

RECLAMATION

Managing Water in the West

Yellowtail Dam & Bighorn Lake 2011 Operations Review

Billings, MT
October, 2011



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BIGHORN LAKE
2011 Operations Review Based on
Draft Criteria

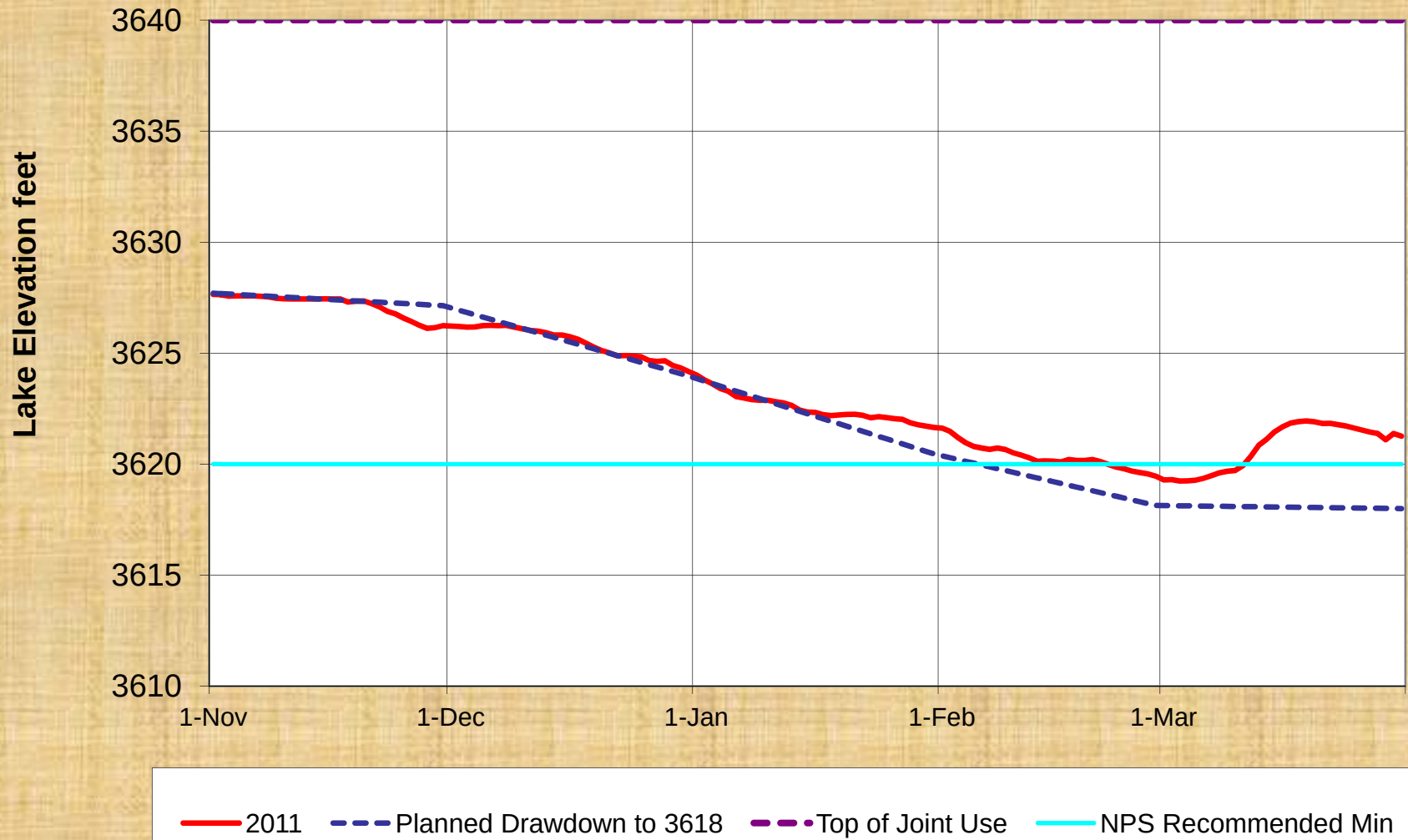
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November-March River Release

	<u>Target</u>	Actual
Oct 31 Lake Elev.	3638-3640	3627.72
Nov-Mar Release		2,370 cfs
Mar 31 Lake Elev.	3618	3620.91

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Bighorn Lake 2011 Nov-Mar Operations



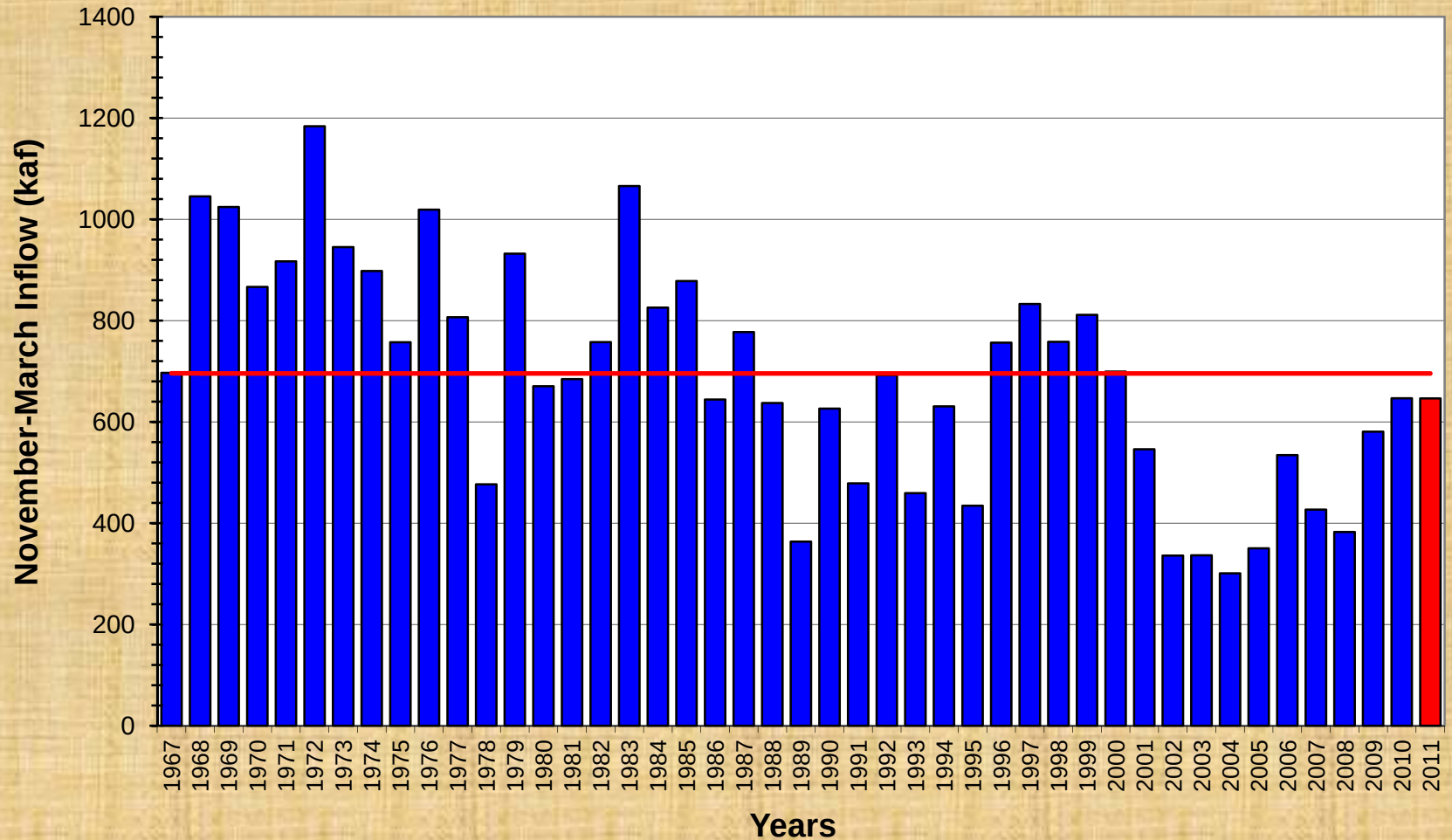
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Recap of Water Year 2011

Bighorn Lake November-March Inflow 1967-2011

2011 – 646 kaf

Ave. – 696 kaf



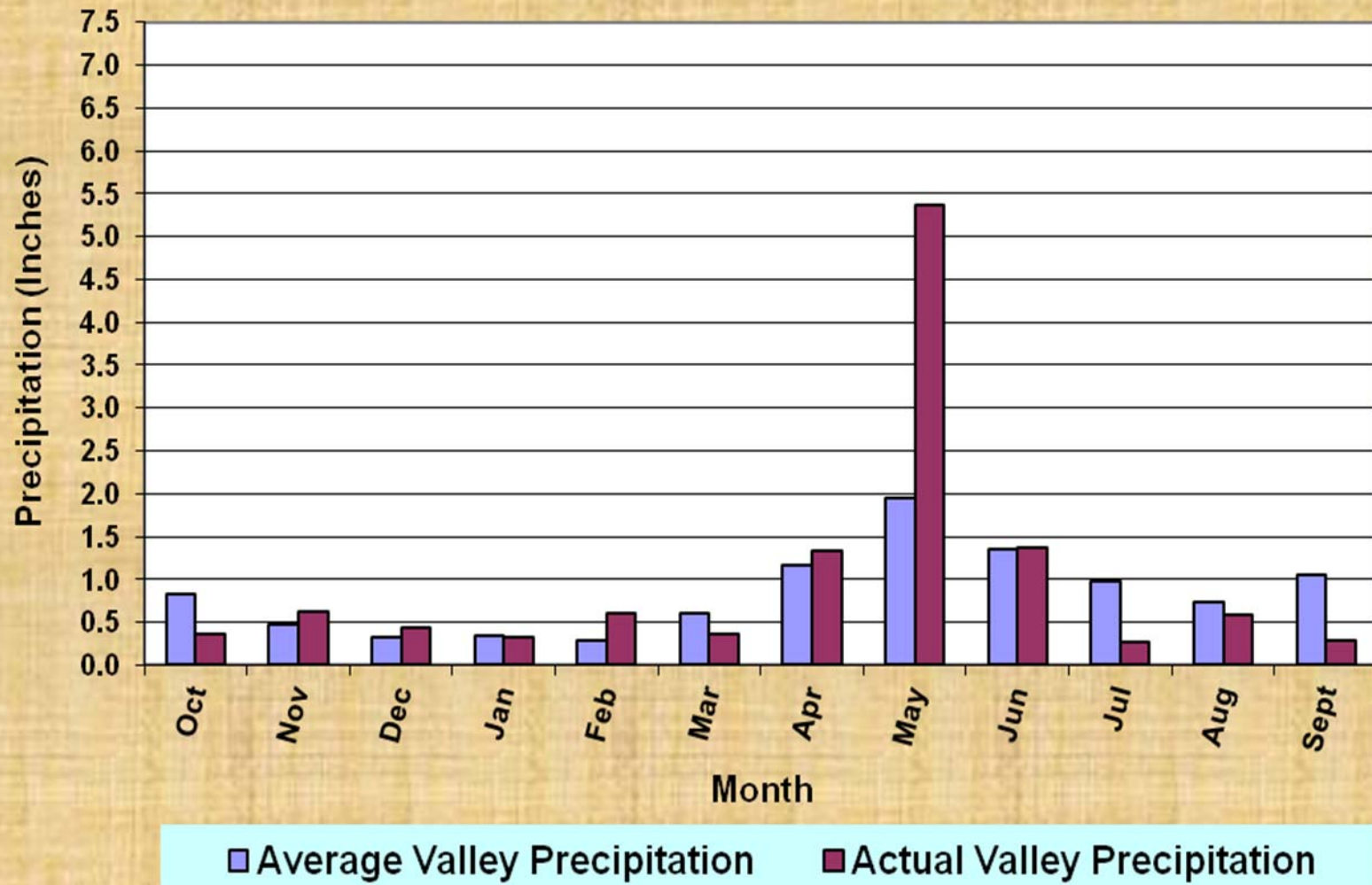
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Spring Runoff Season

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Recap of Water Year 2011

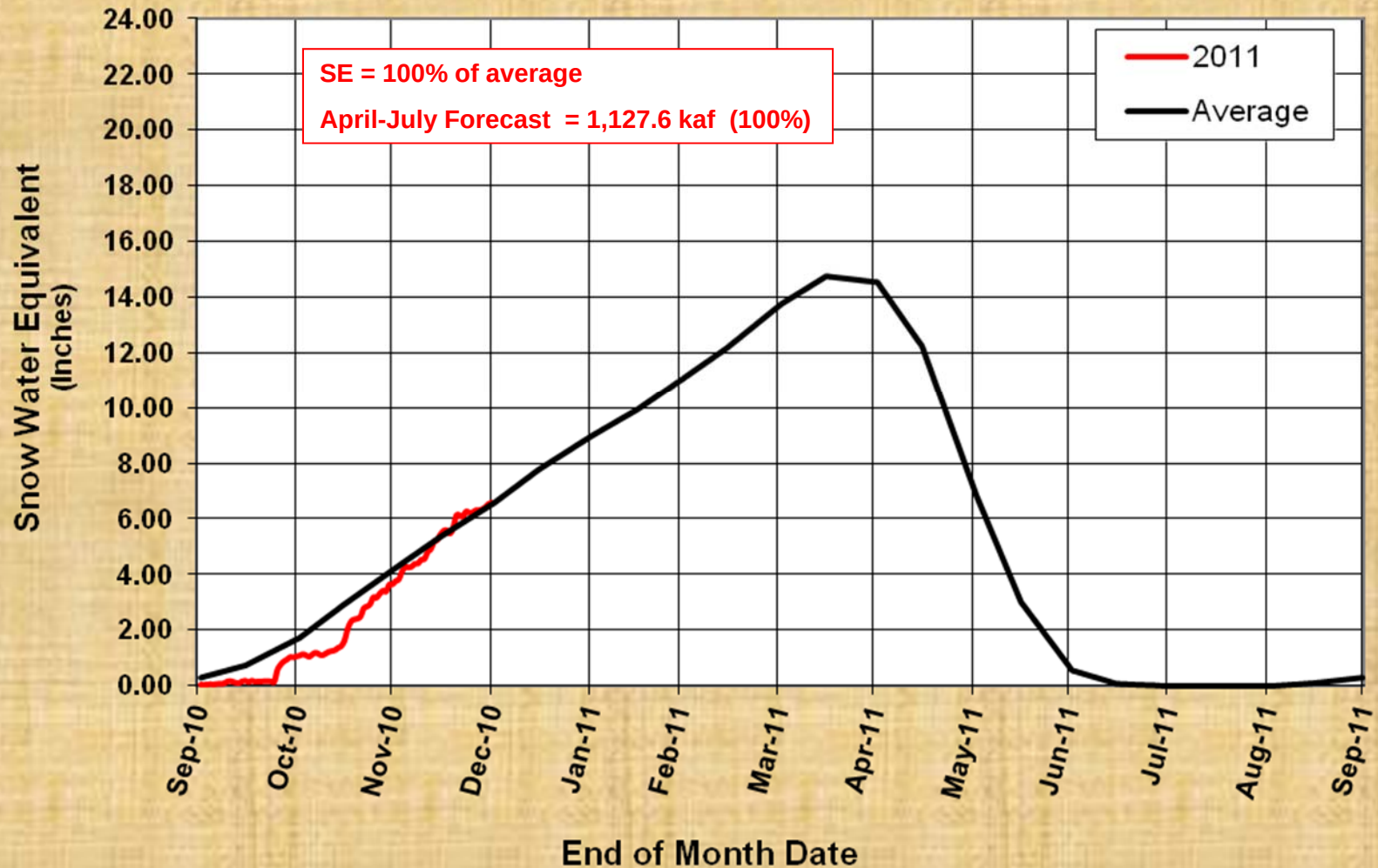
2011 Valley Precipitation



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Recap of Water Year 2011

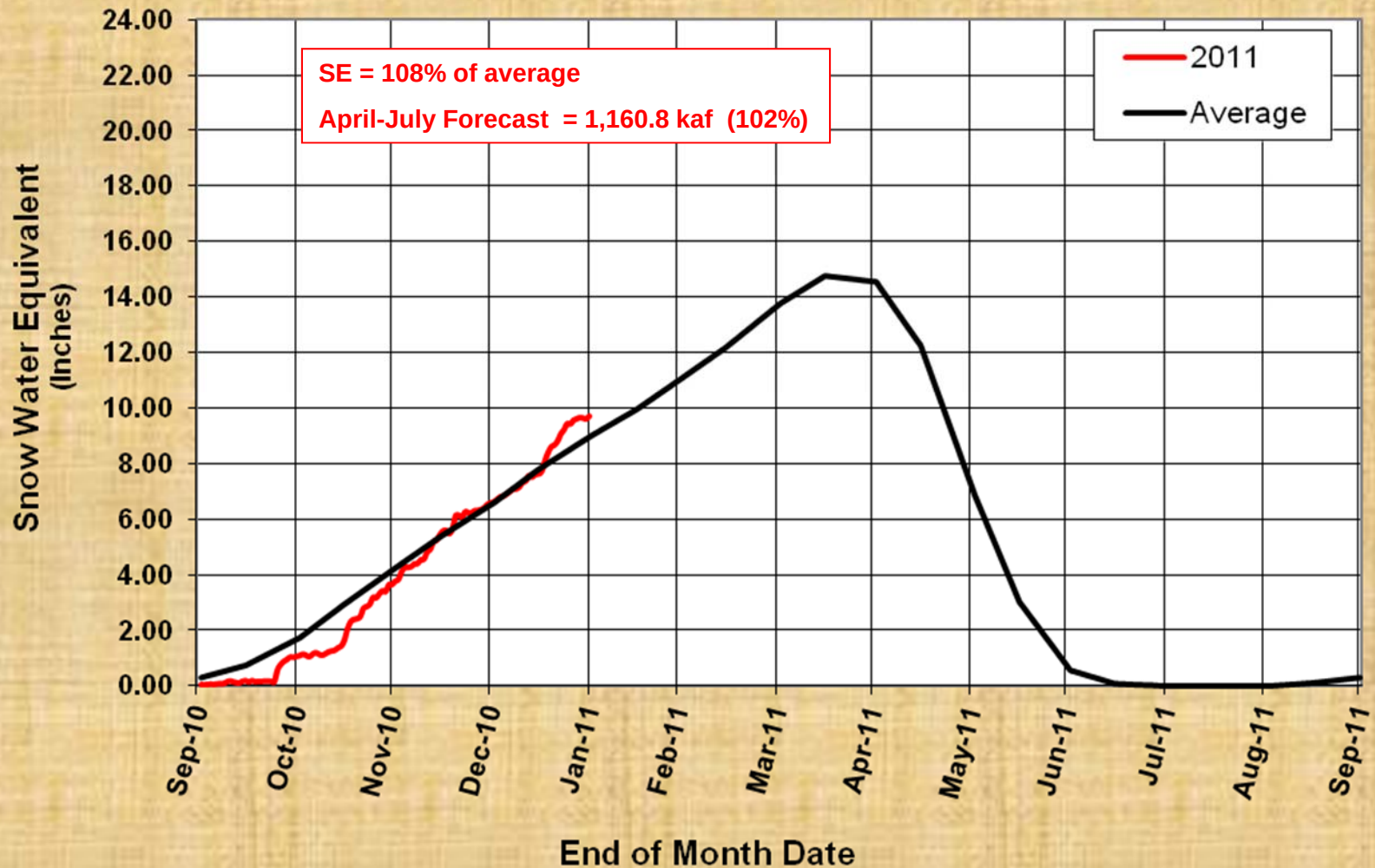
Mountain Snowpack Conditions on January 1



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Recap of Water Year 2011

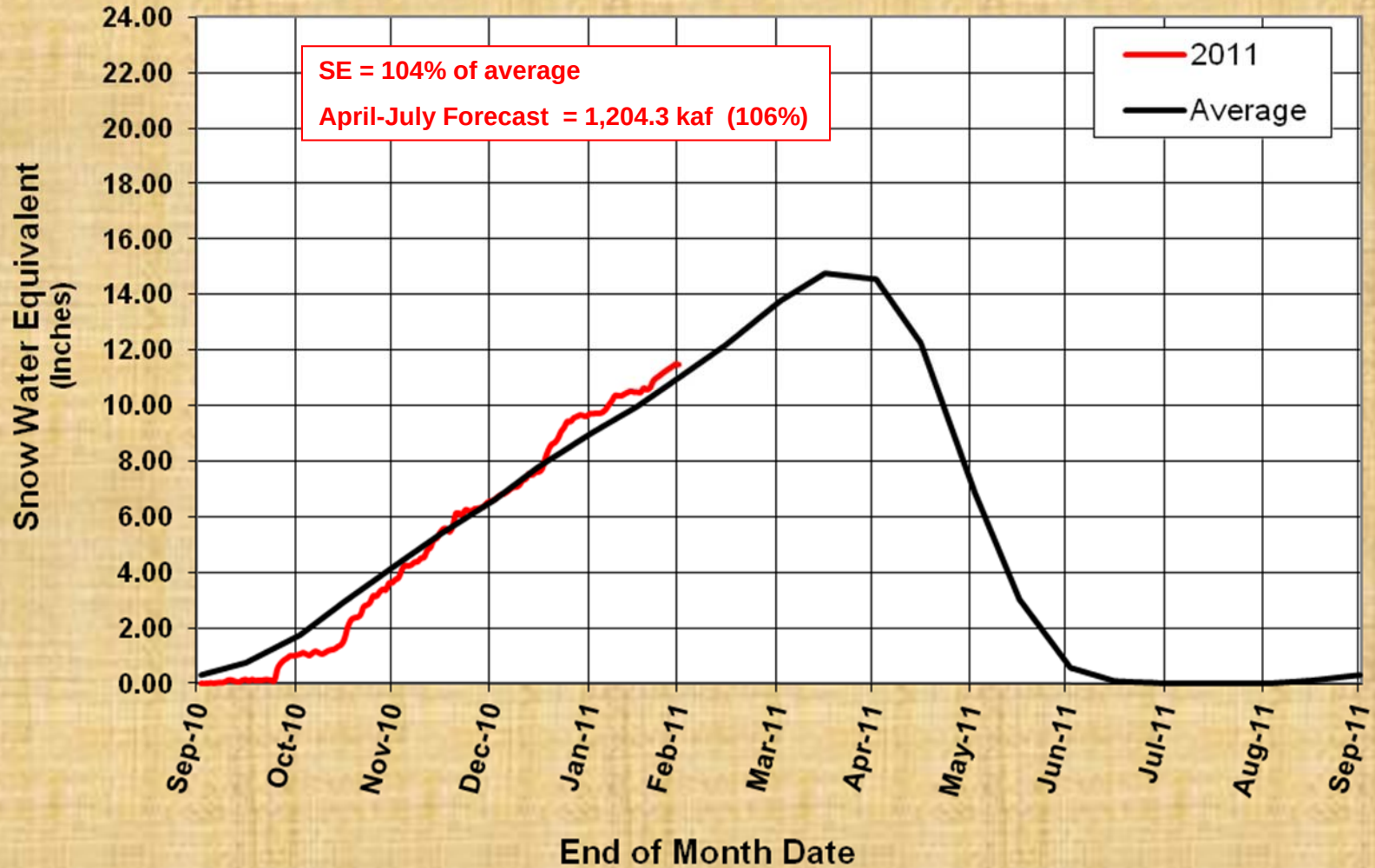
Mountain Snowpack Conditions on February 1



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Recap of Water Year 2011

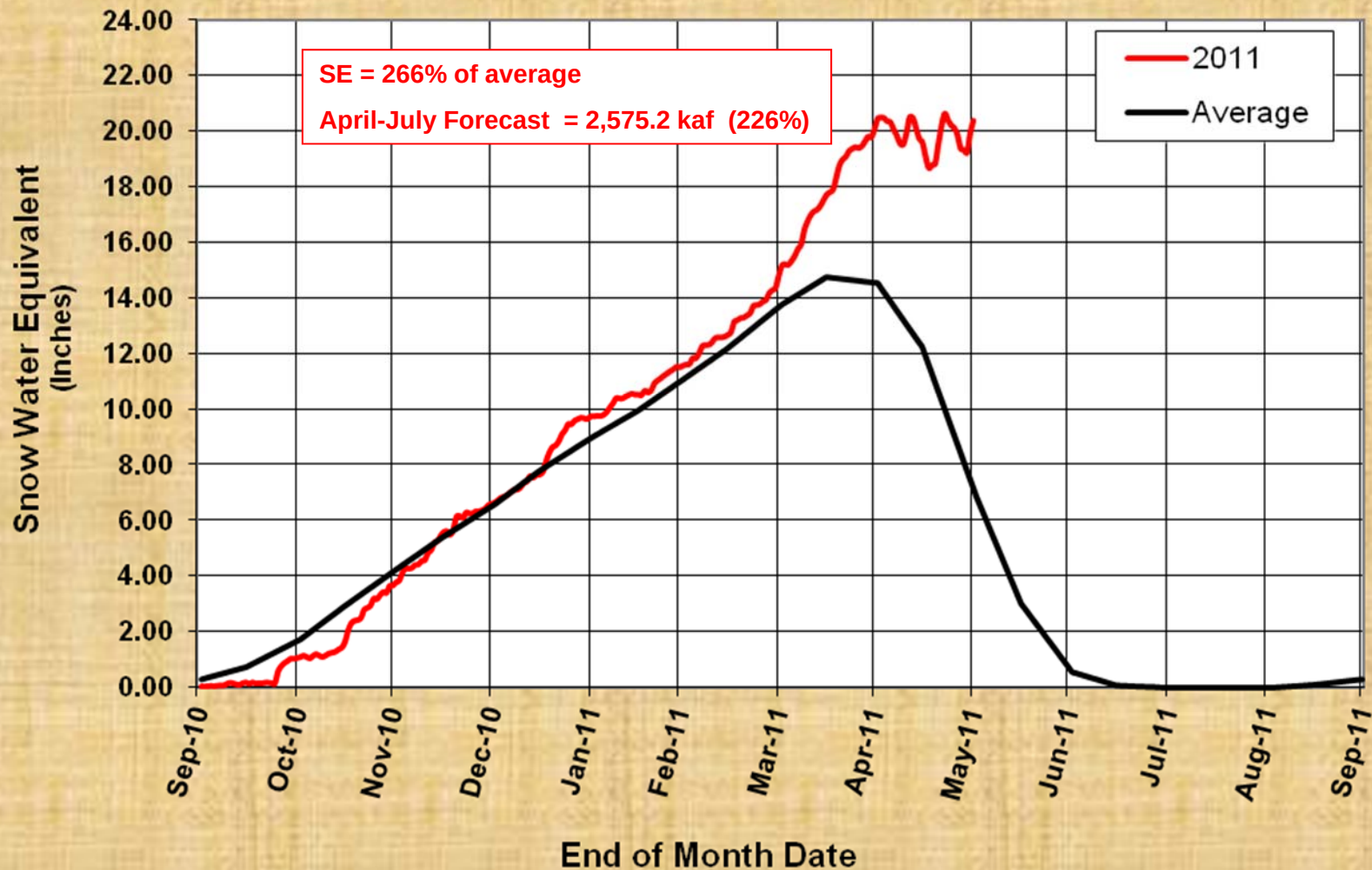
Mountain Snowpack Conditions on March 1



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Recap of Water Year 2011

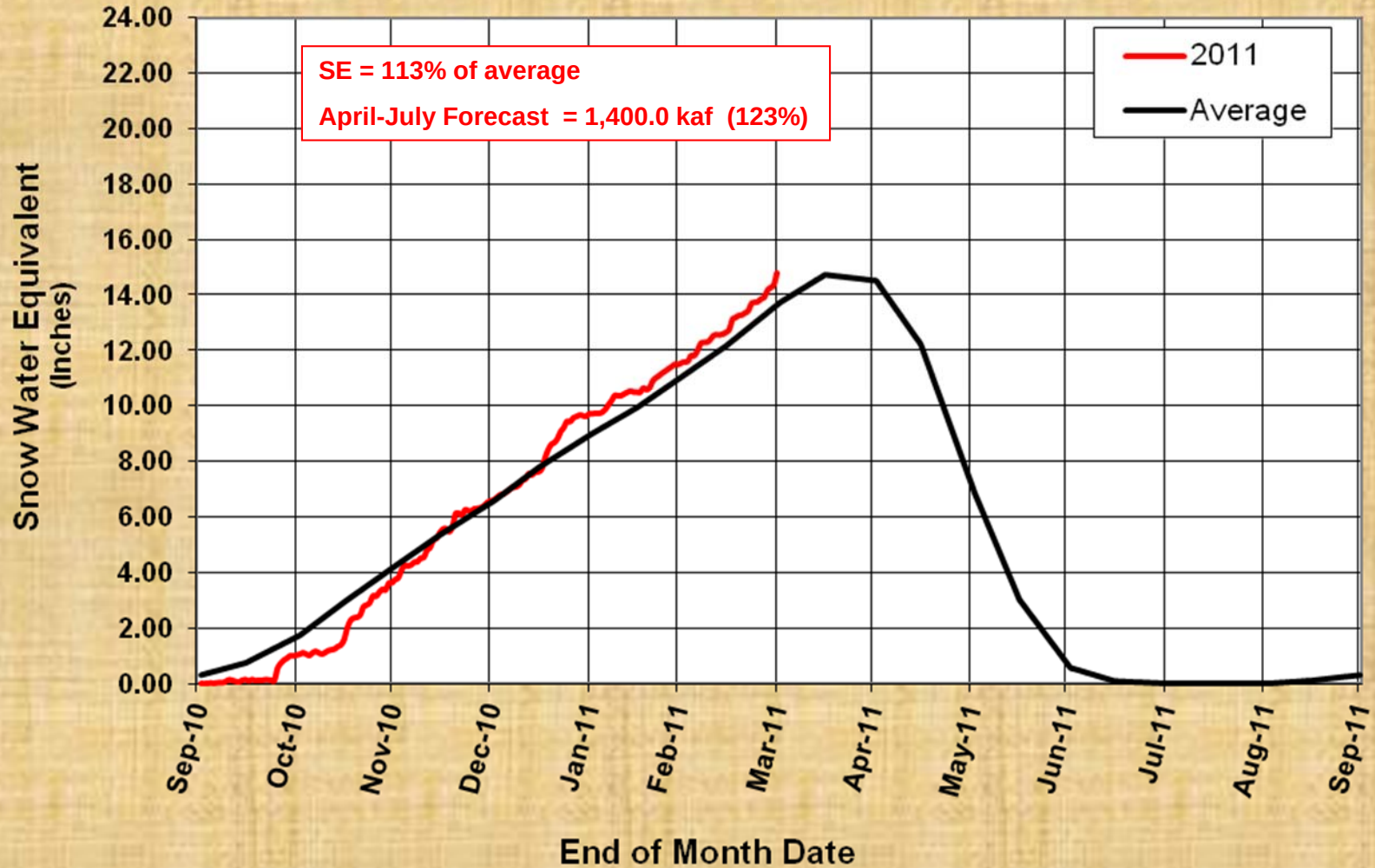
Mountain Snowpack Conditions on June 1



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Recap of Water Year 2011

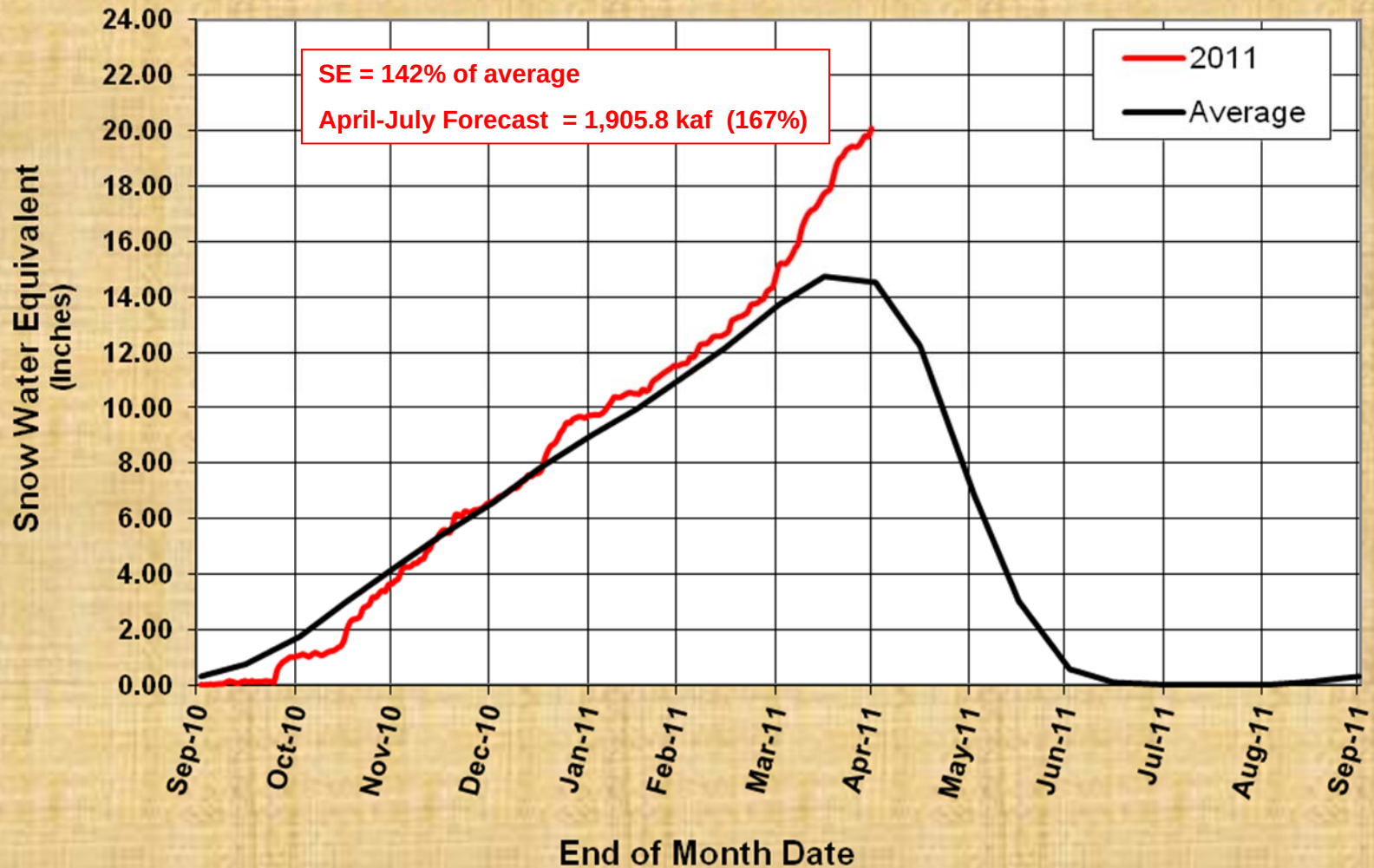
Mountain Snowpack Conditions on April 1



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Recap of Water Year 2011

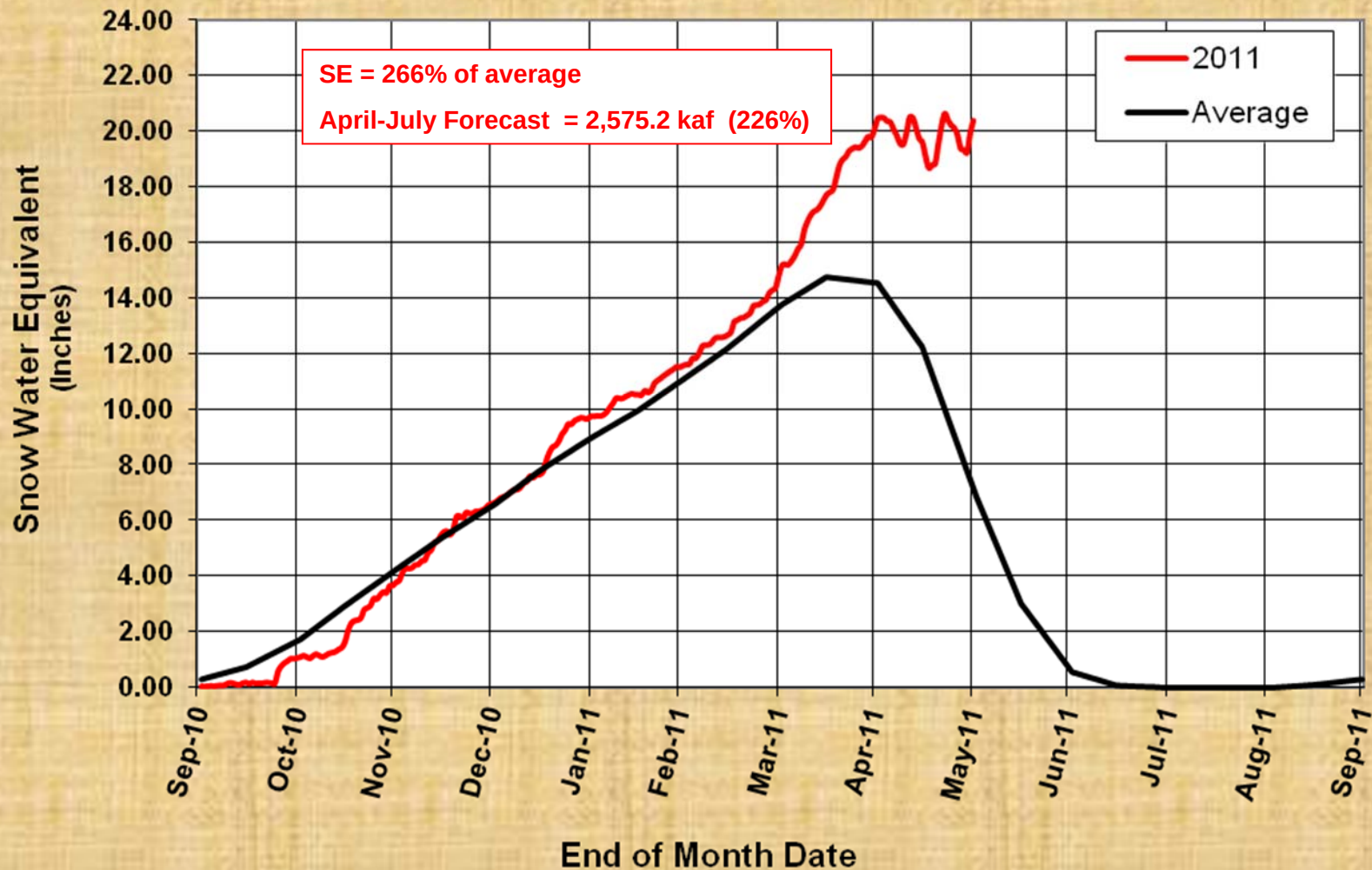
Mountain Snowpack Conditions on May 1



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Recap of Water Year 2011

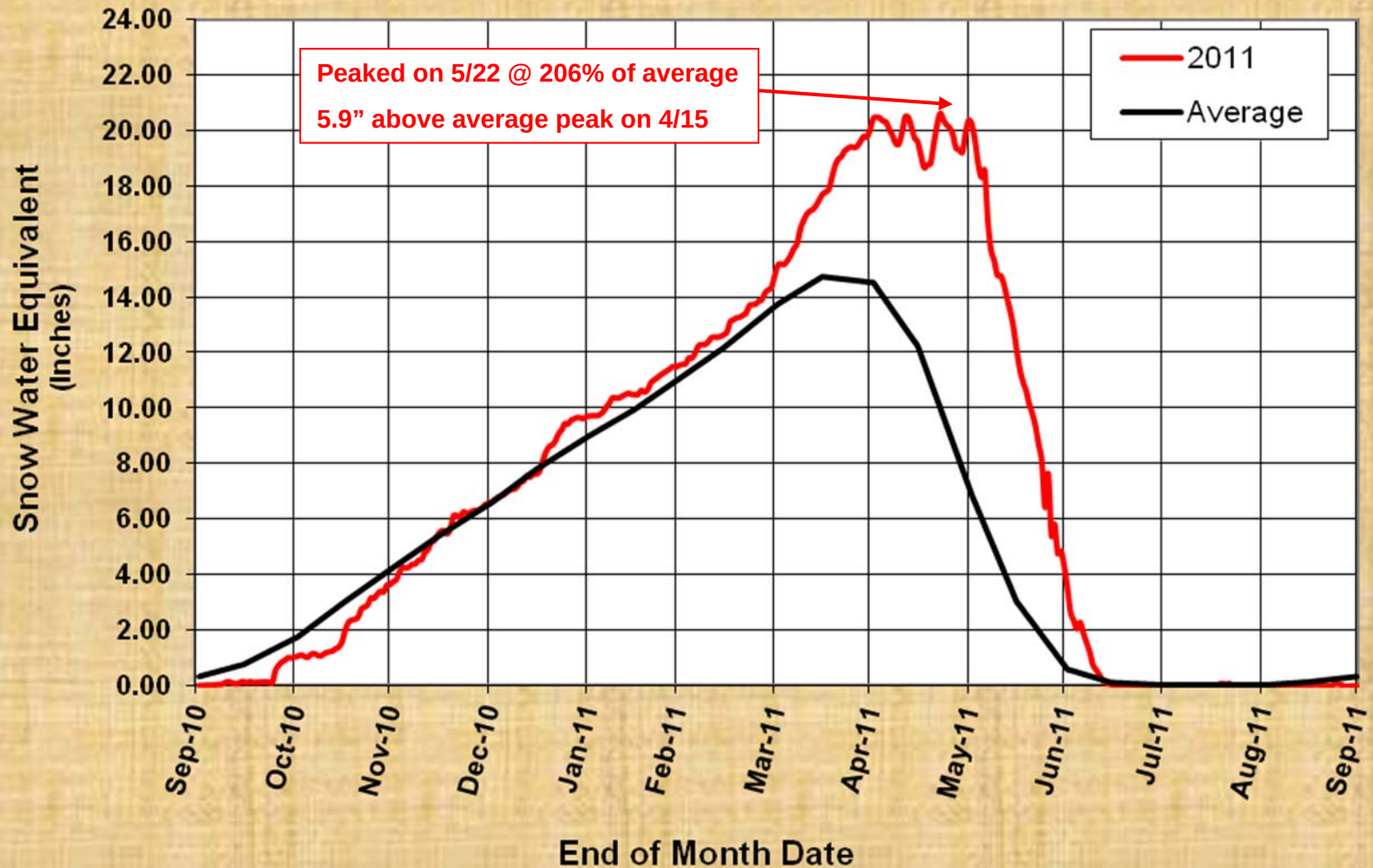
Mountain Snowpack Conditions on June 1



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Recap of Water Year 2011

Mountain Snowpack Conditions - 2011



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Recap of Water Year 2011
6-30-2011



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Recap of Water Year 2011

7-7-2011

July 7, 2011



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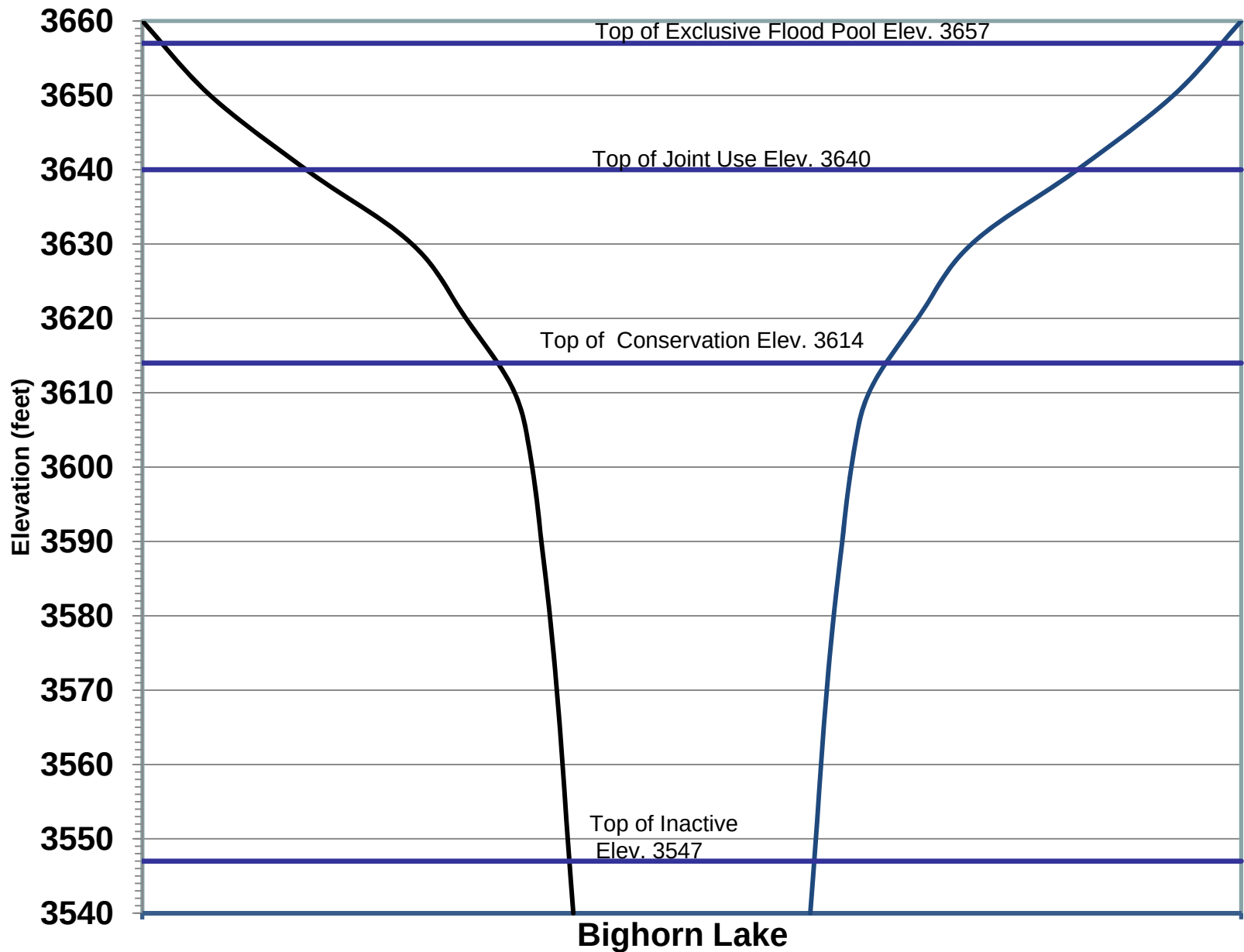
Recap of Water Year 2011
7-21-2011



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Rule Curve Operations Apr-July

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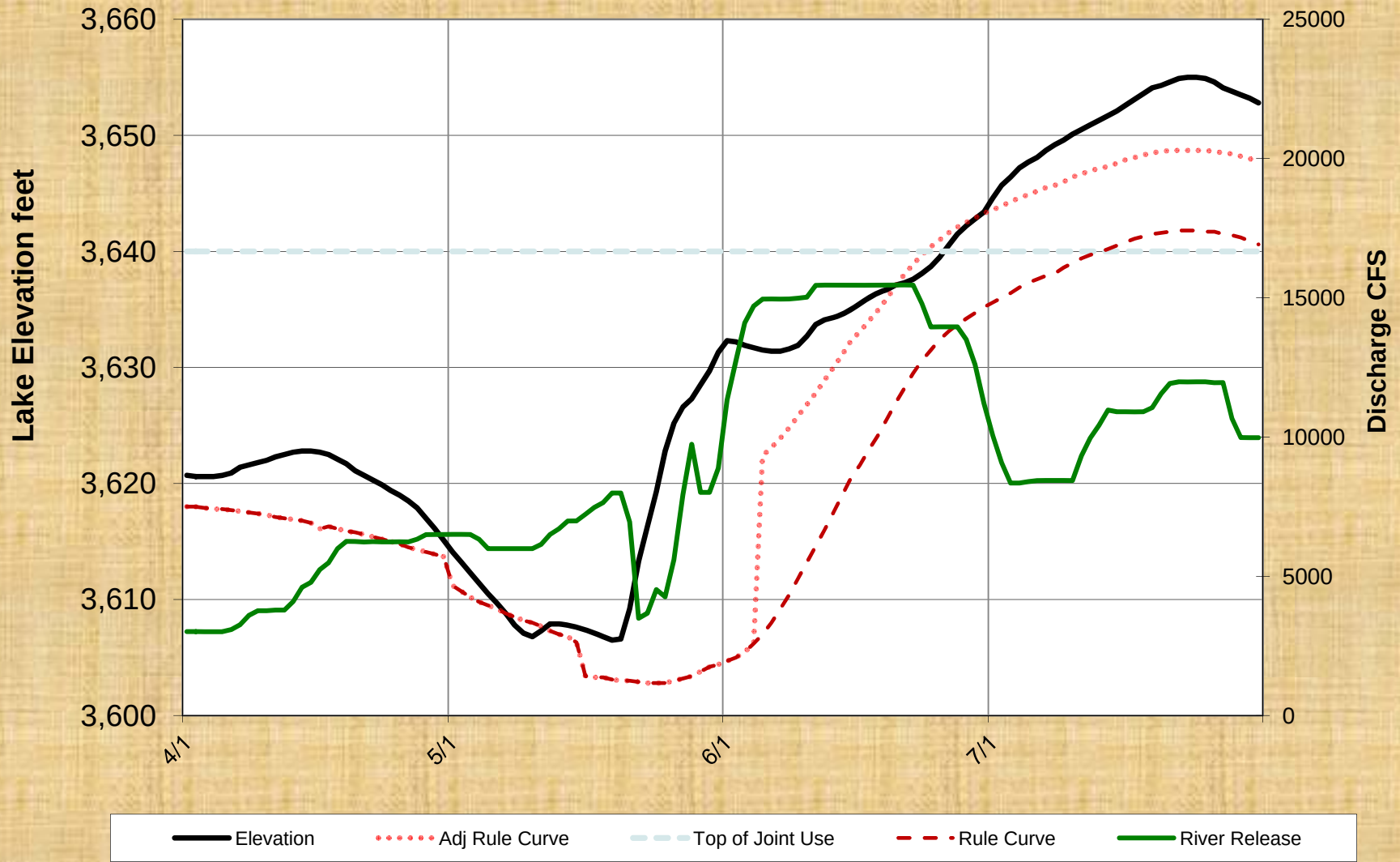
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Apr-July Forecasts 2011 & Rule Curve Targets

<u>Date</u>	<u>Forecast</u>	<u>% of Avg</u>	Rule Curve <u>Min Elev.</u>	<u>Date</u>
April 1	1,400,000	121%	3611.1	5/20
April 15	1,703,877	148%	3606.3	5/23
May 1	1,905,829	165%	3604.2	5/23
May 15	2,147,700	189%	3602.7	5/23
June 1	2,575,182	223%	3602.7	5/23
Actual	2,572,304	223%	3606.5	5/20

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Bighorn Lake Rule Curve Operation 2011



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2011 New Record Event

Previous Record set in 1967

	<u>2011</u>	<u>1967</u>
Apr-Jul Volume	2,572,304 af +301,183 af	2,271,121 af
Apr-Jul % of Avg	223% +13%	197%
Peak River Release	15,460 cfs -8,630 cfs	24,090 cfs
Peak Lake Elev.	3655.03 -1.40	3656.43

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Unregulated Basin Runoff

	<u>2011</u>	<u>1967</u>
Apr-July Volume @ St. X.	2,971,249 af +104,391 af	2,866,858 af
Peak Flow @ St. X.	39,580 cfs -5,957 cfs	45,537 cfs
Apr-July Gains	717,806 af +147,831 af	569,975 af

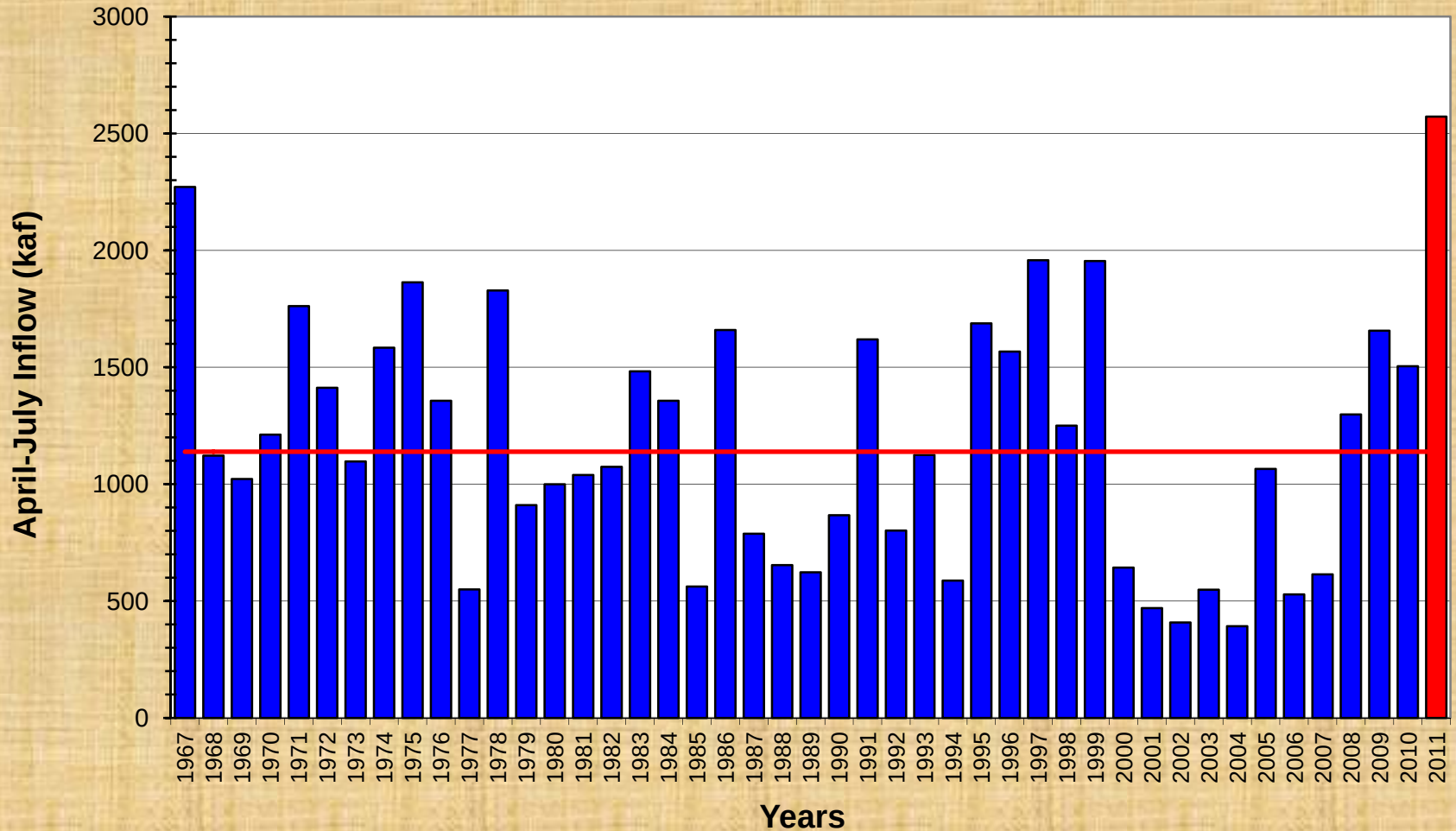
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Recap of Water Year 2011

Bighorn Lake April-July Inflow 1967-2011

2011 – 2,572 kaf

Ave. – 1,138 kaf



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Bighorn River System Operations

Three main Reservoirs

Boysen Reservoir – Wind River

Buffalo Bill Reservoir – Shoshone River

Bighorn Lake – Bighorn River

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Apr-July Reservoir Inflows

<u>Reservoir</u>	<u>Inflow AF</u>	<u>% of Avg</u>
Boysen	994,772	163%
Buffalo Bill	1,230,390	179%
Gains	717,807	582%
Bighorn Lake	2,572,304	223%

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April-July Bighorn Lake Inflow

<u>Reservoir</u>	<u>A-J Flow af</u>	<u>% of Total</u>
Boysen Release	833,063	32%
Buffalo Bill Release	1,043,475	40%
Bighorn Gains	717,807	28%
Bighorn Lake	2,572,304	100%

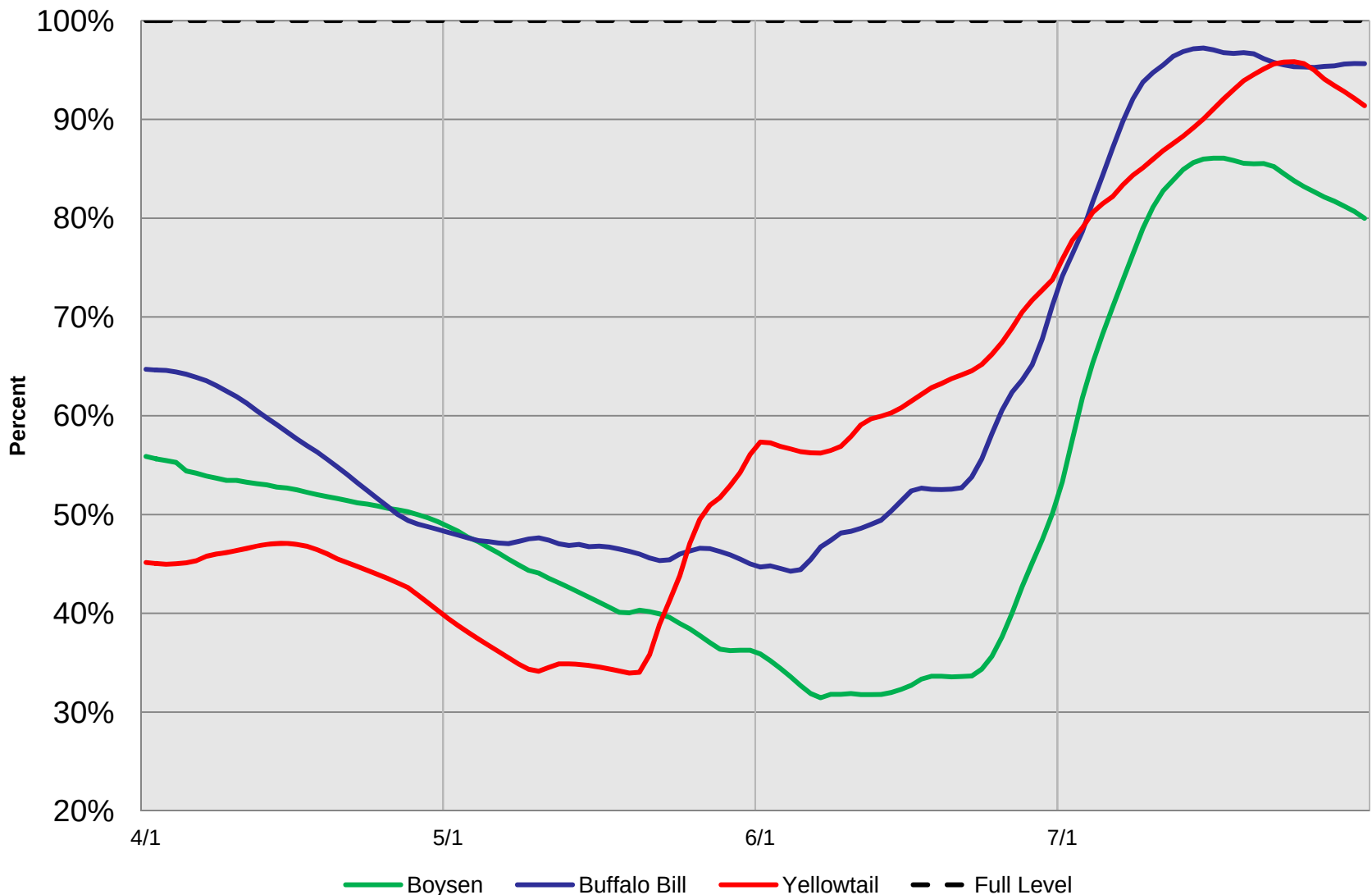
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Reservoir Storage Space Used

<u>Reservoir</u>	<u>Space Used AF</u>	<u>% of Available</u>
Boysen	368,694	55%
Buffalo Bill	320,359	53%
Bighorn Lake	500,703	62%
Total	1,188,756	57%

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Percent of Total Useable Storage Space Filled Conservation, Joint Use and Exclusive Flood Pools

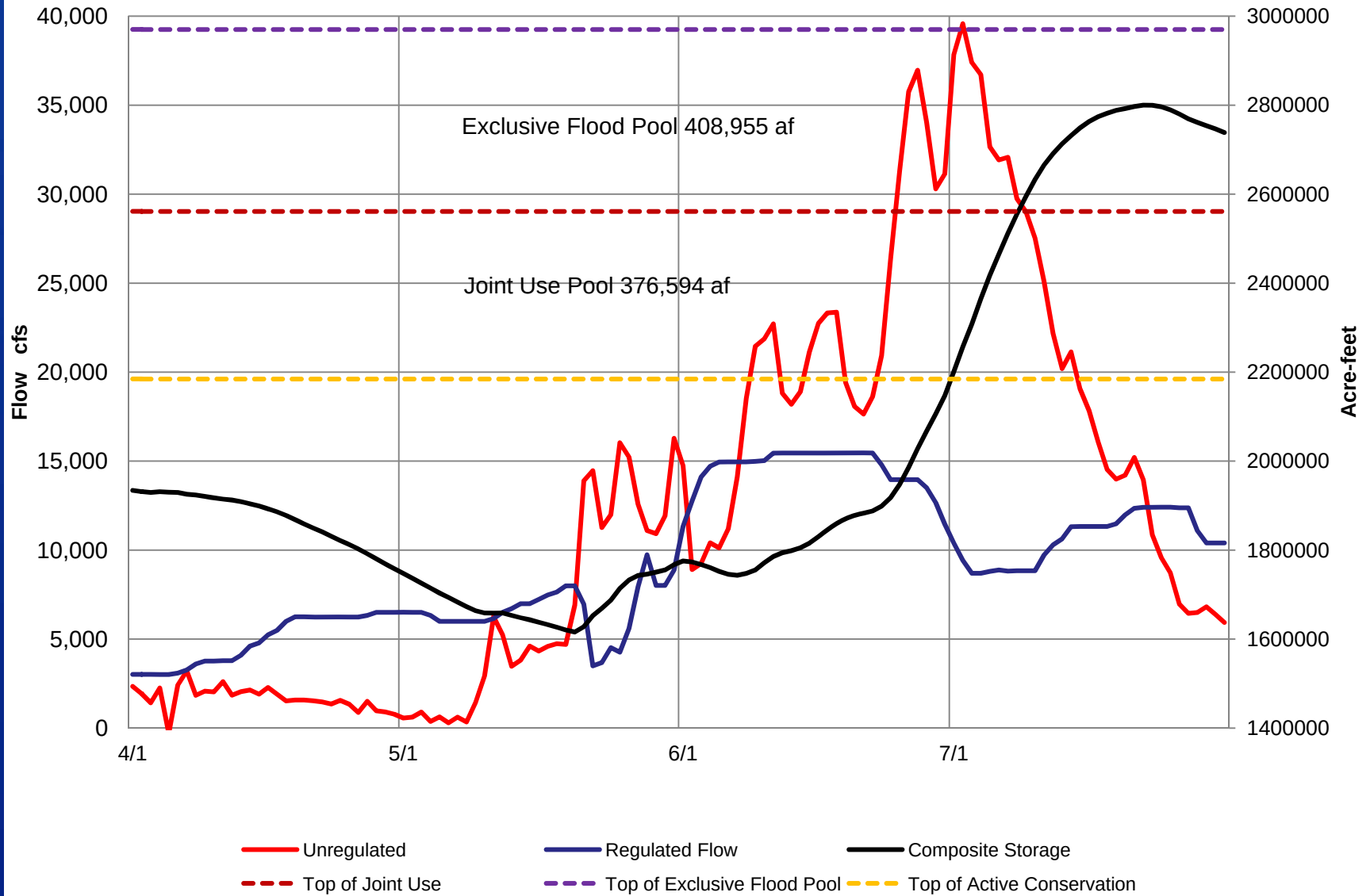


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Composite Reservoir

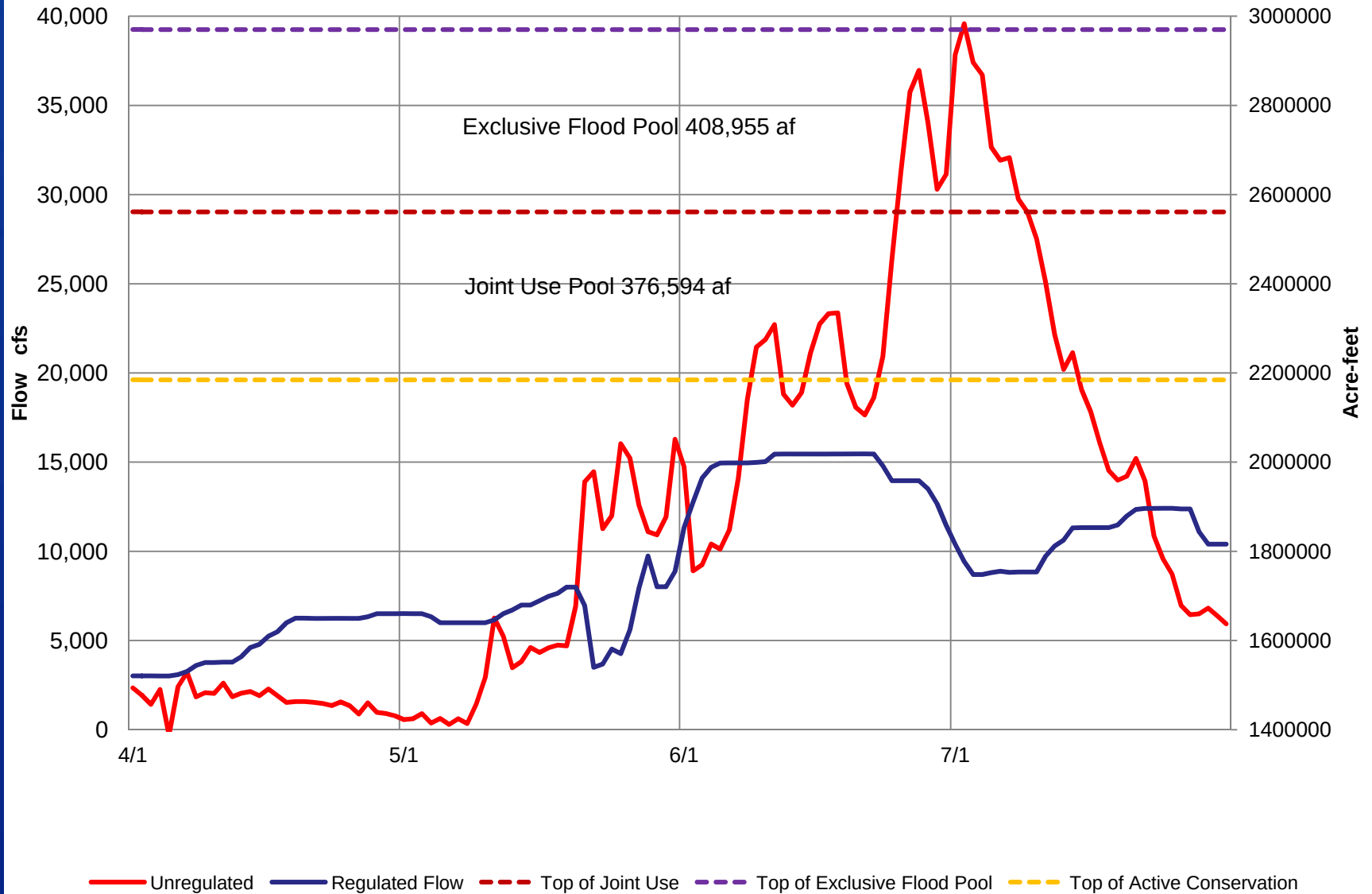
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2011 Bighorn River Basin System Operations (Composite Reservoir)



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2011 Bighorn River Basin System Operations (Composite Reservoir)

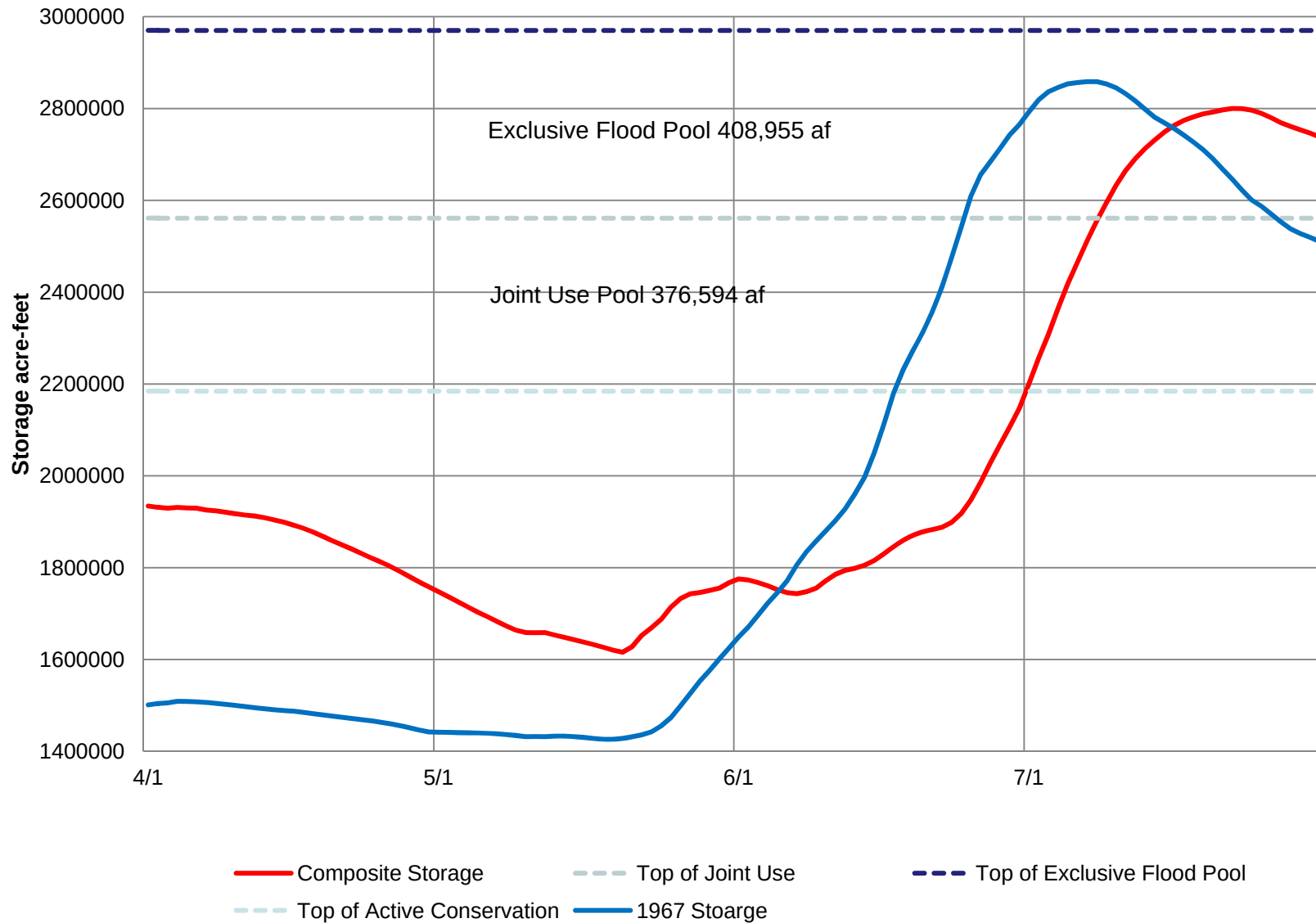


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2011 COMPARED TO 1967

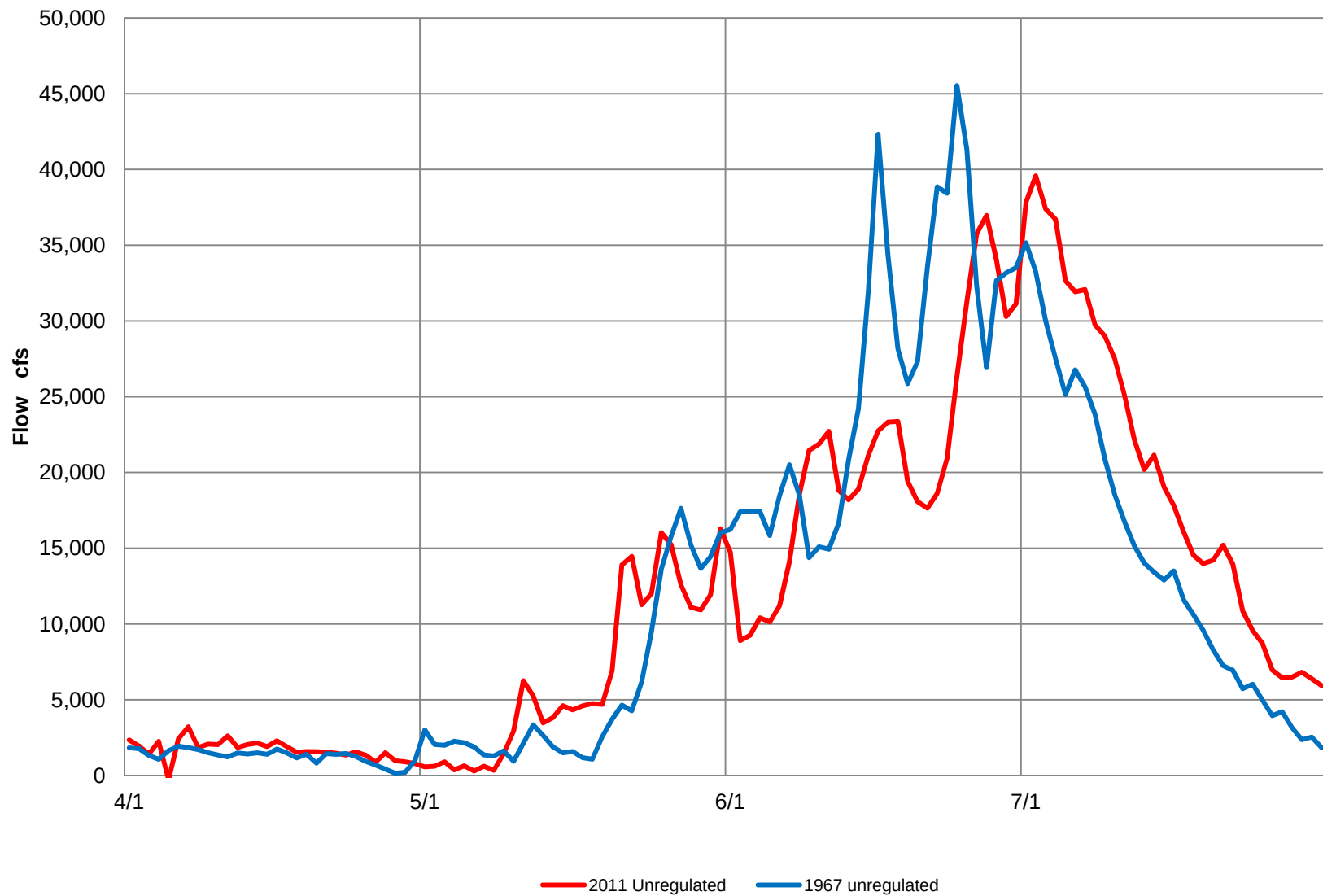
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2011 v. 1967 Bighorn Composite Reservoir Storage



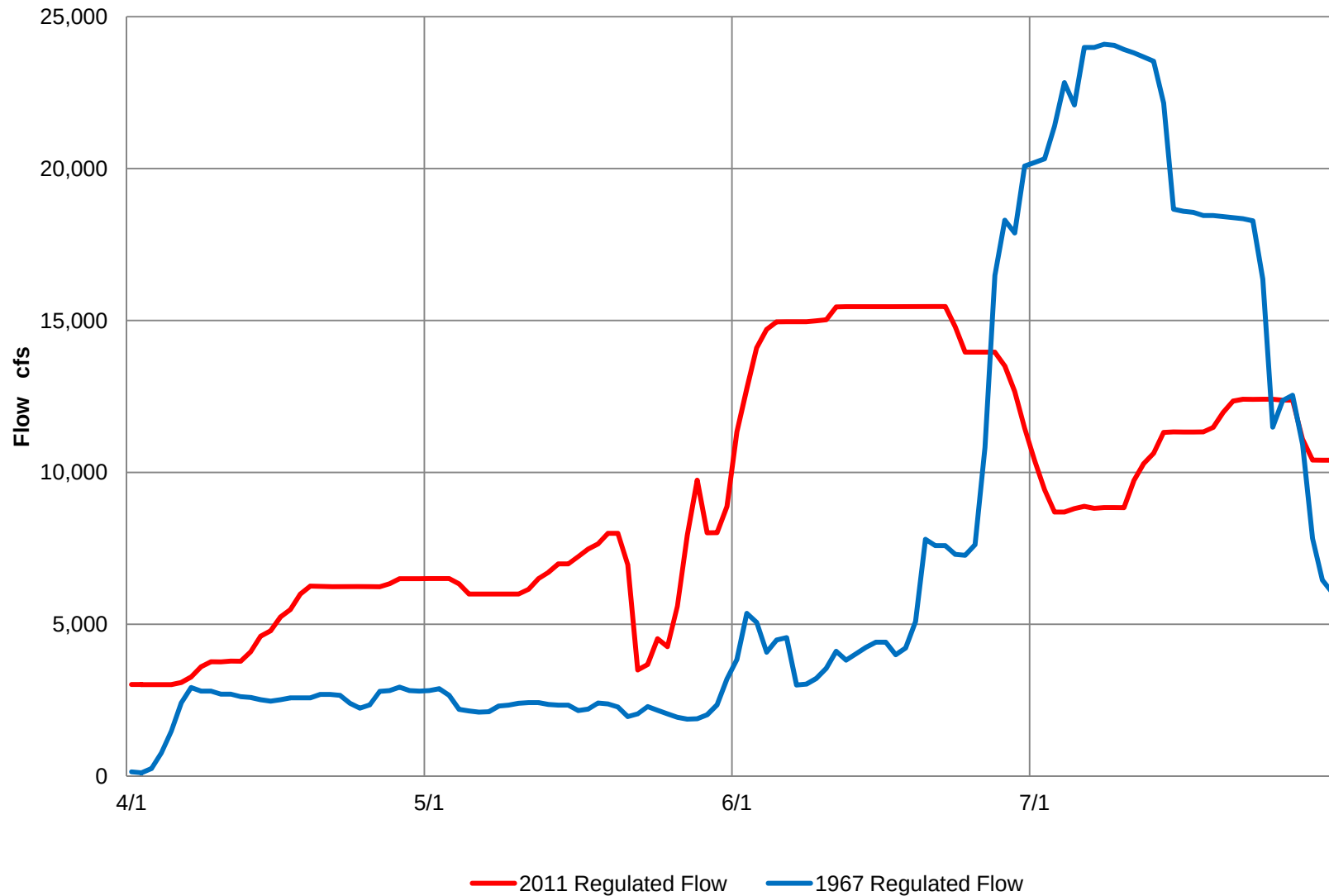
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2011 v 1967 Unregulated Flow
Bighorn River at St. Xavier



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2011 v. 1967 Regulated Flow Bighorn River at St. Xavier



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Questions or Comments

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