



2013 Annual Operating Plan

April 1 Runoff Forecast

RECLAMATION
Managing Water in the West



**US Army Corps
of Engineers®**
Albuquerque District

Definitions

Native/Natural Rio Grande water: Water that comes directly from the Rio Grande Basin

San Juan-Chama water: Water that is imported into the Rio Grande Basin from the San Juan Basin through the San Juan-Chama Project

Rio Grande Compact: Agreement between the states of Colorado, New Mexico, and Texas that apportions Rio Grande water between the three states.

Article 7: Section of the Rio Grande Compact that dictates storage in reservoirs. If Rio Grande Project storage is less than 400,000 ac-ft at Elephant Butte and Caballo, no storage of Rio Grande water can take place at El Vado except to satisfy Native American needs or as part of the Emergency Drought Water Agreement.

Definitions (cont.)

cfs- cubic feet per second (roughly 7.5 gallons/second)

Acre foot = approximately 326,000 gallons or 43,560 cubic feet

Hydrograph – graph of flow rate per unit time

The District – Middle Rio Grande Conservancy District (MRGCD)

The City – City of Albuquerque now Albuquerque Bernalillo County Water Utility Authority (ABCWUA)

NRCS – Natural Resources Conservation Service

Minnow water (supplemental water) – Water leased by Reclamation to meet flow targets specified in the 2003 Biological Opinion

P&P – Prior & Paramount

What Drives the Process

Volume Forecast from the NRCS

Based on snowpack, soil moisture, climate forecast

Choose similar year based on similar volume

Actual hydrograph vs. average hydrograph

Can tweak timing of hydrograph to best match forecasted conditions (warm spring vs. cool spring)

Inflows/Outflows based on nature and policies

Article VII restrictions

Flood control and channel capacity

Timing of water deliveries

Demand curves from water users

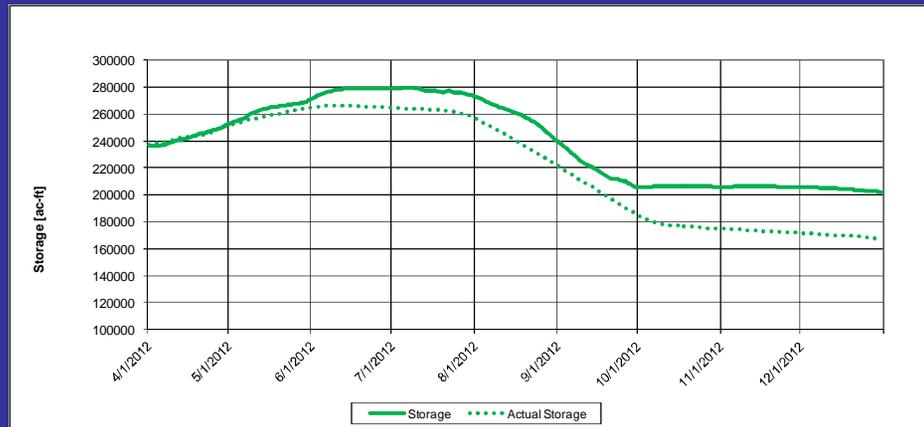
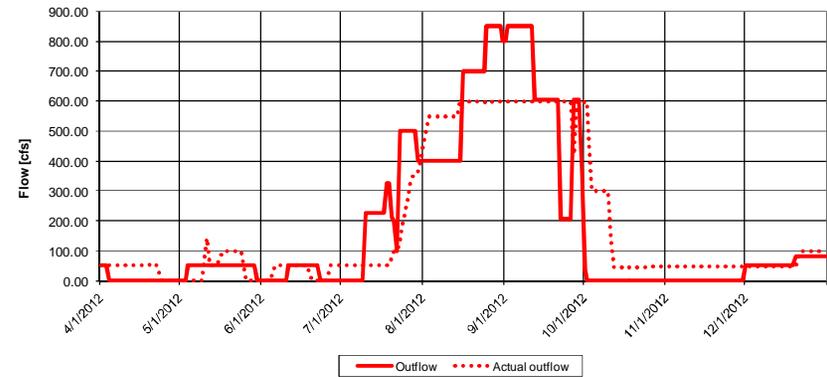
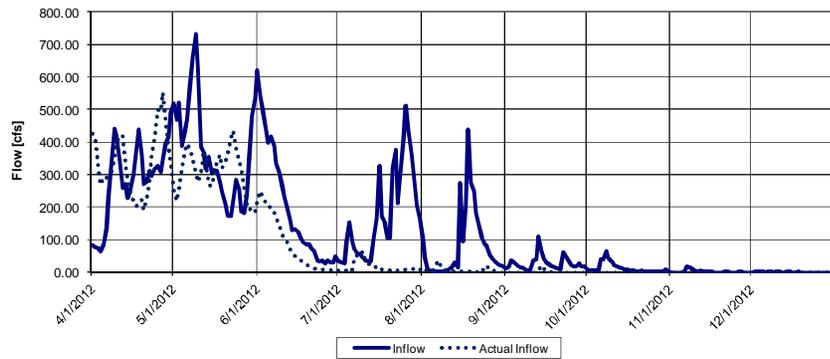
Requirements of the 2003 Biological Opinion

Reservoir storage based on inflow/outflow

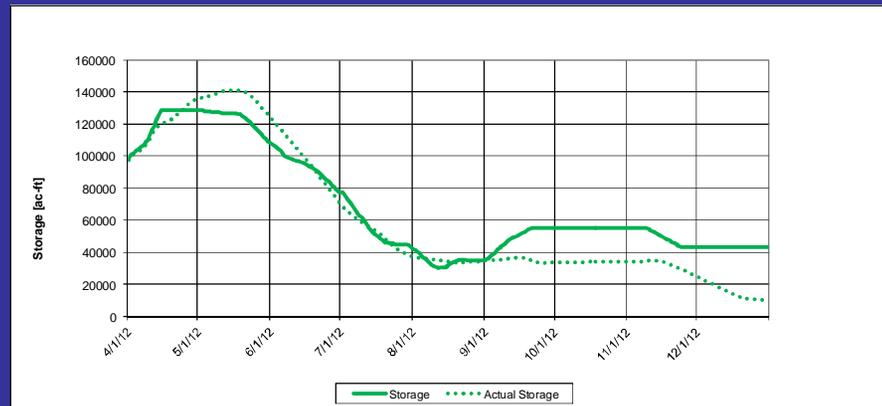
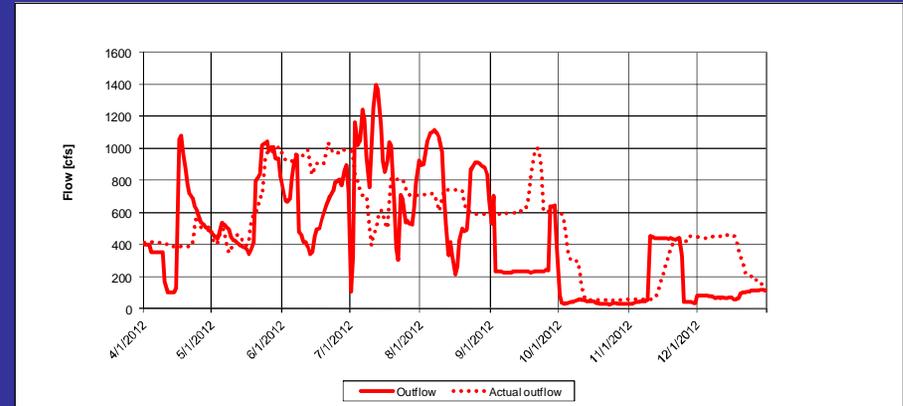
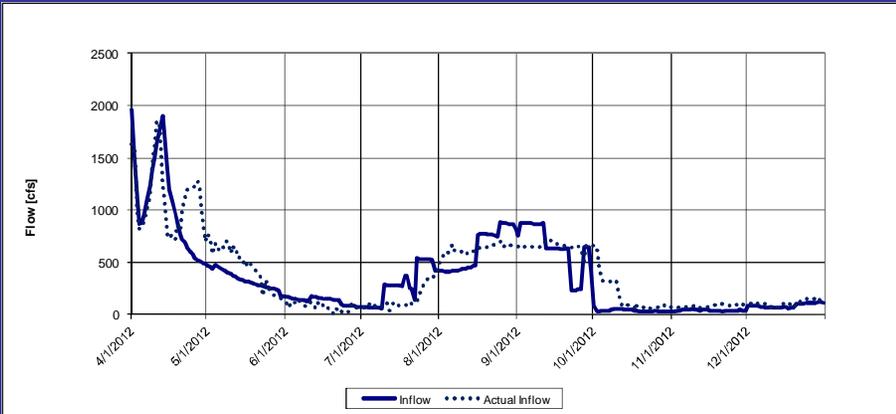
<u>Operated By:</u>	Reclamation	Corps	Water Supply	Recreation	Flood Control	Sediment Control
<u>Dams:</u>						
HERON						
EL VADO						
ABIQUIU						
NAMBE FALLS						
GALISTEO						
COCHITI						
JEMEZ CANYON						
ELEPHANT BUTTE						

2012: The Year in Review

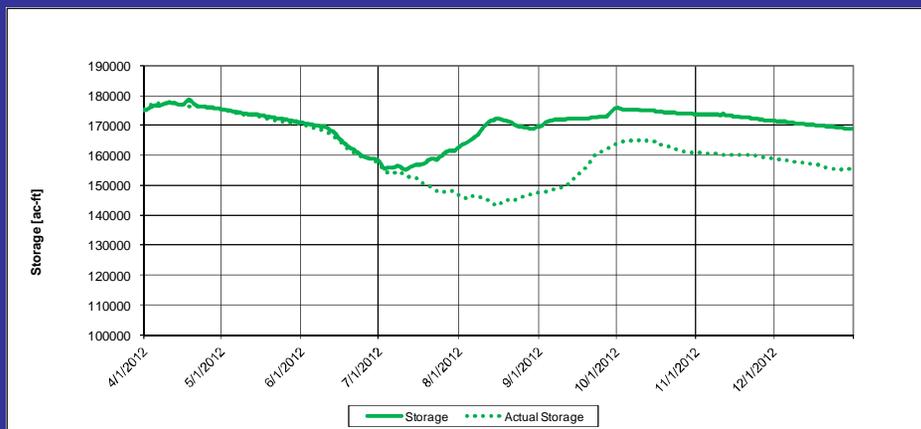
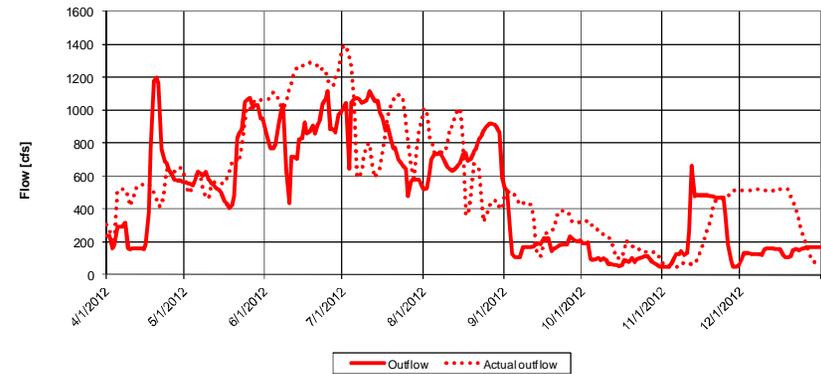
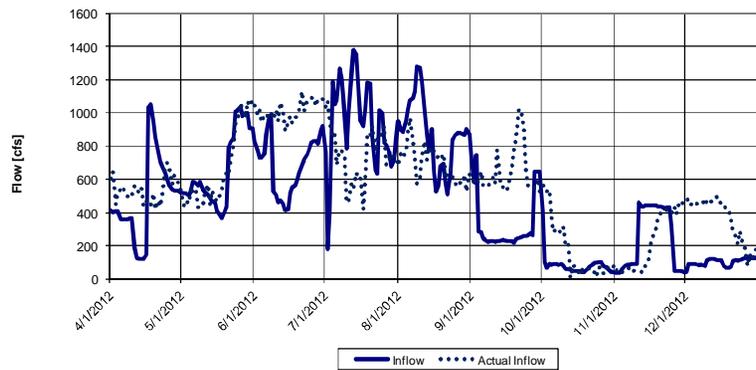
Heron Reservoir



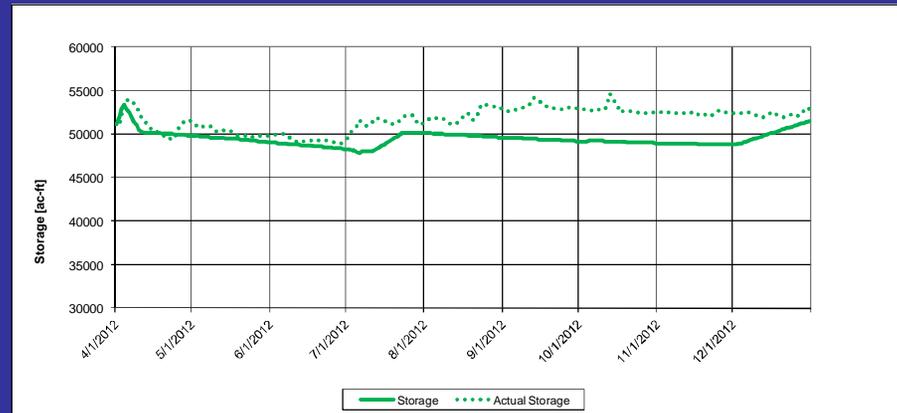
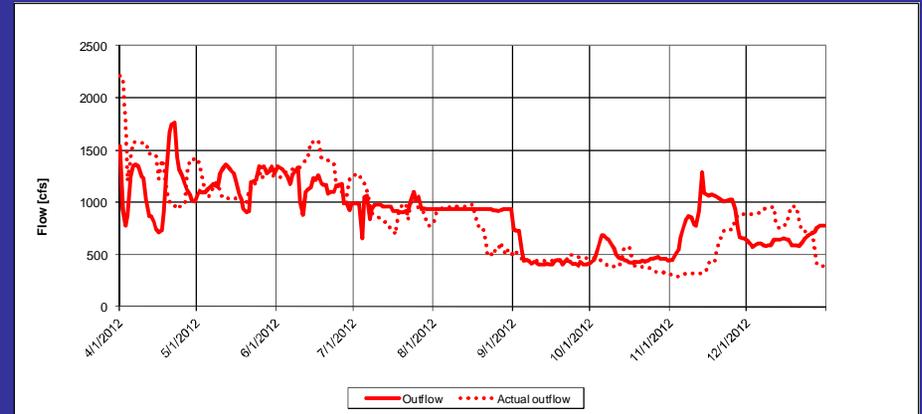
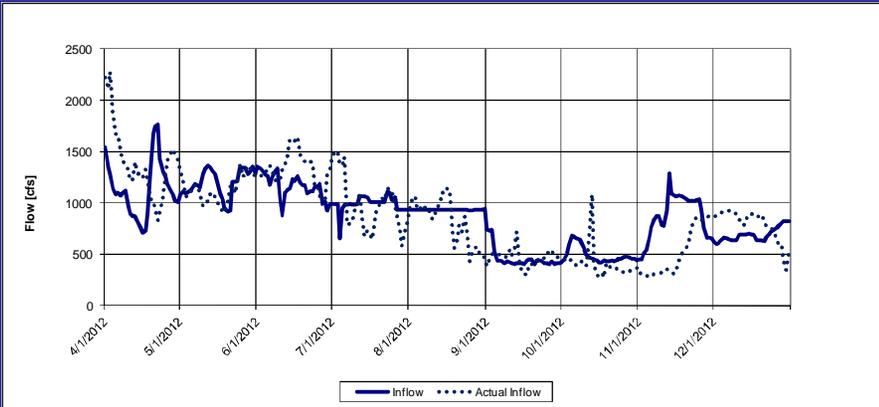
El Vado Reservoir



Abiquiu Reservoir

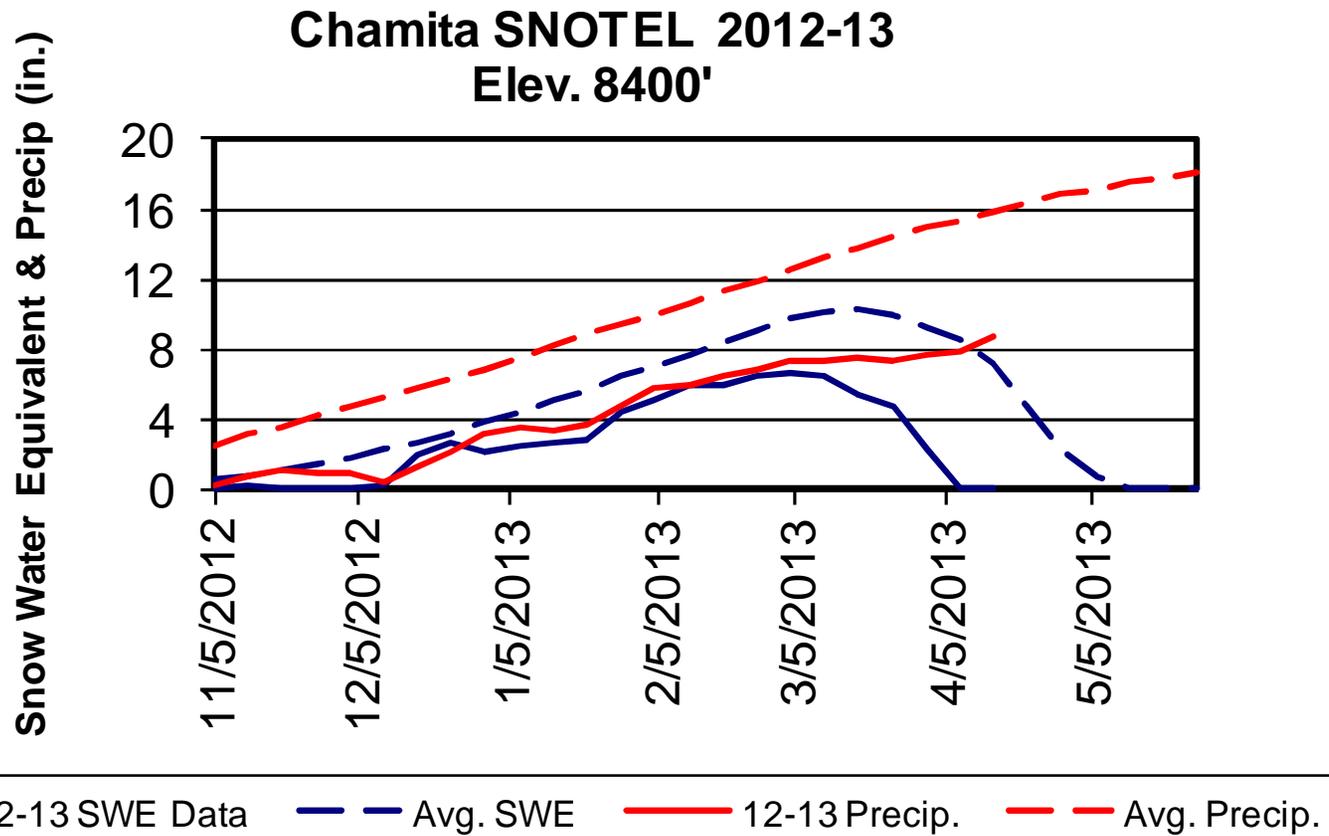


Cochiti Reservoir



Current Snow Conditions

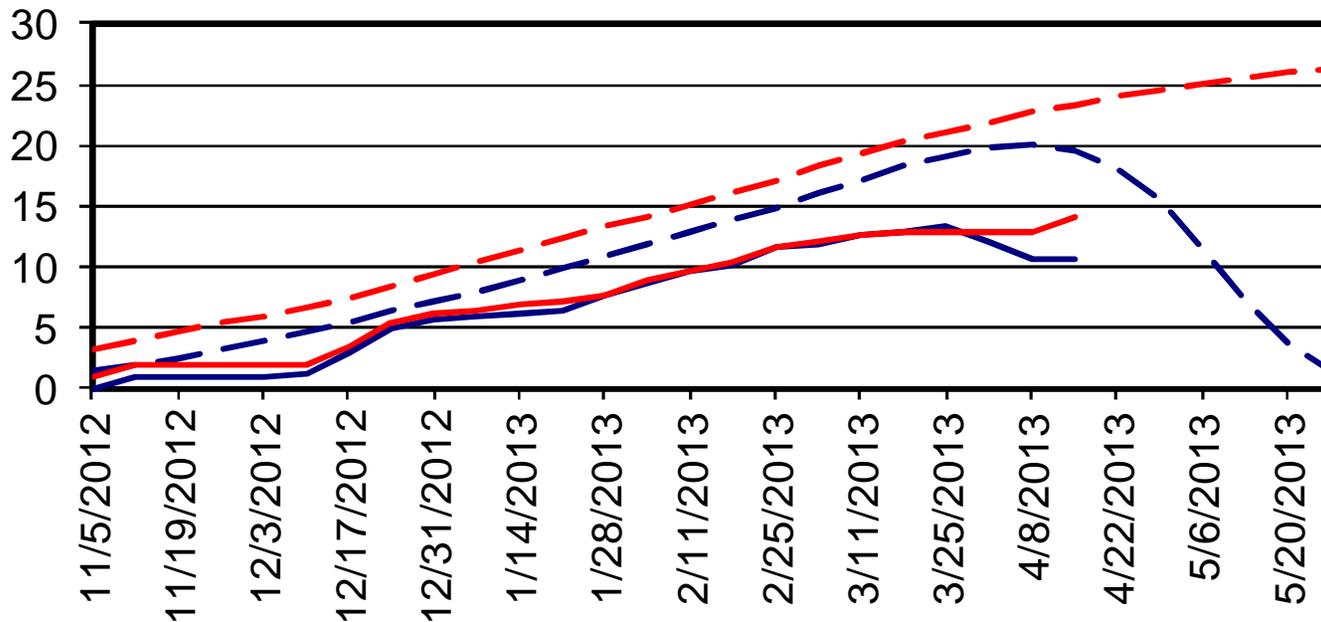
Rio Chama Snow Data



Rio Chama Snow Data

Snow Water Equivalent & Precip (in.)

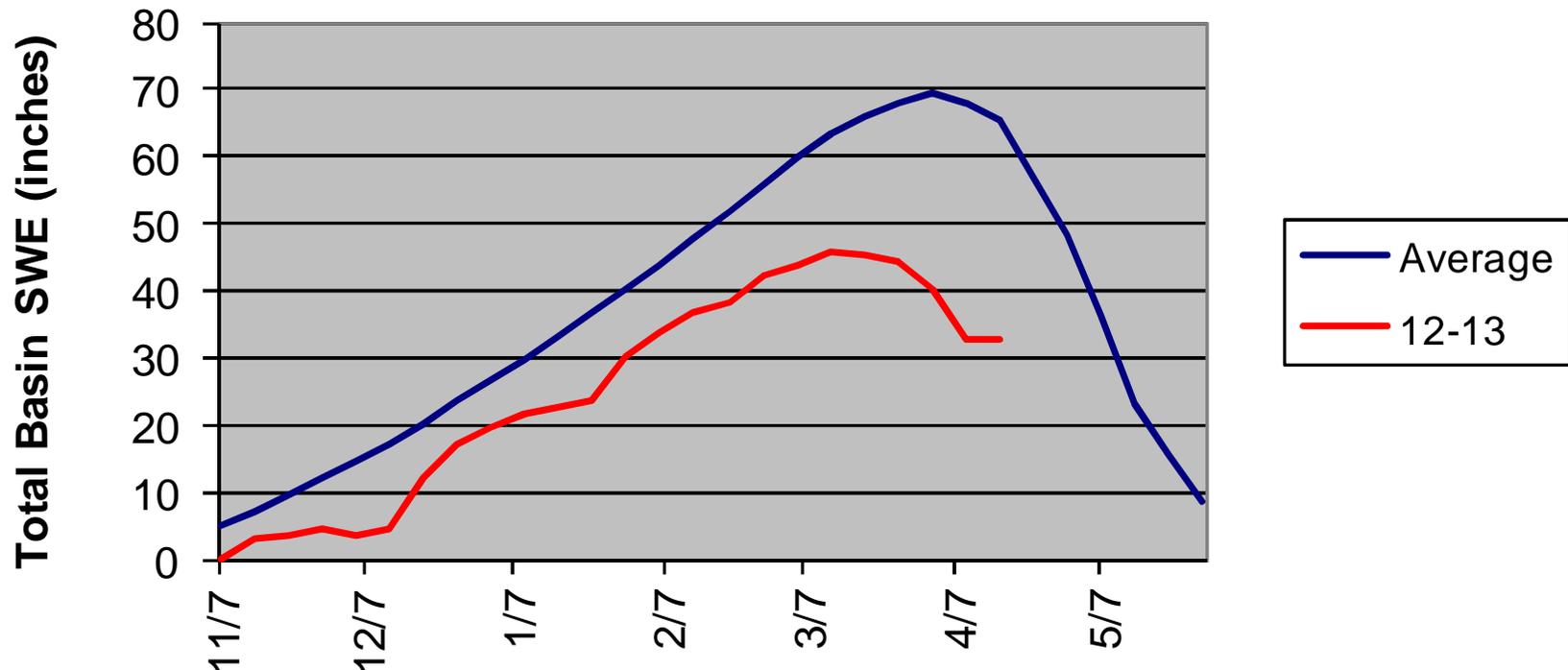
Hopewell SNOTEL Site 2012-13
Elev. 10,000'



— 12-13 SWE Data - - - Avg. SWE — 12-13 Precip. - - - Avg. Precip.

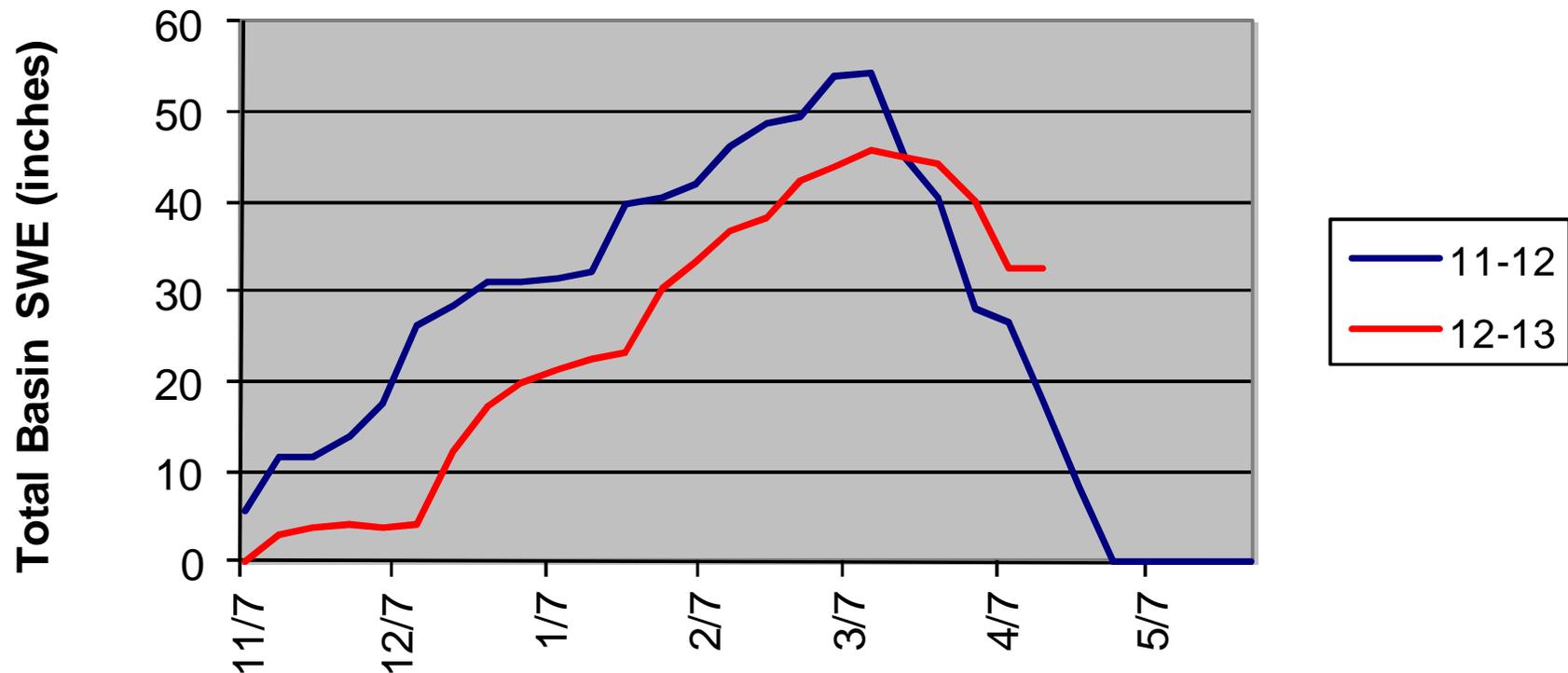
Rio Chama Snow Comparison

Rio Chama Snowpack Comparison



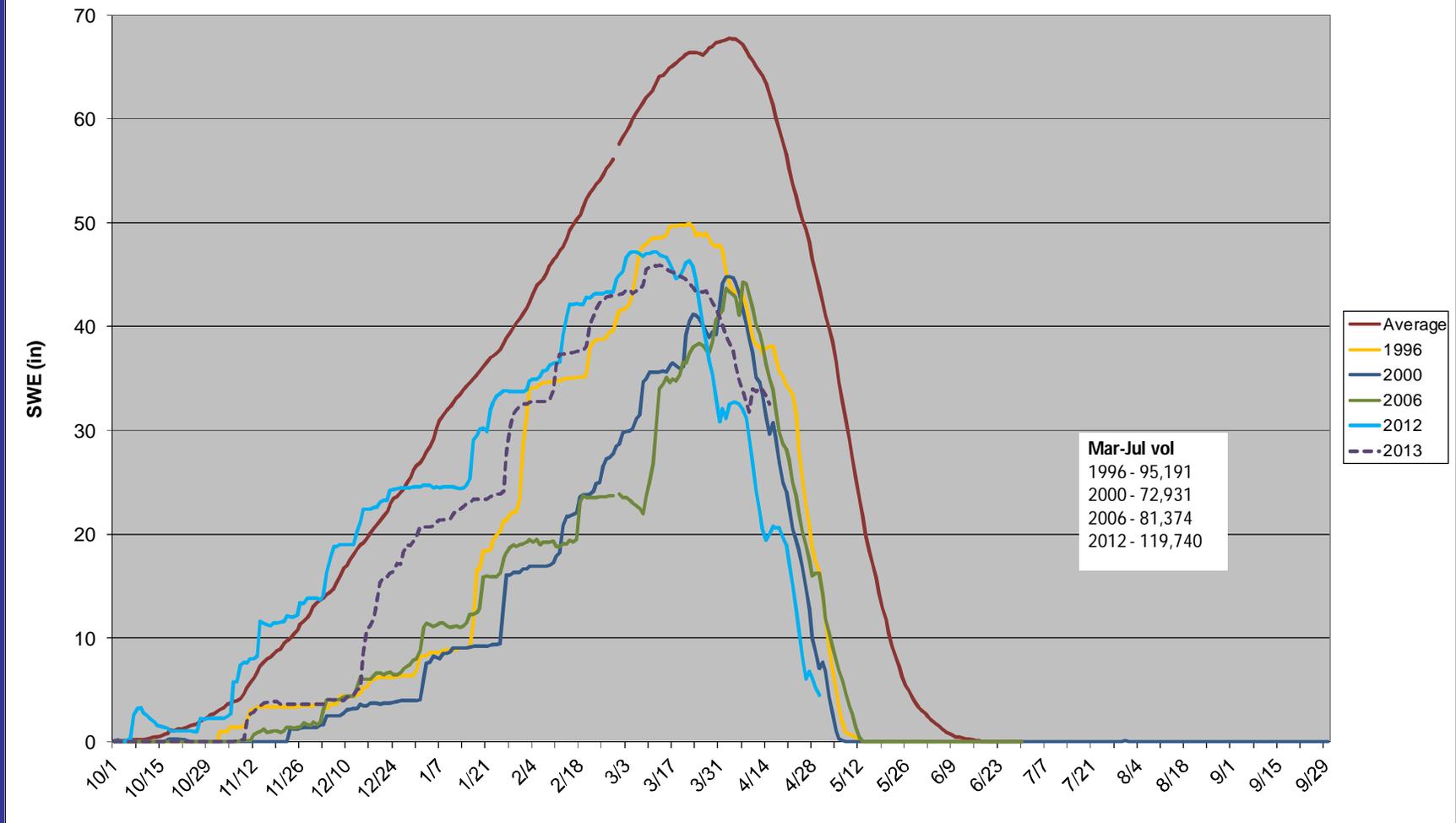
Rio Chama Snow Comparison

Rio Chama Snowpack Comparison

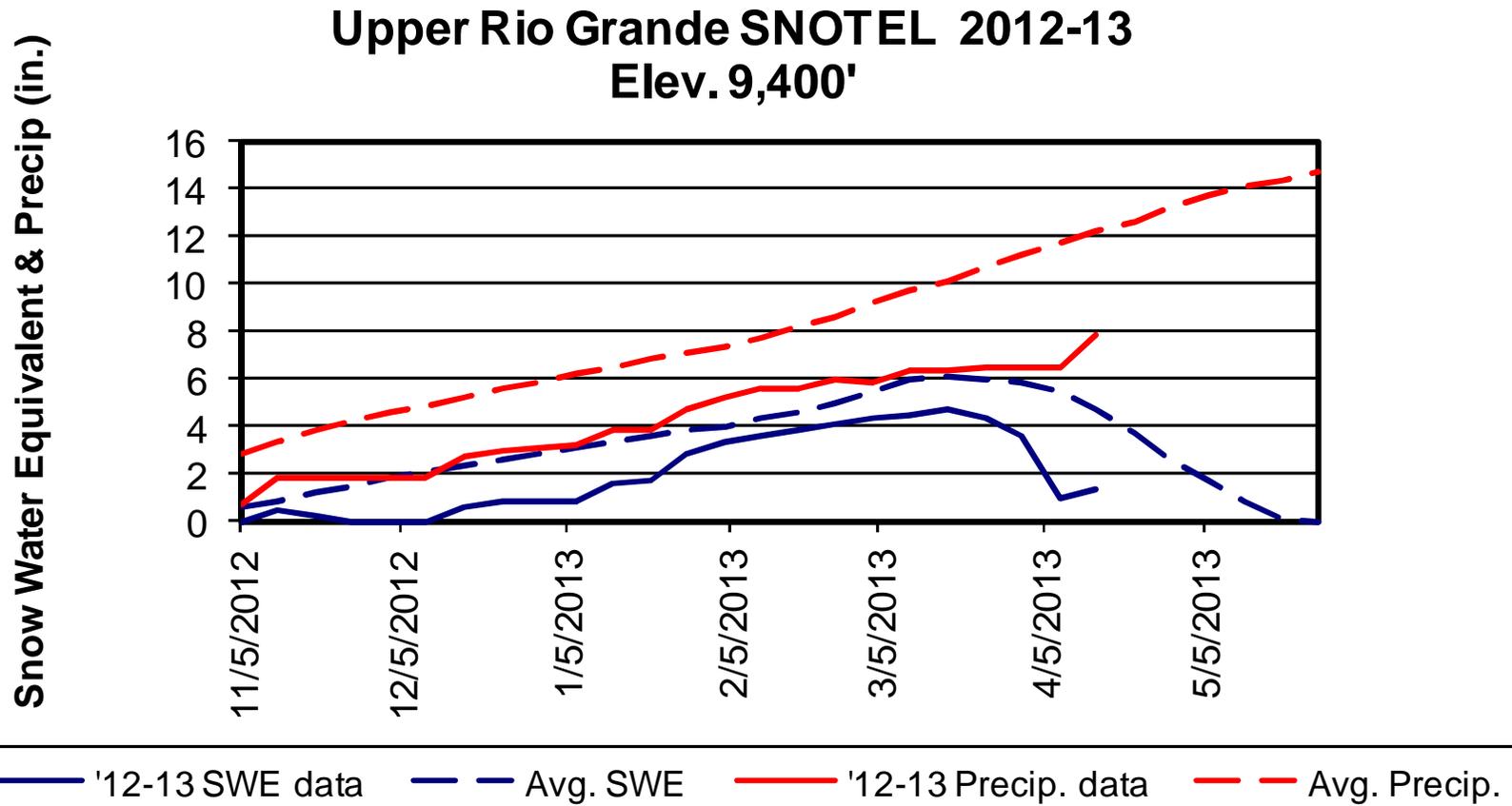


Similar Snowpack Years

2013 vs. 1996, 2000, 2006, 2012, and Average Rio Chama Snowpack Index



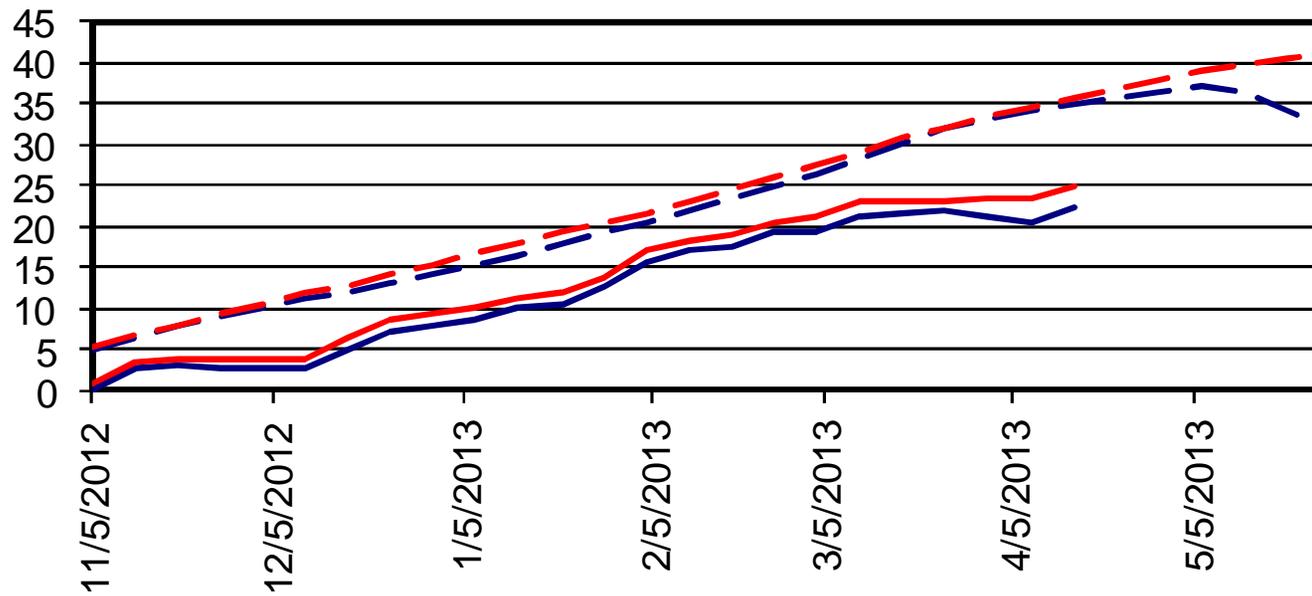
Rio Grande Snow Data



Rio Grande Snow Data

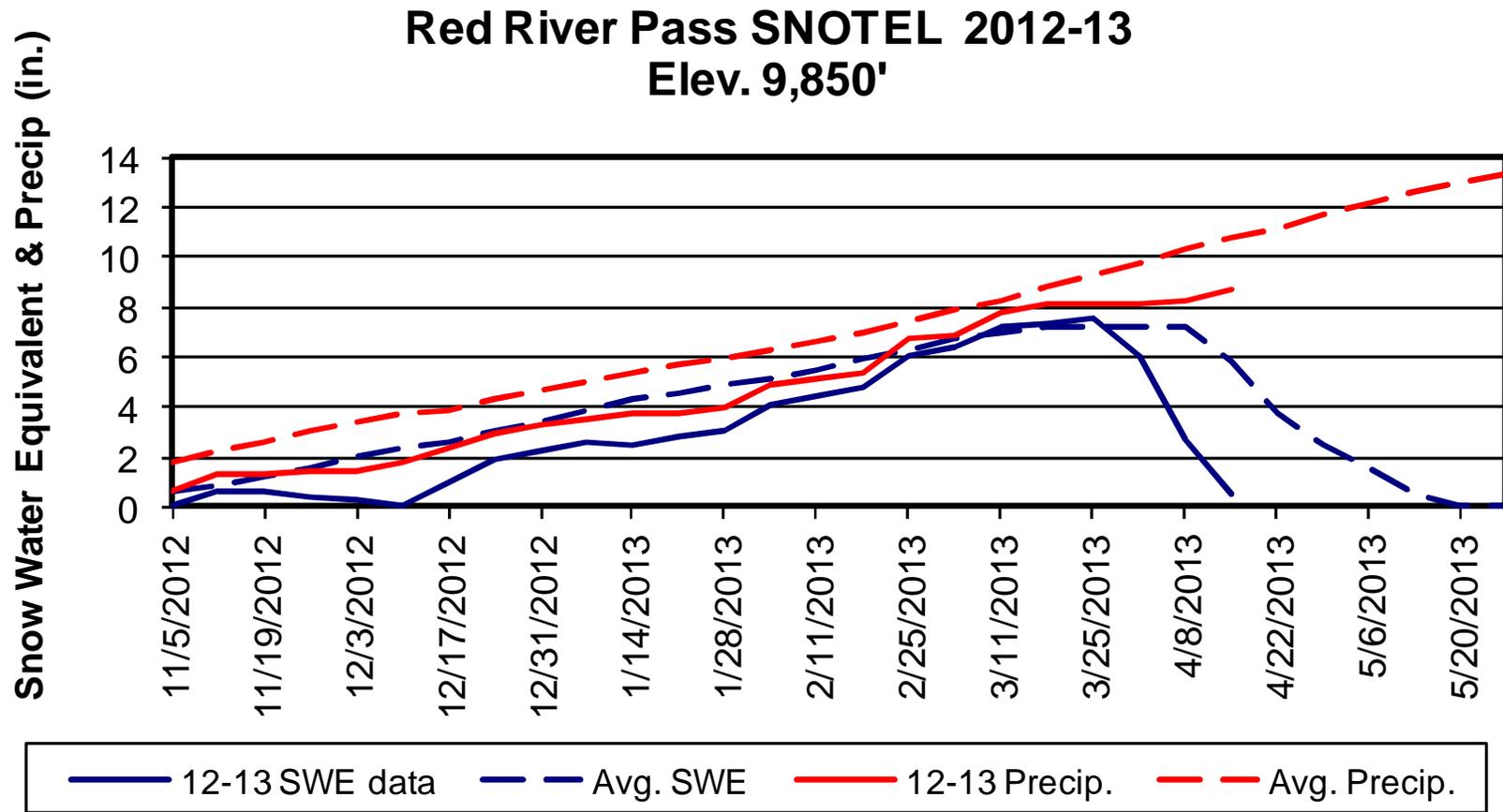
Wolf Creek Summit SNOTEL 2012-13
Elev. 11,000'

Snow Water Equivalent & Precip (in.)

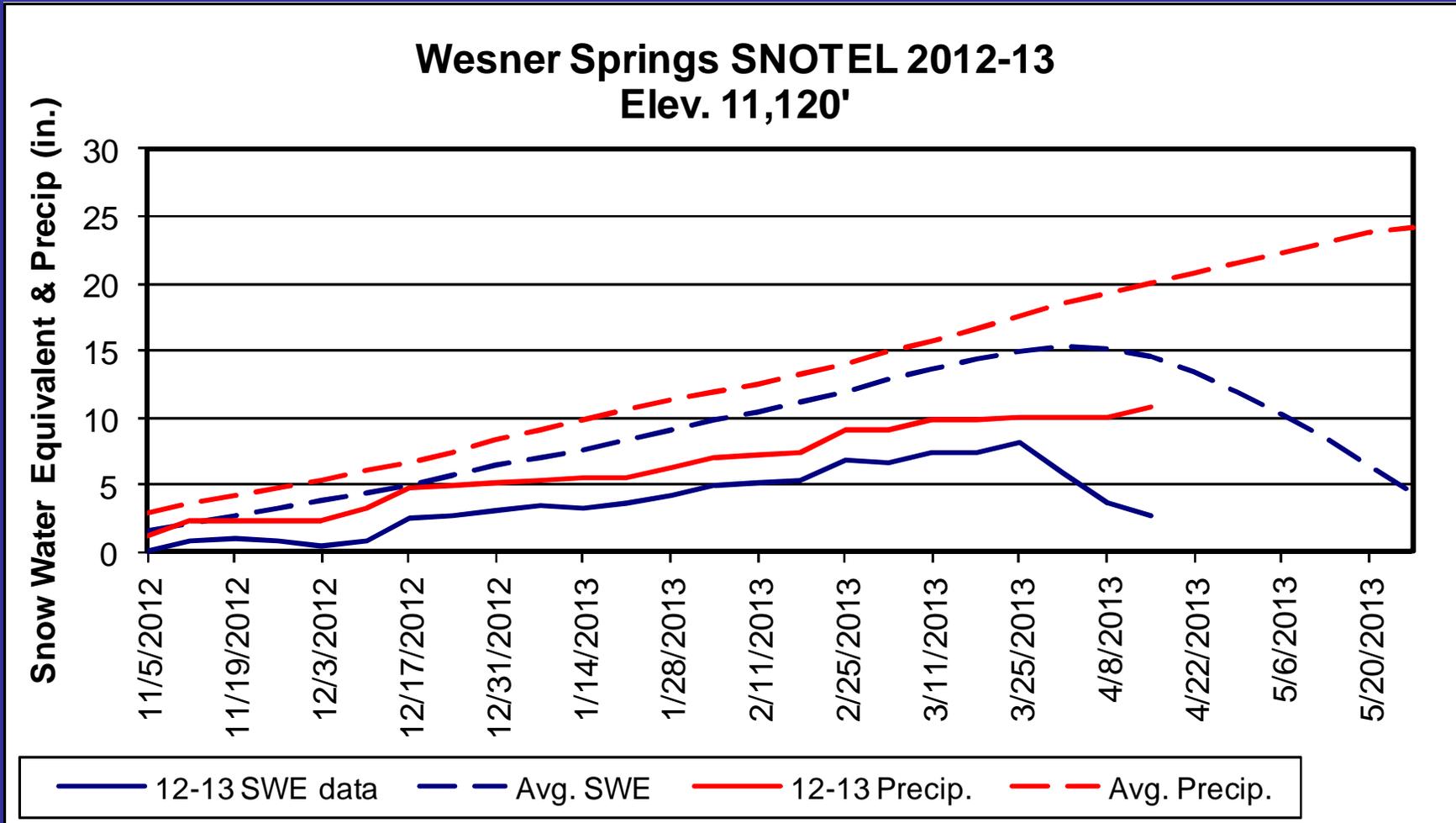


'12-13 SWE data Avg. SWE '12-13 Precip. data Avg. Precip.

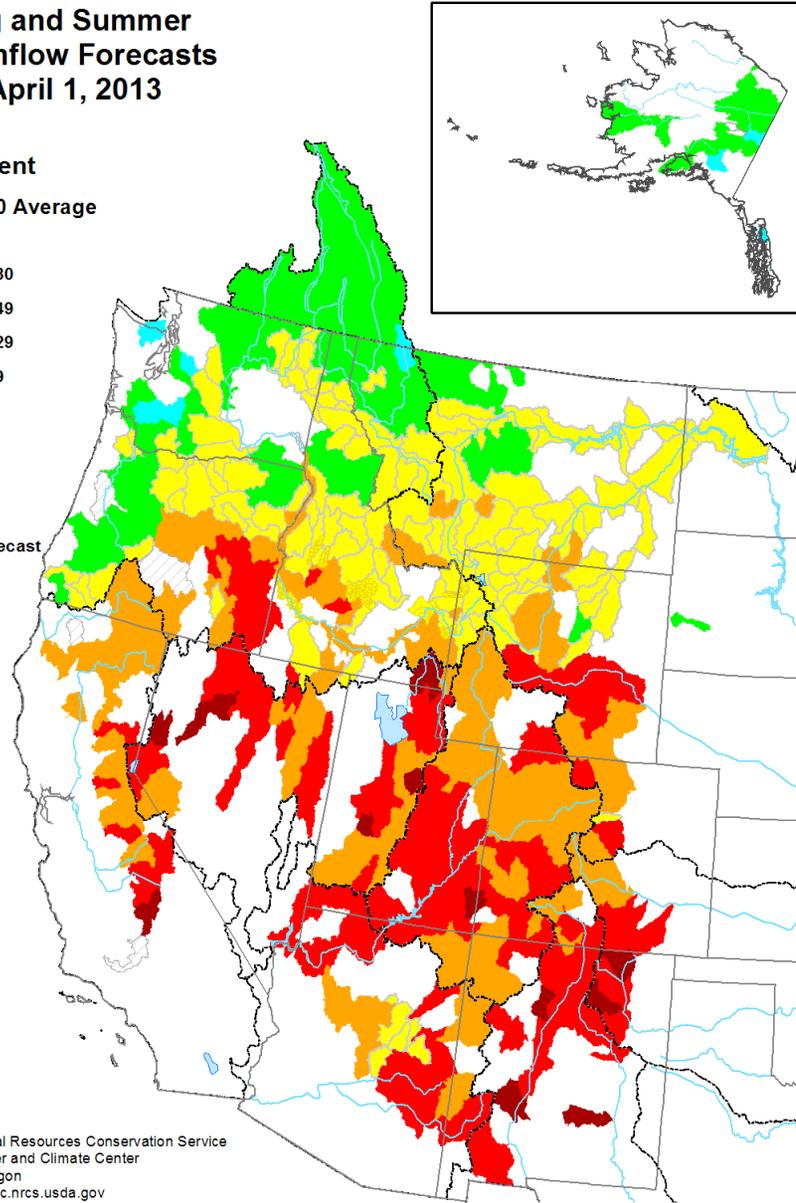
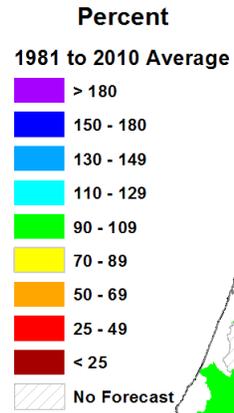
Sangre de Cristo Snow Data



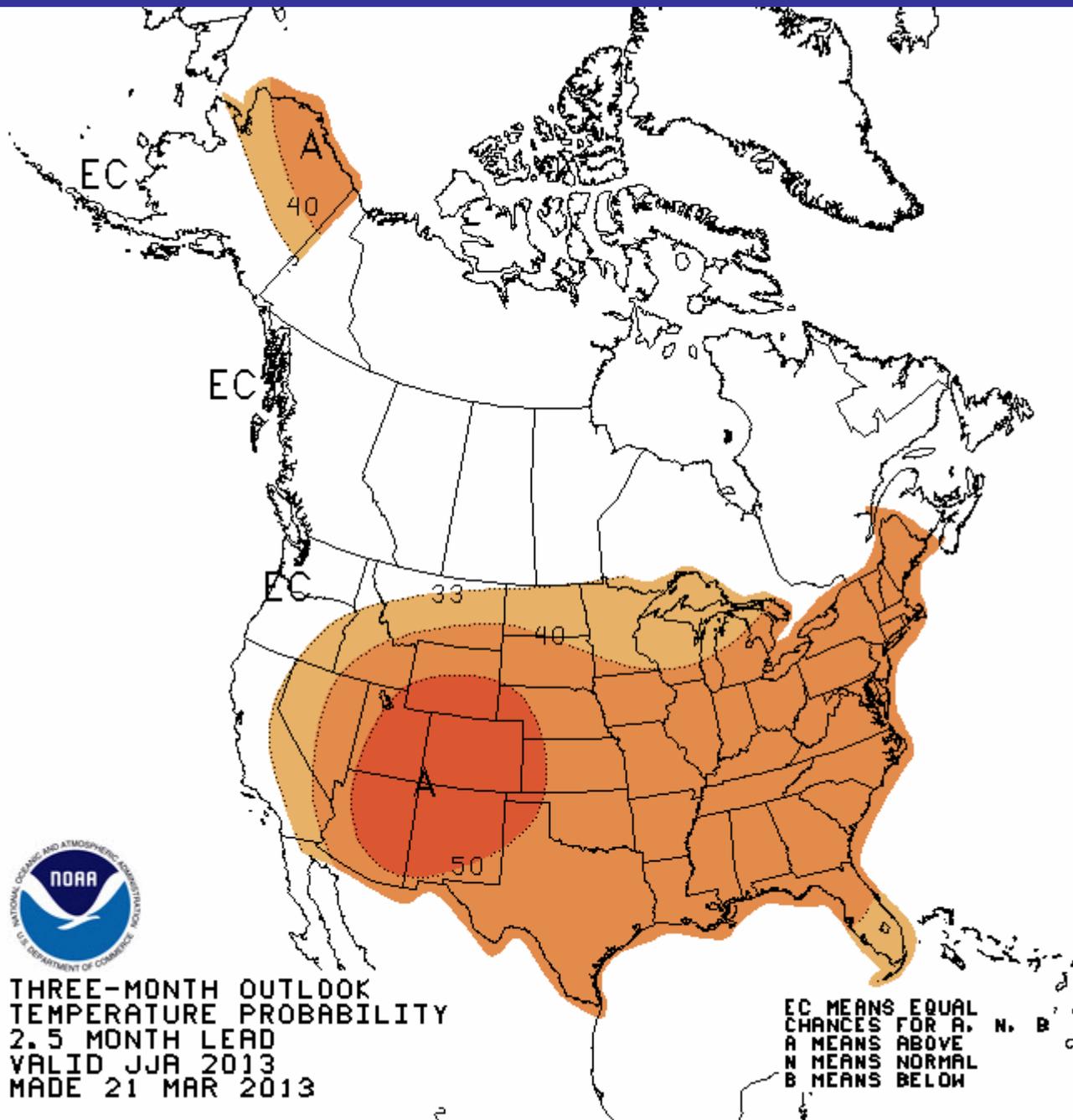
Sangre de Cristo Snow Data



Spring and Summer Streamflow Forecasts as of April 1, 2013

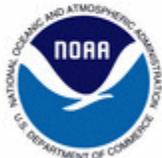
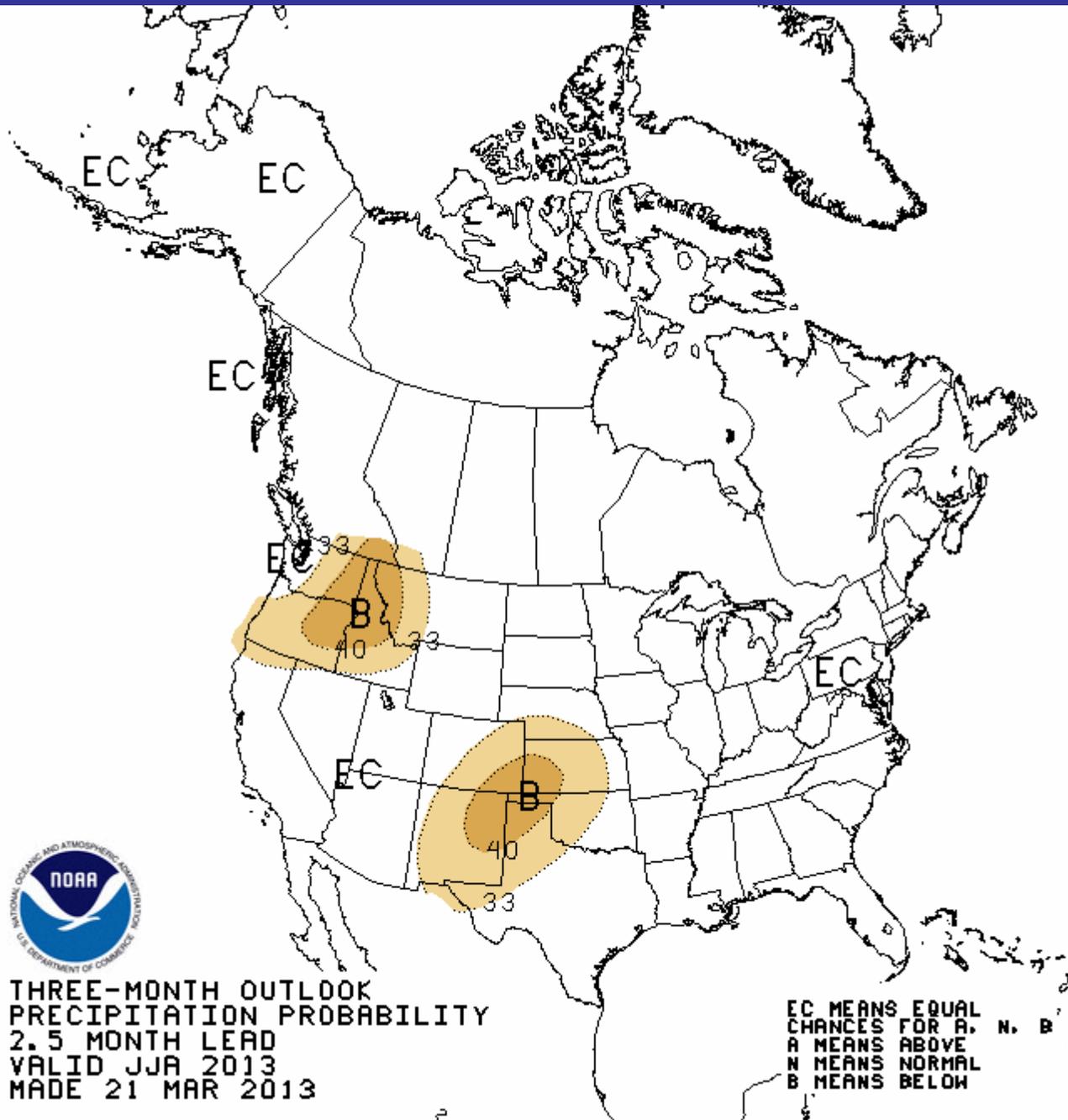


Prepared by
USDA, Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>



THREE-MONTH OUTLOOK
 TEMPERATURE PROBABILITY
 2.5 MONTH LEAD
 VALID JJA 2013
 MADE 21 MAR 2013

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



**THREE-MONTH OUTLOOK
 PRECIPITATION PROBABILITY
 2.5 MONTH LEAD
 VALID JJA 2013
 MADE 21 MAR 2013**

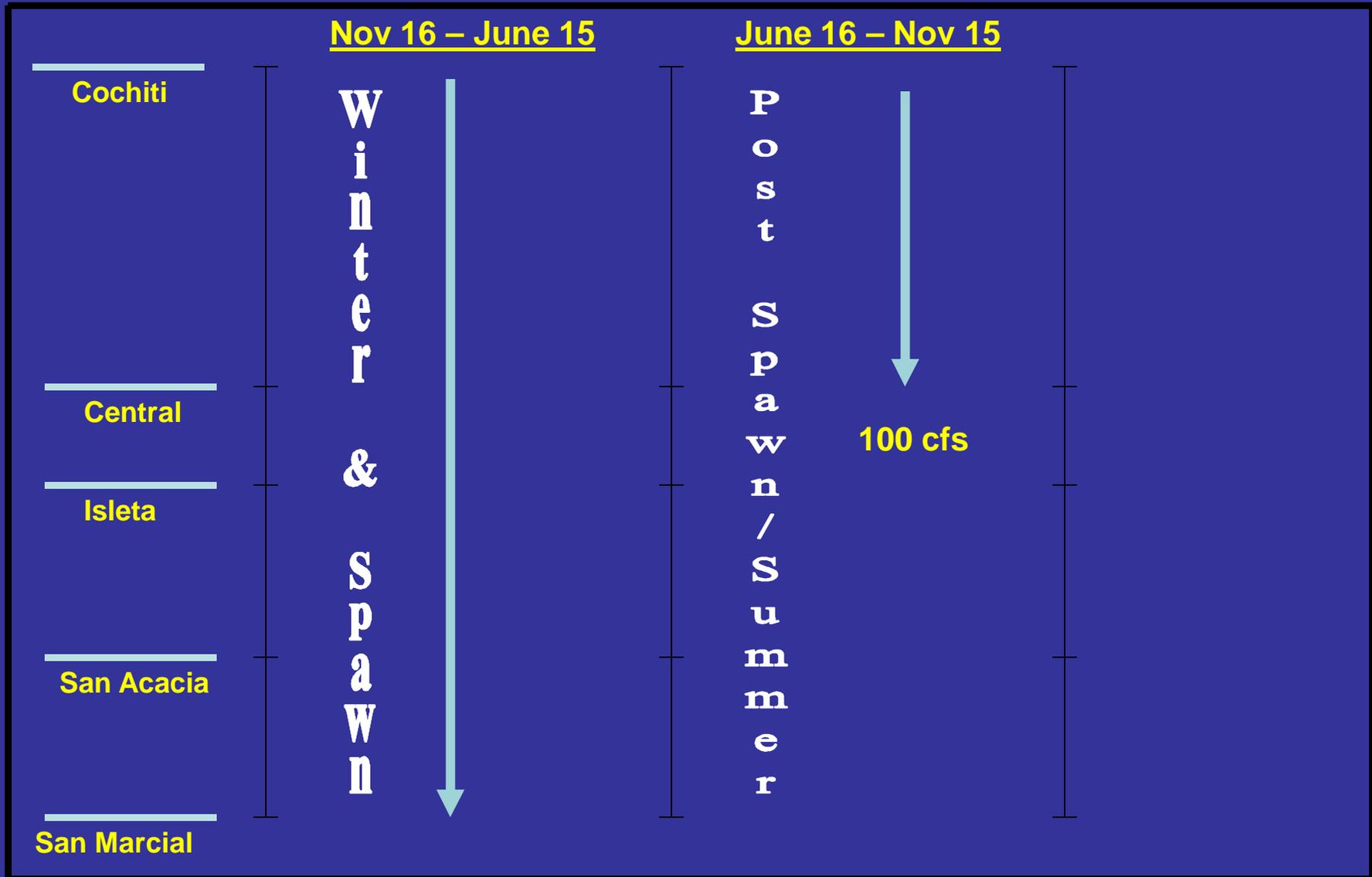
**EC MEANS EQUAL
 CHANCES FOR A, N, B
 A MEANS ABOVE
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2013 Water Operations Modeling

Major Assumptions

- April 1 50% most probable forecast
- Dry year target flow requirements
- Same monsoon conditions as forecast hydrograph year
- Storage of water for Prior & Paramount lands
- Storage occurs under the Emergency Drought Water Agreement for MRGCD
- Article VII restrictions in place all year

March 2003 BiOp Flow Requirements – Dry Year



April Forecast Data

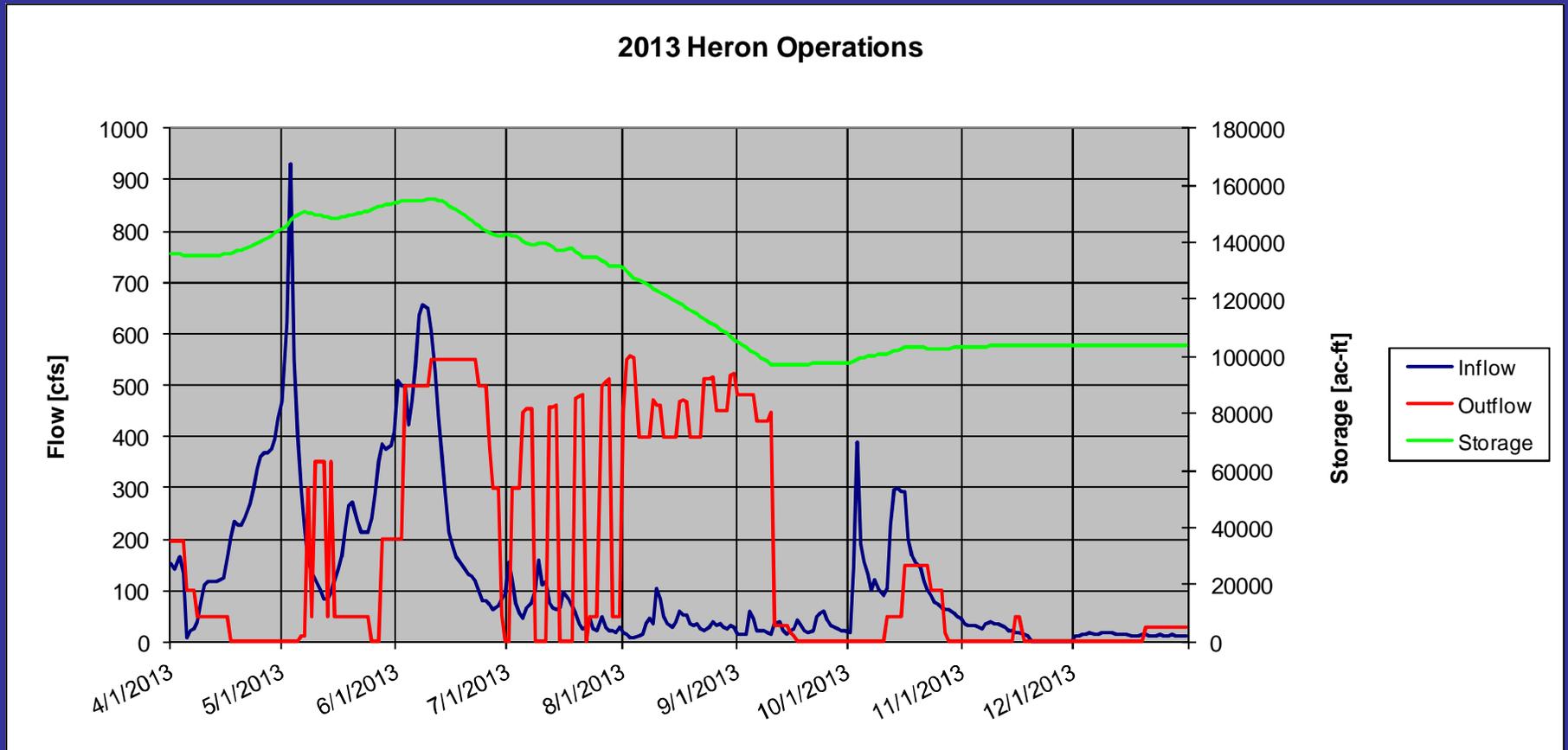
	Most Probable Percent of Average		April 1 50% Probability Volume, ac-ft
	2012	2013	2013
Rio Grande nr Del Norte	71%	52%	265,000
El Vado Reservoir Inflow	49%	36%	80,000
Rio Grande at Otowi	44%	33%	235,000
Nambe Reservoir Inflow	62%	40%	2,600
Jemez blw Jemez Dam	43%	11%	3,300
Rio Blanco @ Diversion	66%	56%	30,000
Navajo River @ Diversion	58%	54%	35,000

Heron Reservoir



Proposed 2013 Heron Operations

Storage Capacity=401,000 ac-ft

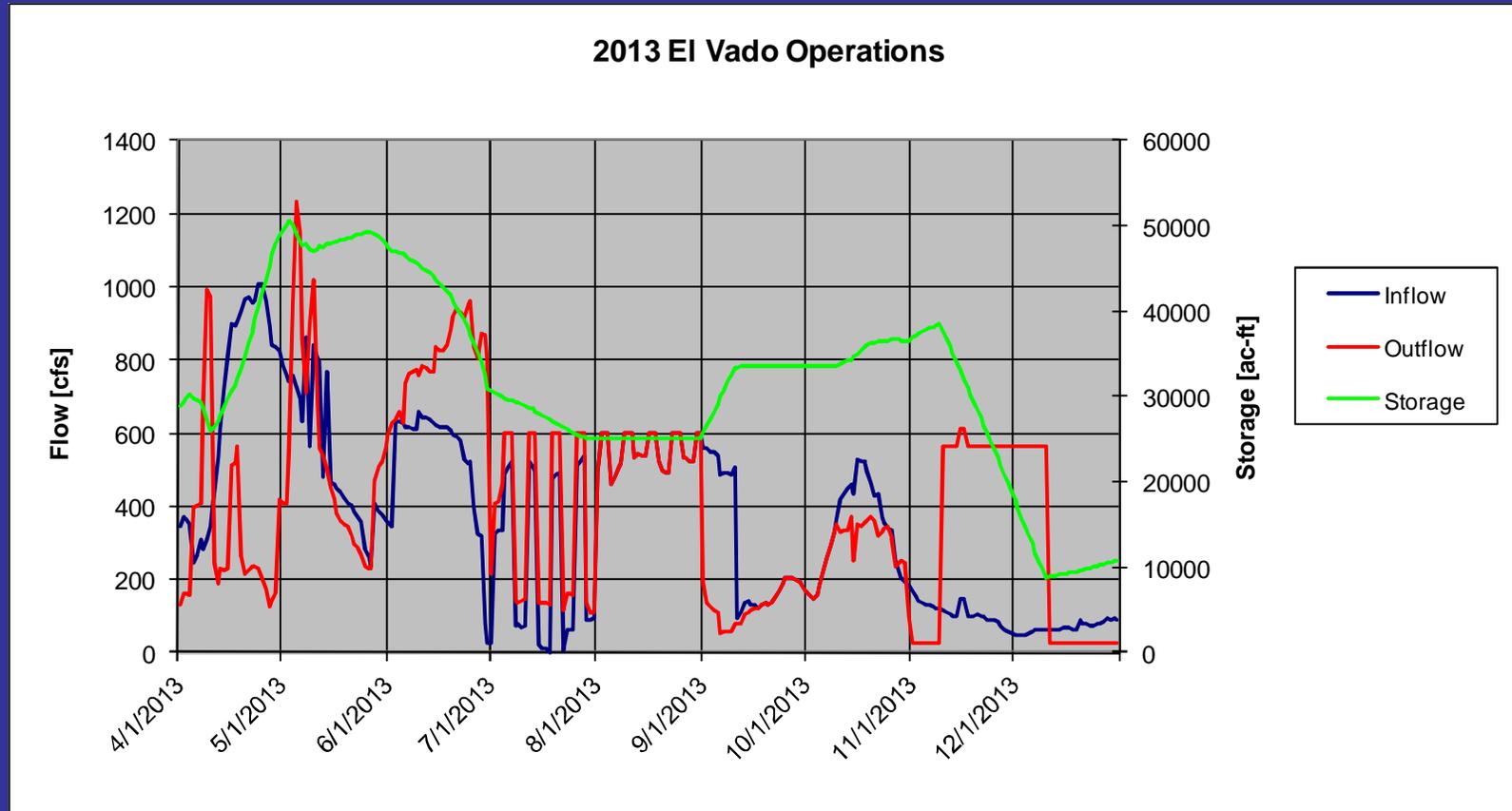


Reservoir will drop 12 feet from beginning of year to end

El Vado Reservoir



Proposed 2013 El Vado Operations



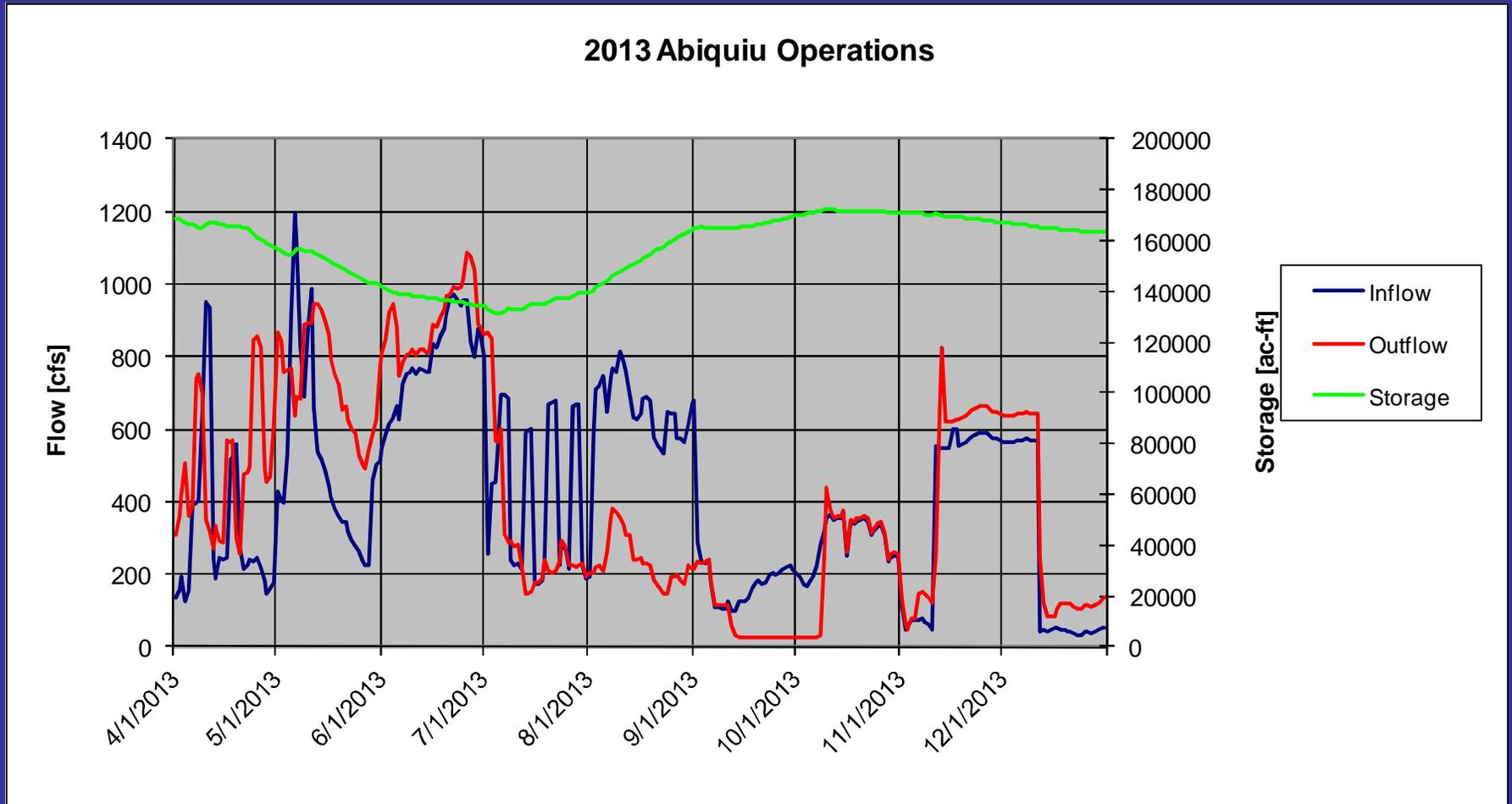
Lake level will fluctuate ~43 feet between May and December

ABIQUIU LAKE

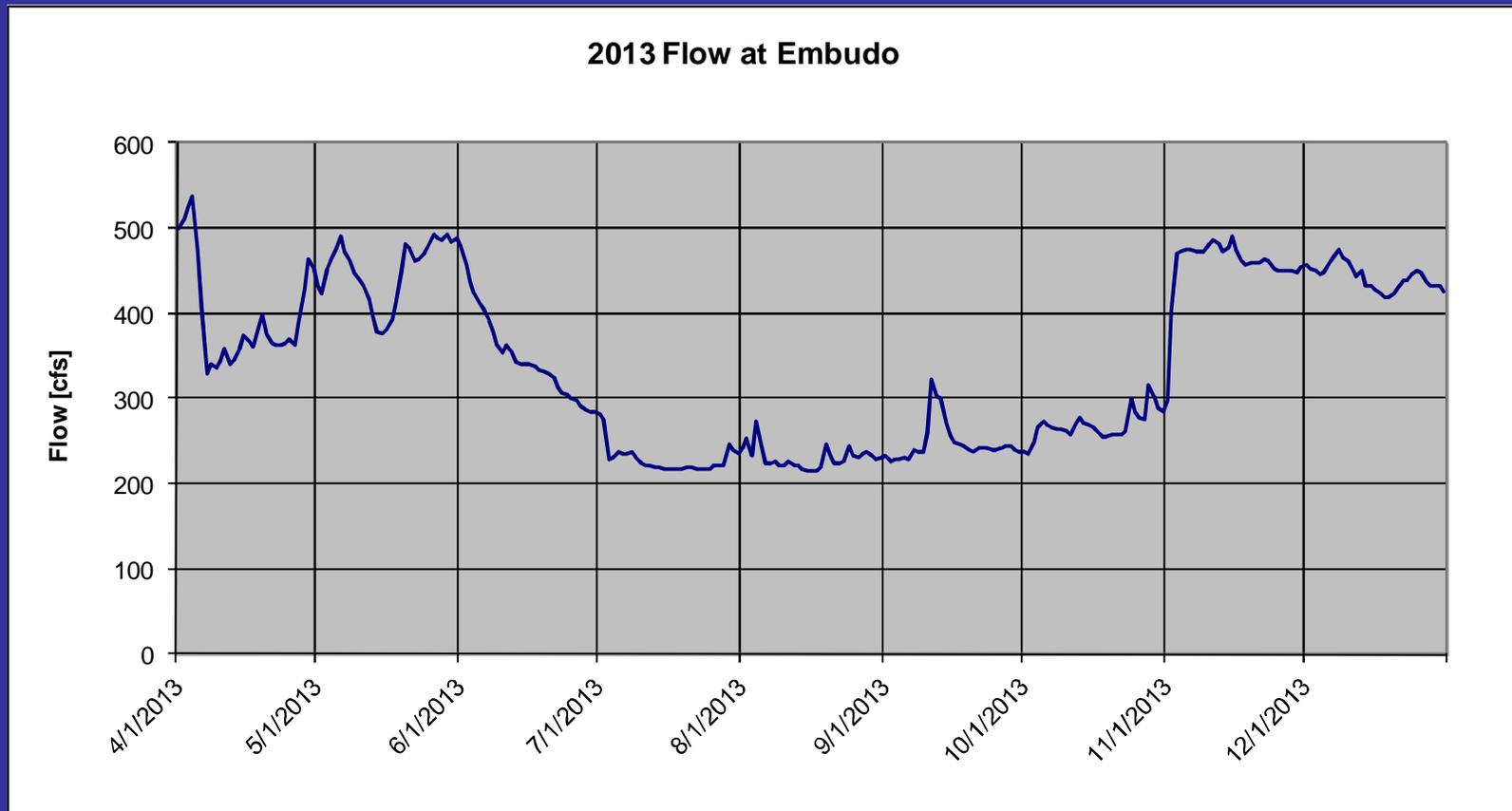


Proposed 2013 Abiquiu Operations

Water Supply SJ-C storage
capacity = 182,000 ac-ft



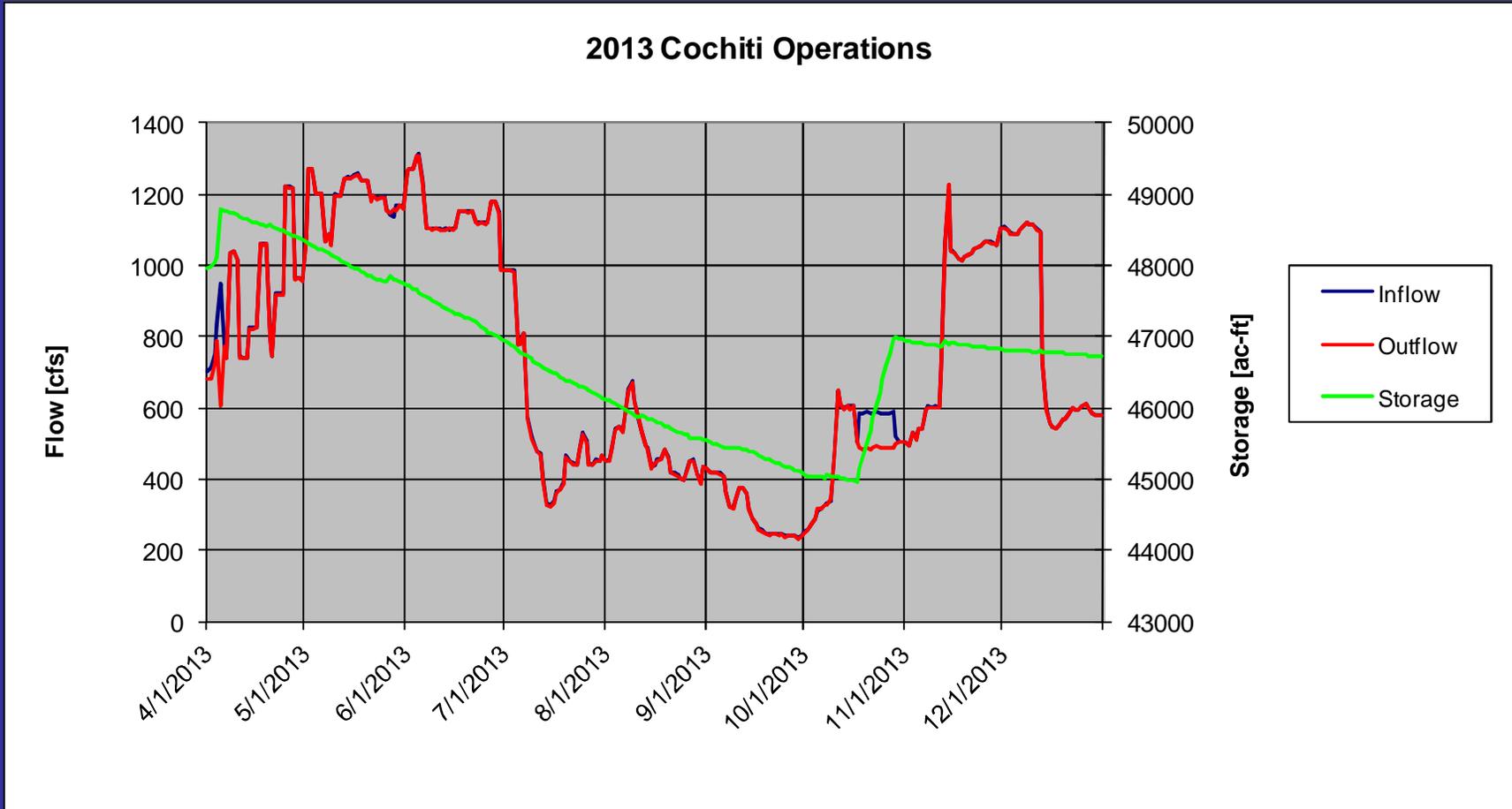
Estimated Hydrograph at Embudo



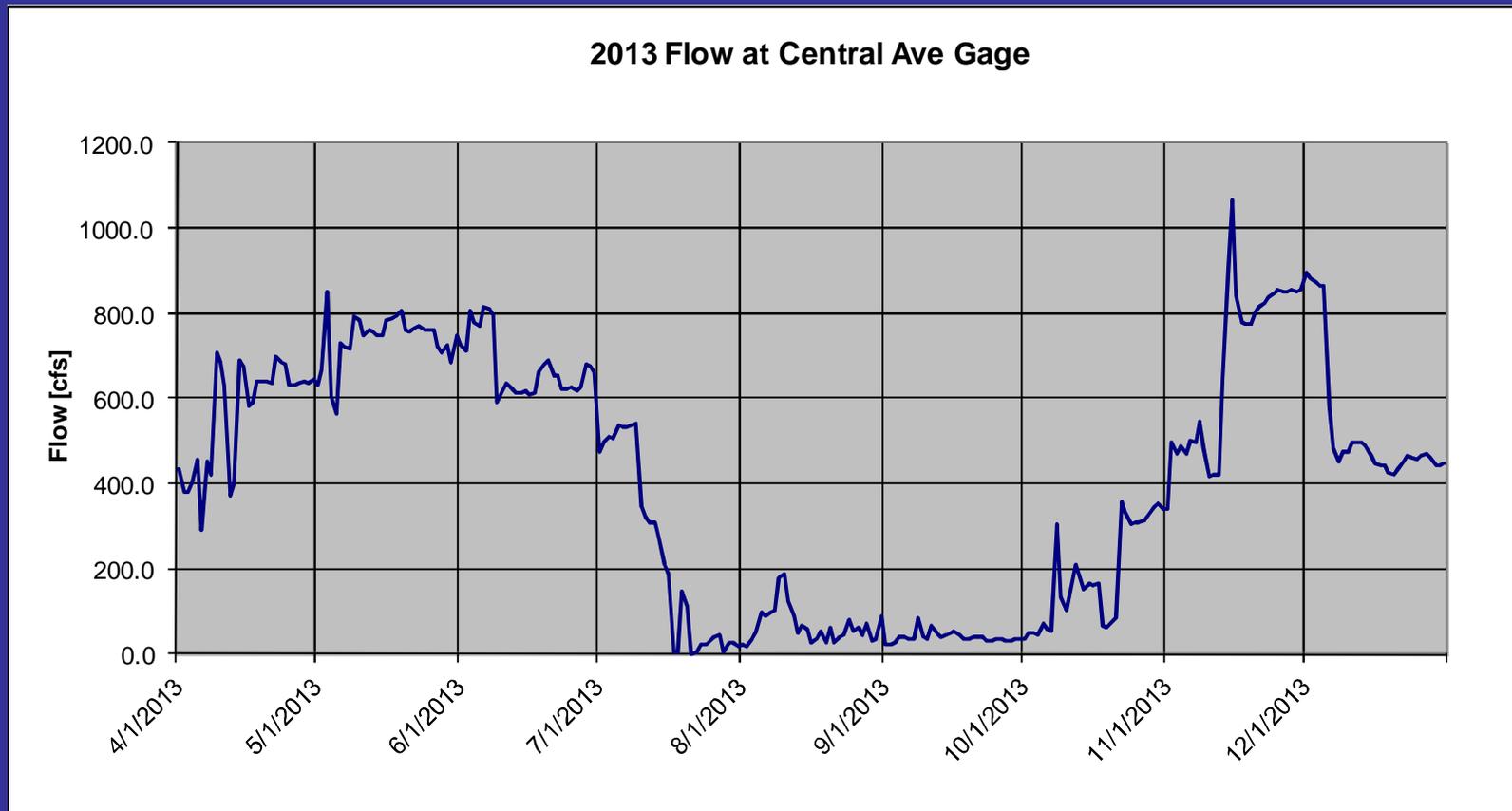
COCHITI LAKE



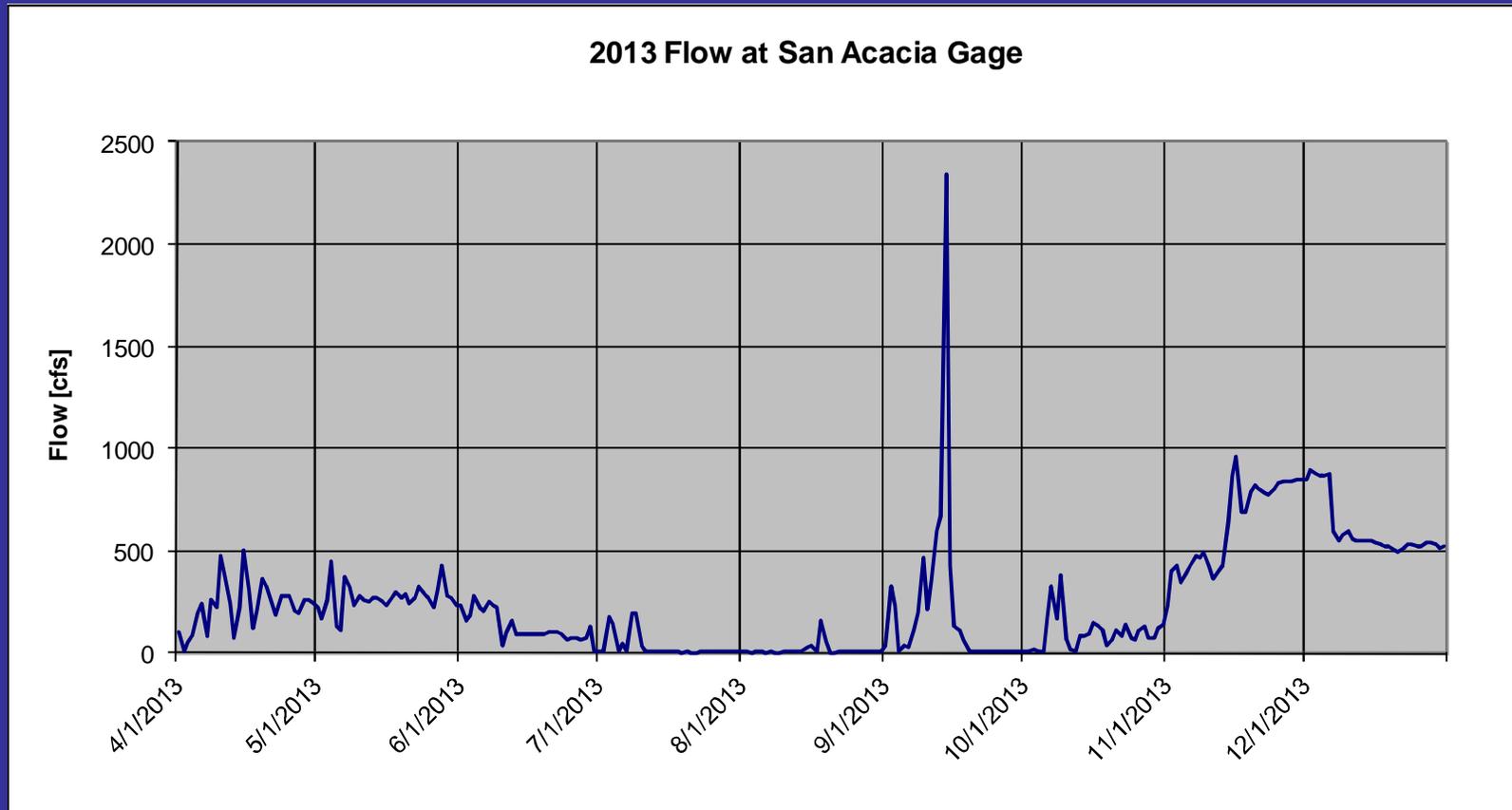
Proposed 2013 Cochiti Operations



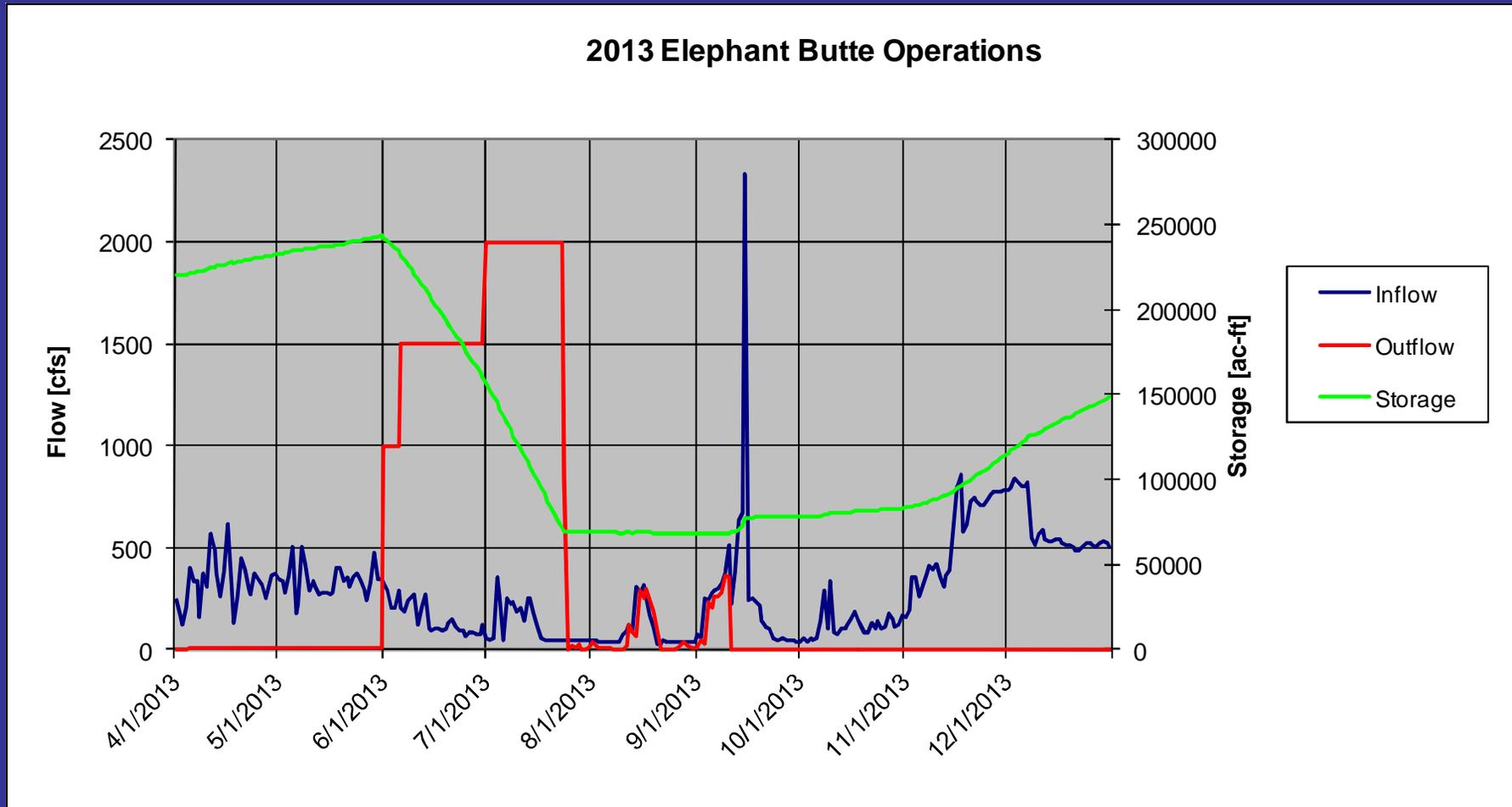
Estimated Hydrograph at Central Ave.



Estimated Flow at San Acacia



Proposed Elephant Butte Operations



Maximum Elevation = 4316.75'. Minimum Elevation = 4286.58'

2013 Outlook

- Current projection - 65,000 to 80,000 ac-ft to meet 2003 BiOp flow requirements
- Reclamation working with SJC contractors to secure additional supplemental water, but may not fill supply/demand gap
- With additional SJC leases, total 2013 supplemental water supply 40,000 to 50,000 ac-ft
- Operational changes needed – Reclamation working with the Corps, the State of New Mexico, the six Middle Rio Grande Pueblos, BIA, ABCWUA, and BDANWR
- Working with Collaborative Program to propose to FWS adjustments to address ESA needs and deal with current conditions