



2014 Annual Operating Plan

April 1 Runoff Forecast



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

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

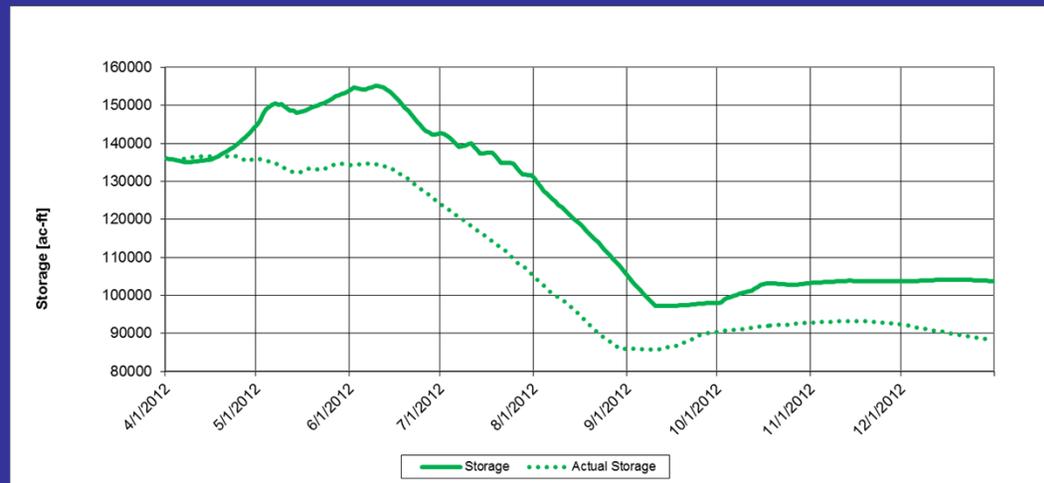
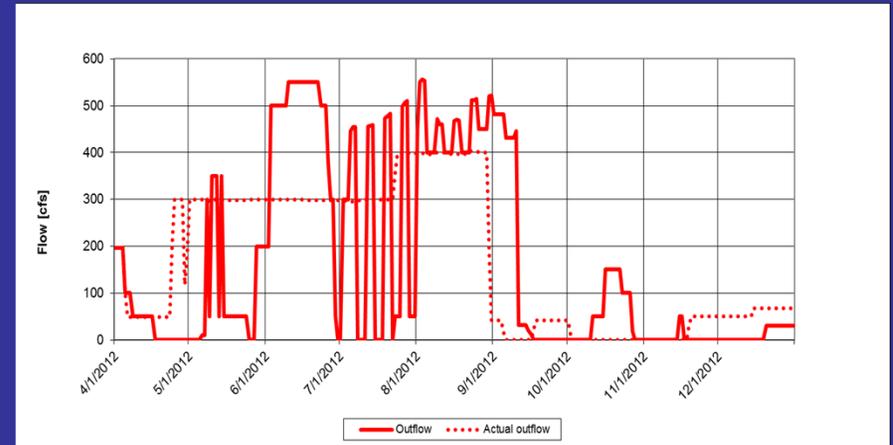
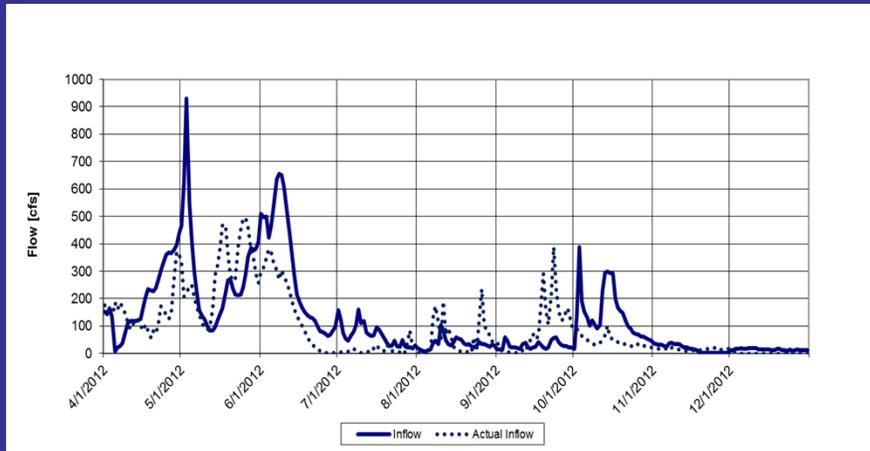
Requirements of the 2003 Biological Opinion

Reservoir storage based on inflow/outflow

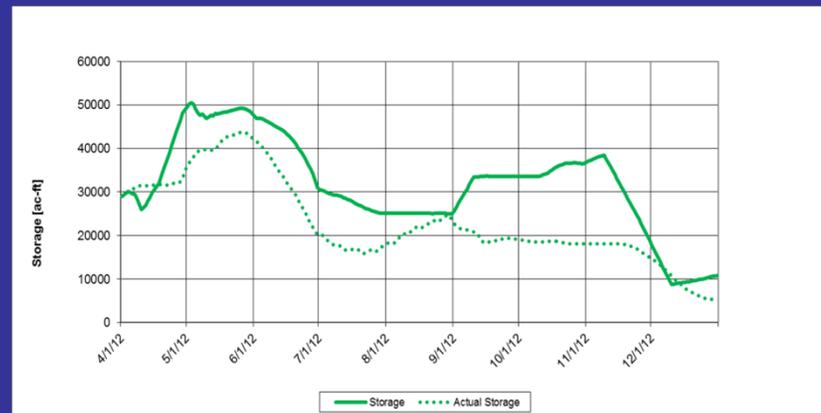
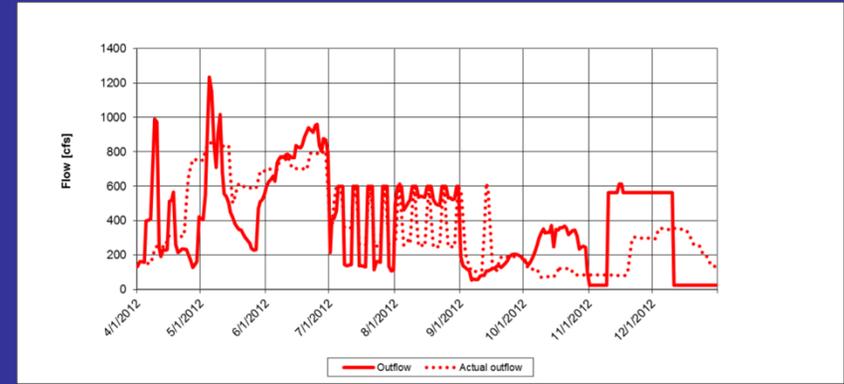
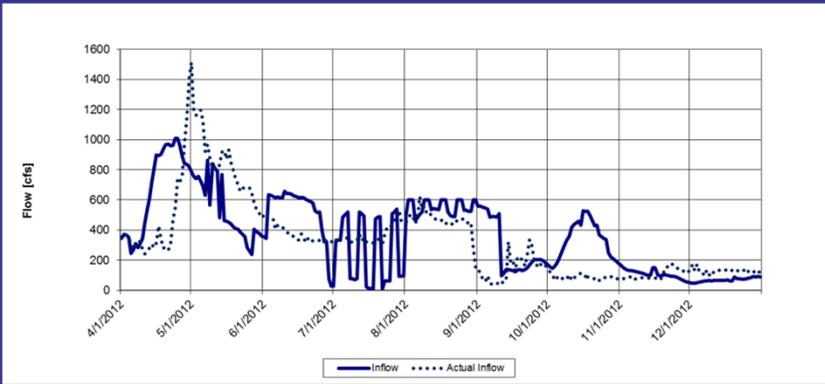
<u>Operated By:</u>	Reclamation	Corps	Water Supply	Recreation	Flood Control	Sediment Control
<u>Dams:</u>						
HERON						
EL VADO						
ABIQUIU						
NAMBE FALLS						
GALISTEO						
COCHITI						
JEMEZ CANYON						
ELEPHANT BUTTE						

2013: The Year in Review

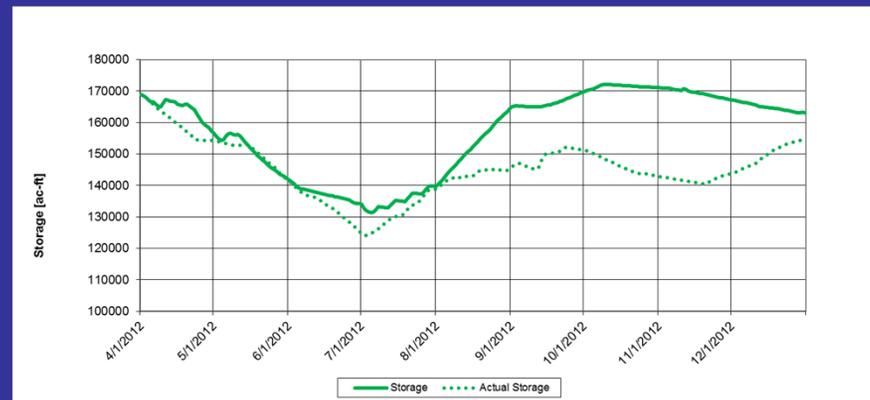
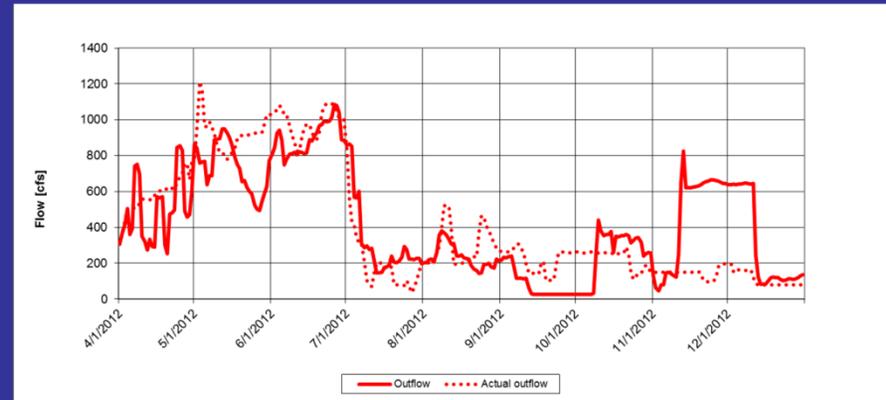
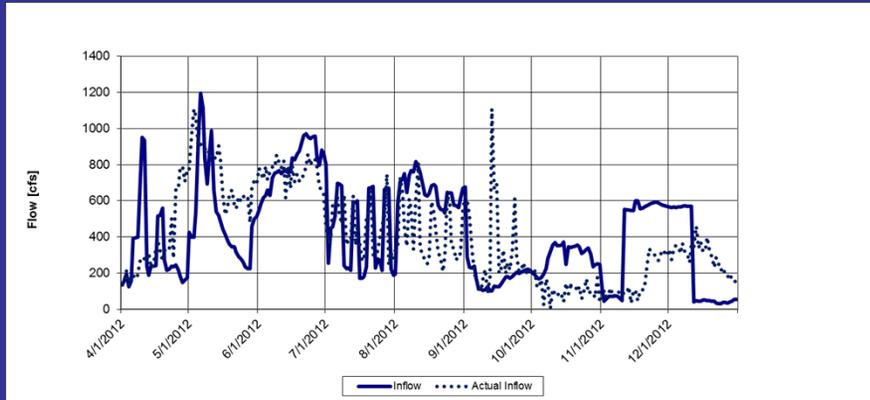
Heron Reservoir



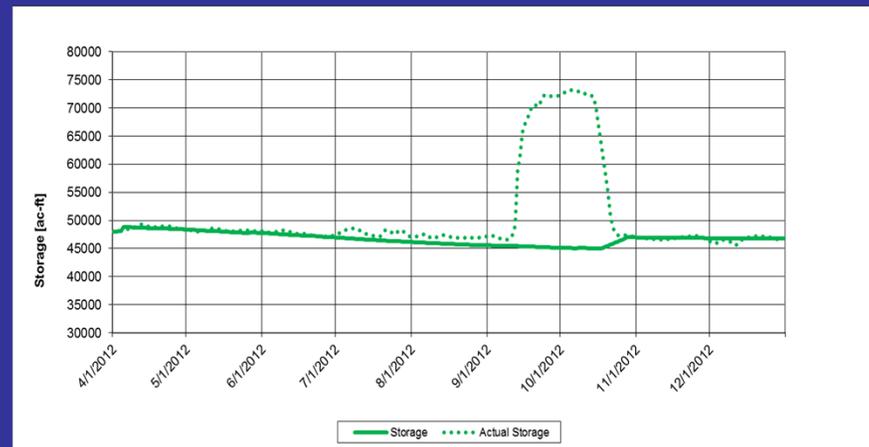
El Vado Reservoir



Abiquiu Reservoir



Cochiti Reservoir

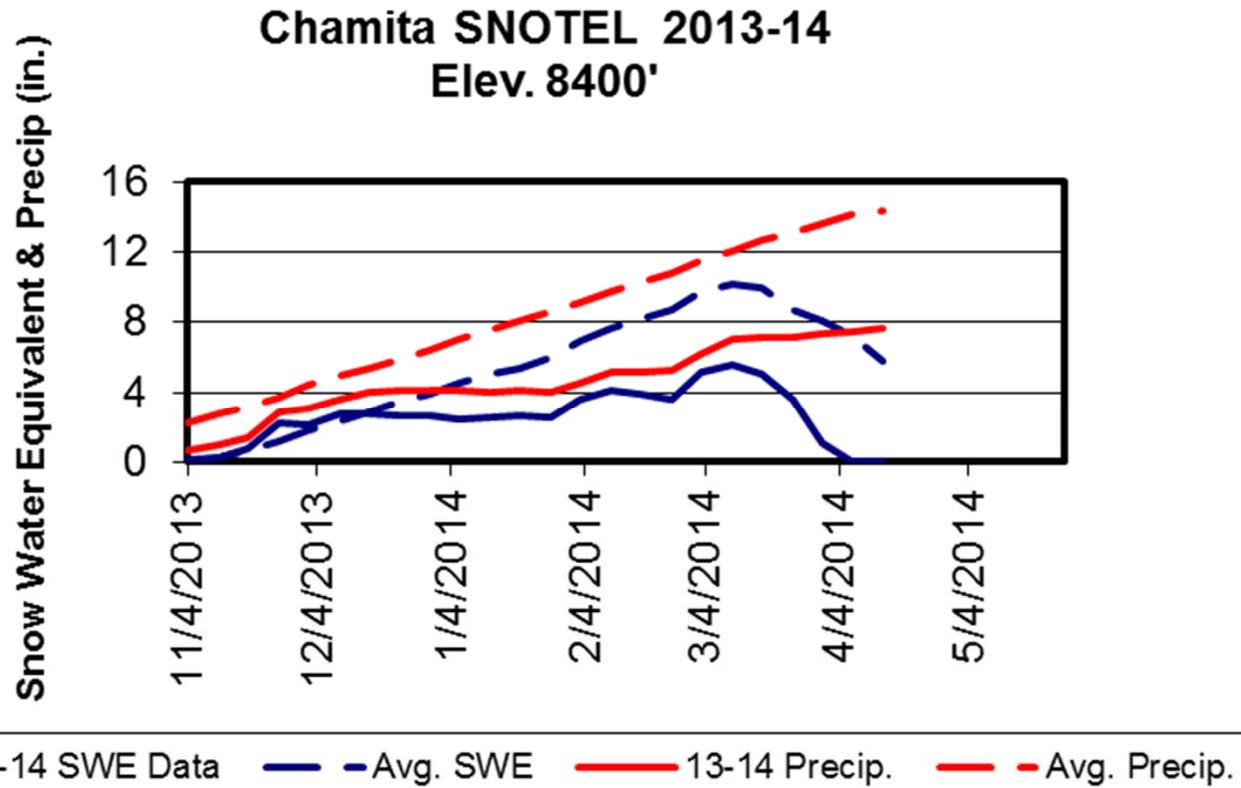


2003 BO Compliance in 2013

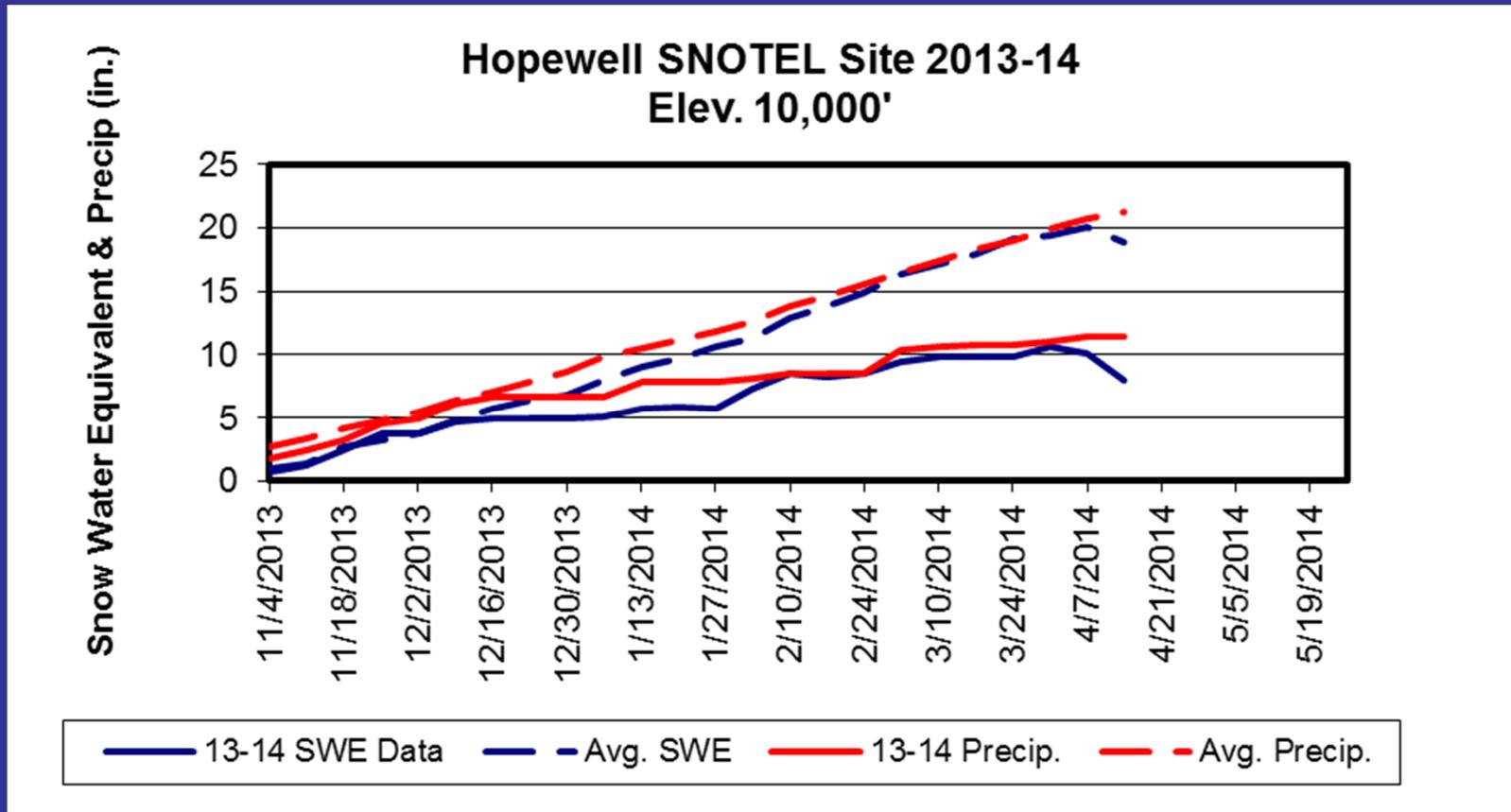
- **Exceptional drought and limited water supply, achieve best possible plan for minnow**
 - Supplemental water release reduced early
 - Conserve for summer use to maintain wetted habitat
 - MAT emergency drought plan endorsed by Collaborative Program and accepted by USFWS
- **Reduced river drying**
 - USFWS conducted rescue and salvage on 36.5 miles of Rio Grande, compared to 51.0 miles in 2012
 - Good monsoonal rains added much needed flow
 - 20KAF of Supplemental Water conserved for 2014

Current Snow Conditions

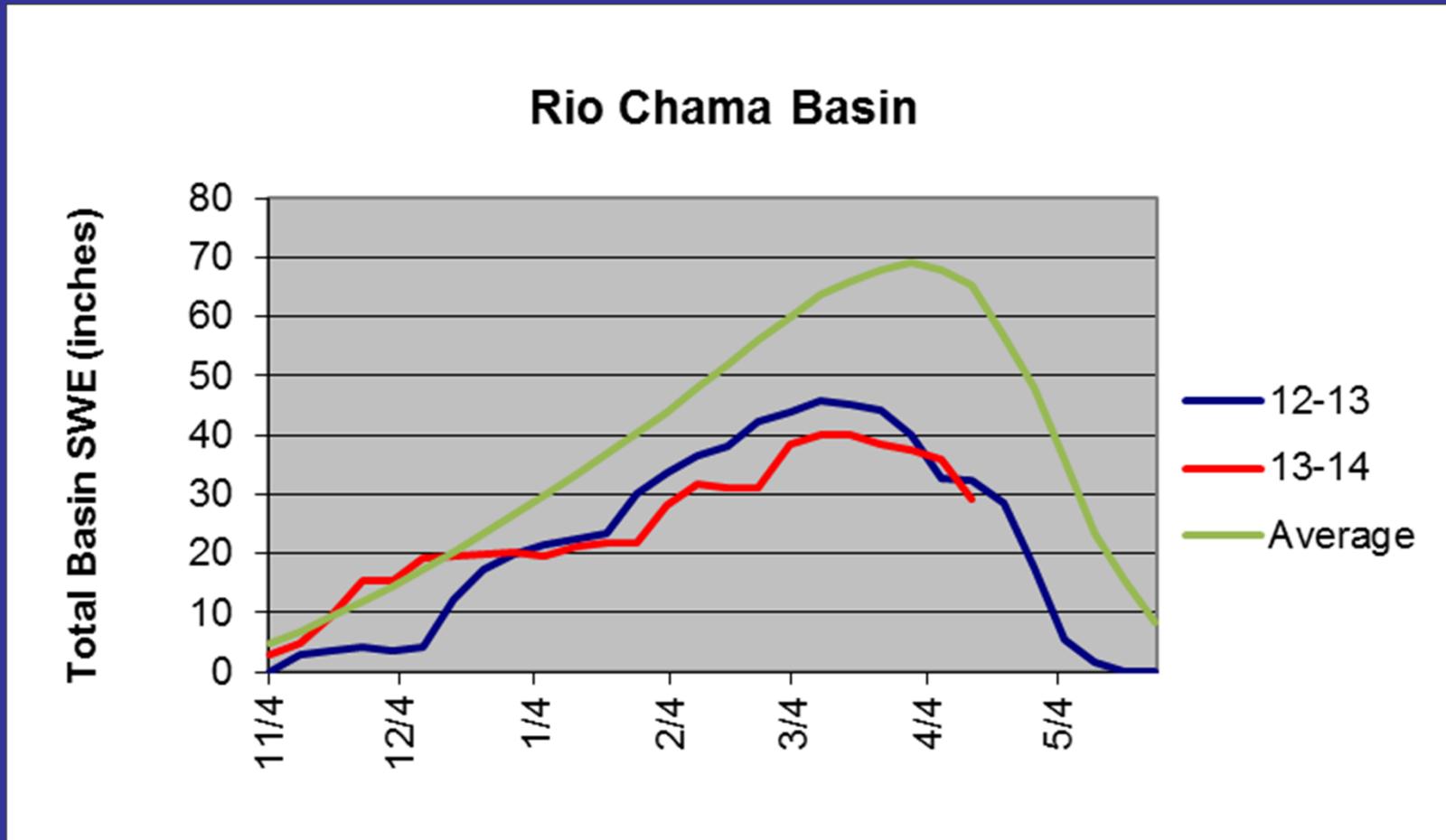
Rio Chama Snow Data



Rio Chama Snow Data

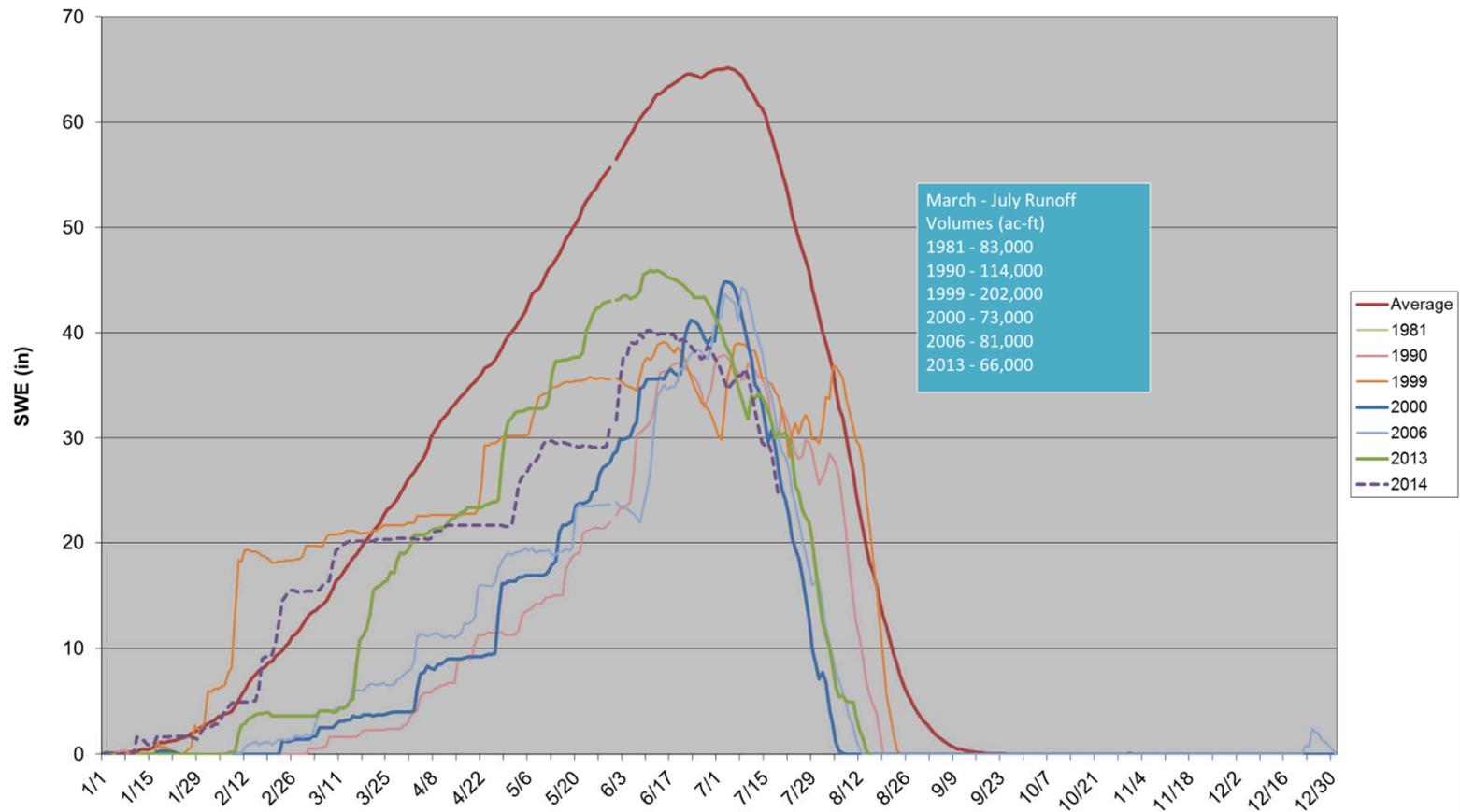


Rio Chama Snow Comparison

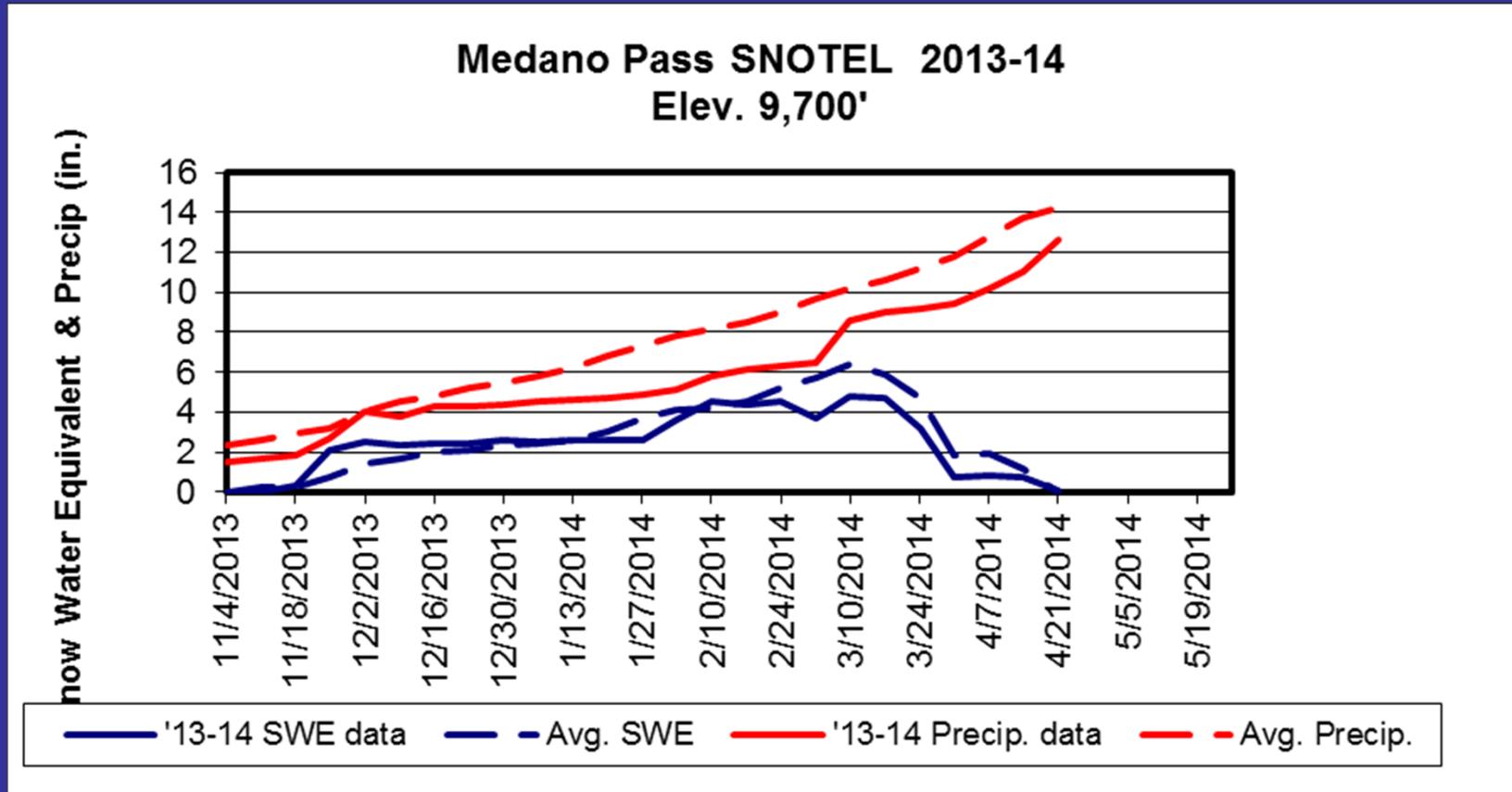


Similar Snowpack Years

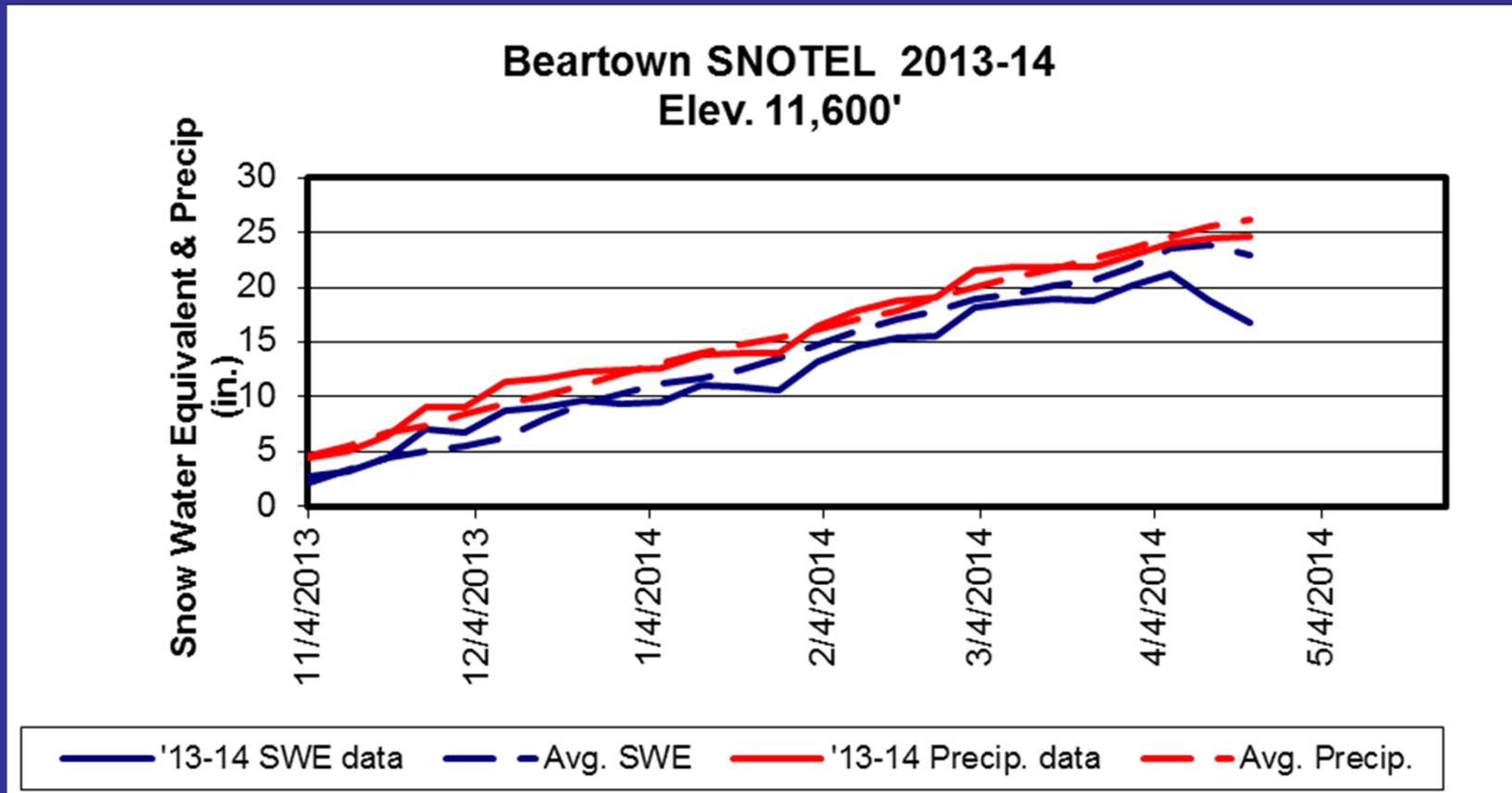
2014 vs. Similar Years, and Average Rio Chama Snowpack Index



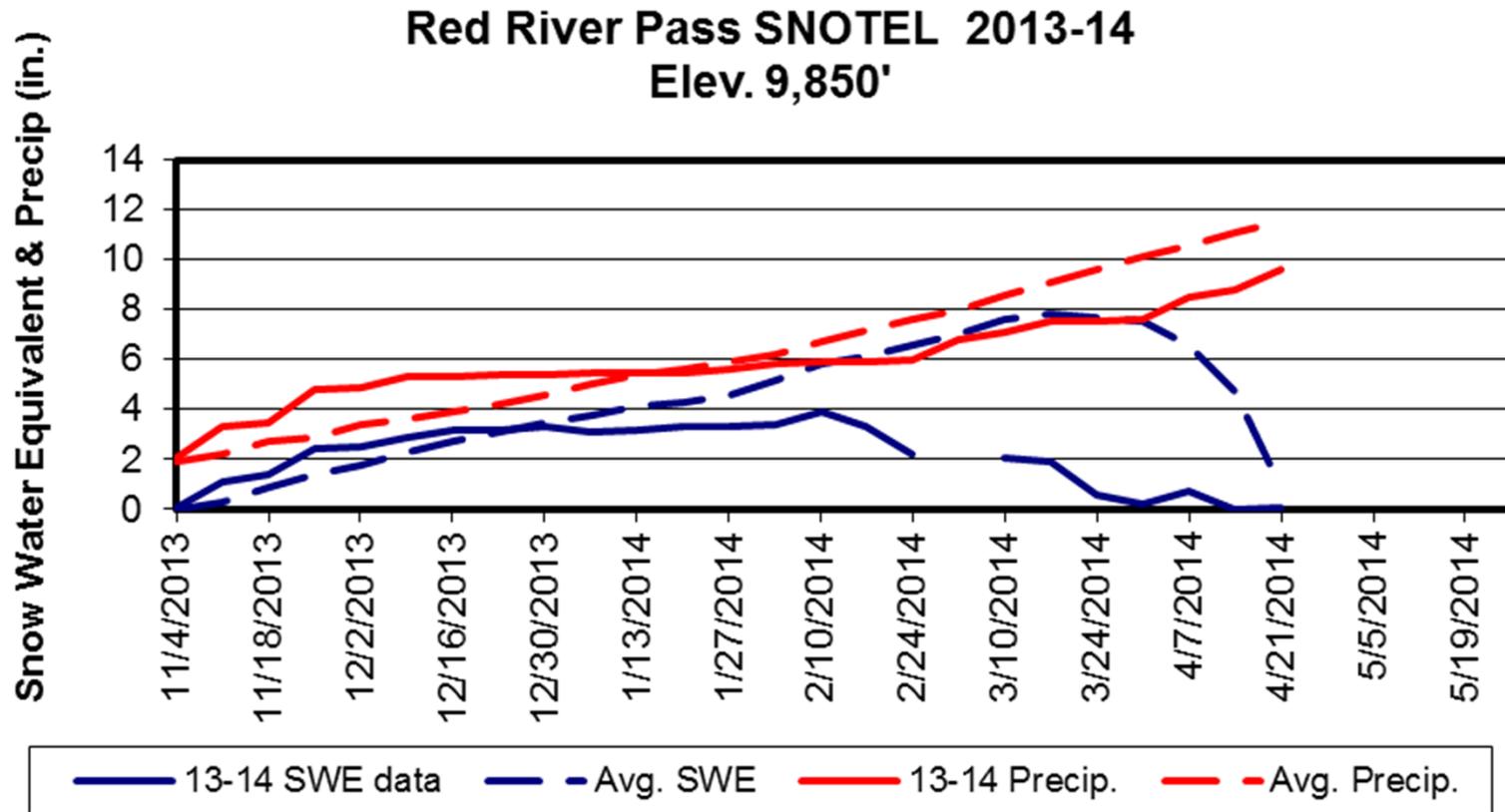
Rio Grande Snow Data



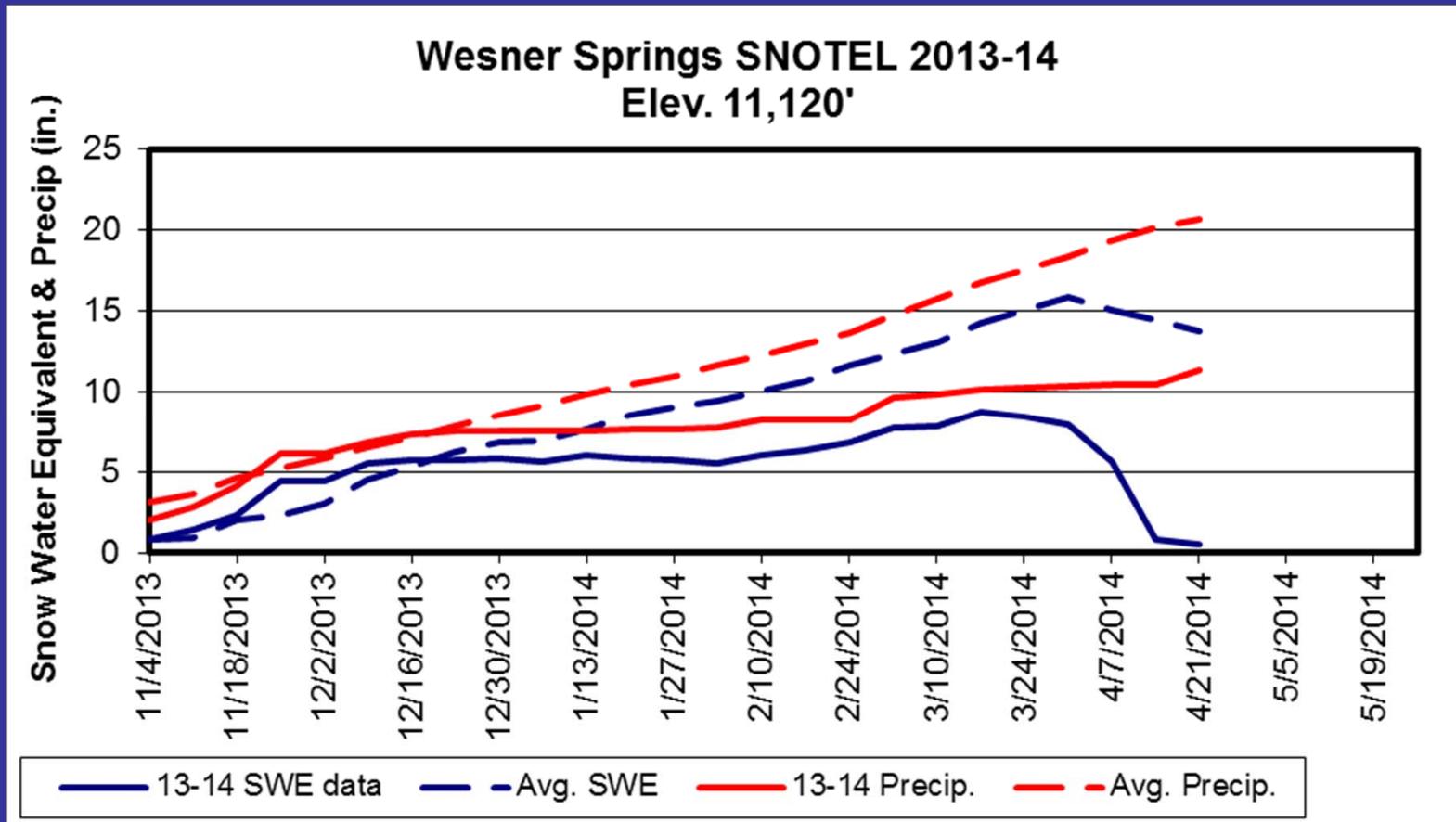
Rio Grande Snow Data



Sangre de Cristo Snow Data



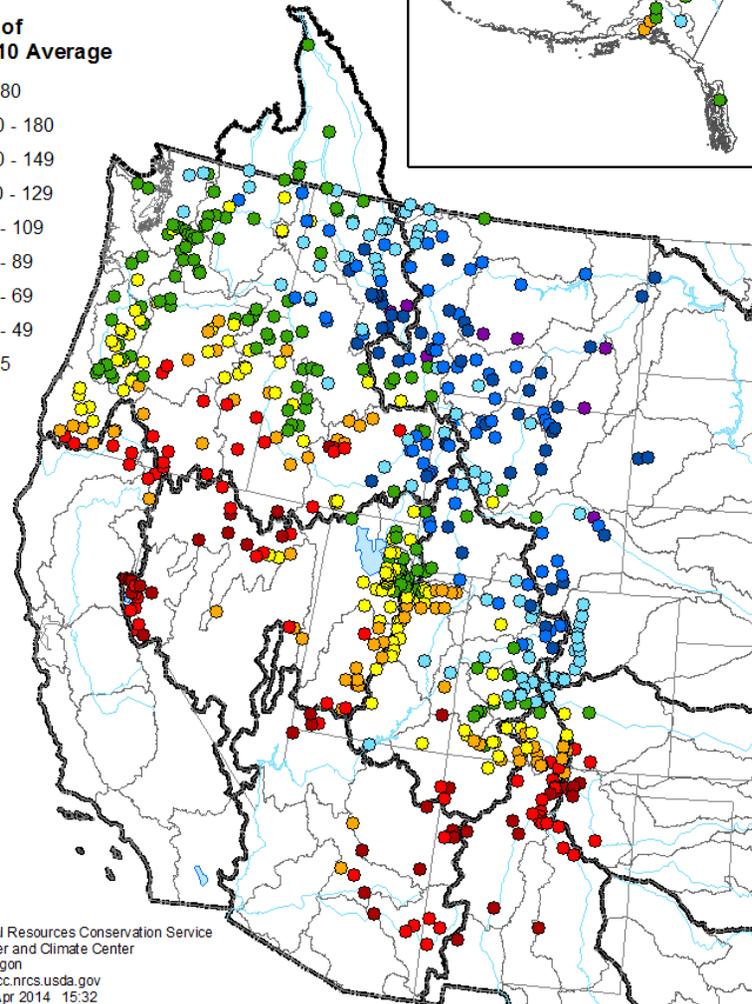
Sangre de Cristo Snow Data



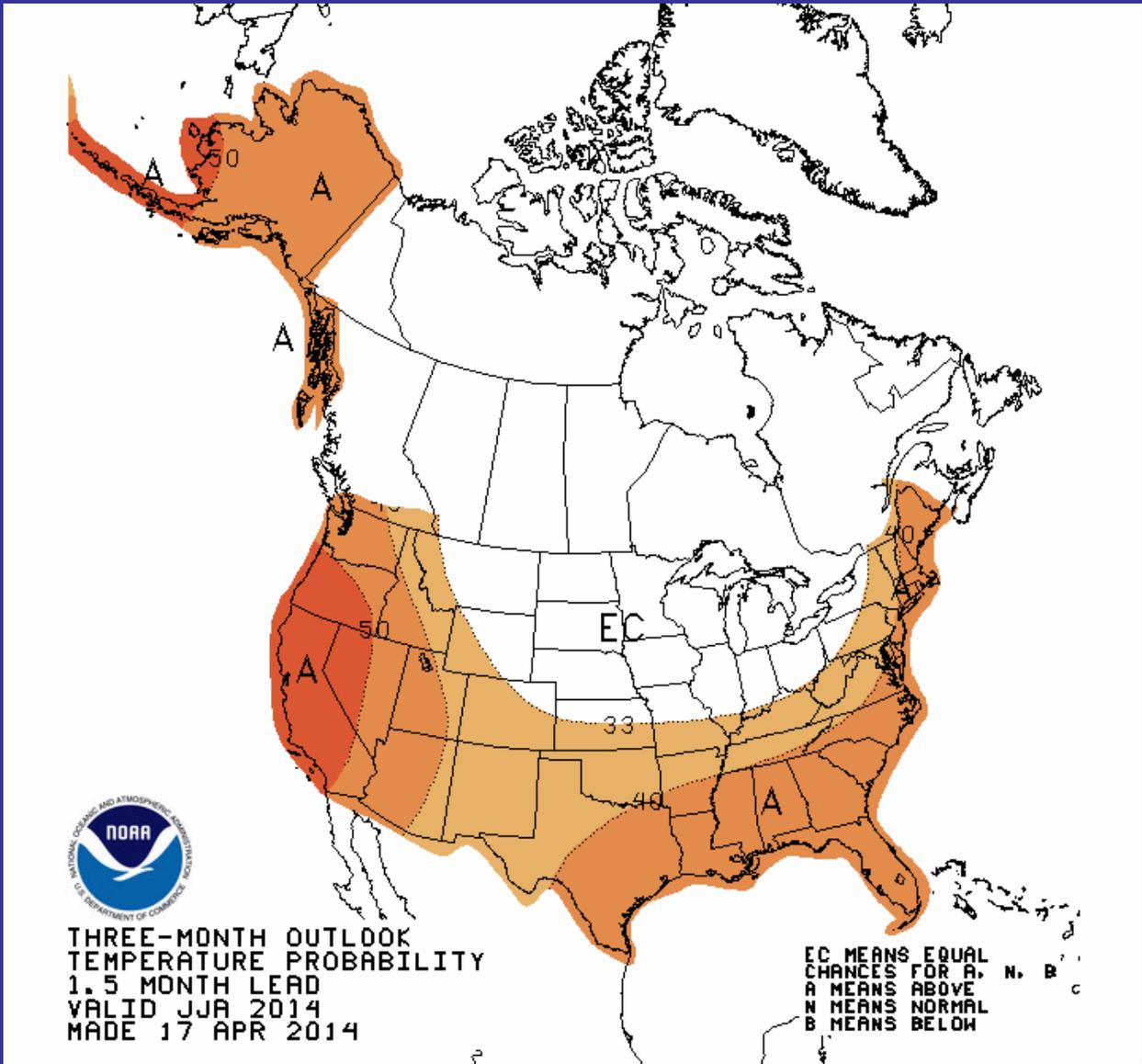
Spring and Summer Streamflow Forecasts as of April 1, 2014

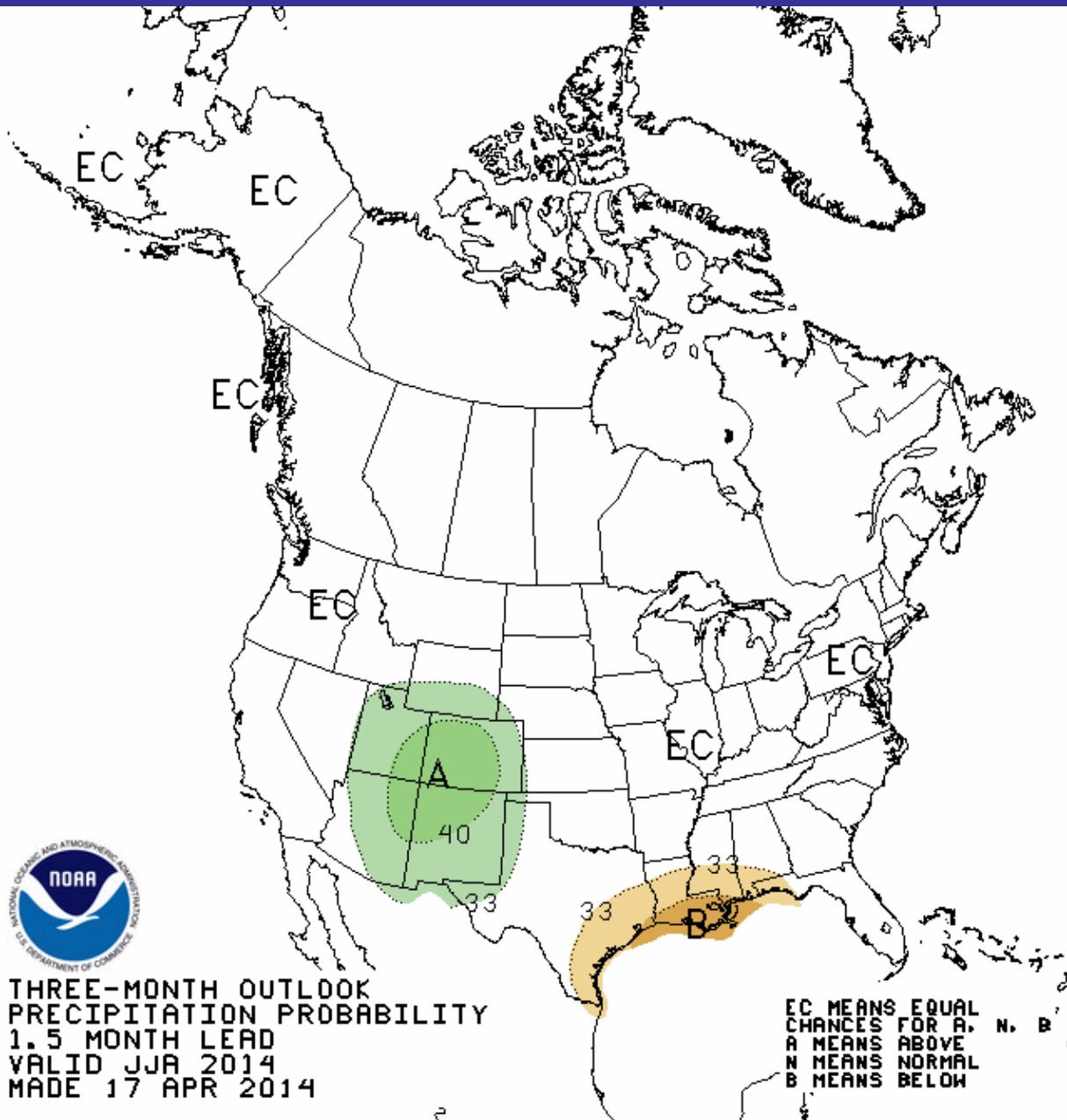
Percent of
1981-2010 Average

- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25



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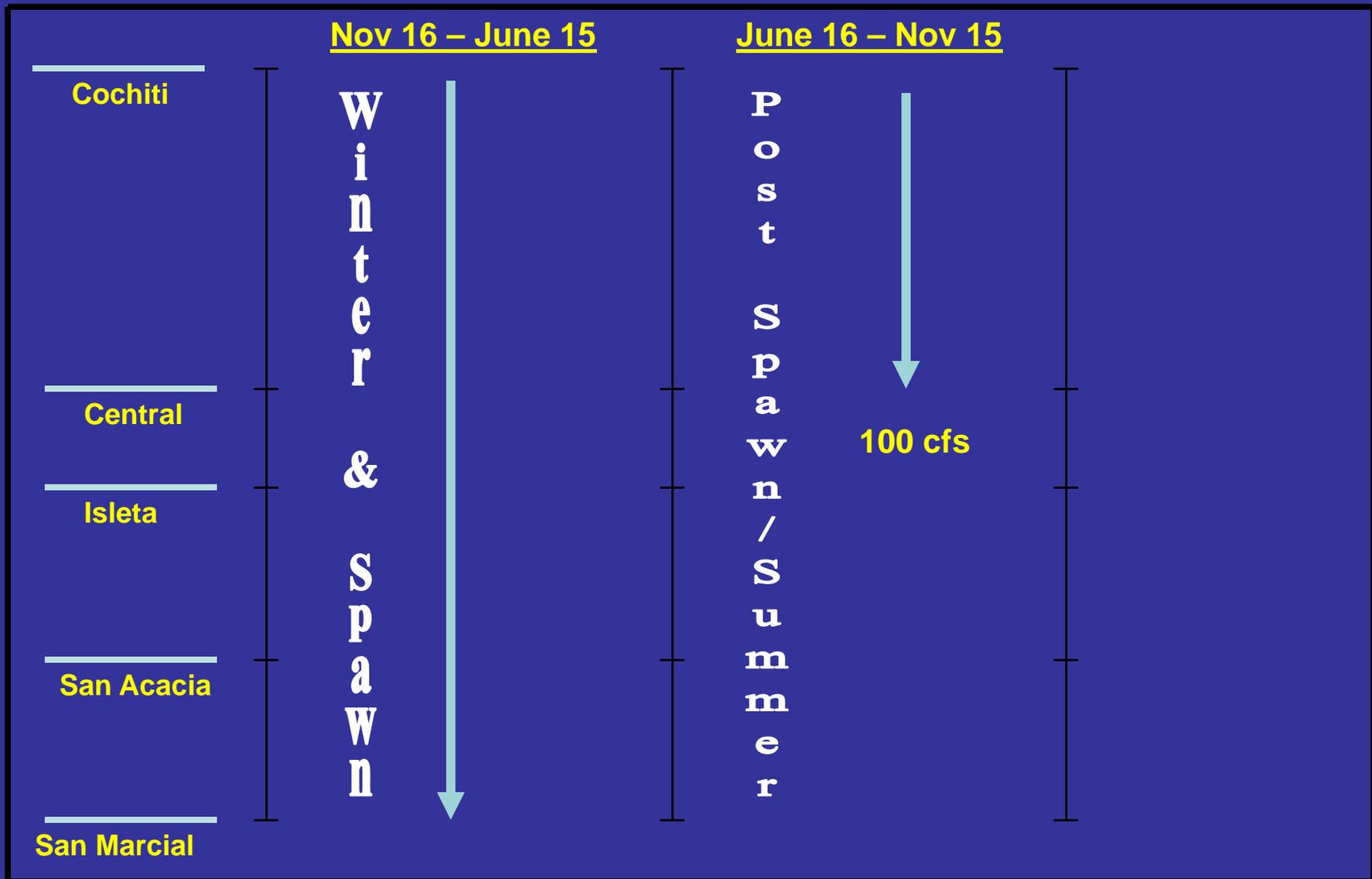




THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
1.5 MONTH LEAD
VALID JJA 2014
MADE 17 APR 2014

2014 Water Operations Modeling

March 2003 BiOp Flow Requirements – Dry Year



Major Assumptions

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

April Forecast Data

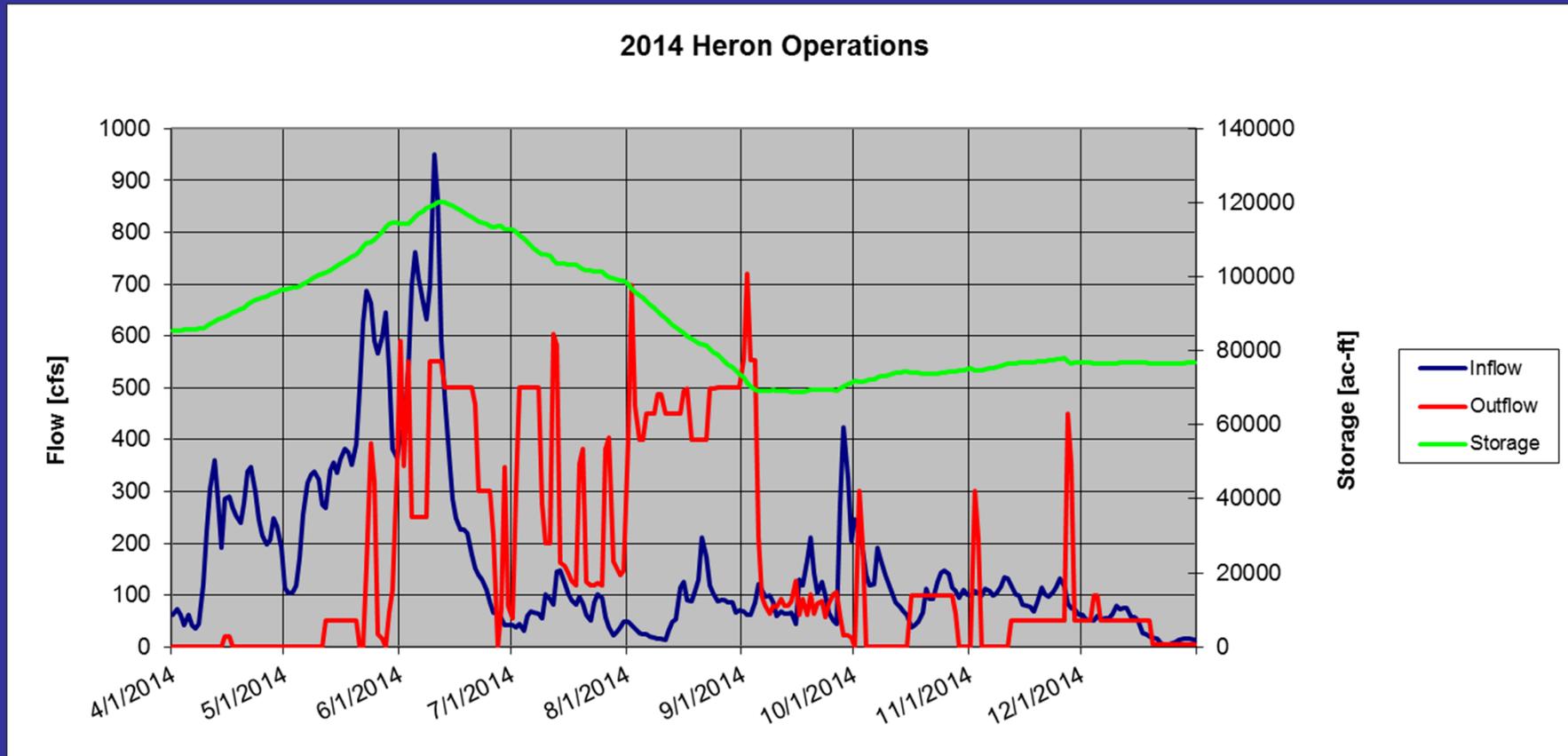
	Most Probable Percent of Average		April 1 50% Probability Volume, ac-ft
	2013	2014	2014
Rio Grande nr Del Norte	52%	80%	410,000
El Vado Reservoir Inflow	36%	28%	64,000
Rio Grande at Otowi	33%	32%	230,000
Nambe Reservoir Inflow	40%	40%	2,600
Jemez blw Jemez Dam	13%	16%	5,300
Rio Blanco @ Diversion	56%	67%	36,000
Navajo River @ Diversion	54%	65%	42,000

Heron Reservoir



Proposed 2013 Heron Operations

Storage Capacity=401,000 ac-ft

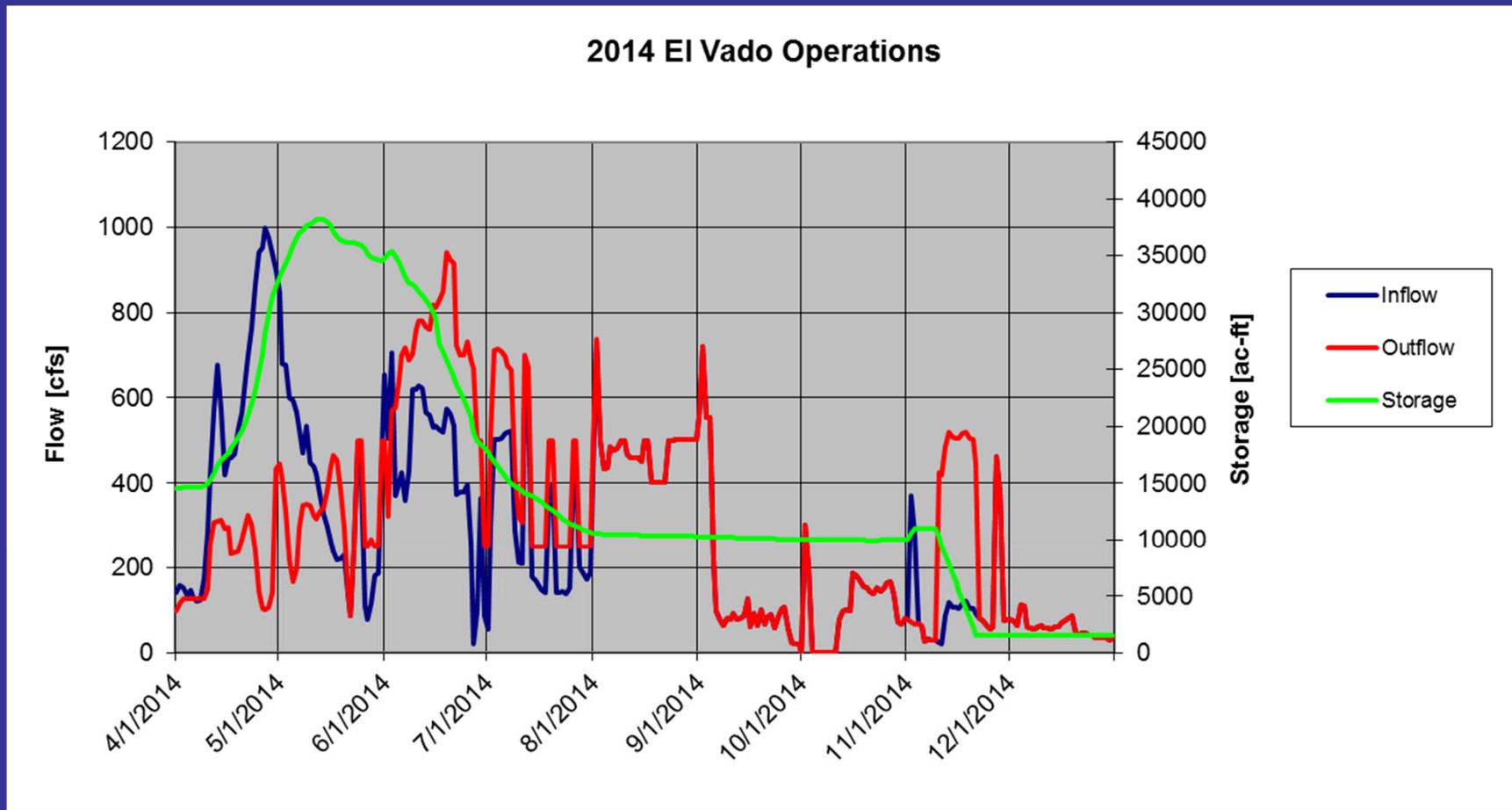


Reservoir will drop 5 feet from beginning of year to end

El Vado Reservoir



Proposed 2013 El Vado Operations



El Vado Reservoir:

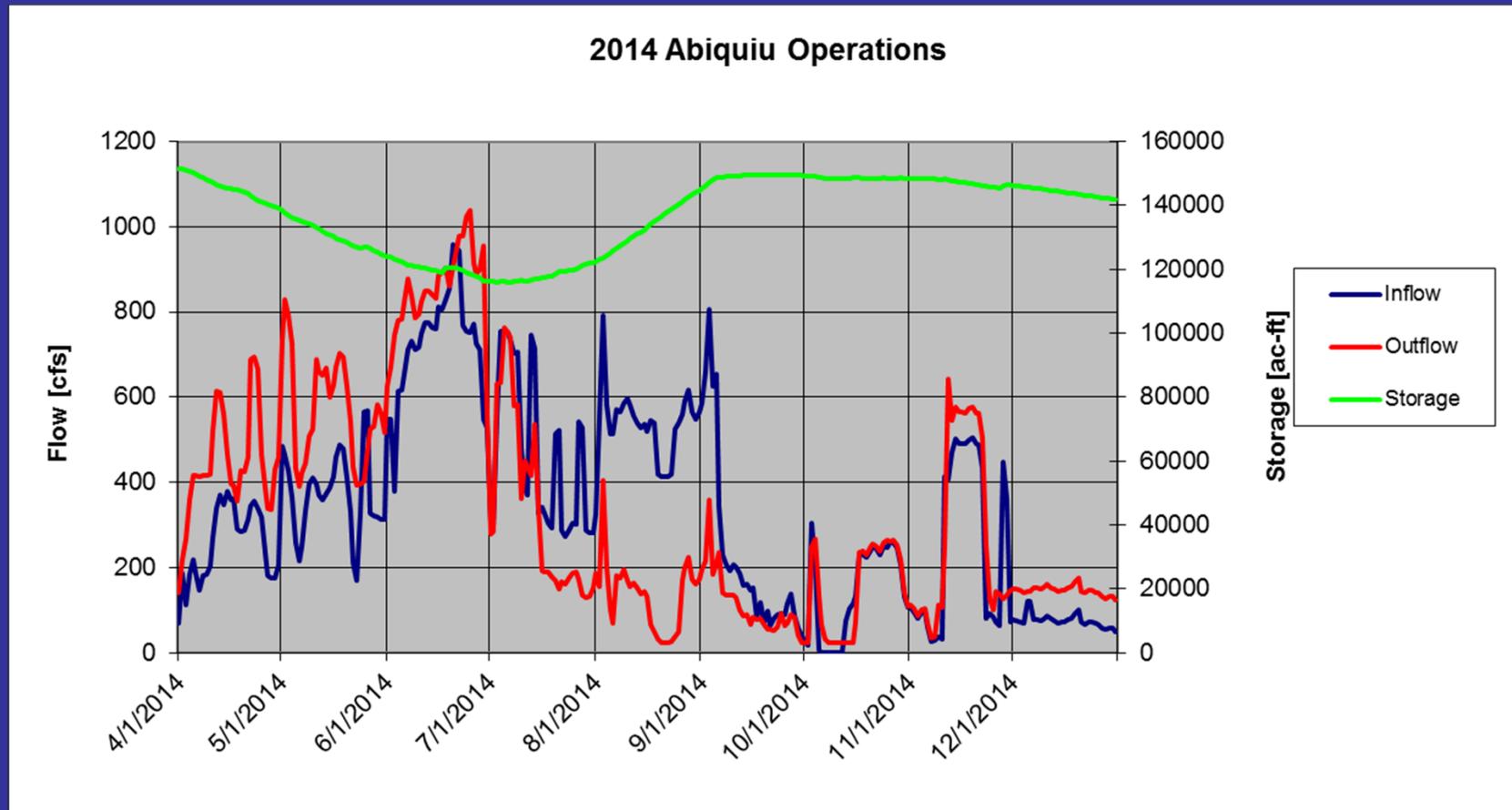
Lake Level: 48' of fluctuation between May and Dec

ABIQUIU LAKE

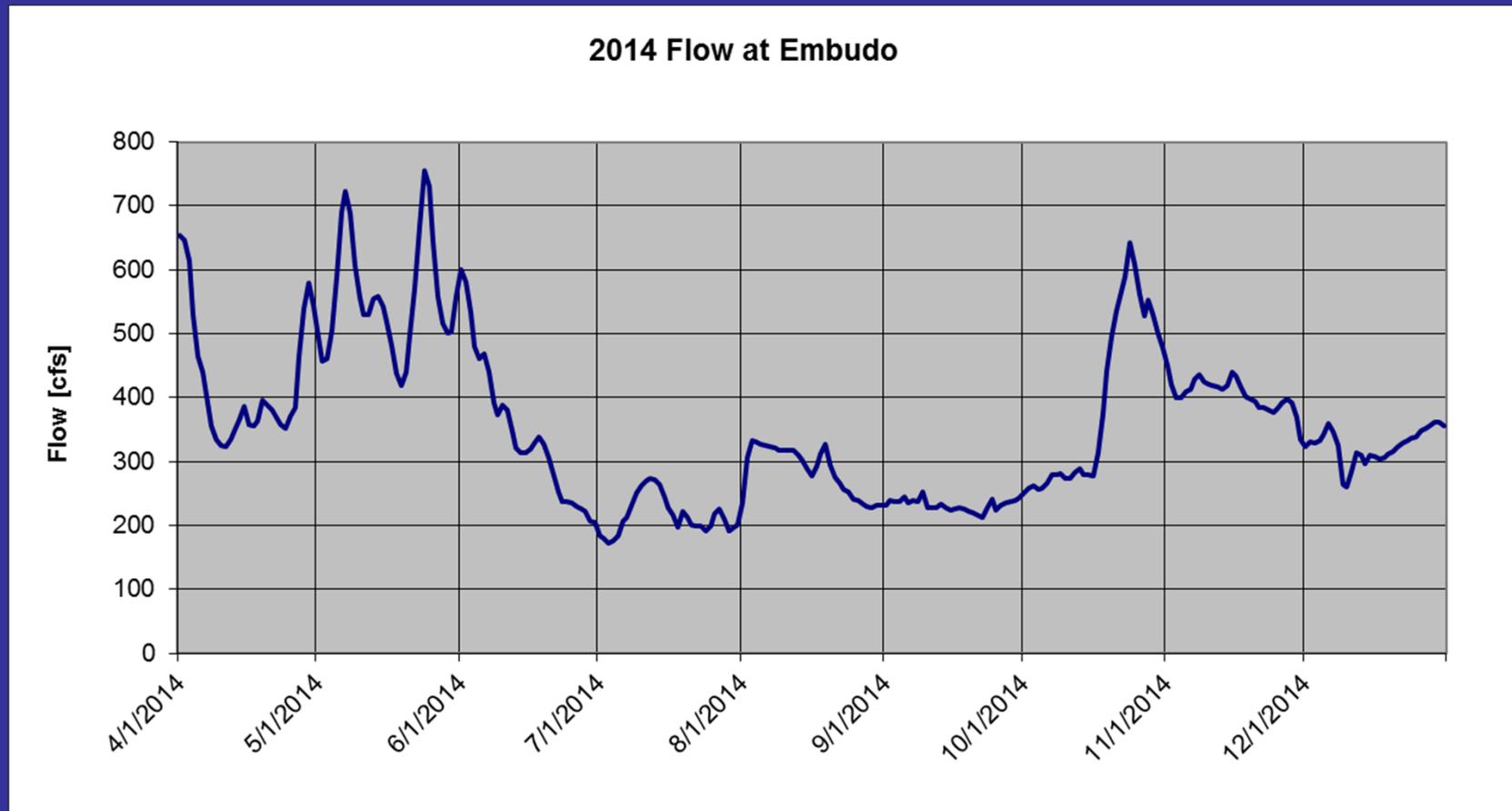


Proposed 2013 Abiquiu Operations

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



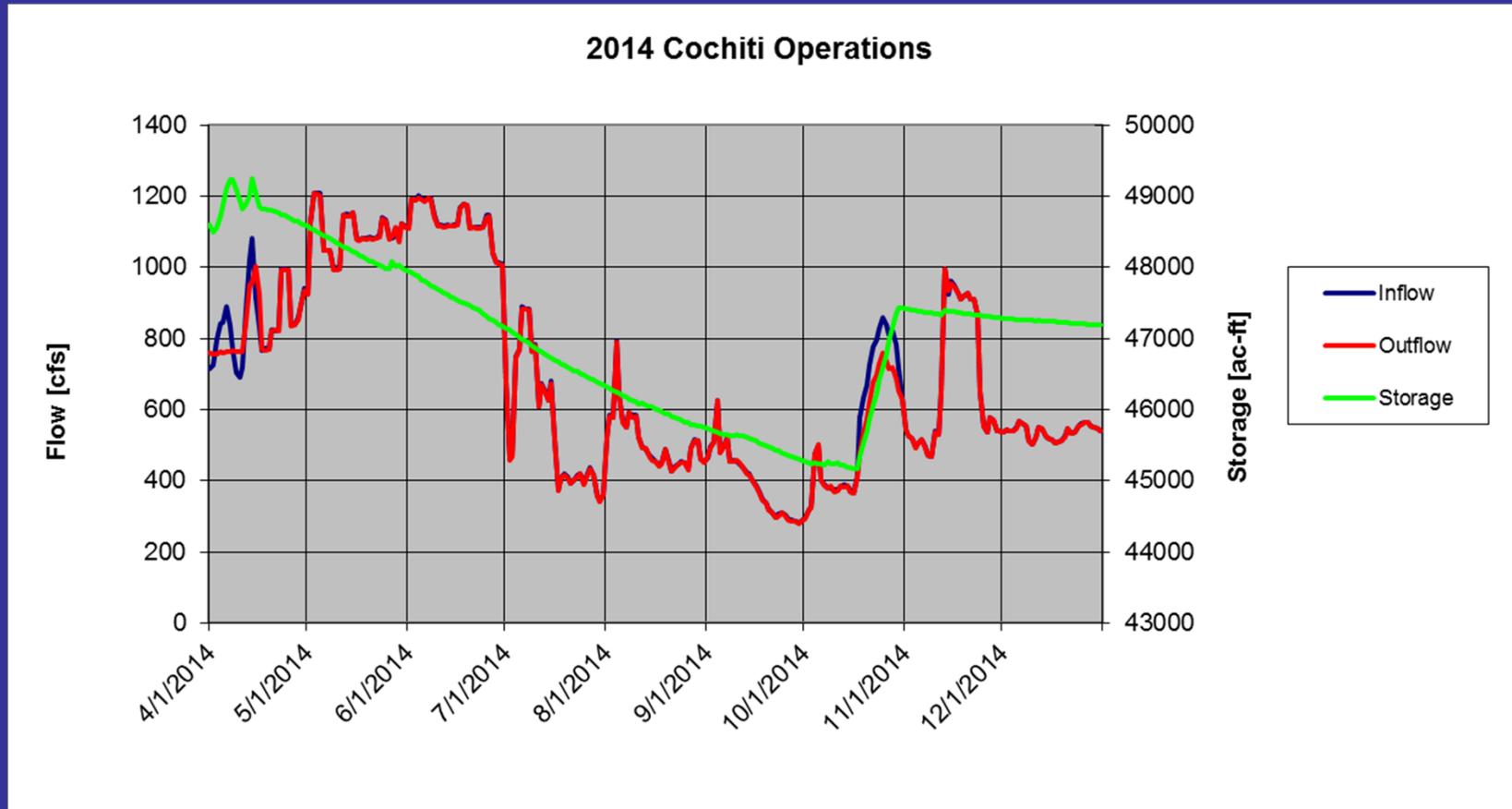
Estimated Hydrograph at Embudo



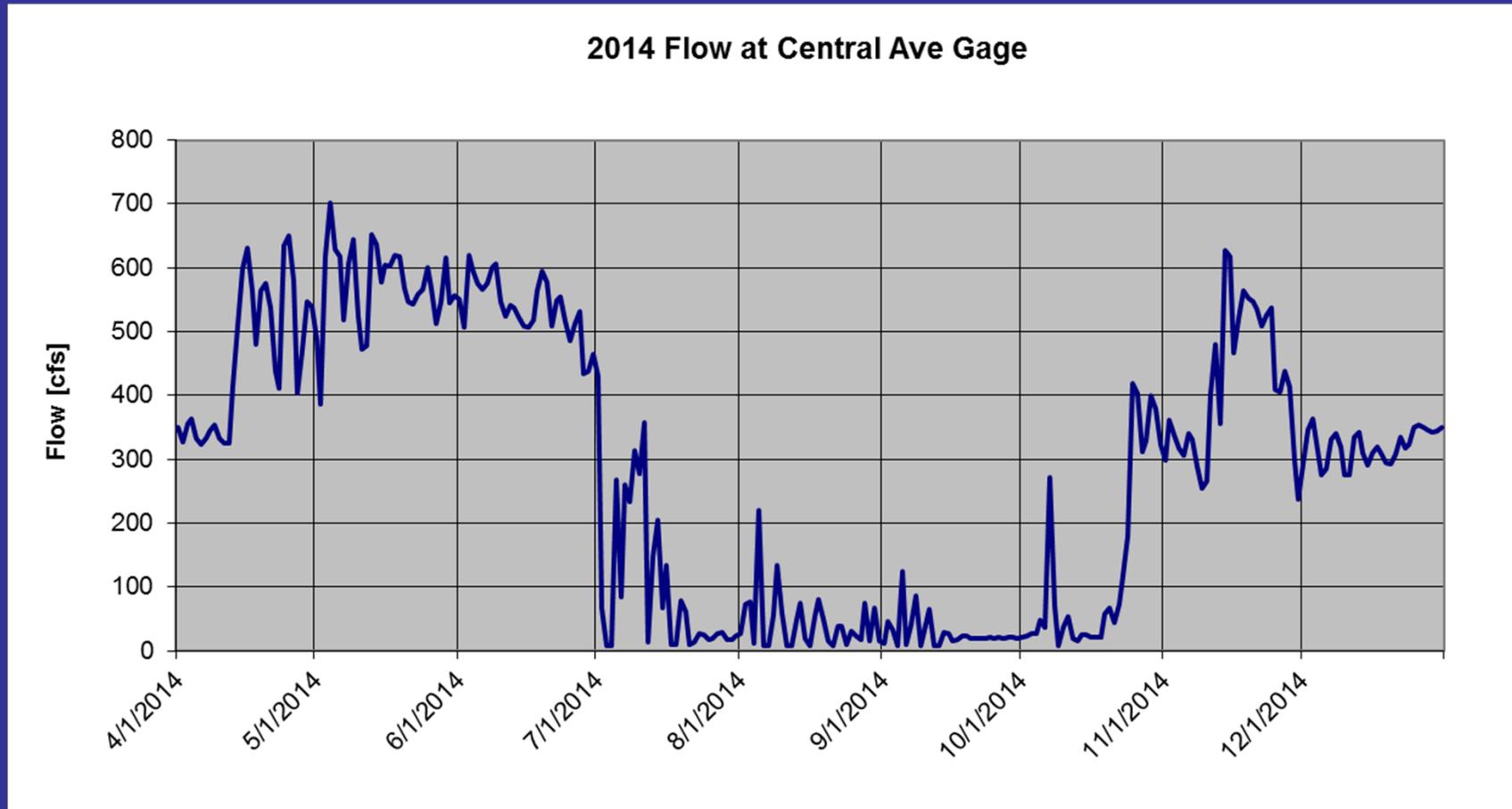
COCHITI LAKE



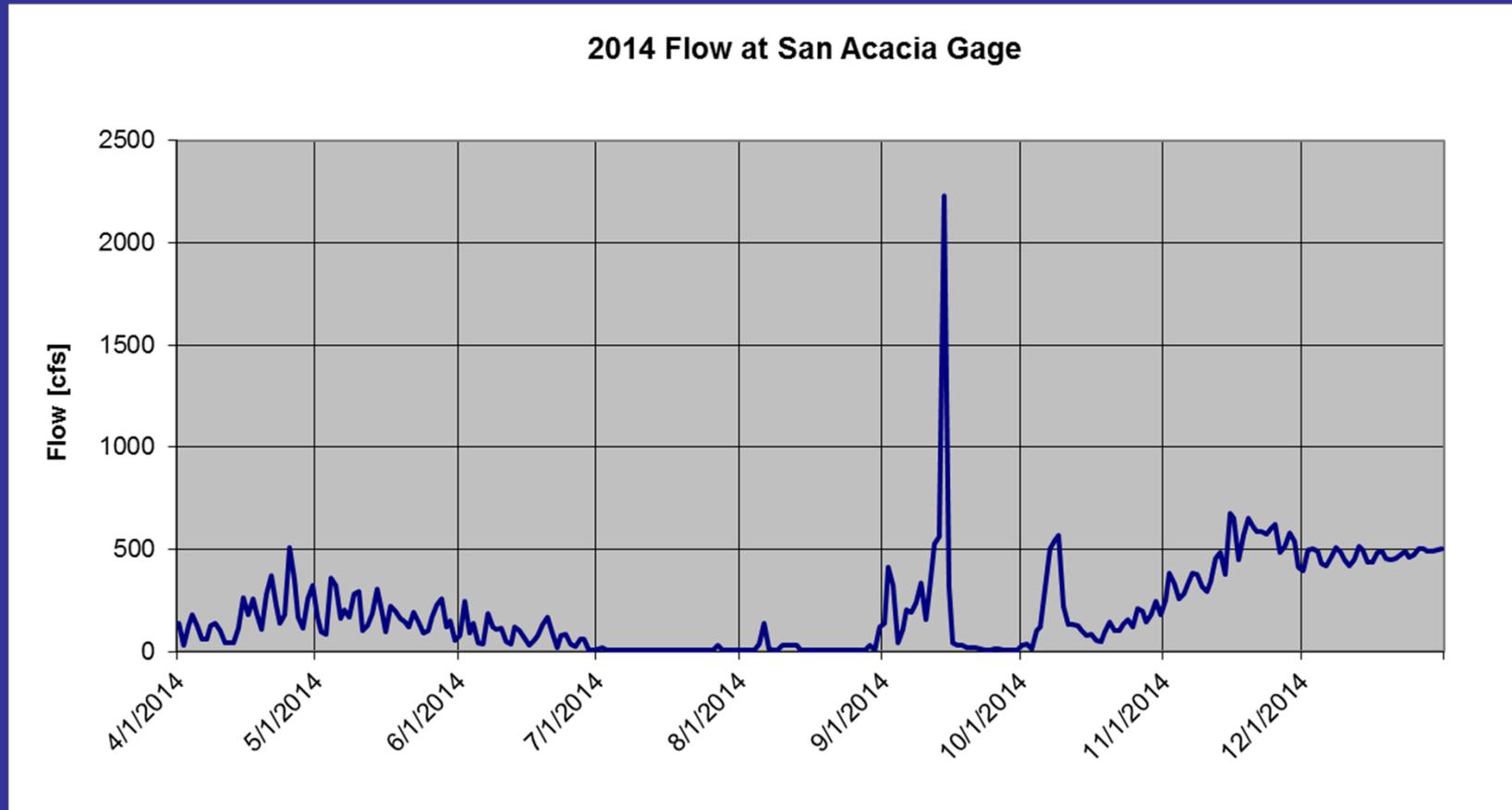
Proposed 2013 Cochiti Operations



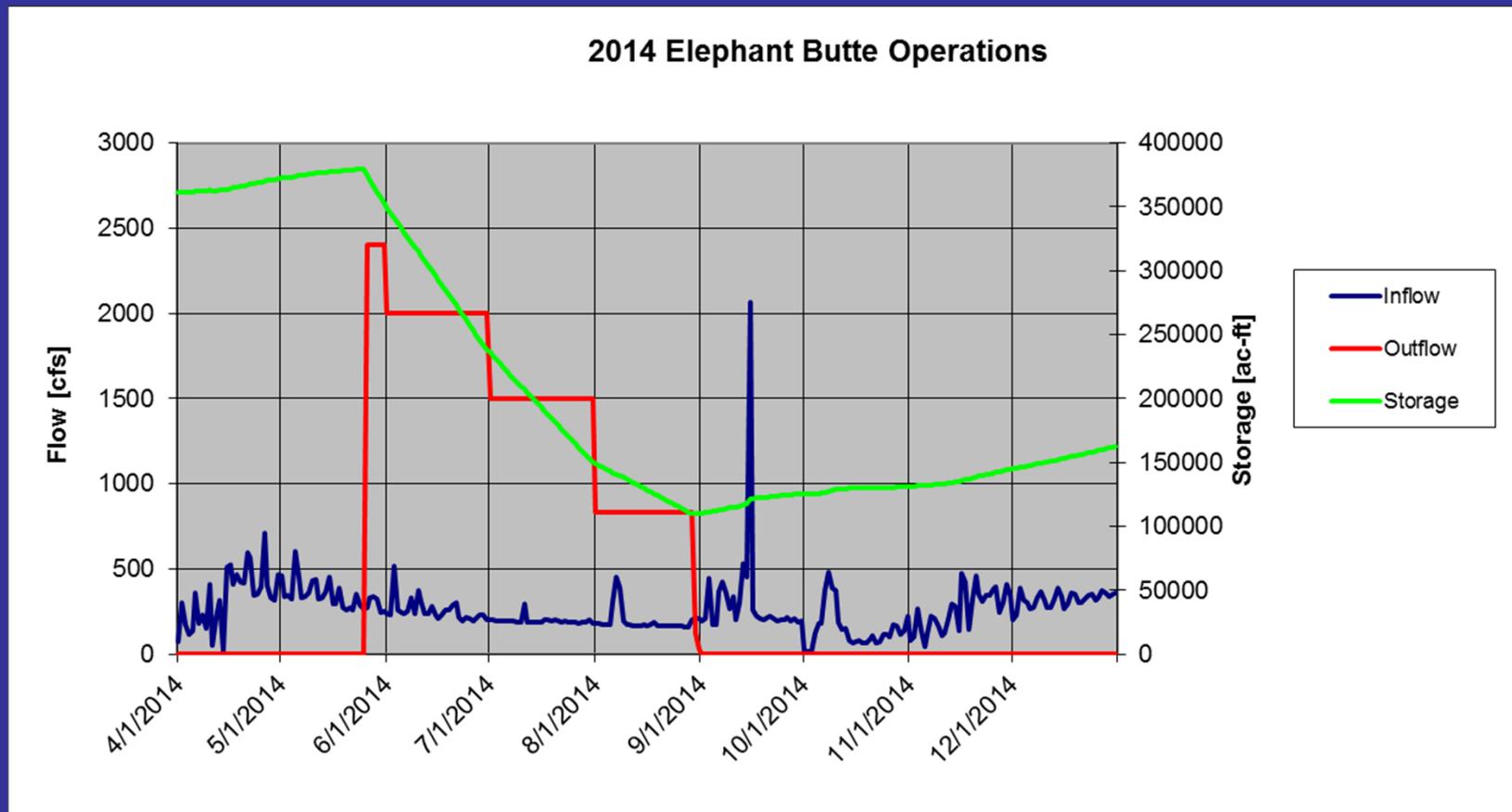
Estimated Hydrograph at Central Ave.



Estimated Flow at San Acacia



Proposed Elephant Butte Operations



Maximum Elevation = 4330.69'. Minimum Elevation = 4297.29'

2003 BO Compliance for 2014

- **Similar to 2013, drought and limited water supply**
 - With ABCWUA's help, move SJC water to Elephant Butte to create spring pulse
 - Operation to begin soon
 - Peak flow at Central of 1,500 – 1,800 cfs for 7 days
- **Use of supplemental water**
 - Aim to keep Rio Grande connected to June 15th
 - Use supplemental water judiciously

Rio Chama High Flow Pulse

- **USE MRGCD's SJC water**
- **Route from El Vado to Abiquiu**
- **To begin Friday, end Sunday**
- **Peak ~2,000 cfs for several hours**
- **Hold > 1,000 cfs for weekend**
- **Details being finalized**