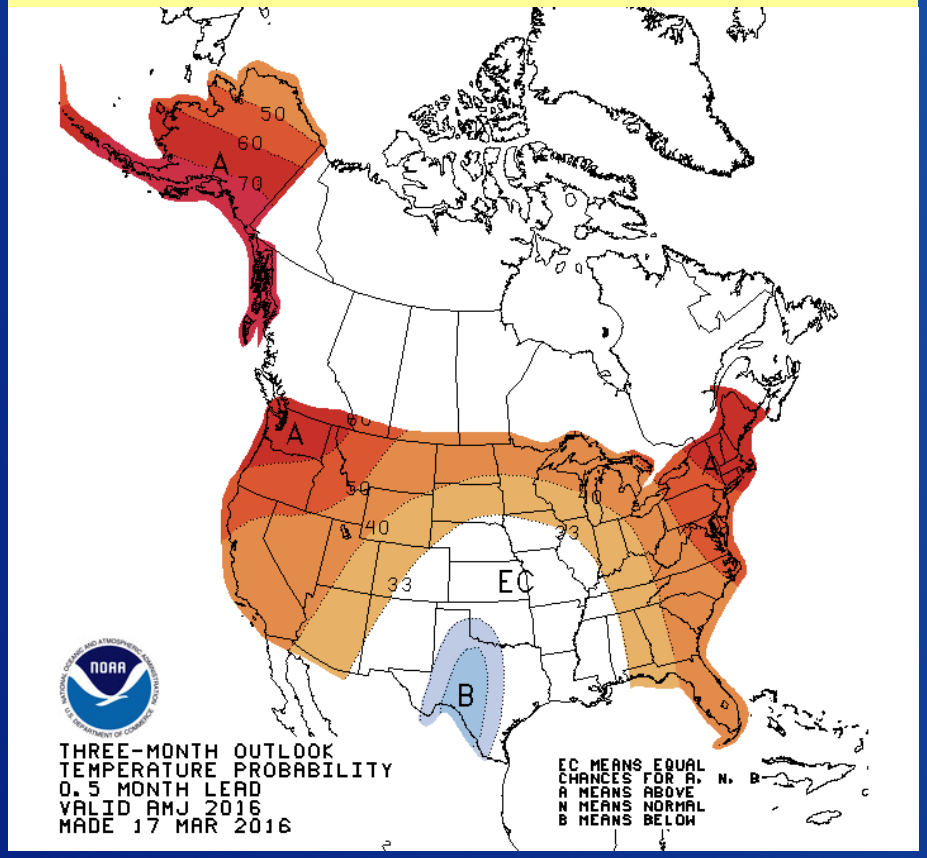
SNOW WATER EQUIVALENT - % MEDIAN

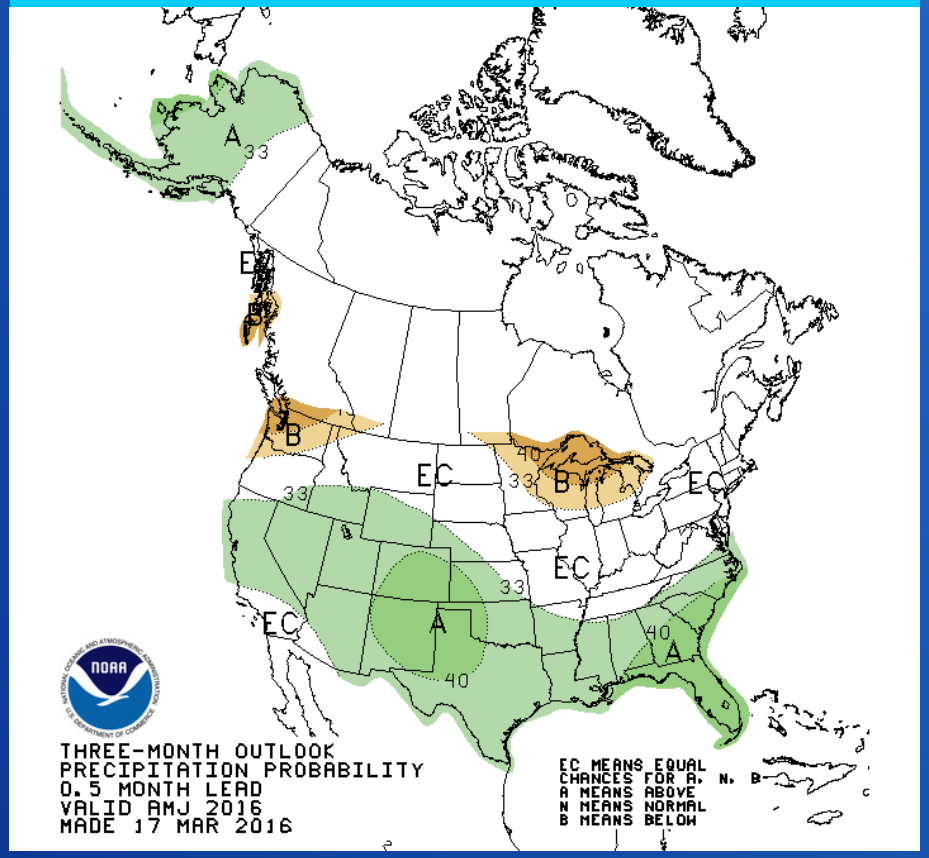
DRAINAGE BASIN	4/11/2016	4/4/2016	3/28/2016	4/11/2015	4/11/2014	4/11/2013
SNAKE RIVER	93	98	100	83	143	92
MADISON	86	87	93	62	120	94
YELLOWSTONE	88	94	91	86	152	93
WIND RIVER	95	105	90	73	125	80
BIGHORN BASIN	80	89	80	80	149	90
SHOSHONE RIVER	96	94	95	77	153	89
POWDER	81	92	81	80	156	98
TONGUE	66	76	63	75	140	82
BELLE FOURCHE	35	64	53	0	181	74
CHEYENNE	14	58	60	0	135	81
UPPER N. PLATTE	97	101	100	62	125	77
SWEETWATER	88	95	85	54	108	67
LOWER N. PLATTE	108	120	100	50	125	66
LARAMIE	108	117	117	67	136	78
S. PLATTE	126	133	127	69	142	80
LITTLE SNAKE RIVER	92	101	101	46	123	70
UPPER GREEN	95	101	99	89	157	82
LOWER GREEN	98	110	104	54	126	90
UPPER BEAR	84	99	96	52	113	79
Weighted State Average	85	97	90	61	139	83

Red = down blue = up green = even * data is suspect

RECLAMATION

National Weather Service Three Month Outlook





RECLAMATION

Bighorn Basin Water Supply Forecast

April 1 Forecast of April – July Snowmelt Runoff

BIGHORN WATER SUPPLY FORECAST

The April 1, 2016, water supply forecast indicates at or near average April - July runoff can be expected at all Bighorn Basin forecast points.

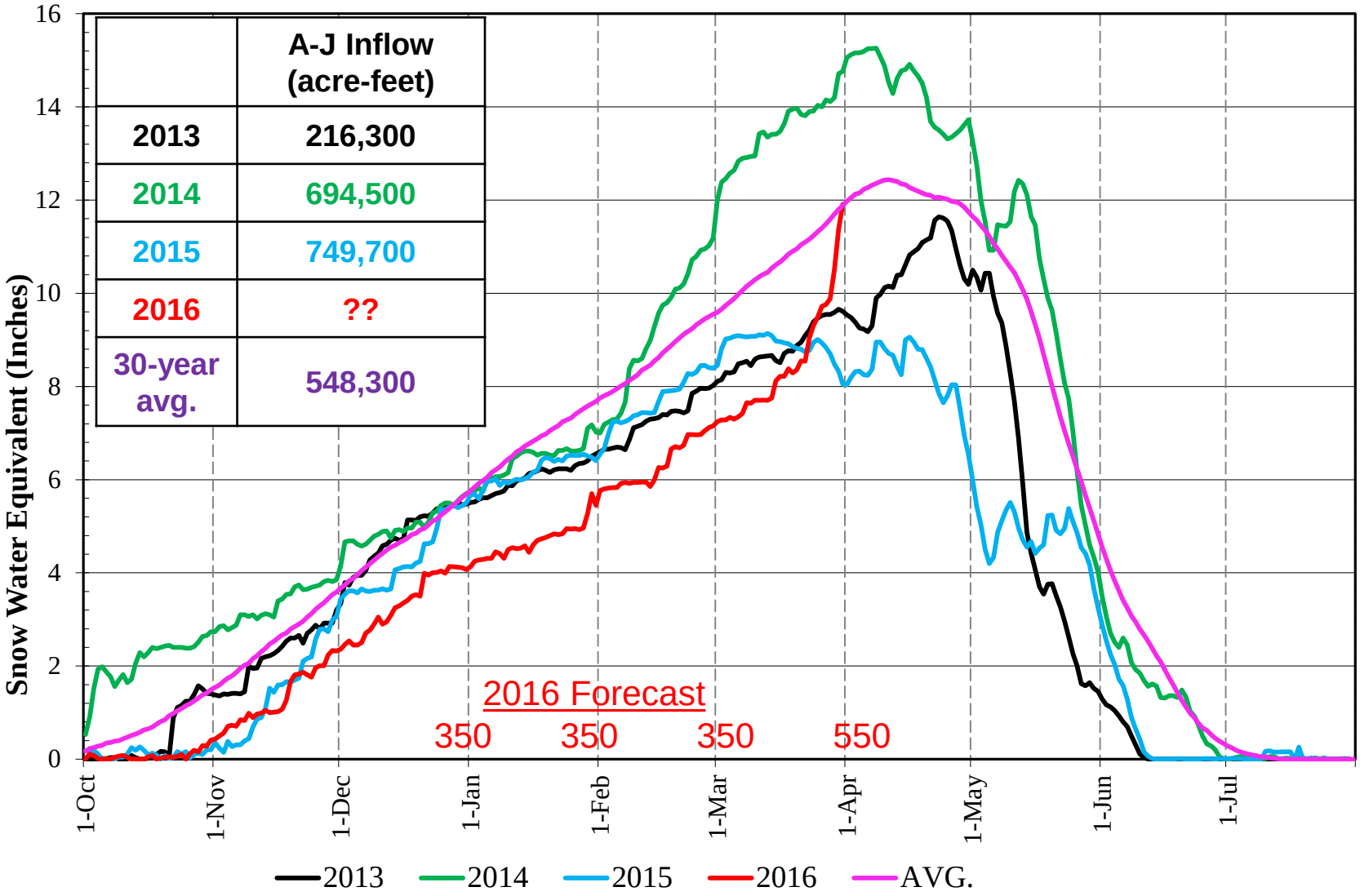
(1000 acre-feet)

Forecast Points	April 1, 2016 Forecast of April-July Runoff			30 Yr. April-July Runoff Avg. [2]	Expected % of Avg.	Comparative Actual April - July Runoff			
	Reasonable Minimum[1]	Expected	Reasonable Maximum[1]			W. Yr. 2015	W. Yr. 2014	W. Yr. 2013	W. Yr. 2012
Bull Lake Reservoir	110	135	160	138.2	98	138	148	106	118
Wind River above Bull Lake Creek	280	380	480	409.5	93	529	580	283	314
Boysen Reservoir	300	550	800	548.3	100	750	695	216	219
Buffalo Bill Reservoir	420	620	820	686.3	90	696	1062	577	592

[1] The probability is estimated to be 9 chances in 10 that the actual volume will fall between the reasonable minimum and reasonable maximum
[2] Average is based on the 1986-2015 period.
[3] Actual inflows are as follows:

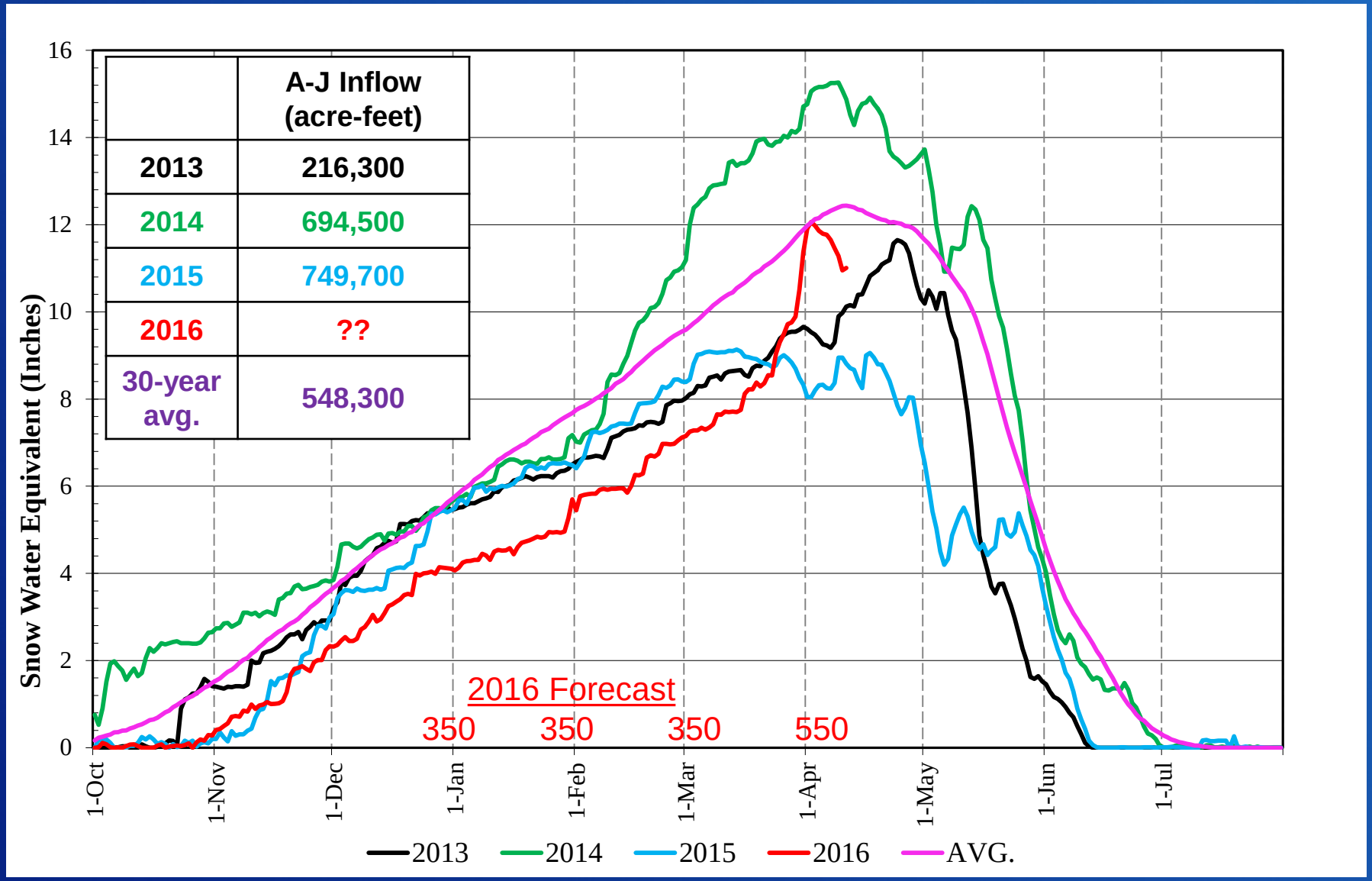
RECLAMATION

Boysen Forecast - April

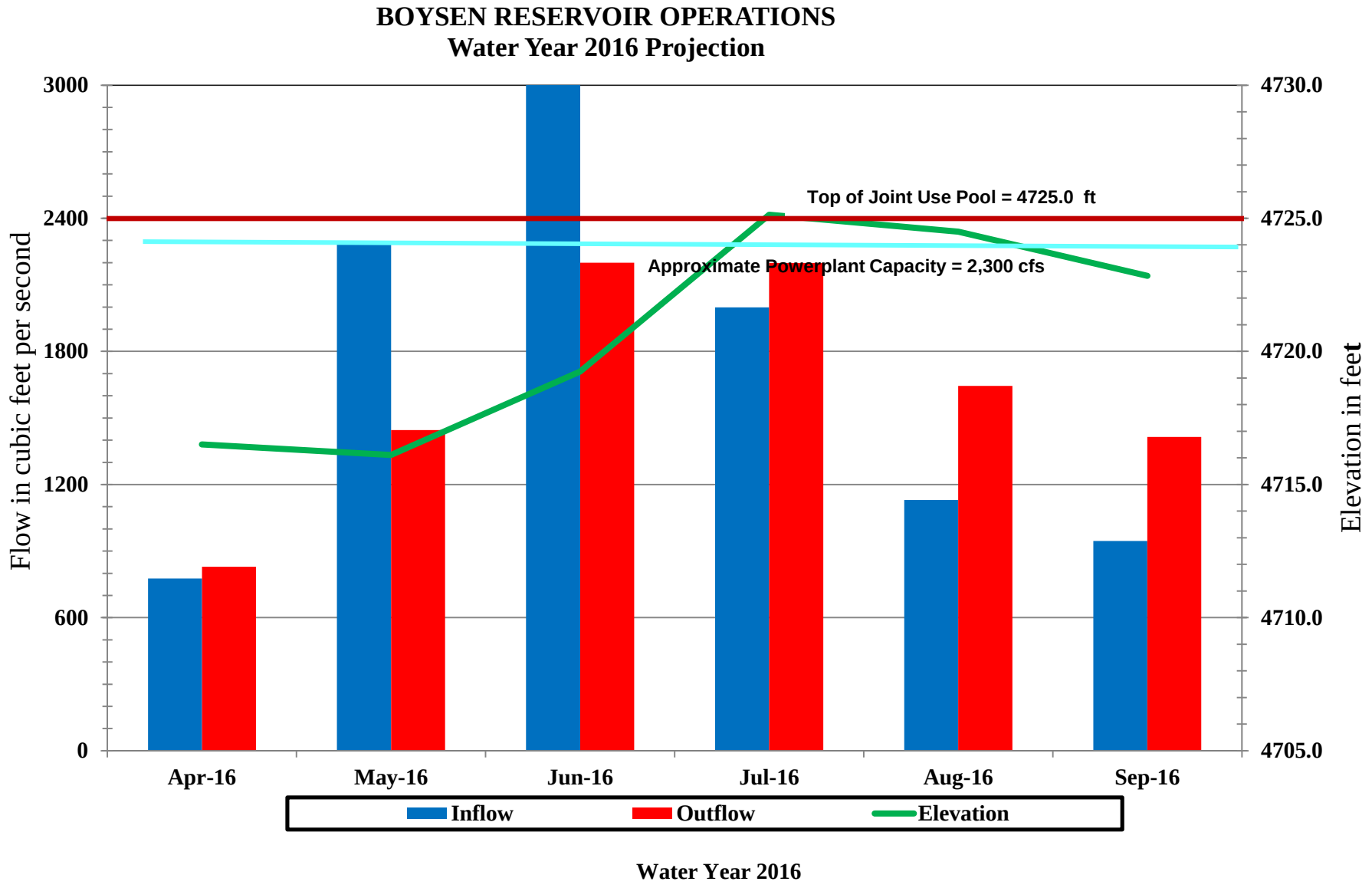


RECLAMATION

Boysen Forecast – Full Year

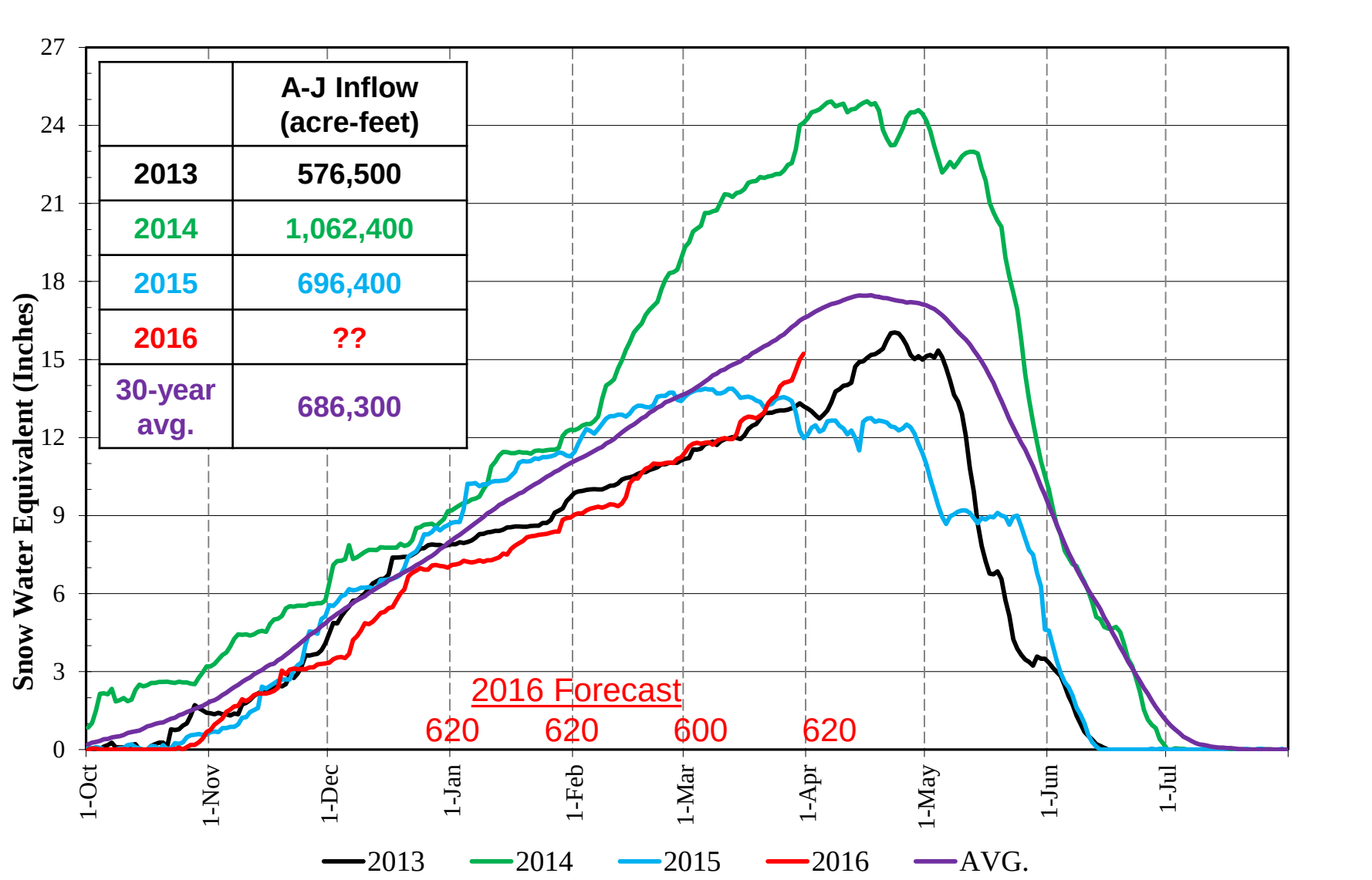


RECLAMATION



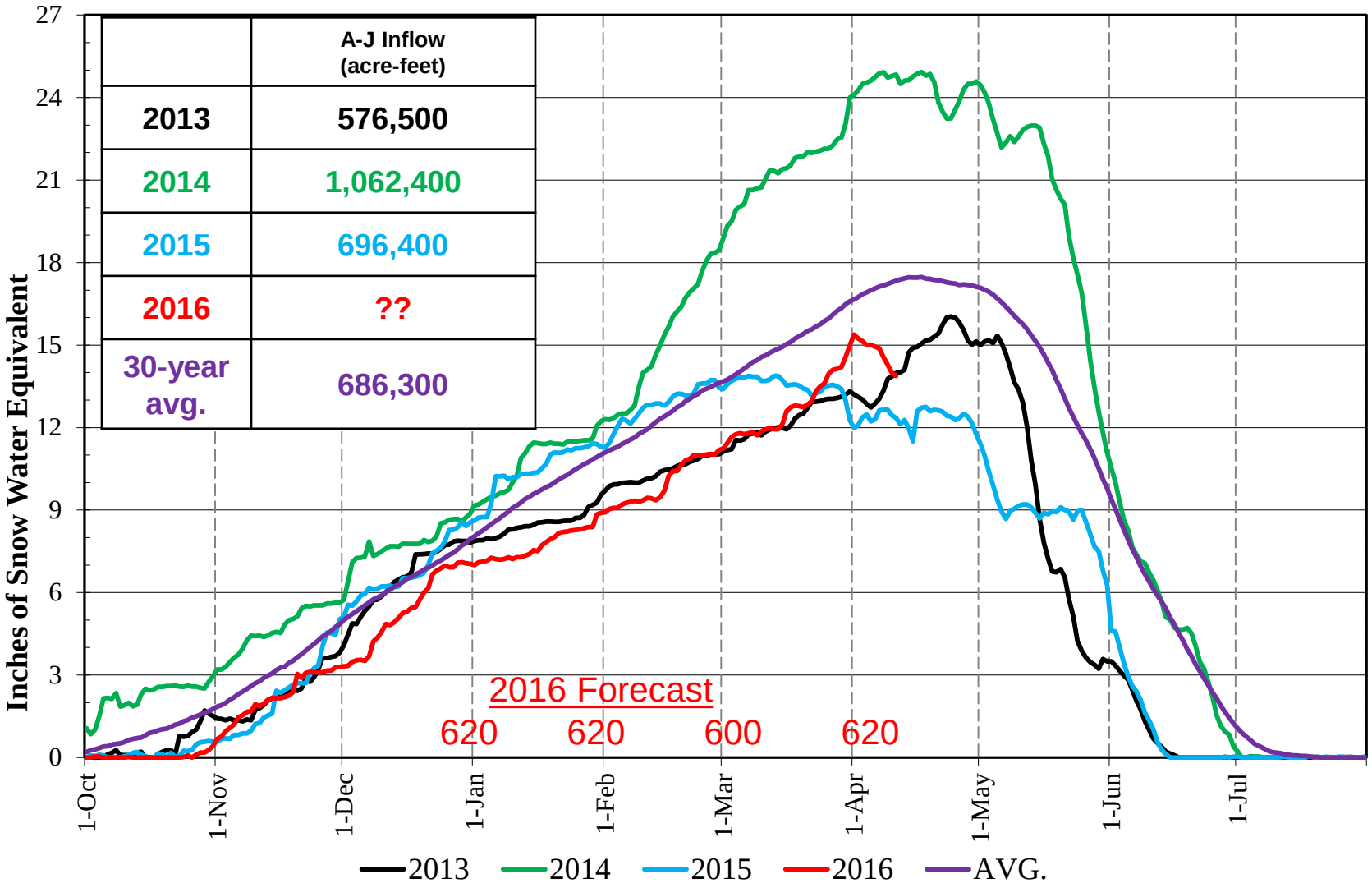
RECLAMATION

Buffalo Bill Forecast - April



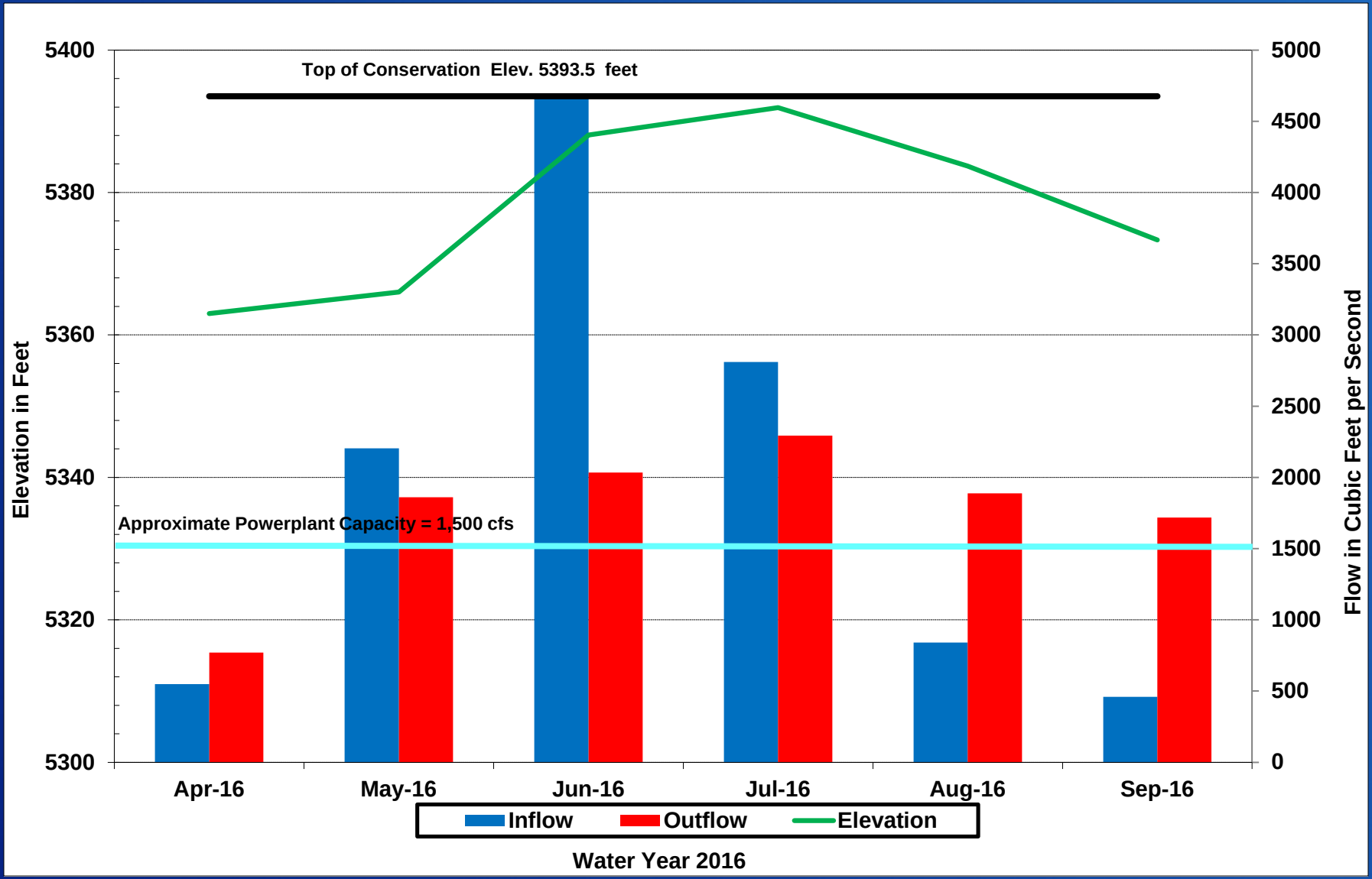
RECLAMATION

Buffalo Bill Forecast – Full Year



RECLAMATION

Buffalo Bill Reservoir Operations



RECLAMATION

Yellowtail Dam and Bighorn Lake Operations Review

RECLAMATION

Recap of Fall and Winter 2015/2016

Total April-October Gain = 239,300 acre-feet

Forecasted November-March Gain = 258,200 acre-feet

Upstream Reservoir Fall & Winter Releases =

Boysen = 850 cfs

Buffalo Bill = 205 cfs

End-of-October Storage = 952,900 acre-feet

Projected End-of-March Target Elevation = 3617 (807,900 acre-feet)

Calculated Fall & Winter Release for Yellowtail:

River = 2,450 cfs

RECLAMATION

Recap of Fall and Winter 2015/2016

Nov-Mar Gains:

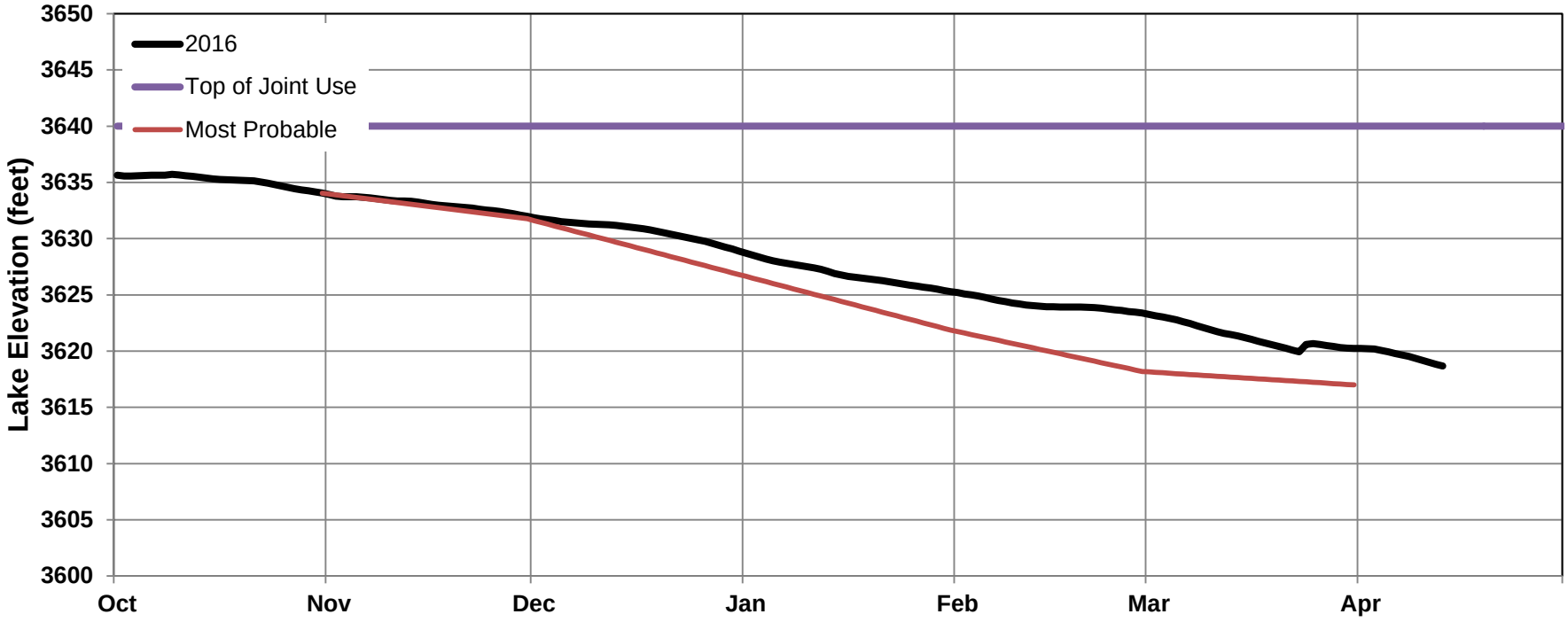
Forecast on November 1, 2015: 258.2 kaf (101% of Avg)
Actual November-March Gains: 279.0 kaf (109% of Avg)

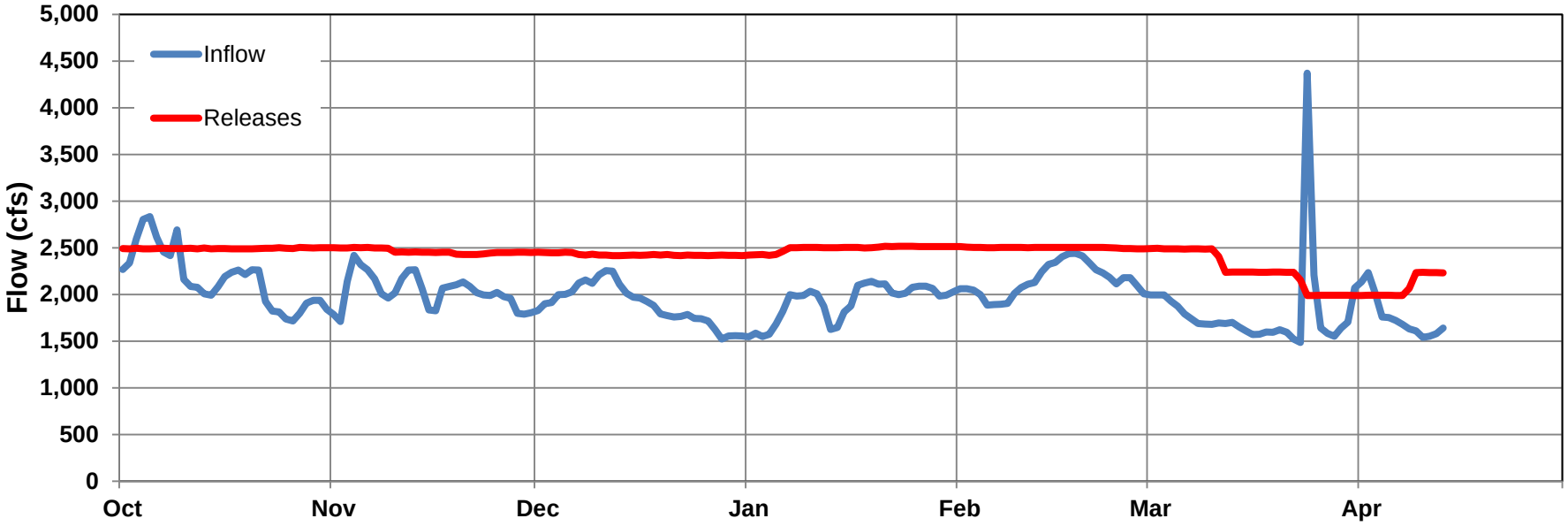
Total Nov-Mar Inflow:

Forecast on November 1, 2015: 575.1 kaf (100% of Avg)
Actual November-March Inflows:590.3 kaf (103% of Avg)

RECLAMATION

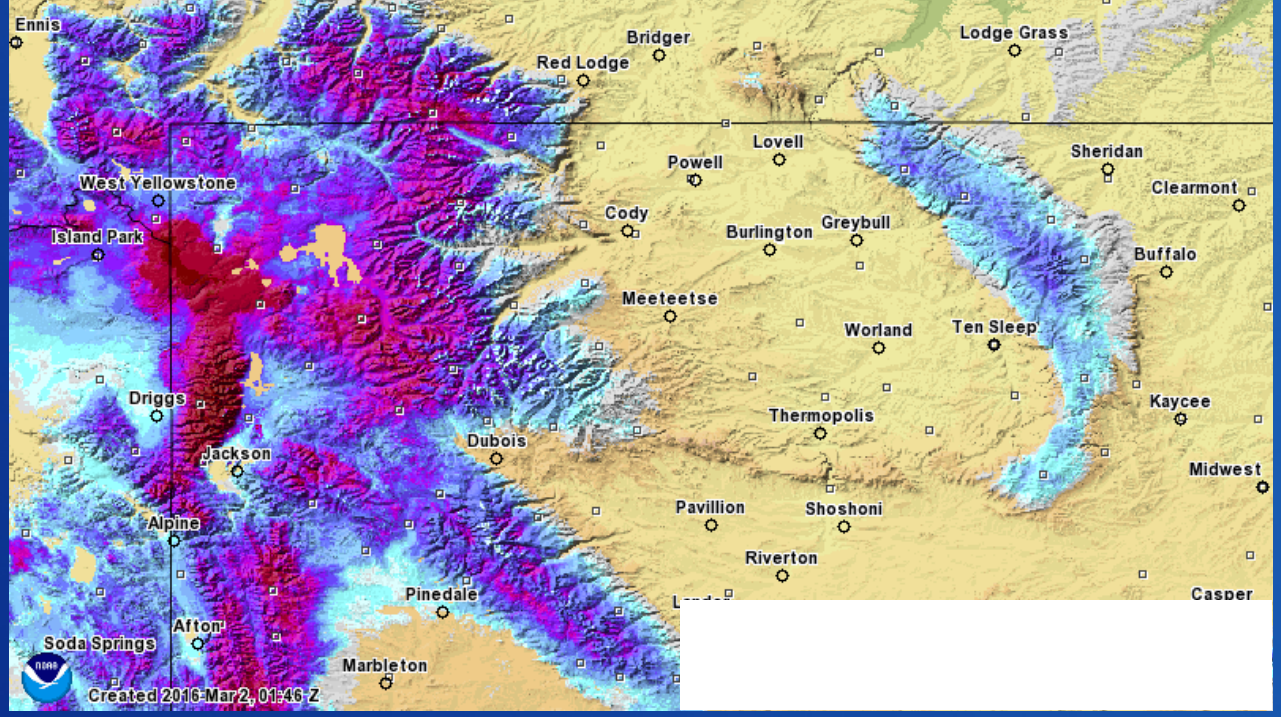
Bighorn Lake Operations 2016

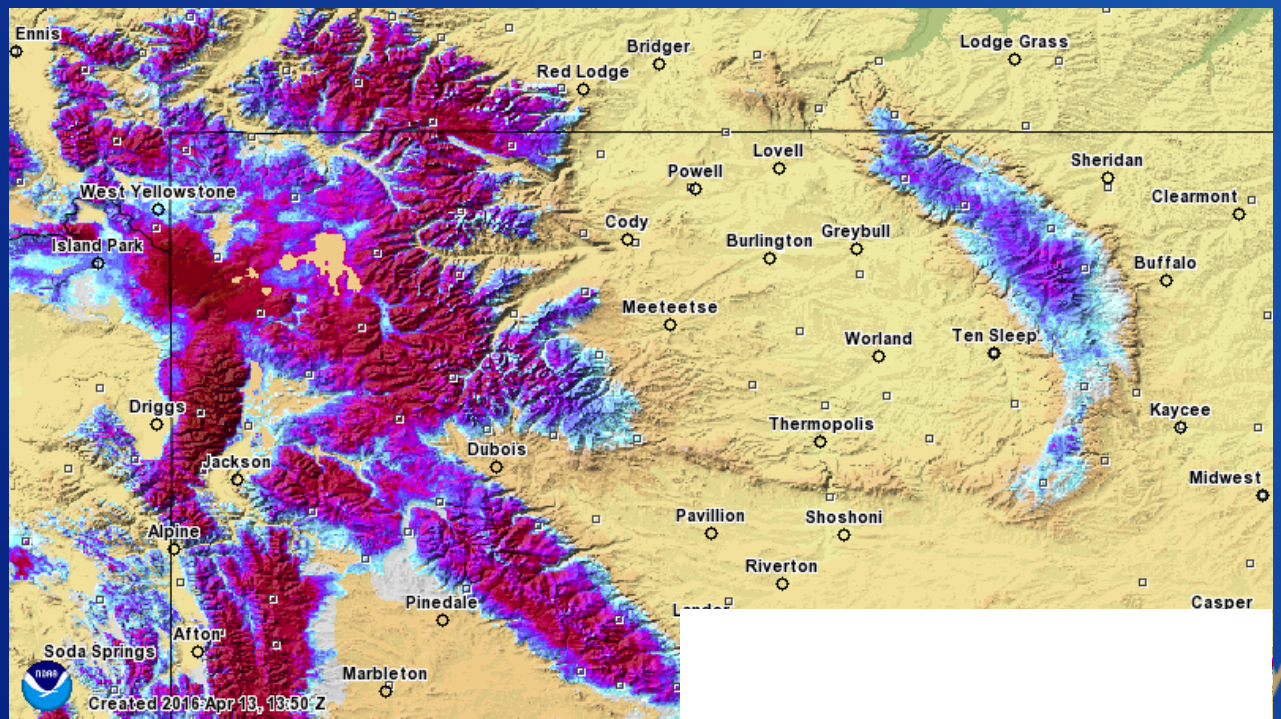


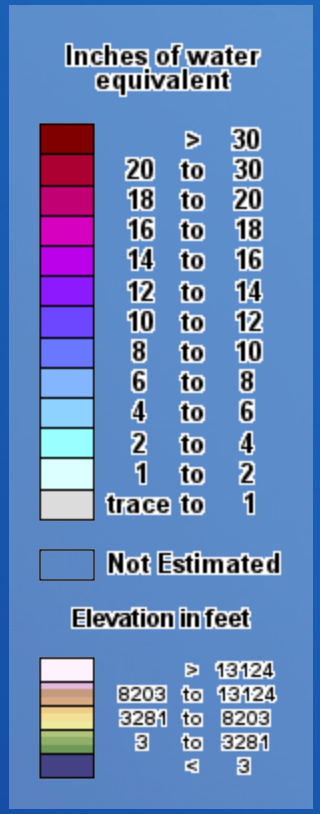


Snowpack and Precipitation

RECLAMATION

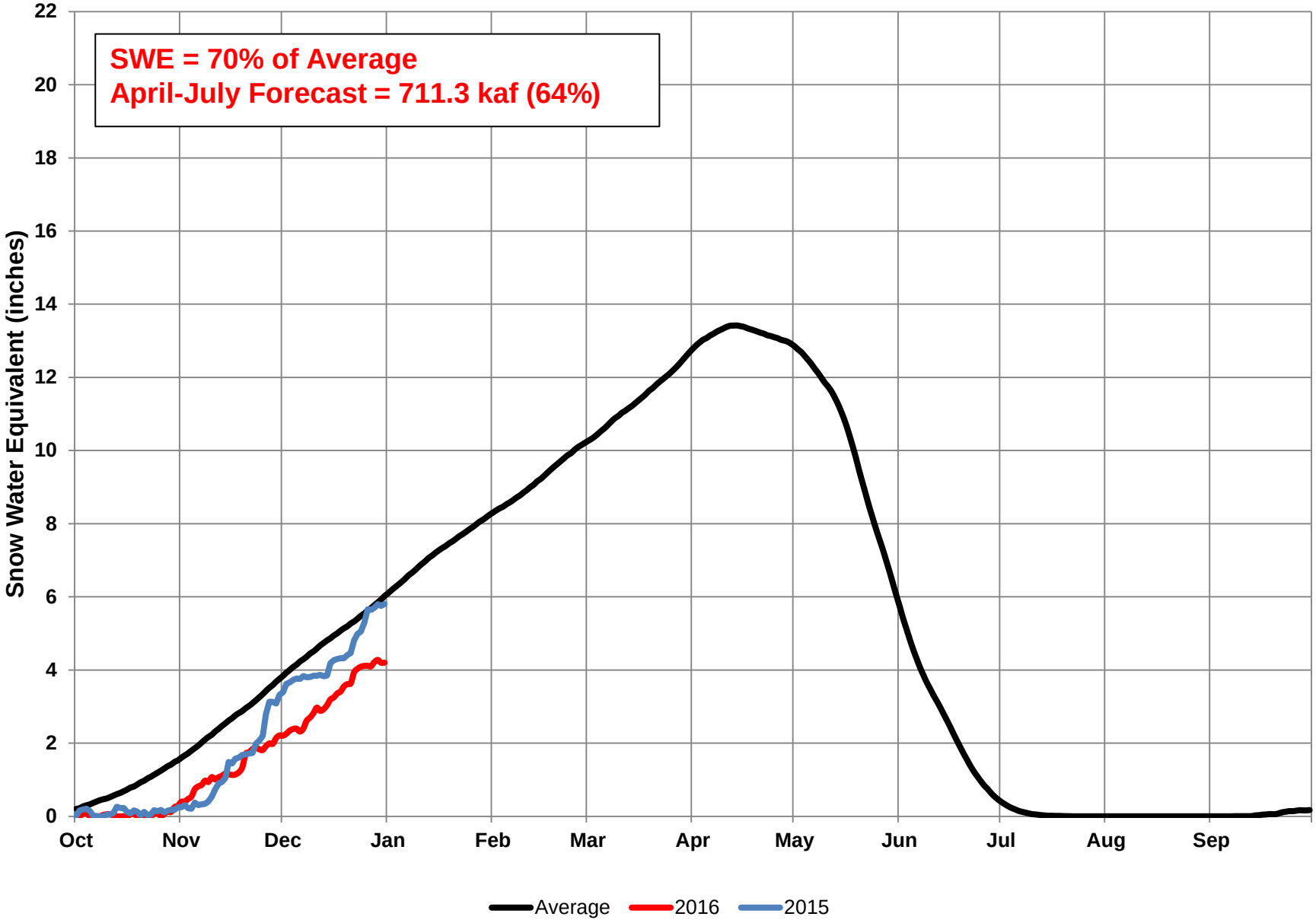

Ennis
Bridger
Red Lodge
Lodge Grass
Lovell
Powell
Sheridan
Clearmont
West Yellowstone
Island Park
Cody
Burlington
Greybull
Buffalo
Meeteetse
Worland
Ten Sleep
Driggs
Thermopolis
Kaycee
Dubois
Jackson
Midwest
Pavillion
Shoshoni
Alpine
Riverton
Pinedale
Casper
Afton
Soda Springs
Marbleton
Created 2016 Mar 2, 01:46 Z


Ennis
Bridger
Red Lodge
Lodge Grass
Lovell
Powell
Sheridan
Clearmont
West Yellowstone
Island Park
Cody
Burlington
Greybull
Buffalo
Meeteetse
Worland
Ten Sleep
Driggs
Thermopolis
Kaycee
Dubois
Jackson
Midwest
Pavillion
Shoshoni
Alpine
Riverton
Pinedale
Casper
Afton
Soda Springs
Marbleton
Created 2016 Apr 13, 13:50 Z


Inches of water equivalent
> 30
20 to 30
18 to 20
16 to 18
14 to 16
12 to 14
10 to 12
8 to 10
6 to 8
4 to 6
2 to 4
1 to 2
trace to 1
Not Estimated
Elevation in feet
> 13124
8203 to 13124
3281 to 8203
3 to 3281
< 3

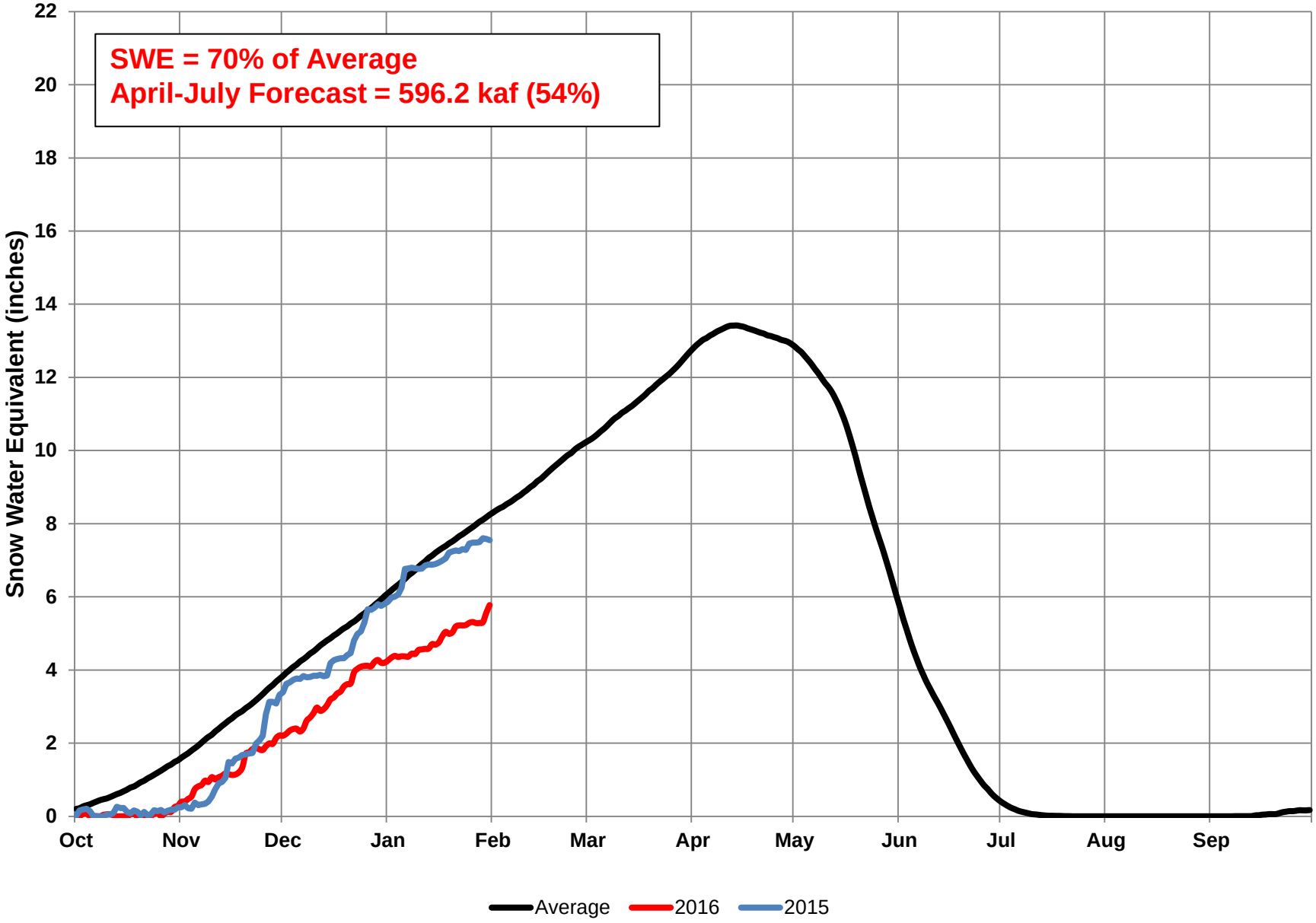
MATION

Mountain Snowpack on January 1



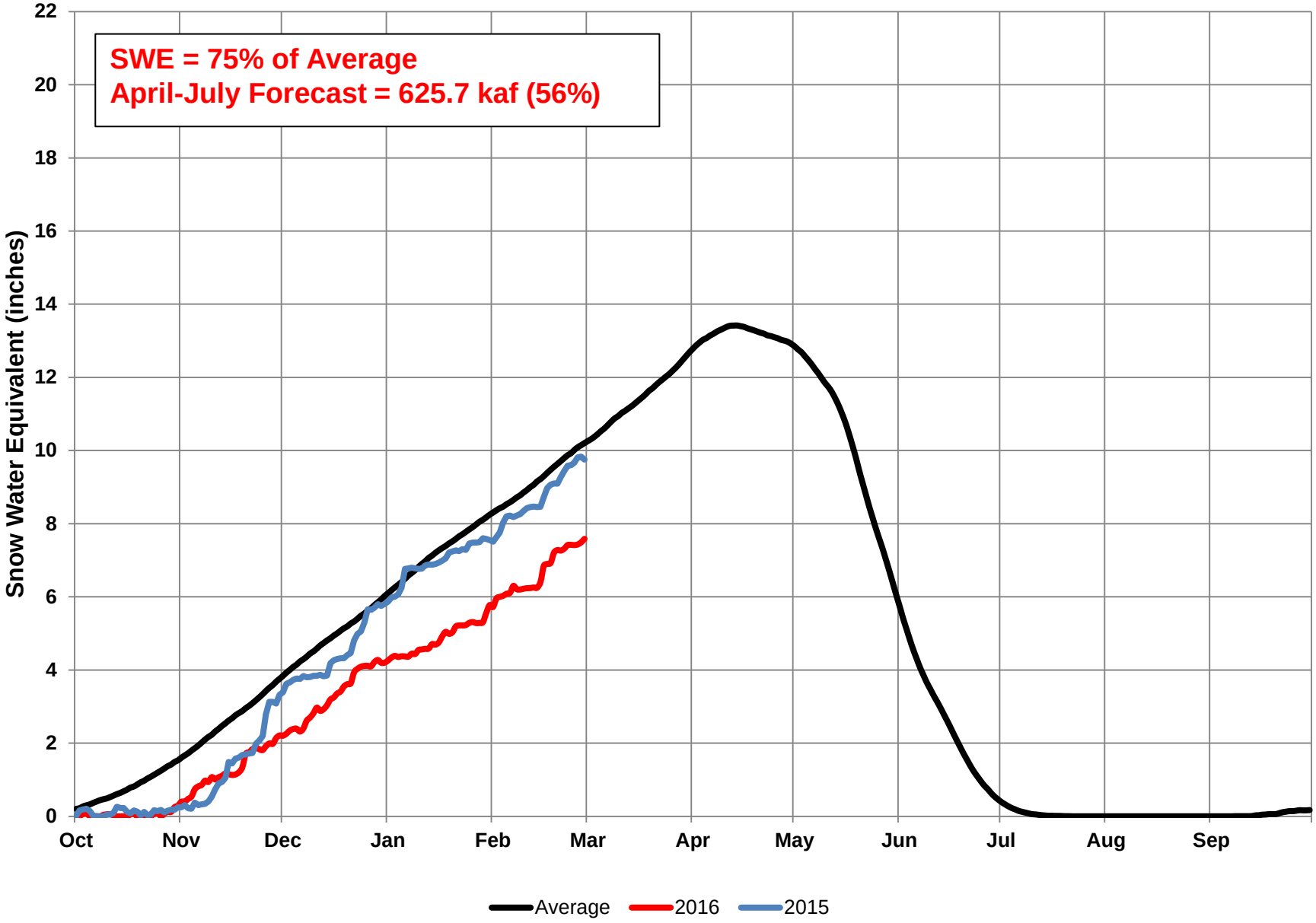
RECLAMATION

Mountain Snowpack on February 1



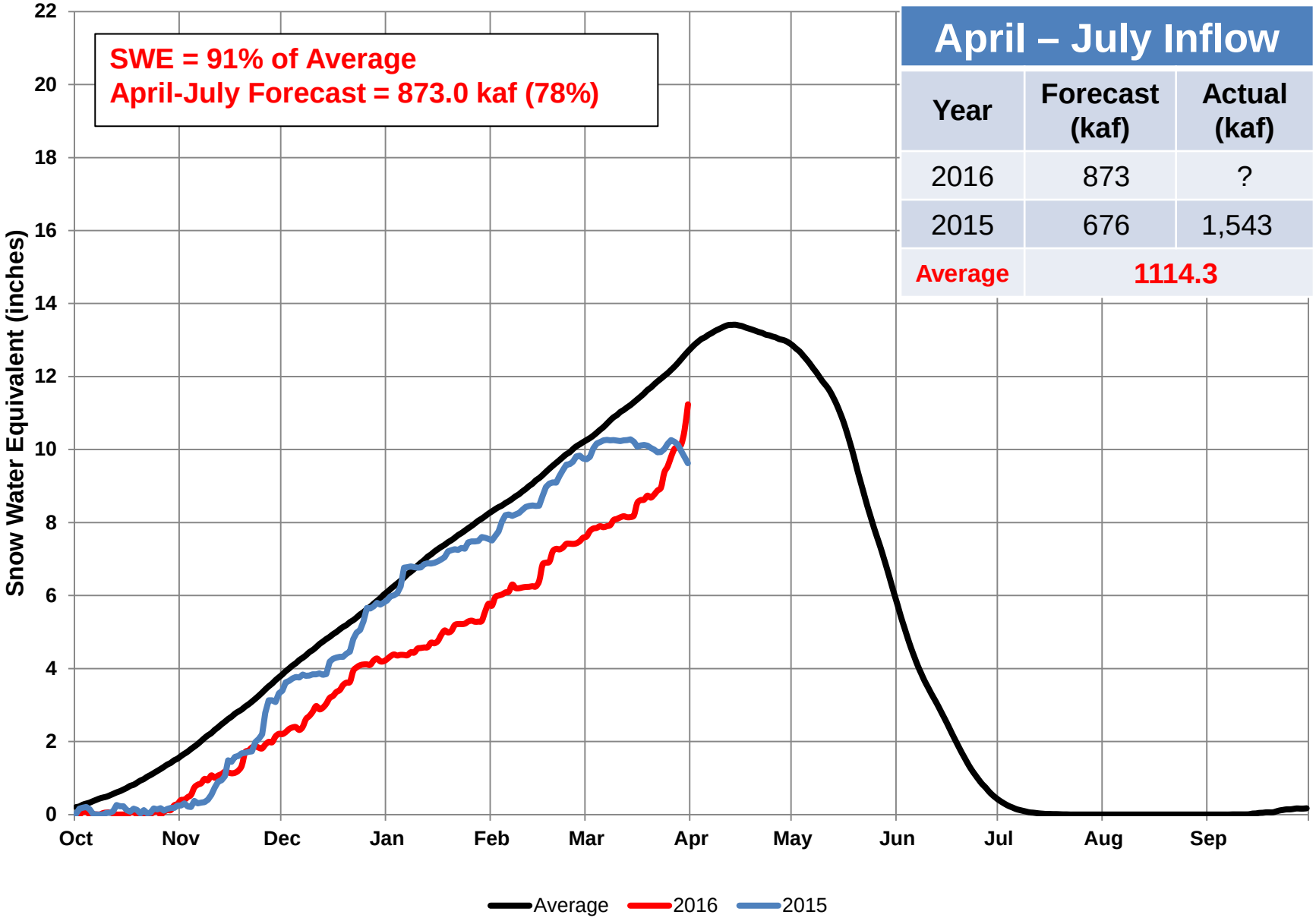
RECLAMATION

Mountain Snowpack on March 1



RECLAMATION

Mountain Snowpack on April 1

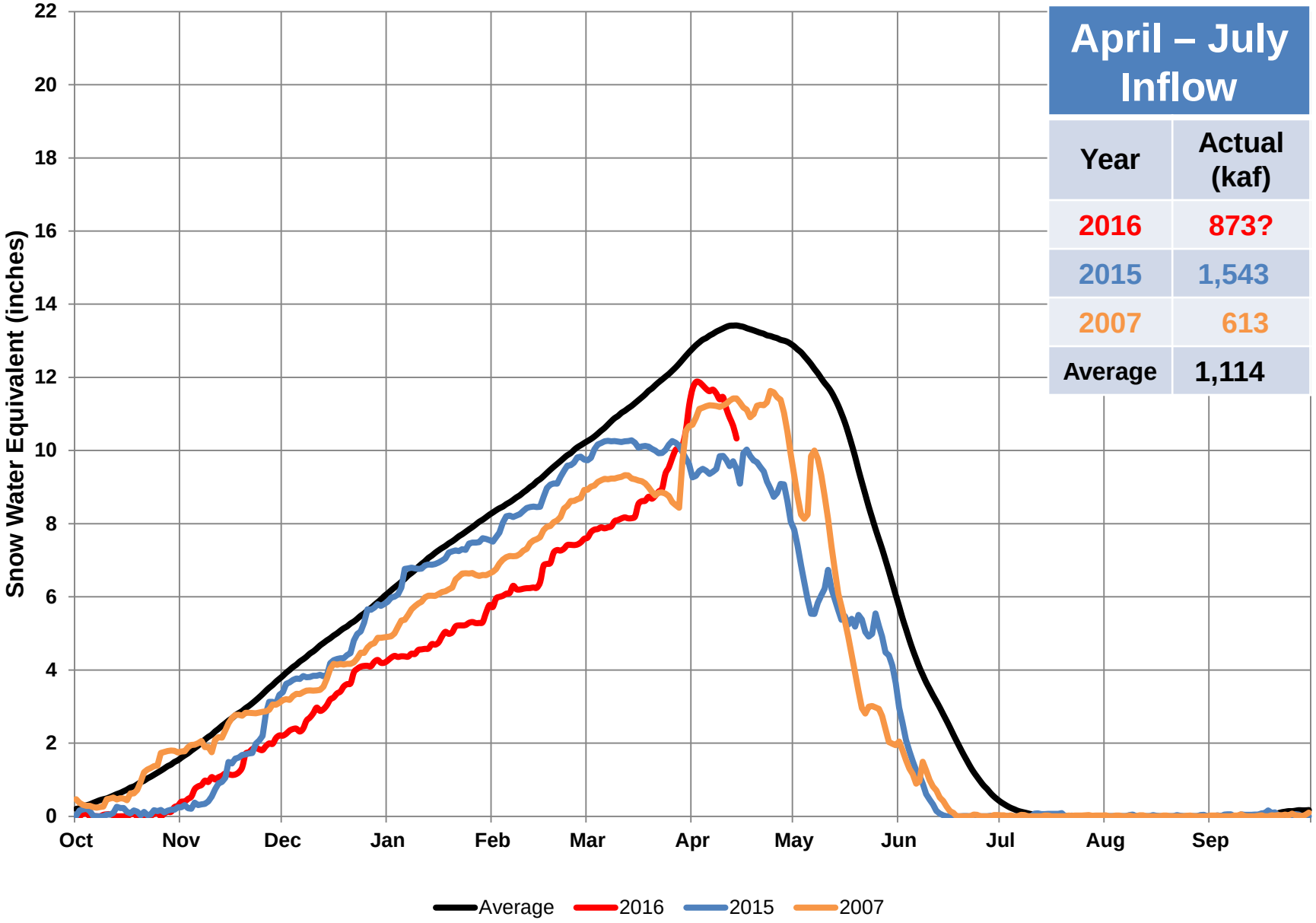


April – July Inflow

Year	Forecast (kaf)	Actual (kaf)
2016	873	?
2015	676	1,543
Average	1114.3	

RECLAMATION

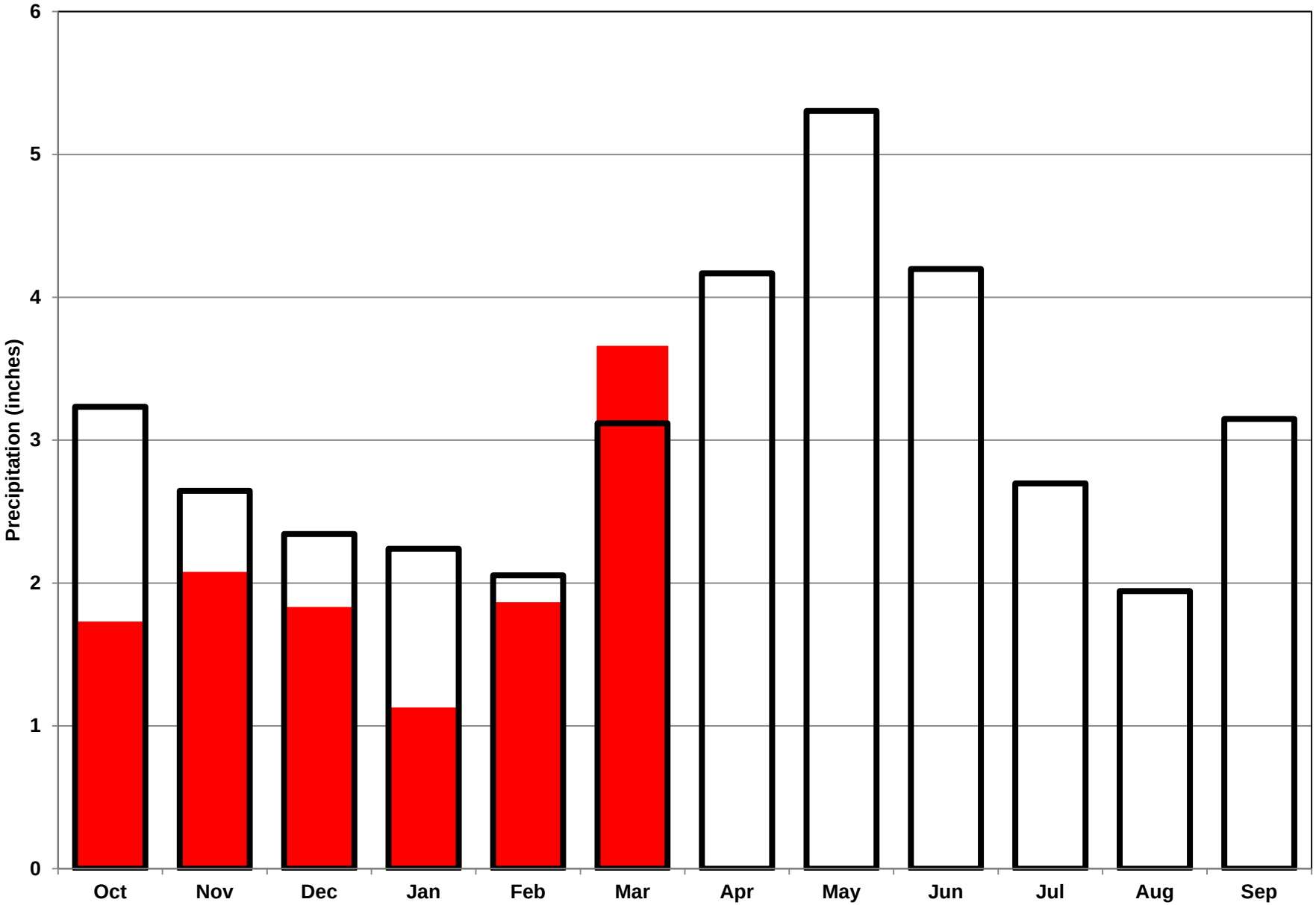
Mountain Snowpack on April 13



April – July Inflow	
Year	Actual (kaf)
2016	873?
2015	1,543
2007	613
Average	1,114

RECLAMATION

Bighorn River Basin Precipitation



RECLAMATION

2016 Outlook

RECLAMATION

Bighorn Lake April – July Forecast

Most Probable Inflow
873,000 af or 78% of average

Minimum Probable Inflow
485,800 af or 44% of average

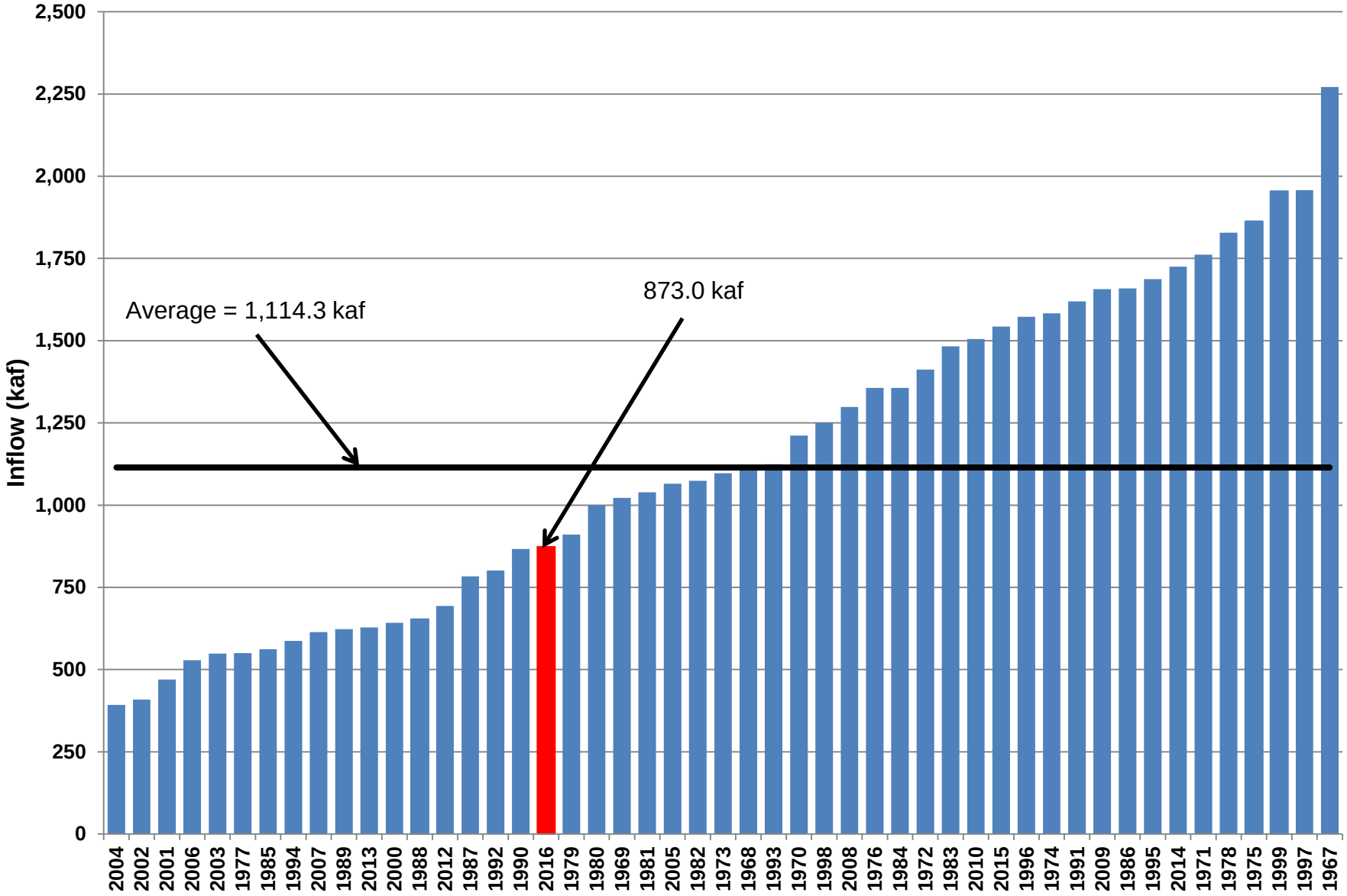
Maximum Probable Inflow
1,304,300 af or 117% of average

April – July Inflow		
Year	**Forecast (kaf)**	**Actual (kaf)**
2016	873	?
2015	676	1,543
2014	1,967	1,725
2013	661	628
2012	1,064	693
2011	1,400	2,572
Average	**1,114**	

RECLAMATION

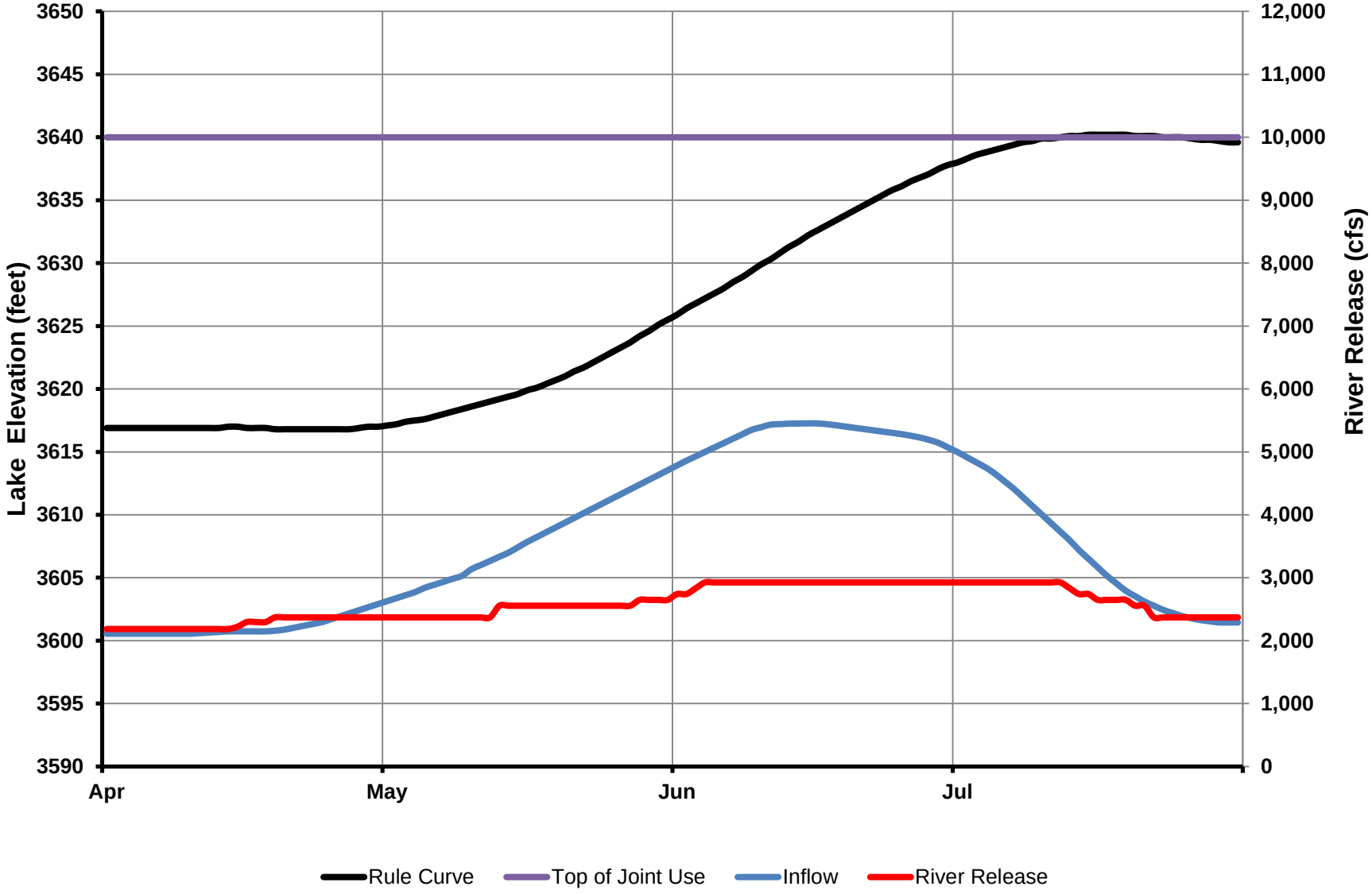
Bighorn Lake April through July Inflow

Period of Record 1967-2015



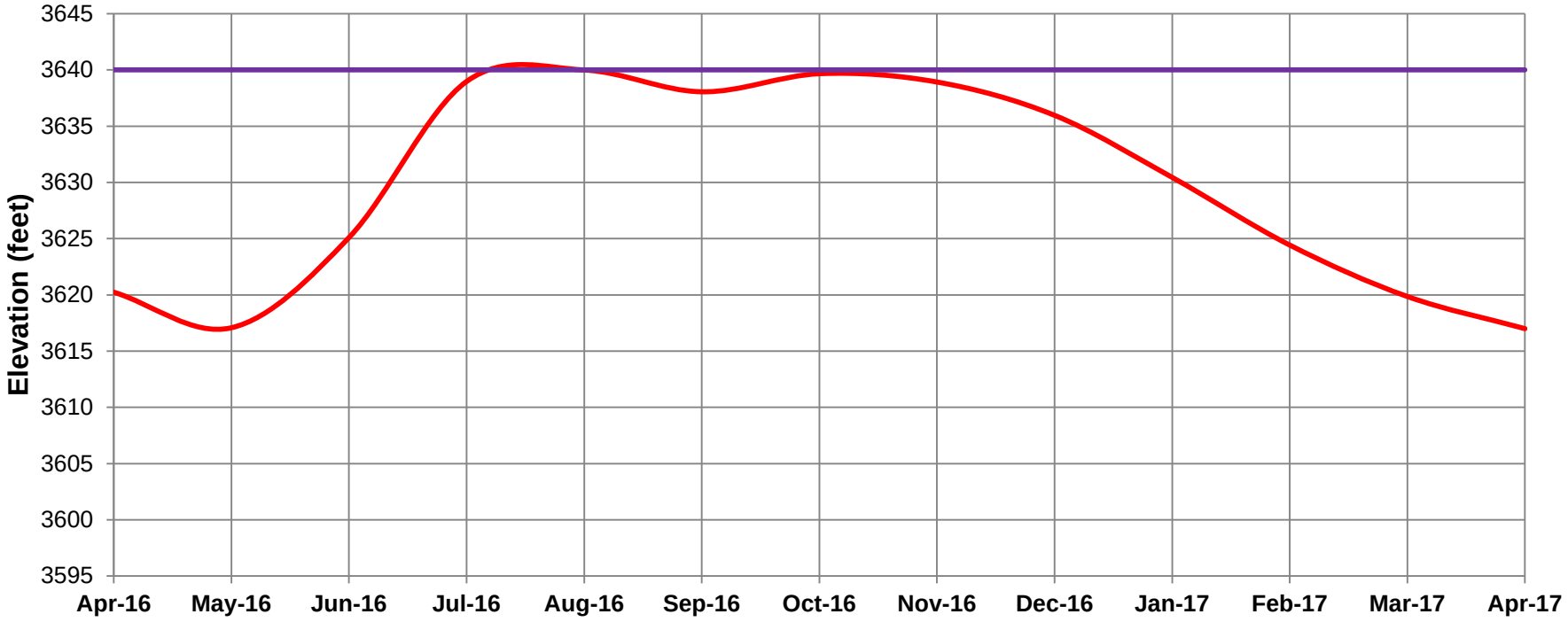
RECLAMATION

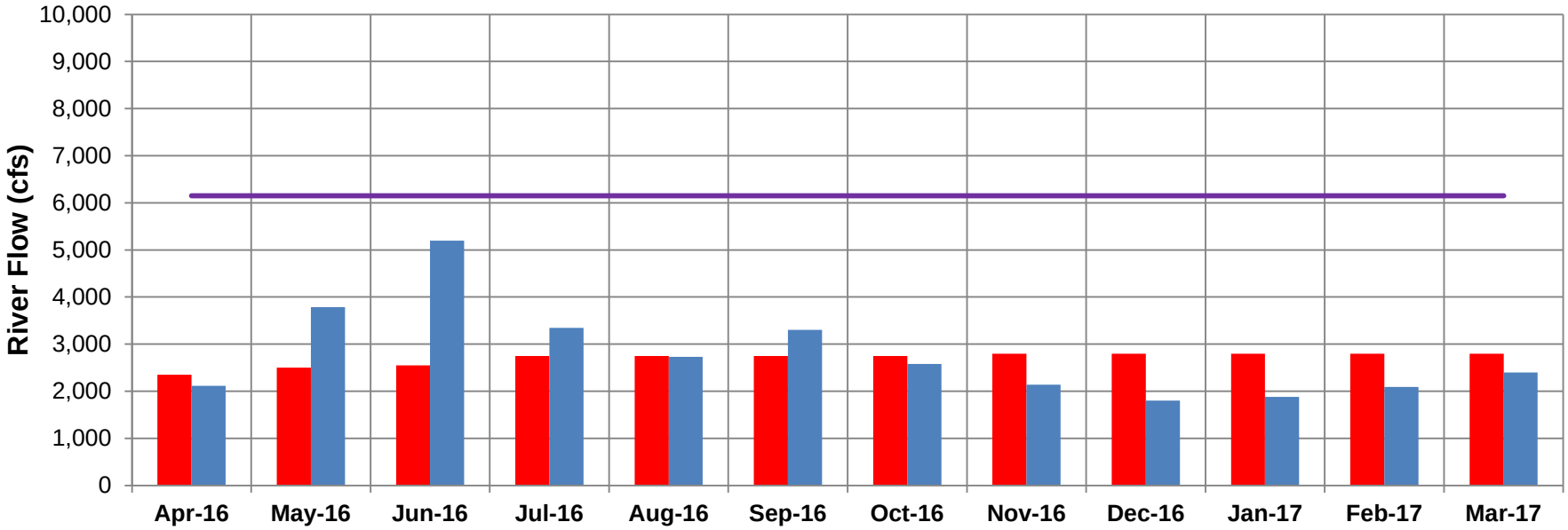
April 1 Rule Curve



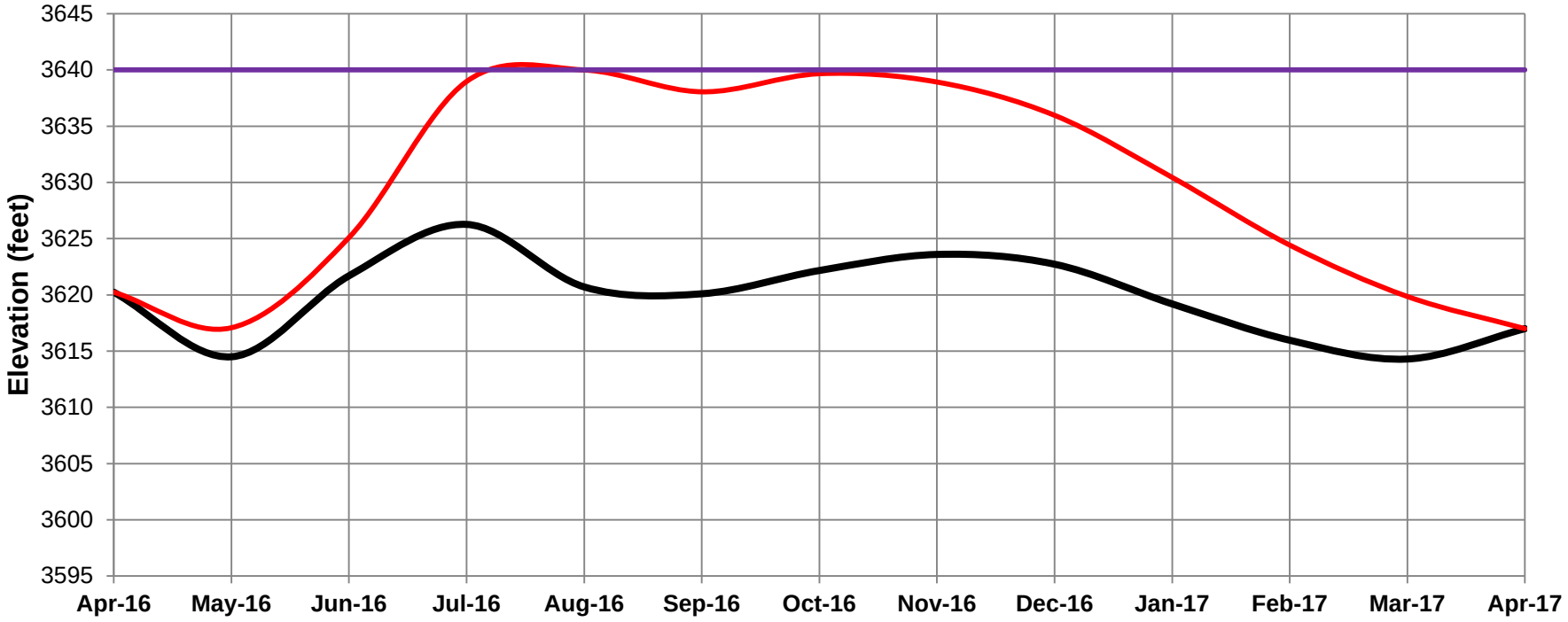
RECLAMATION

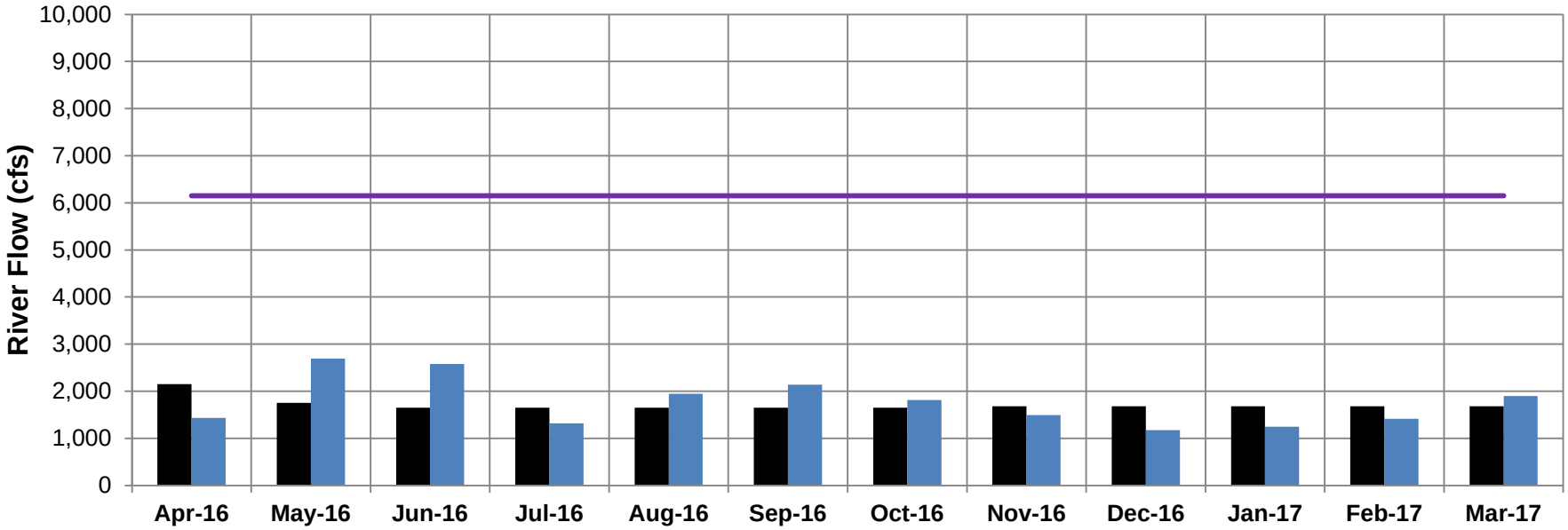
Most Probable Inflow Operations



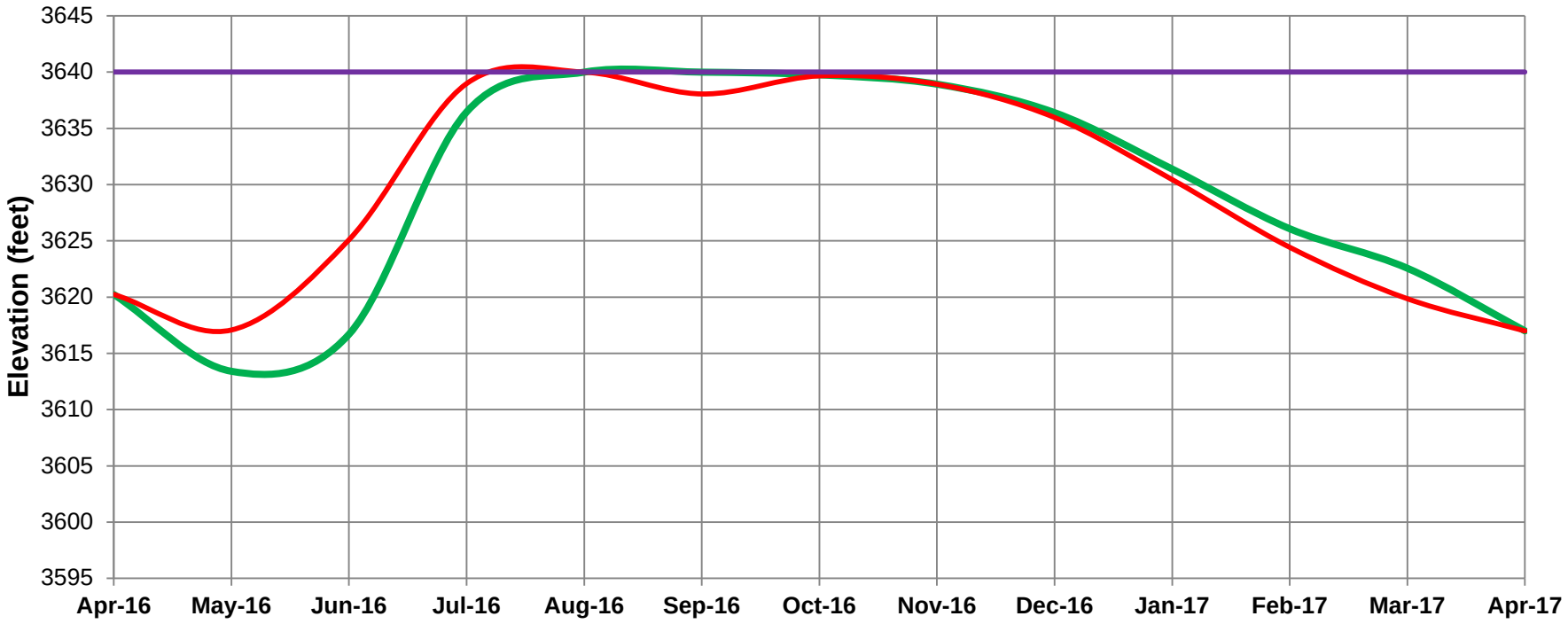


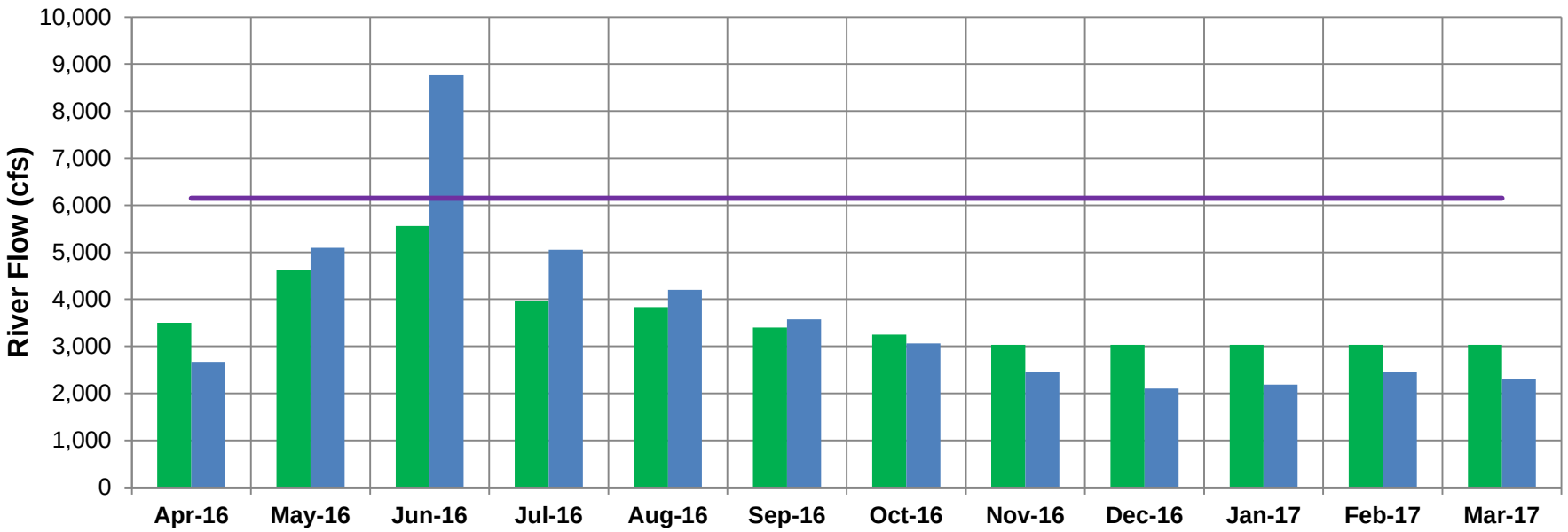
Most and Minimum Probable Inflow Operations



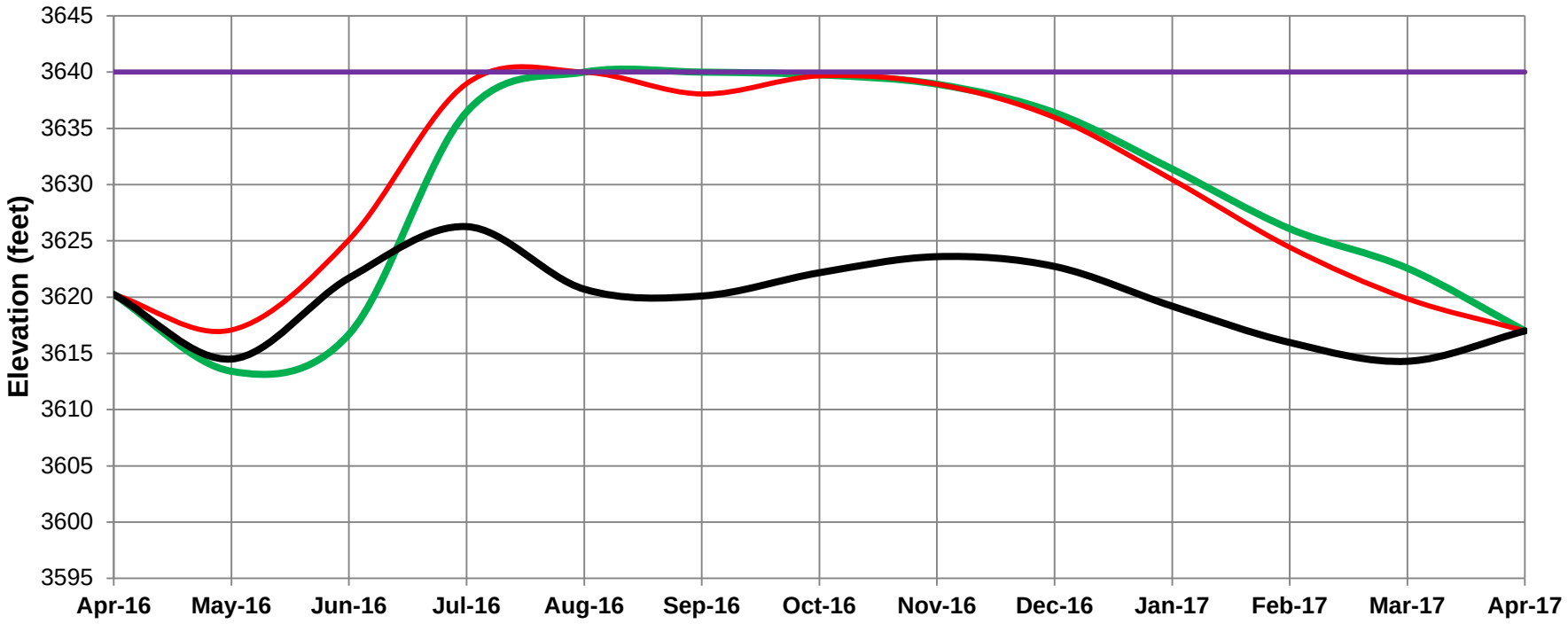


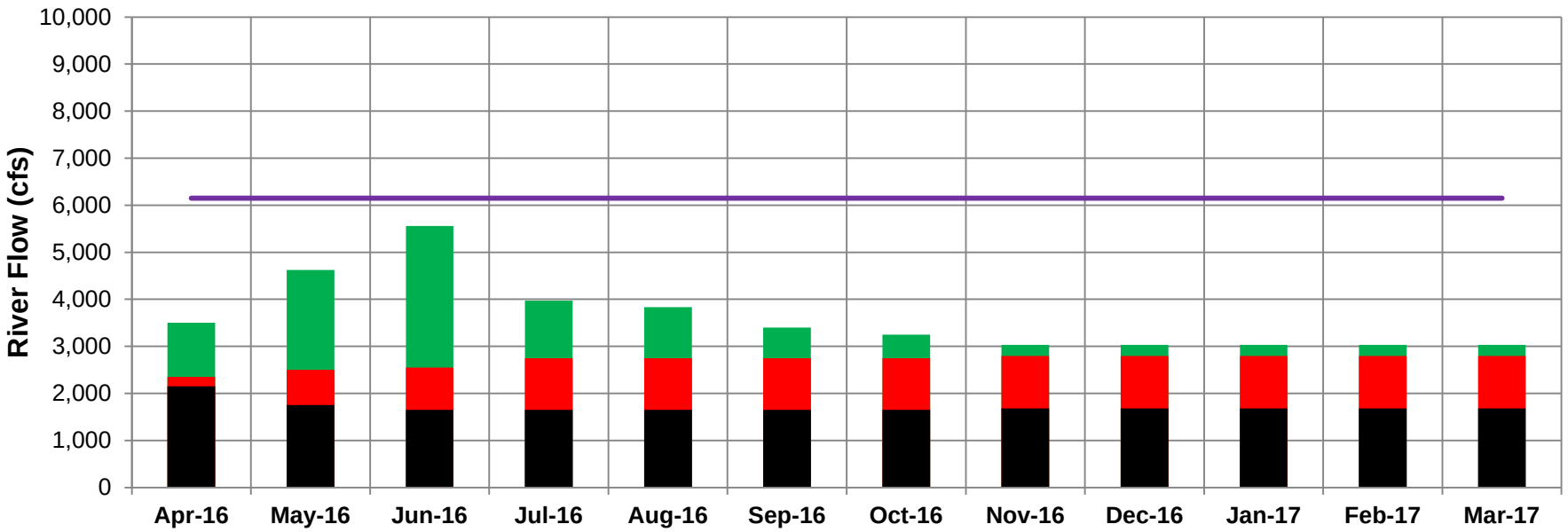
Most and Maximum Probable Inflow Operations





Most, Minimum, and Maximum Probable Inflow Operations





Questions and Feedback

The information presented at this meeting can be found on the Montana Area Office website at:

www.usbr.gov/gp/mtao/yellowtail/index.html