2011 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)

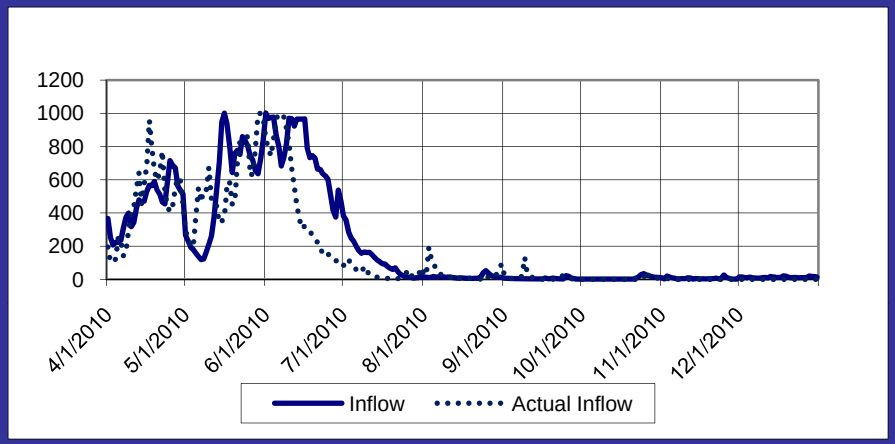
Inflows/Outflows based on nature and policies
Article VII restrictions
Flood control and channel capacity
Timing of water deliveries
Demand curves from water users
Requirements of the 2003 Biological Opinion

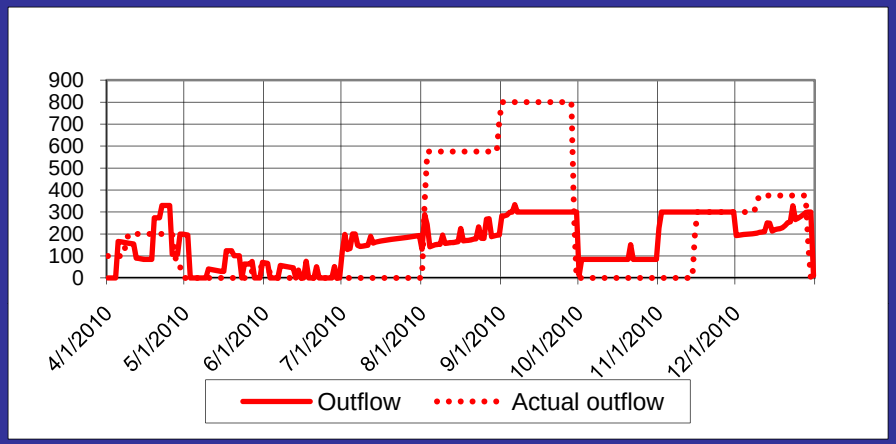
Reservoir storage based on inflow/outflow

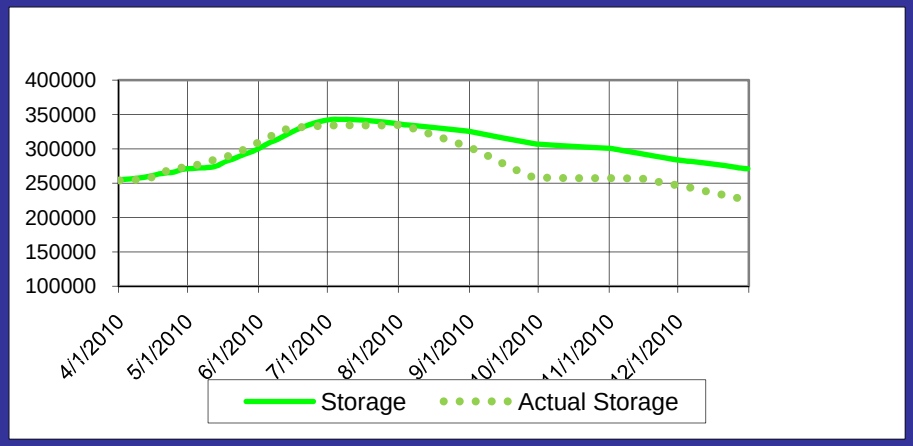
Operated By: Dams:	Reclamation	Corps	Water Supply	Recreation	Flood Control	Sediment Control
HERON	☺		☐	☐		
EL VADO	☺		☐	☐		
ABIQUIU		☺	☐	☐	☐	☐
NAMBE FALLS	☺		☐	☐		
GALISTEO		☺			☐	
COCHITI		☺		☐	☐	☐
JEMEZ CANYON		☺			☐	☐
ELEPHANT BUTTE	☺		☐	☐		

2010: The Year in Review

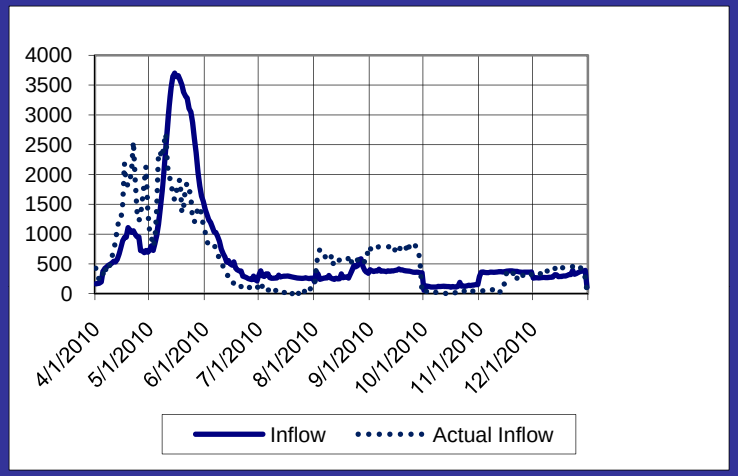
Heron Reservoir

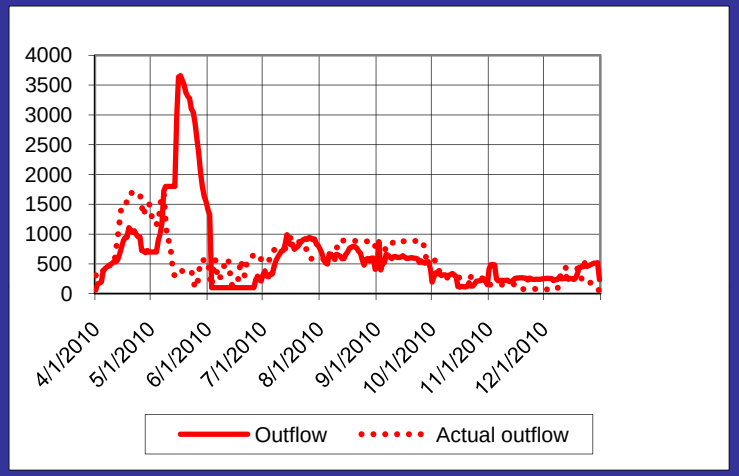


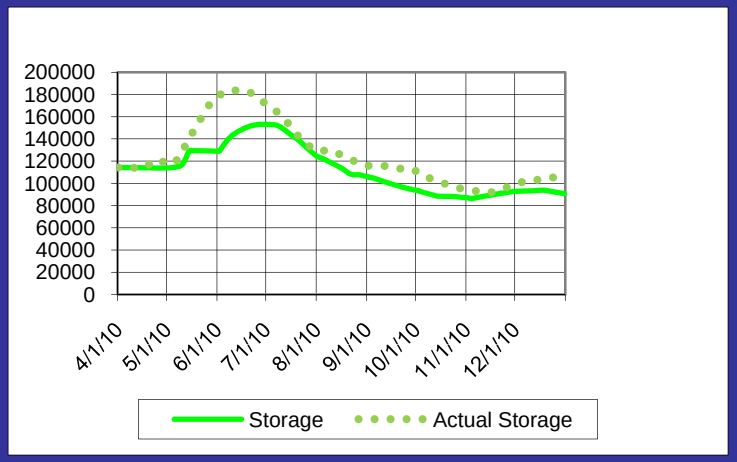




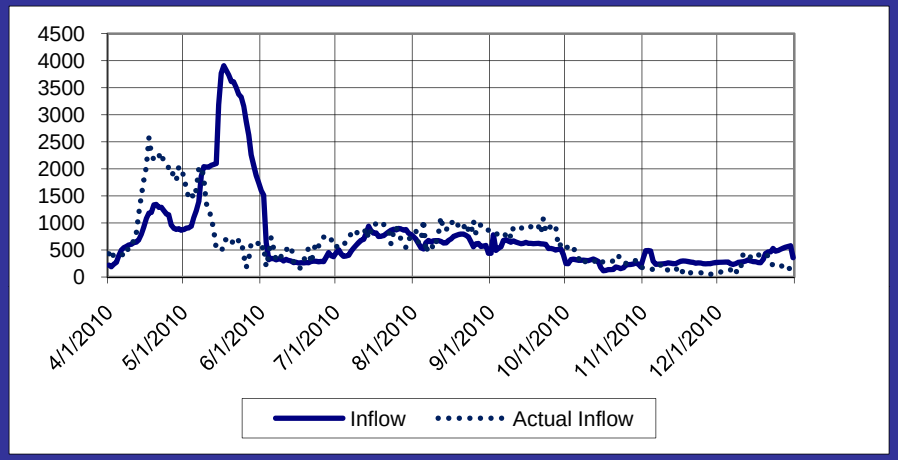
El Vado Reservoir

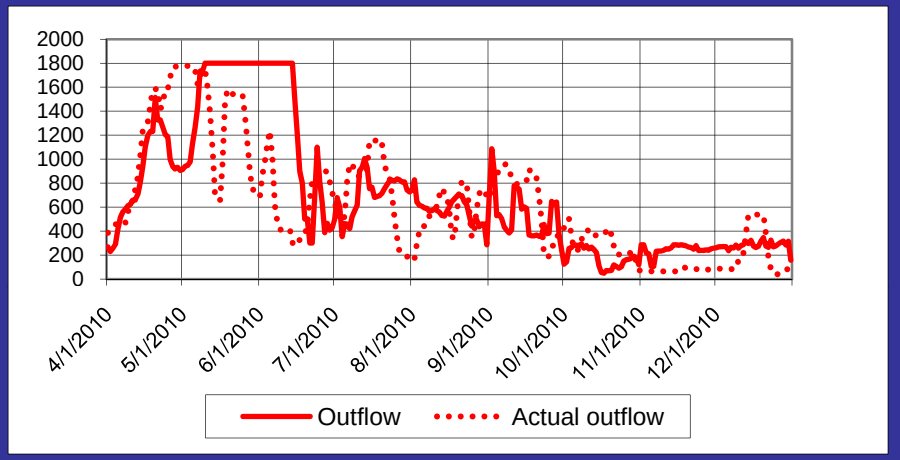


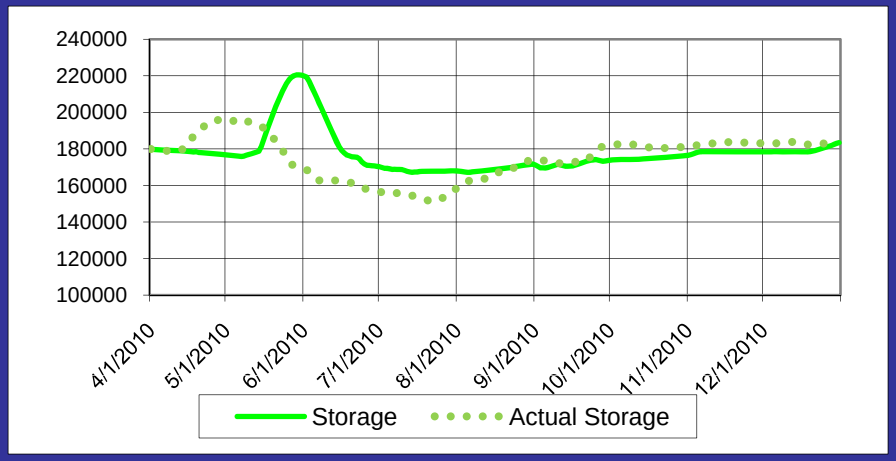




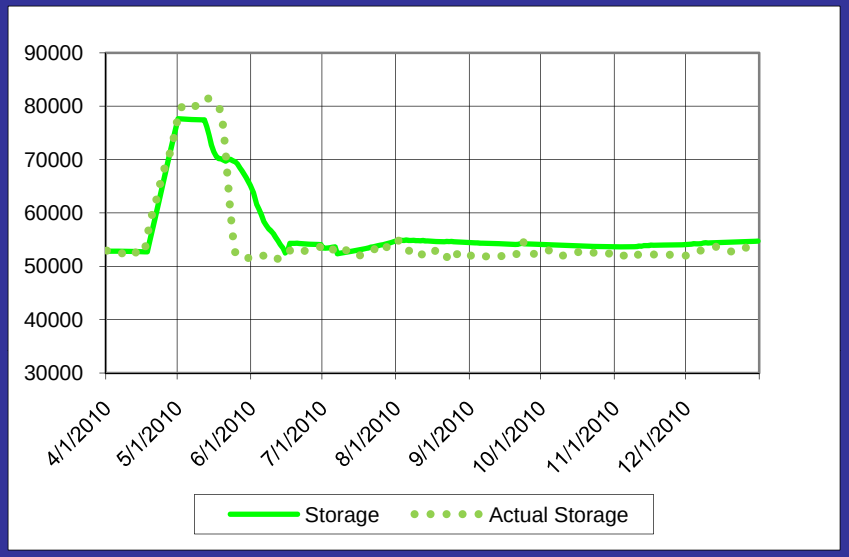
Abiquiu Reservoir

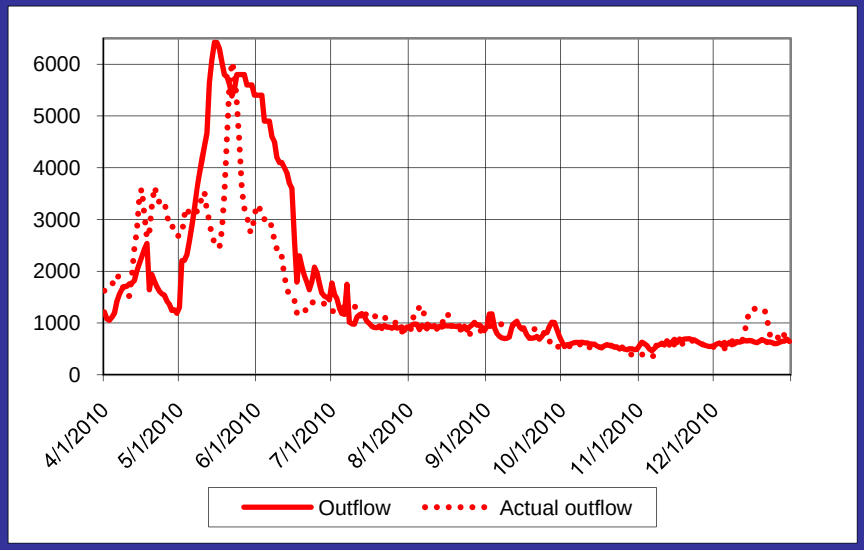


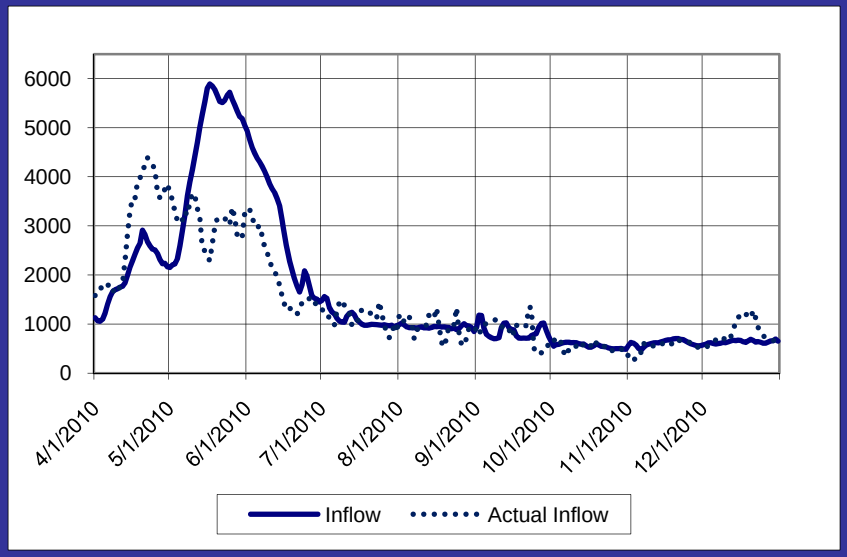




Cochiti Reservoir

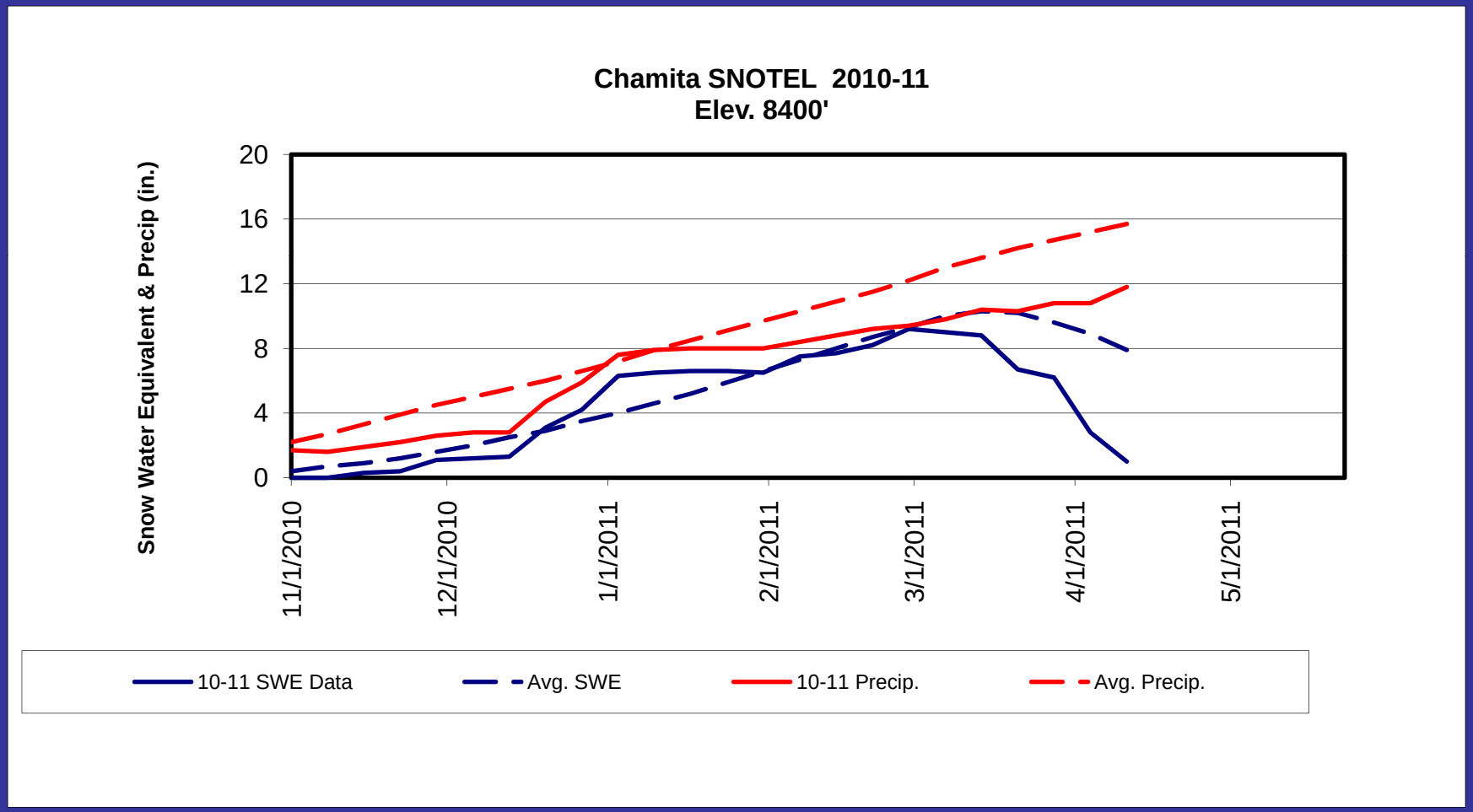




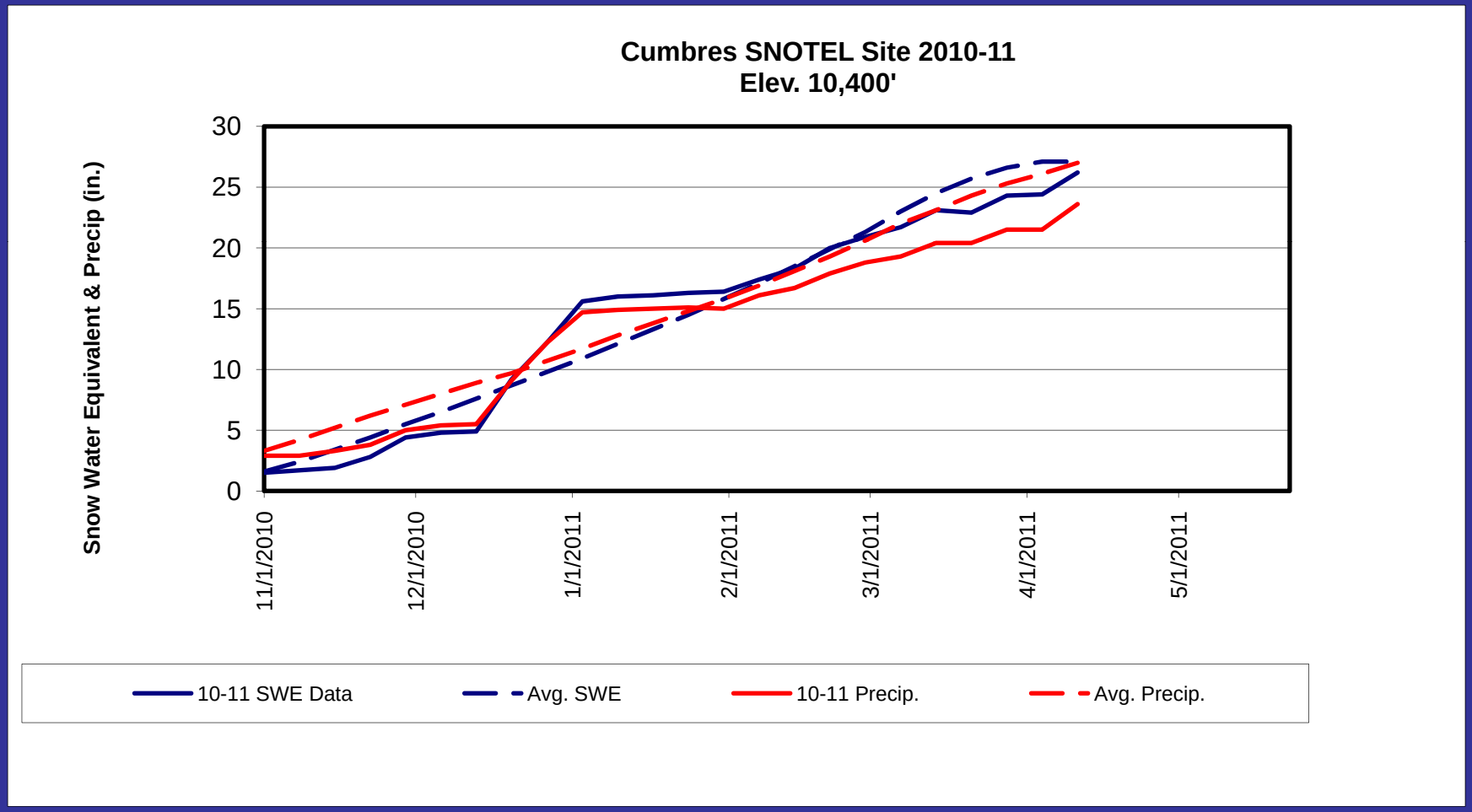


Current Snow Conditions

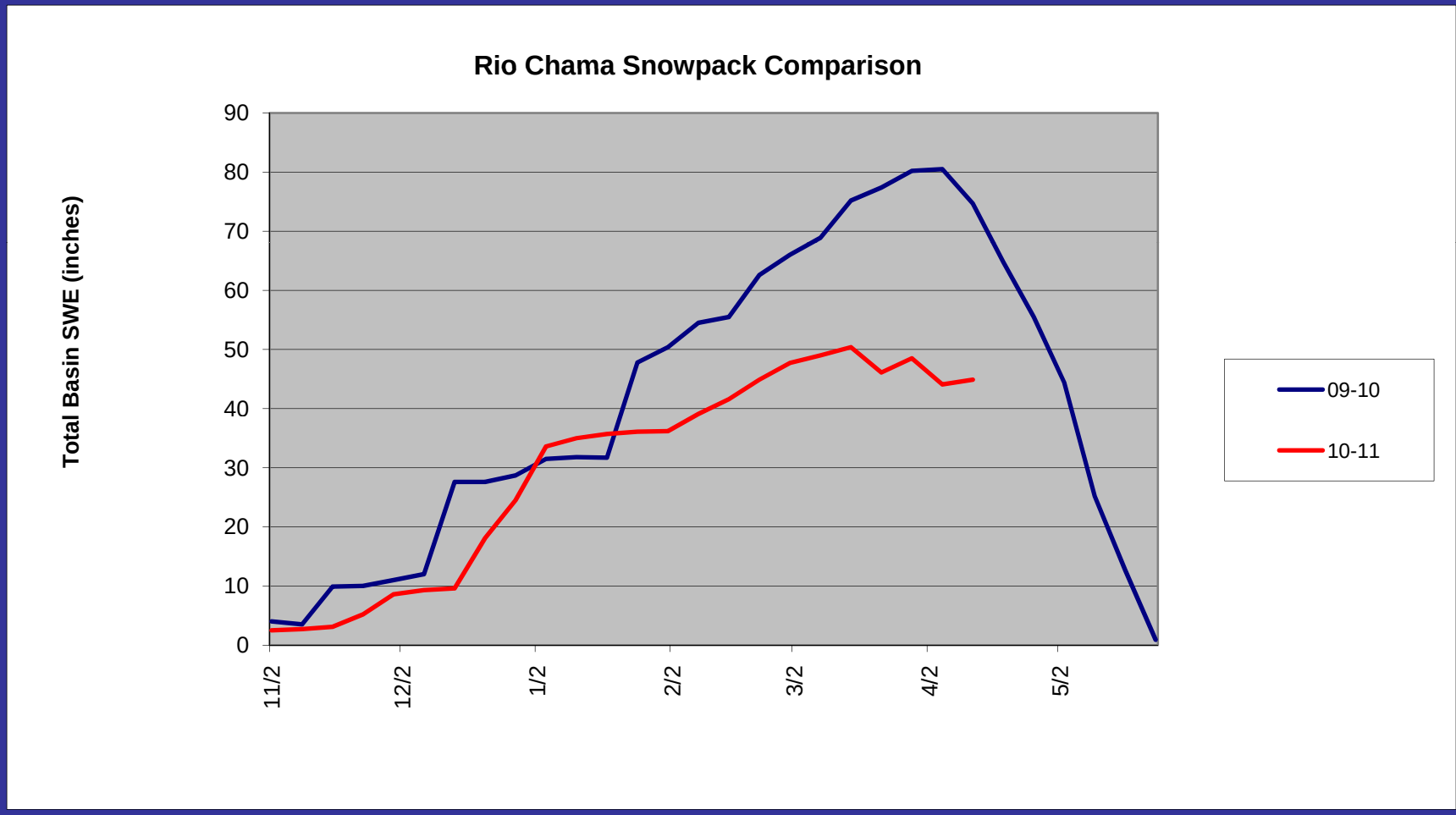
Rio Chama Snow Data



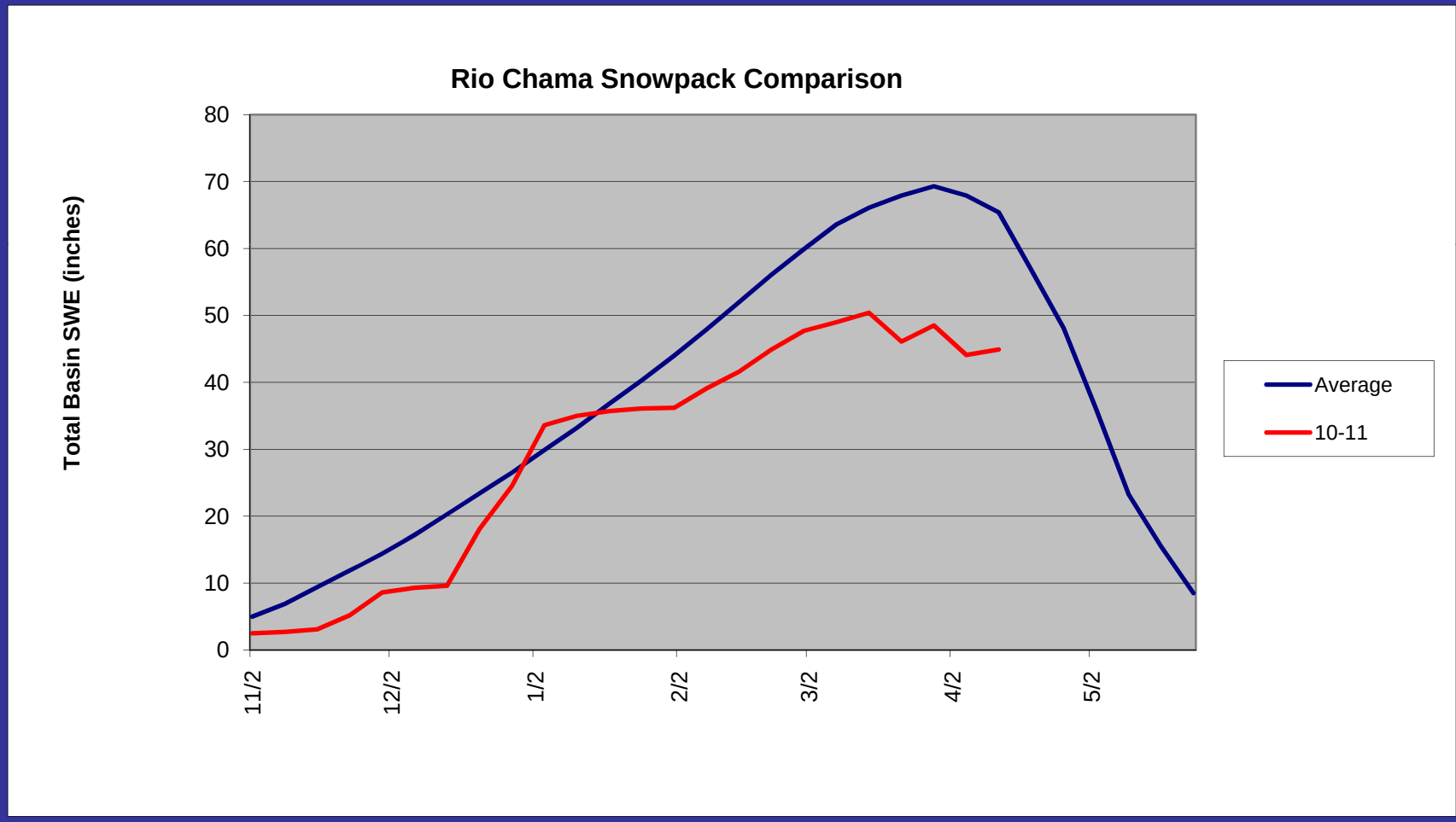
Rio Chama Snow Data



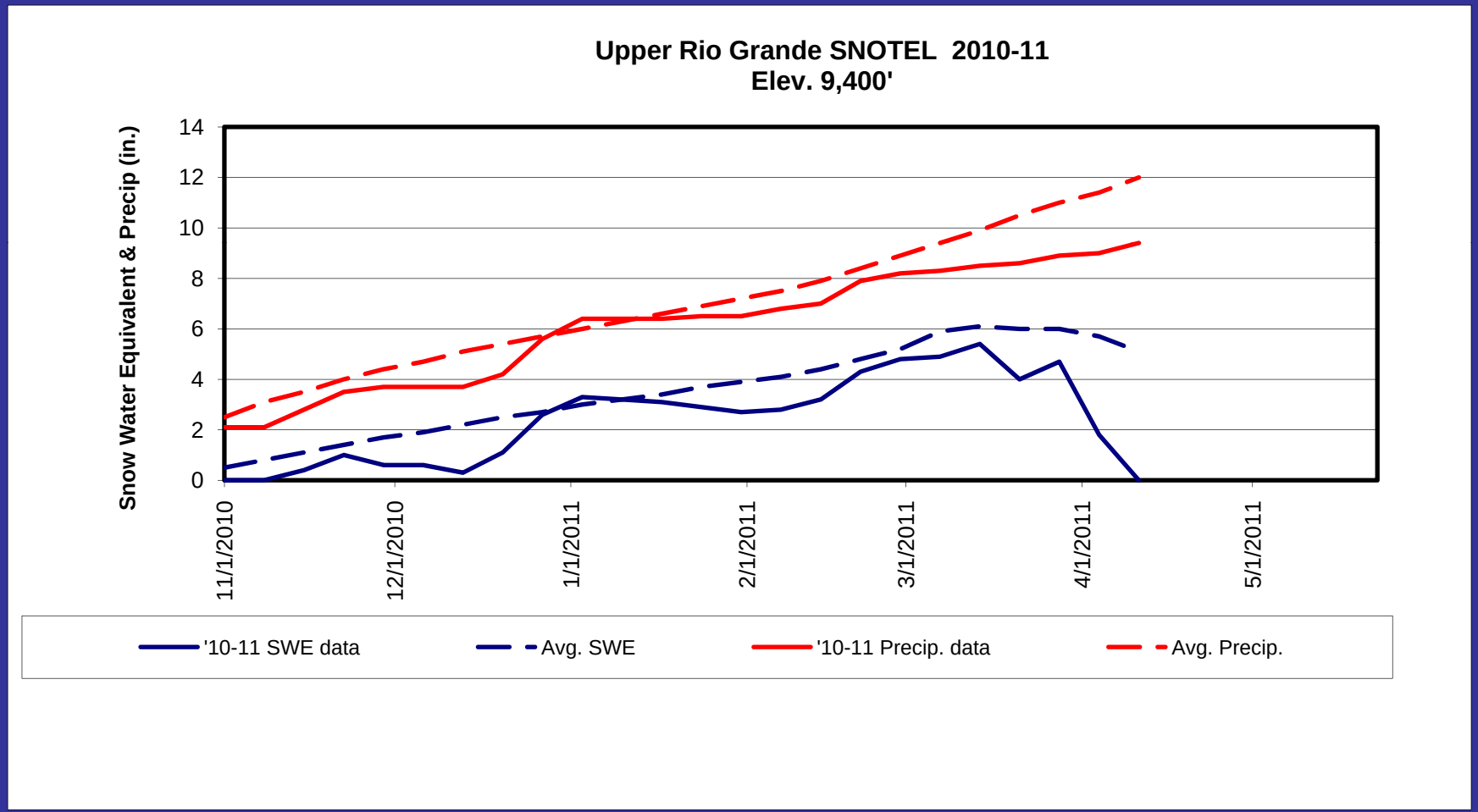
Rio Chama Snow Comparison



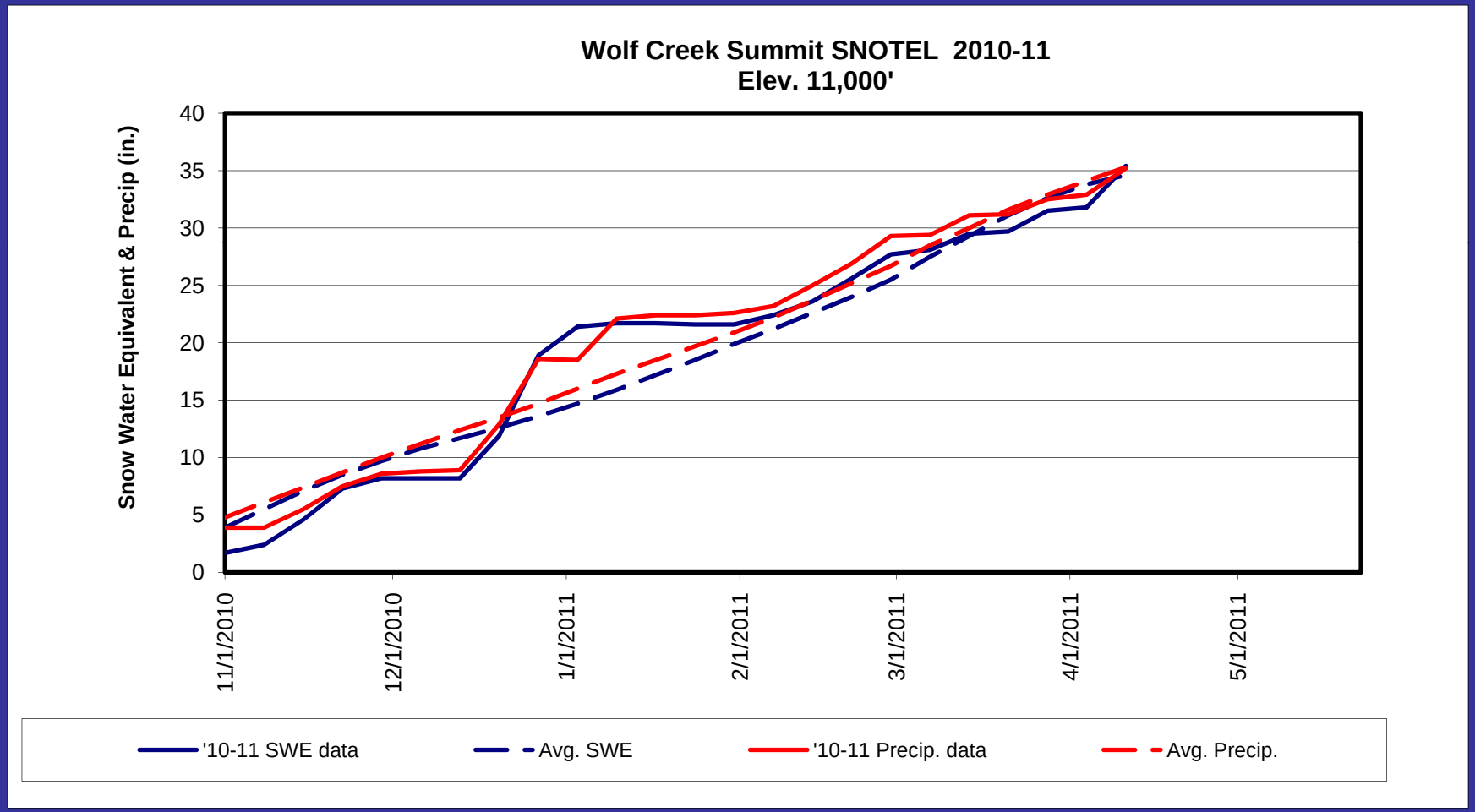
Rio Chama Snow Comparison



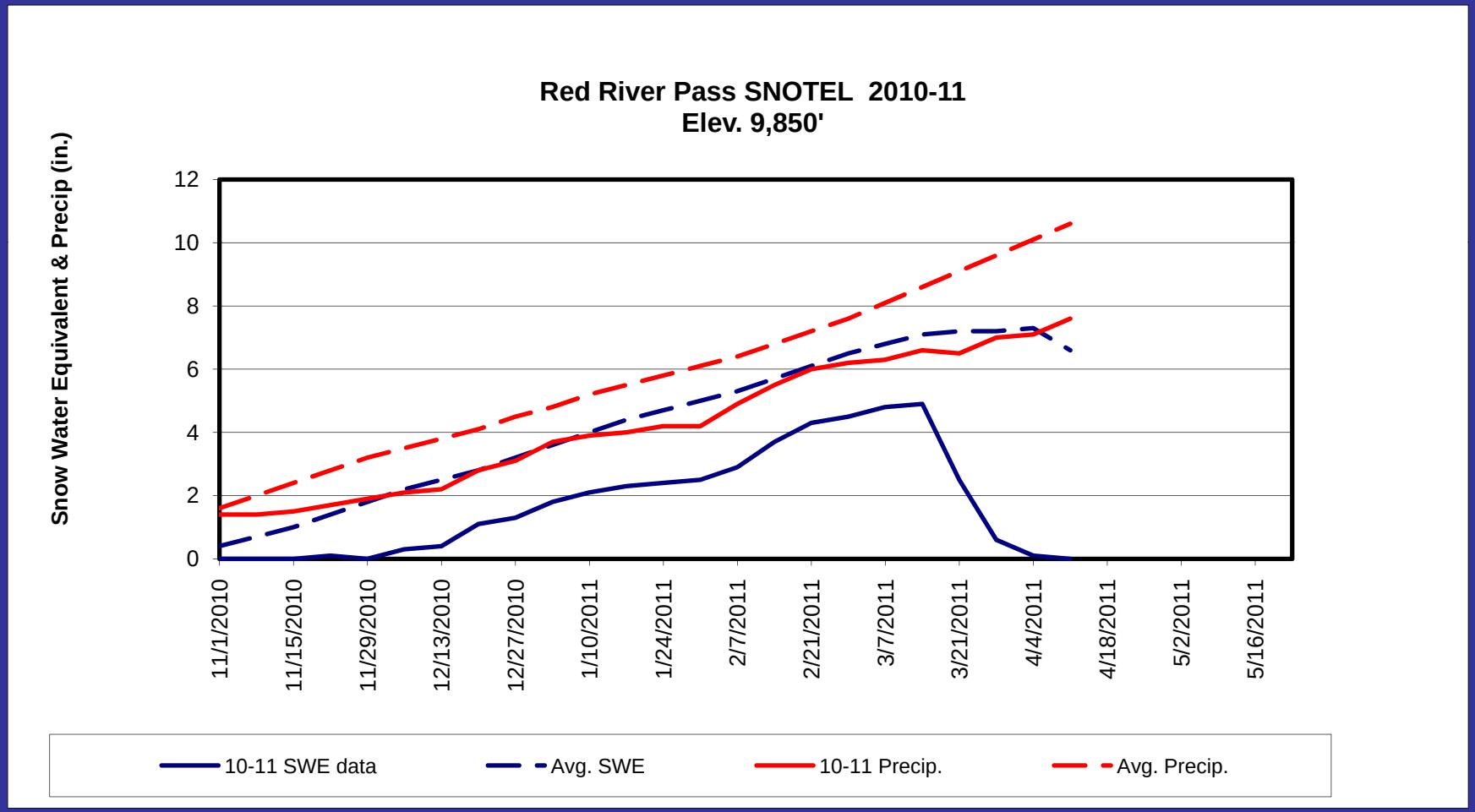
Rio Grande Snow Data



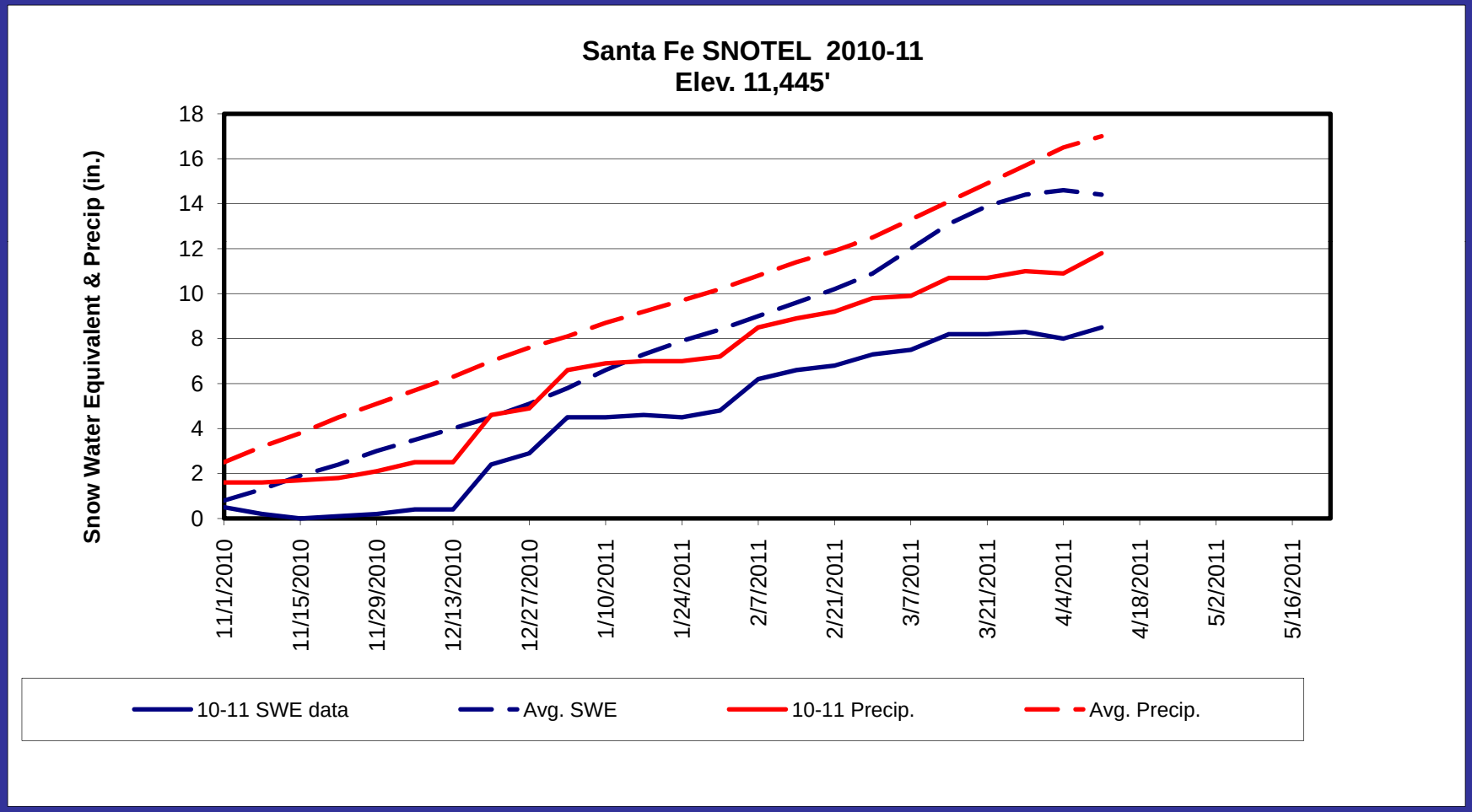
Rio Grande Snow Data

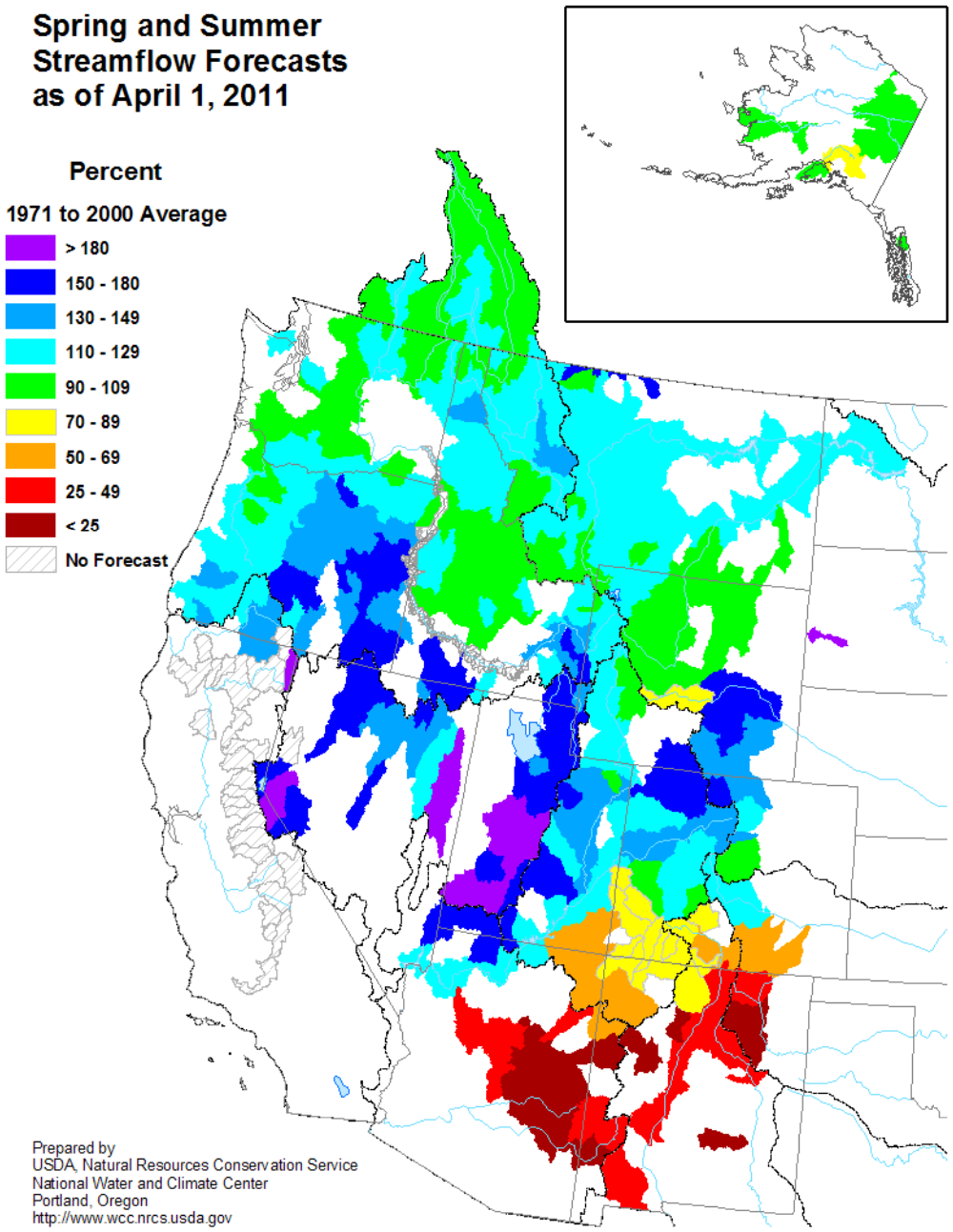


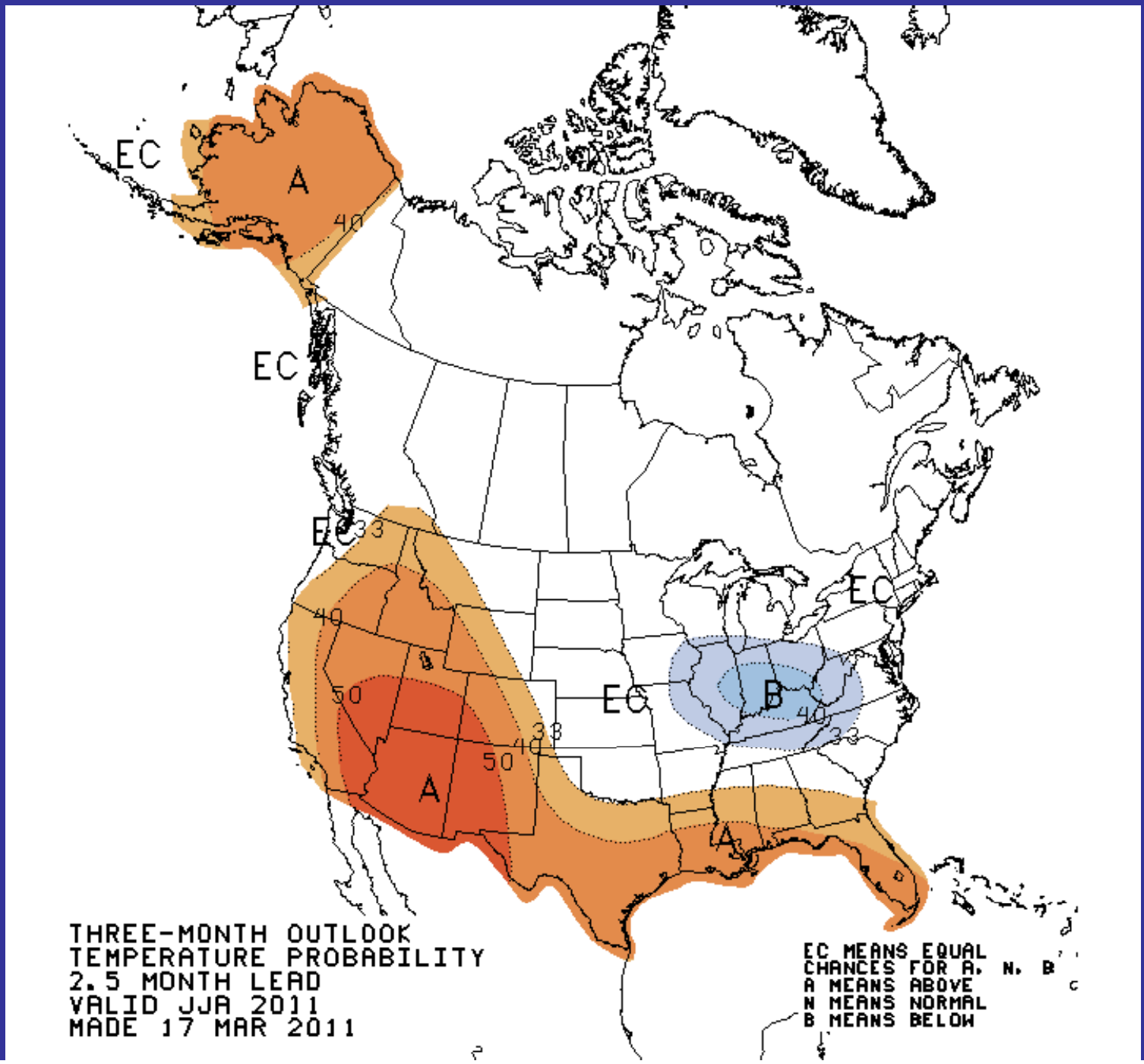
Sangre de Cristo Snow Data

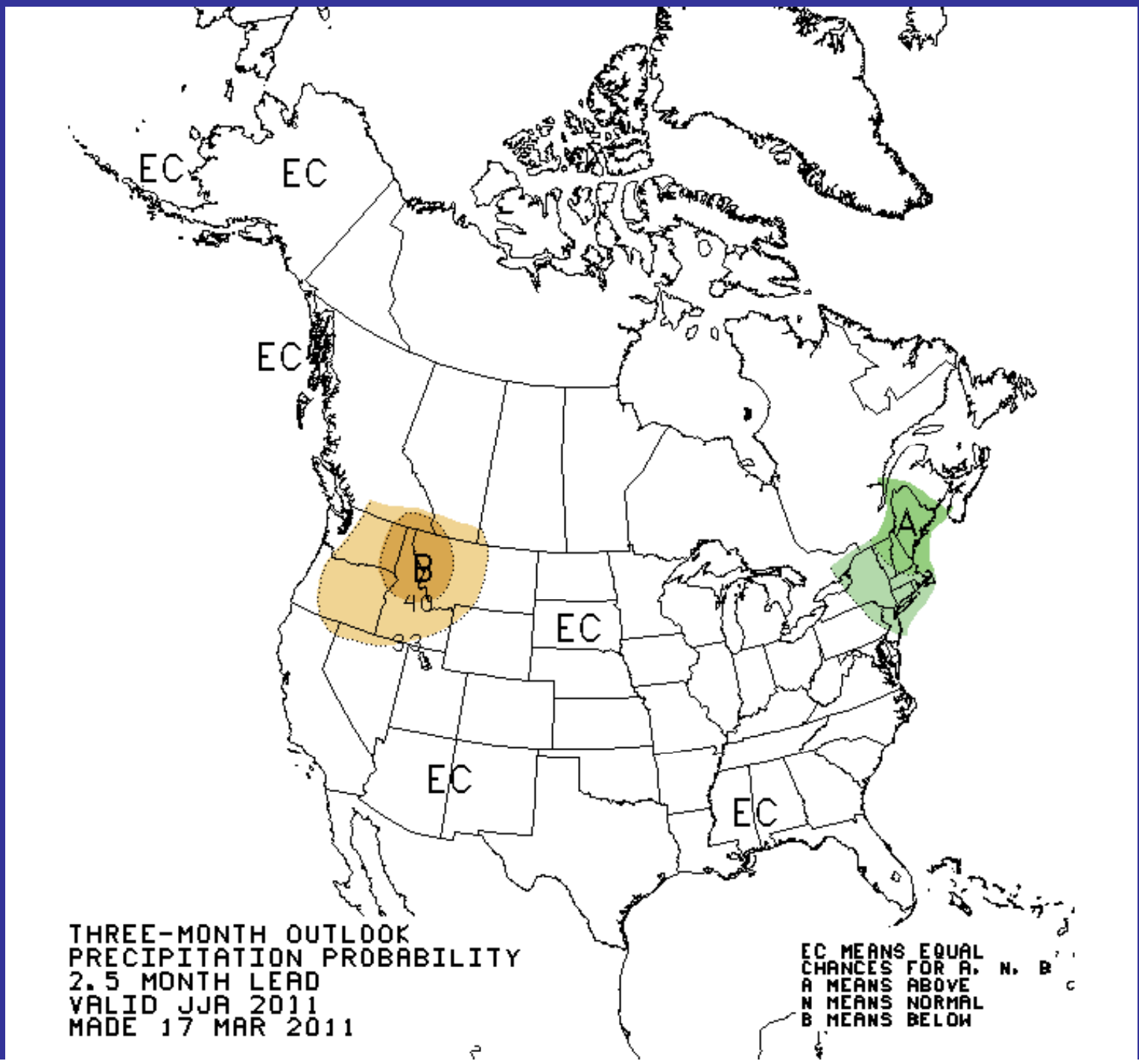


Sangre de Cristo Snow Data



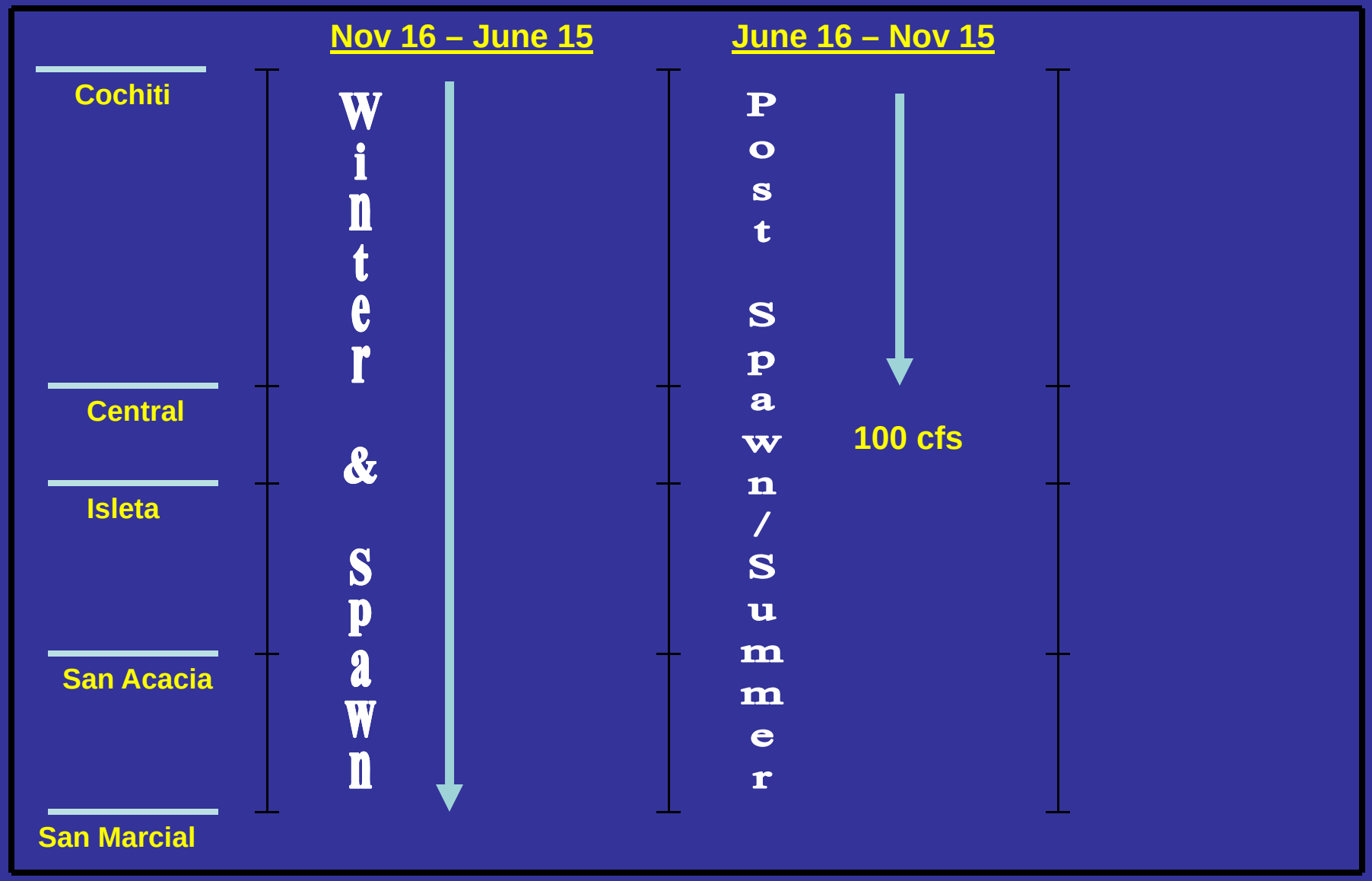

Spring and Summer
Streamflow Forecasts
as of April 1, 2011
Percent
1971 to 2000 Average
> 180
150 - 180
130 - 149
110 - 129
90 - 109
70 - 89
50 - 69
25 - 49
< 25
No Forecast
Prepared by
USDA, Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov


EC
A
40
EC
EC
33
40
50
EC
B
40
33
38
50
10
A
A
THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
2.5 MONTH LEAD
VALID JJA 2011
MADE 17 MAR 2011
EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW


EC
EC
EC
EC
EC
EC
EC
A
B
40
30
THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
2.5 MONTH LEAD
VALID JJA 2011
MADE 17 MAR 2011
EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

2011 Water Operations Modeling

March 2003 BiOp Flow Requirements – Dry Year



Major Assumptions

- April 1 70% 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 & Reclamation
- Storage of water for Prior & Paramount lands

April Forecast Data

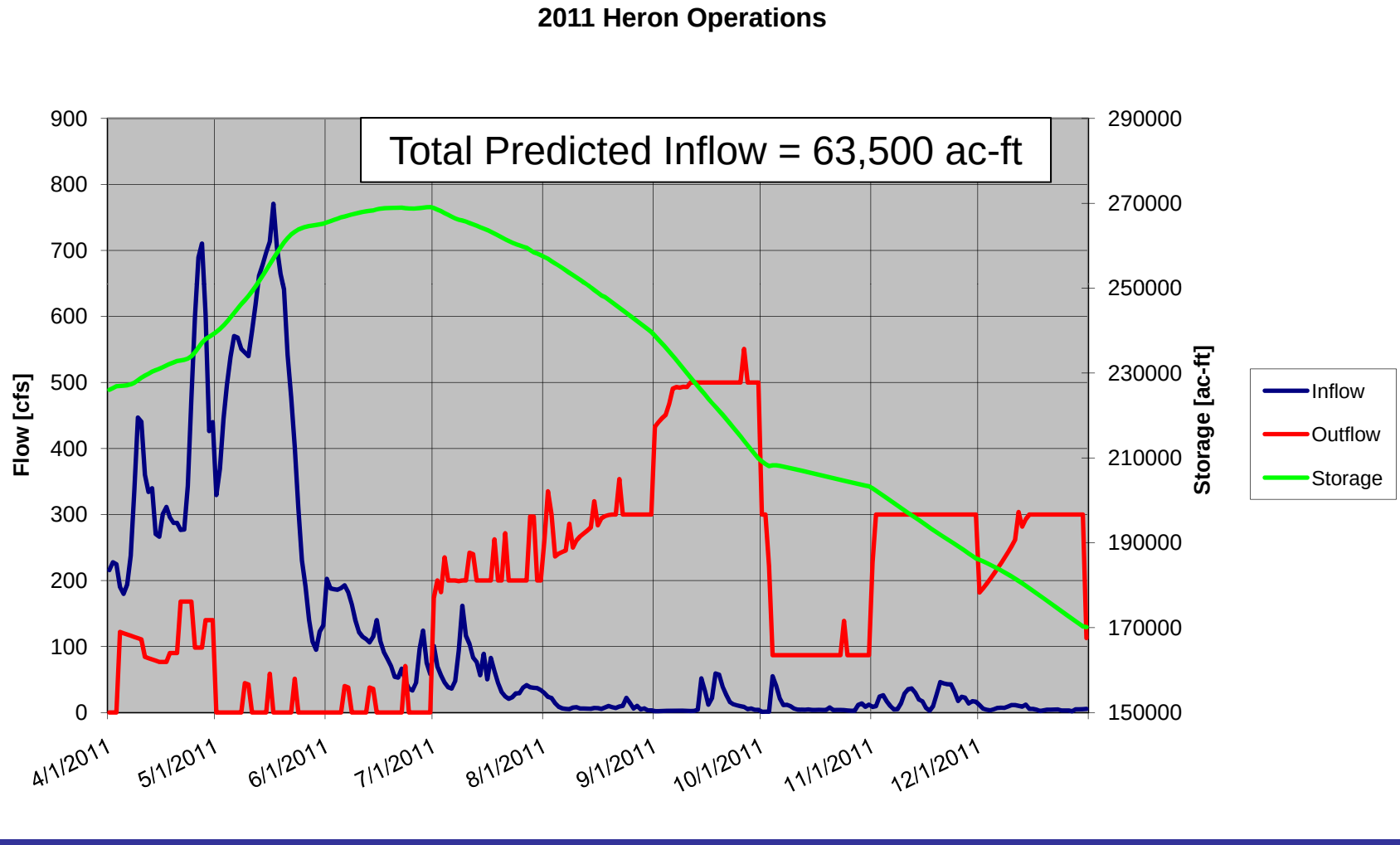
	Most Probable Percent of Average		April 1 70% Probability Volume, ac-ft (% of avg)
	2010	2011	2011
Rio Grande nr Del Norte	94%	73%	340,000 (64%)
El Vado Reservoir Inflow	97%	71%	144,000 (61%)
Rio Grande at Otowi	99%	49%	370,000 (39%)
Santa Fe River nr Santa Fe	133%	26%	800 (17%)
Jemez blw Jemez Dam	102%	18%	5,400 (12%)
Heron Reservoir Inflow	97%	80%	67,000 (54%)

Major Results

- Snowmelt runoff much below normal
- BiOp flow requirements met through out the irrigation season
- Supplemental water releases already began late-March
- Recreational flows provided for the Rio Chama through all of the Summer
- Almost all to all supplemental water exhausted by end of year
- MRGCD season shortened and/or all storage exhausted

Heron Reservoir

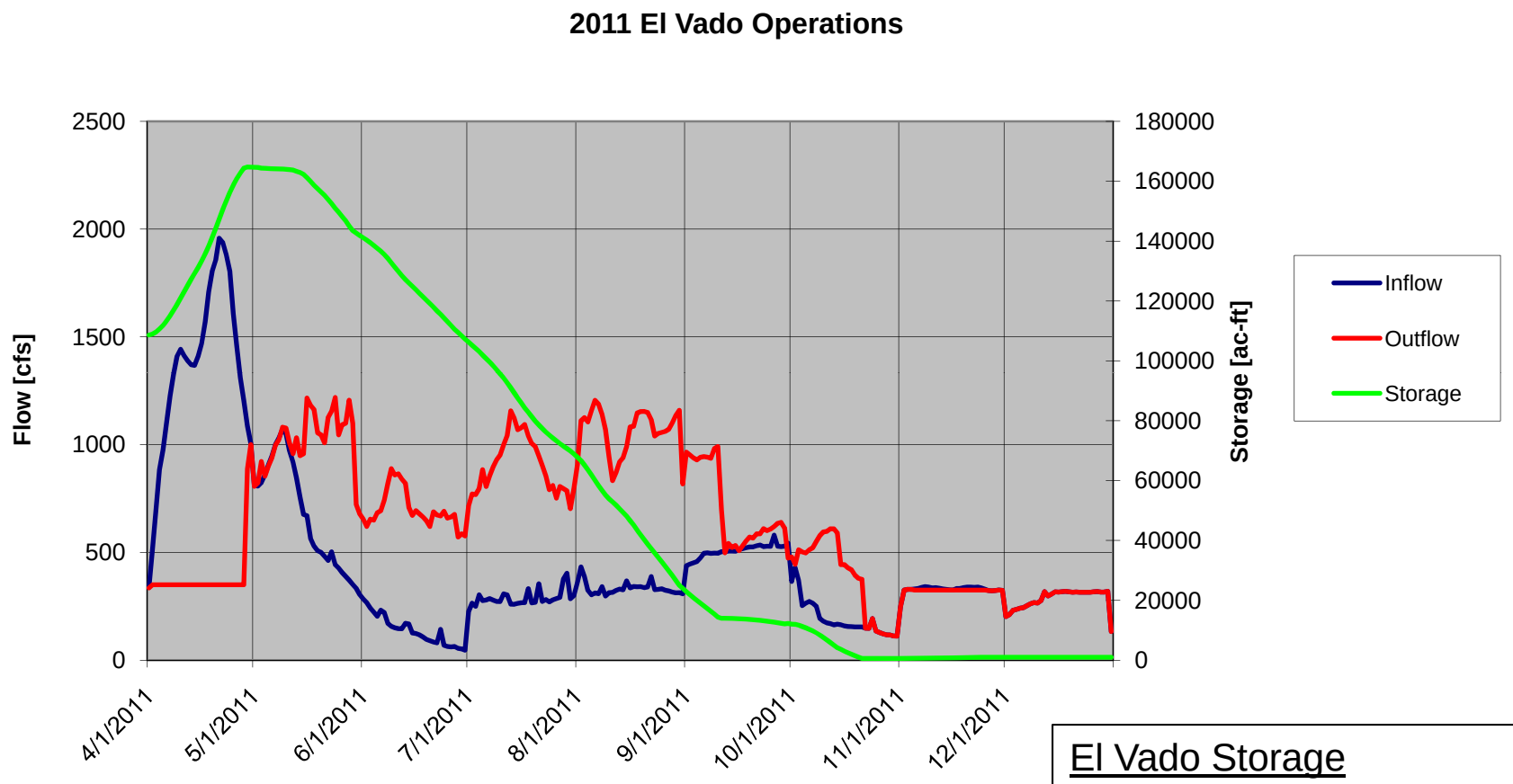
Proposed 2011 Heron Operations



Reservoir will drop 14 feet from beginning of year to end

El Vado Reservoir

Proposed 2011 El Vado Operations



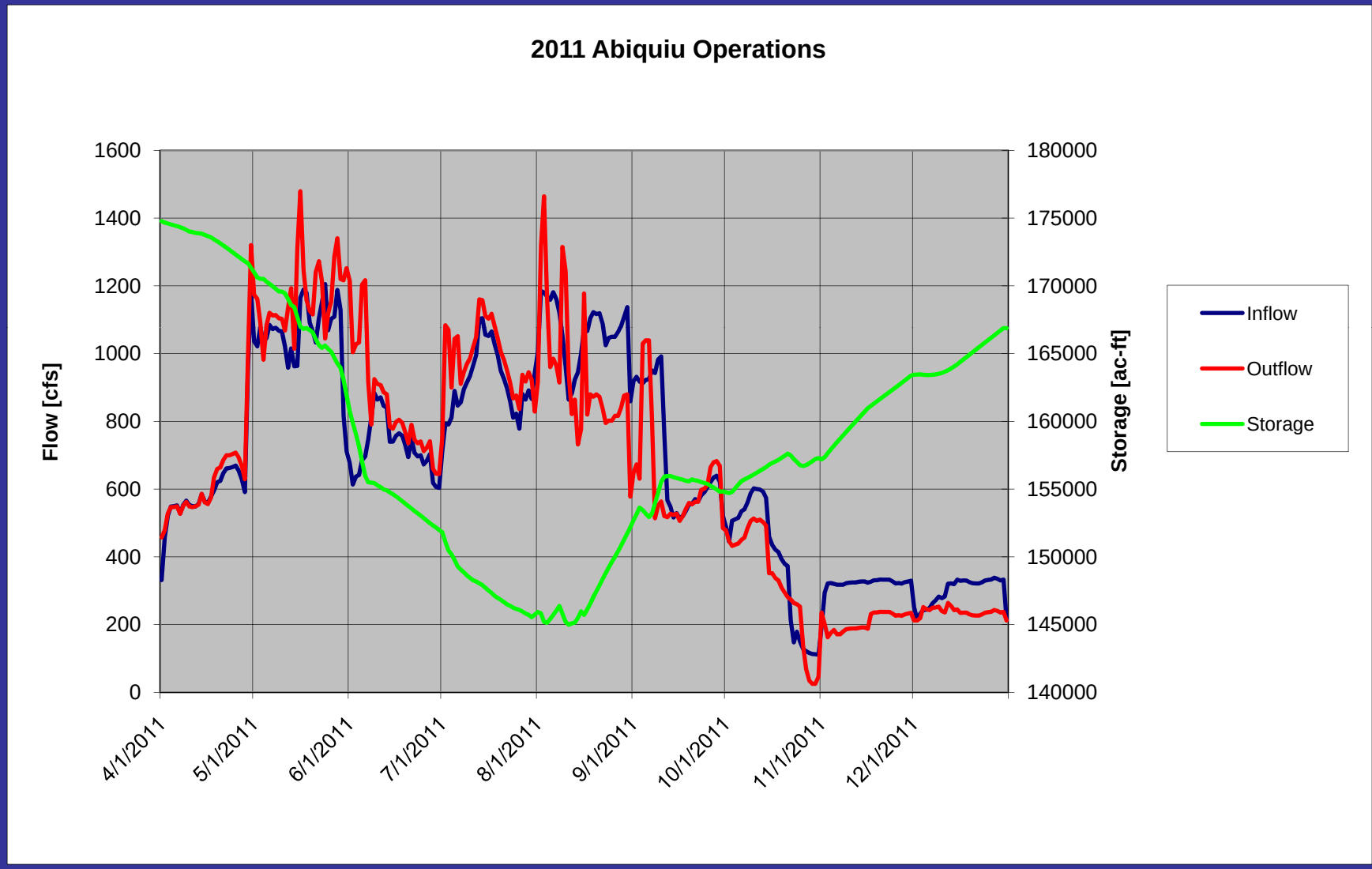
El Vado Storage
P&P – 25,000 ac-ft
EDW, MRGCD – 18,500 ac-ft
EDW, BOR – 12,300 ac-ft

El Vado Reservoir:

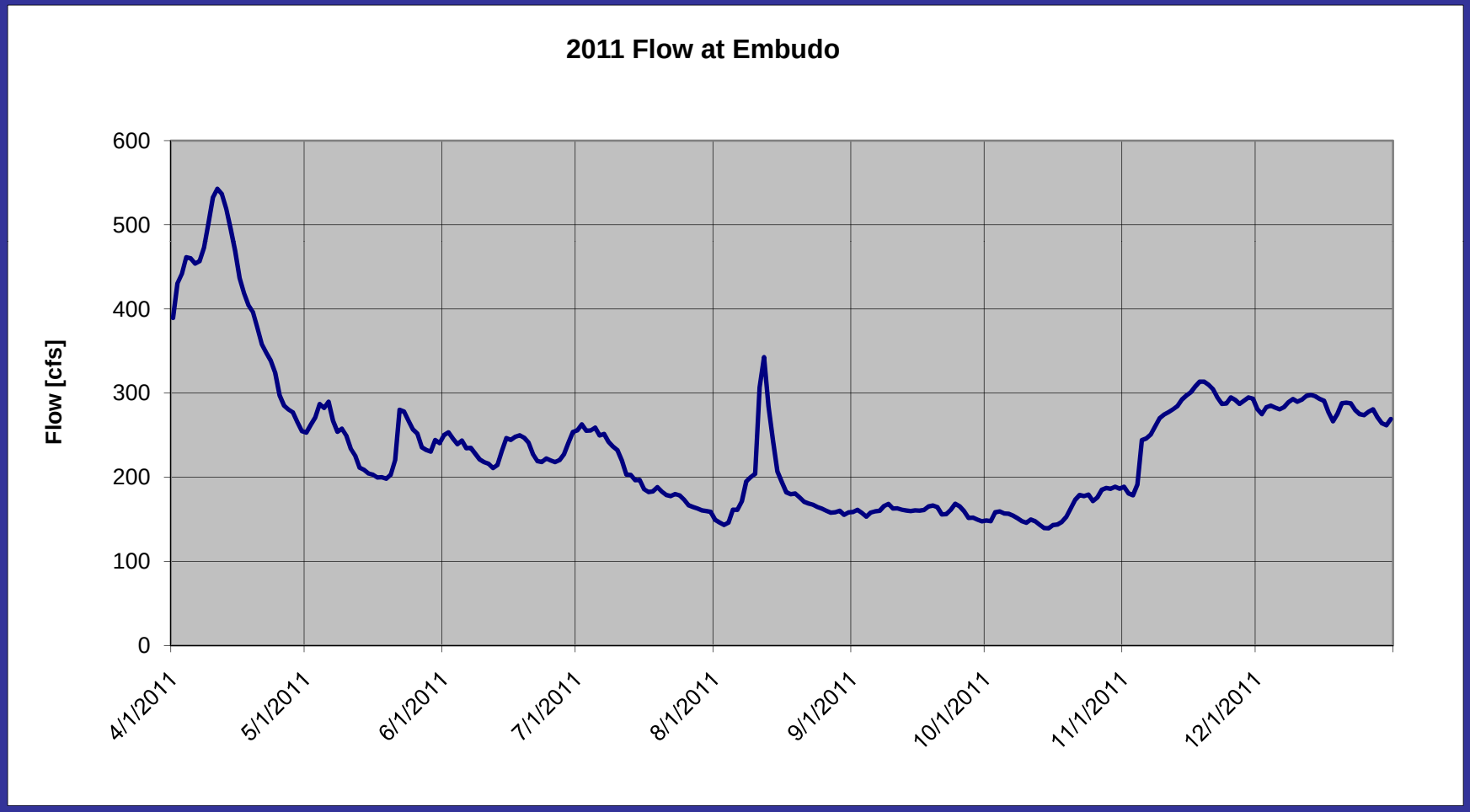
Lake Level: Dropping from a peak at elev. 6893’ to 6779’ by EOY

ABIQUIU LAKE

Proposed 2011 Abiquiu Operations

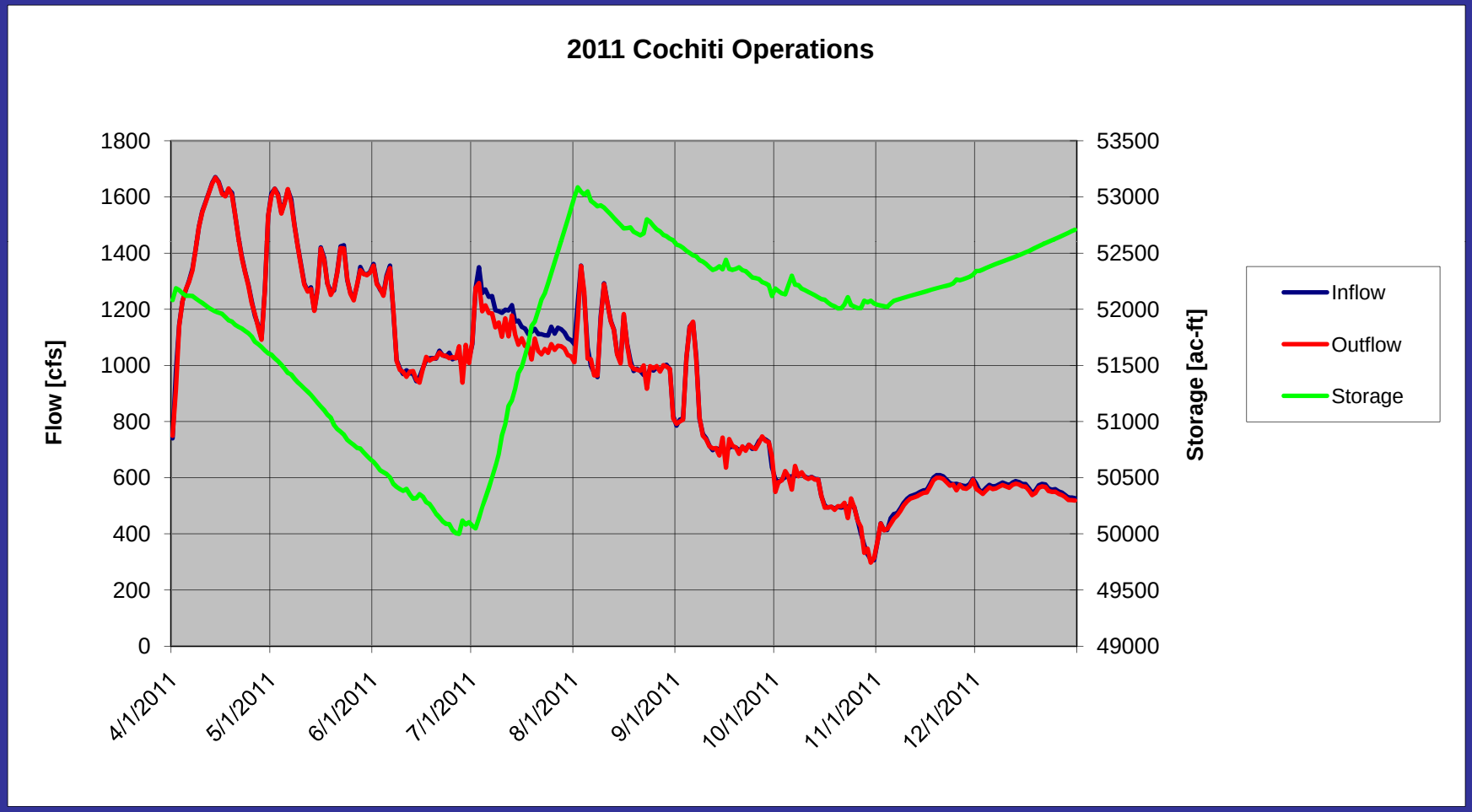


Estimated Hydrograph at Embudo



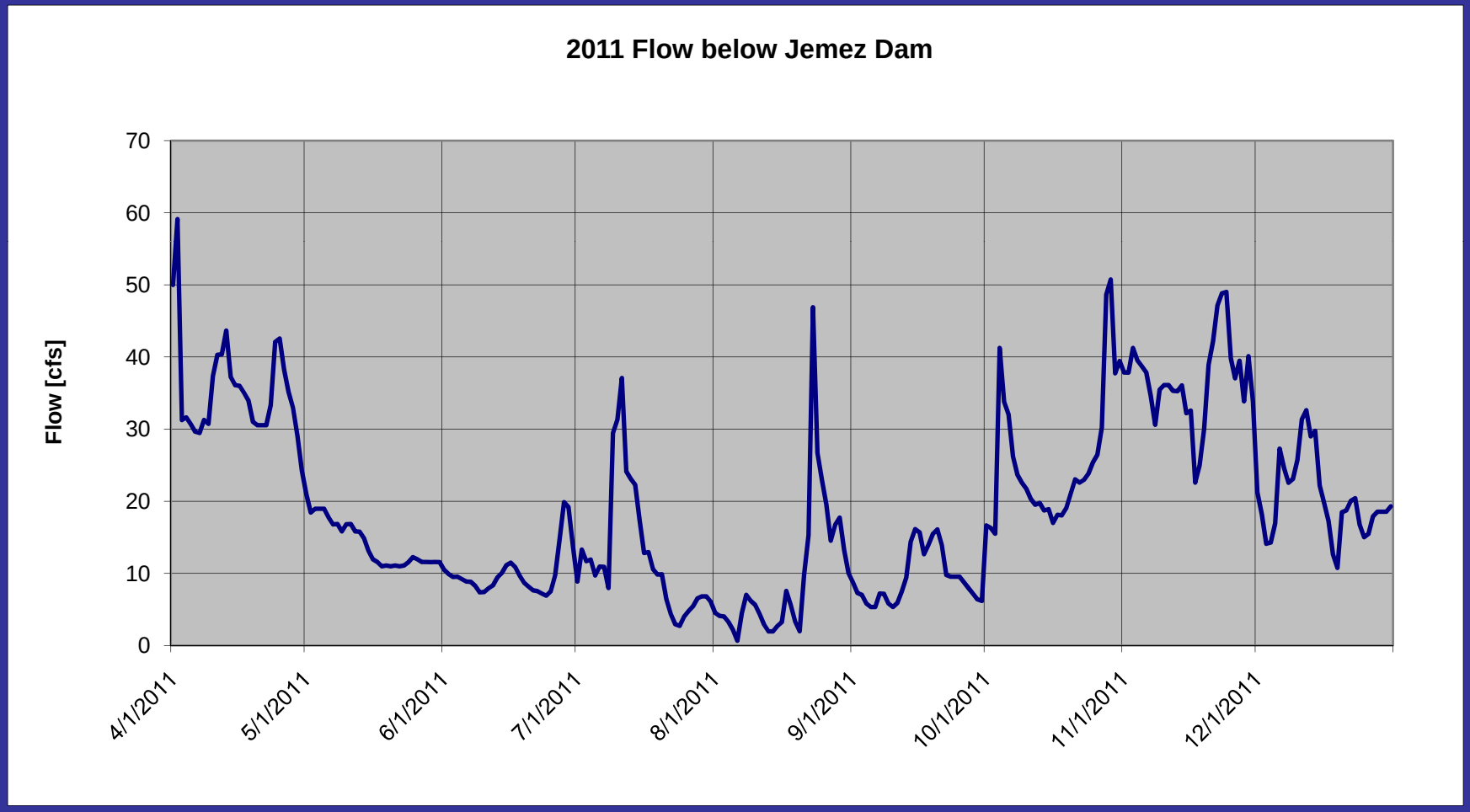

COCHITI LAKE

Proposed 2011 Cochiti Operations

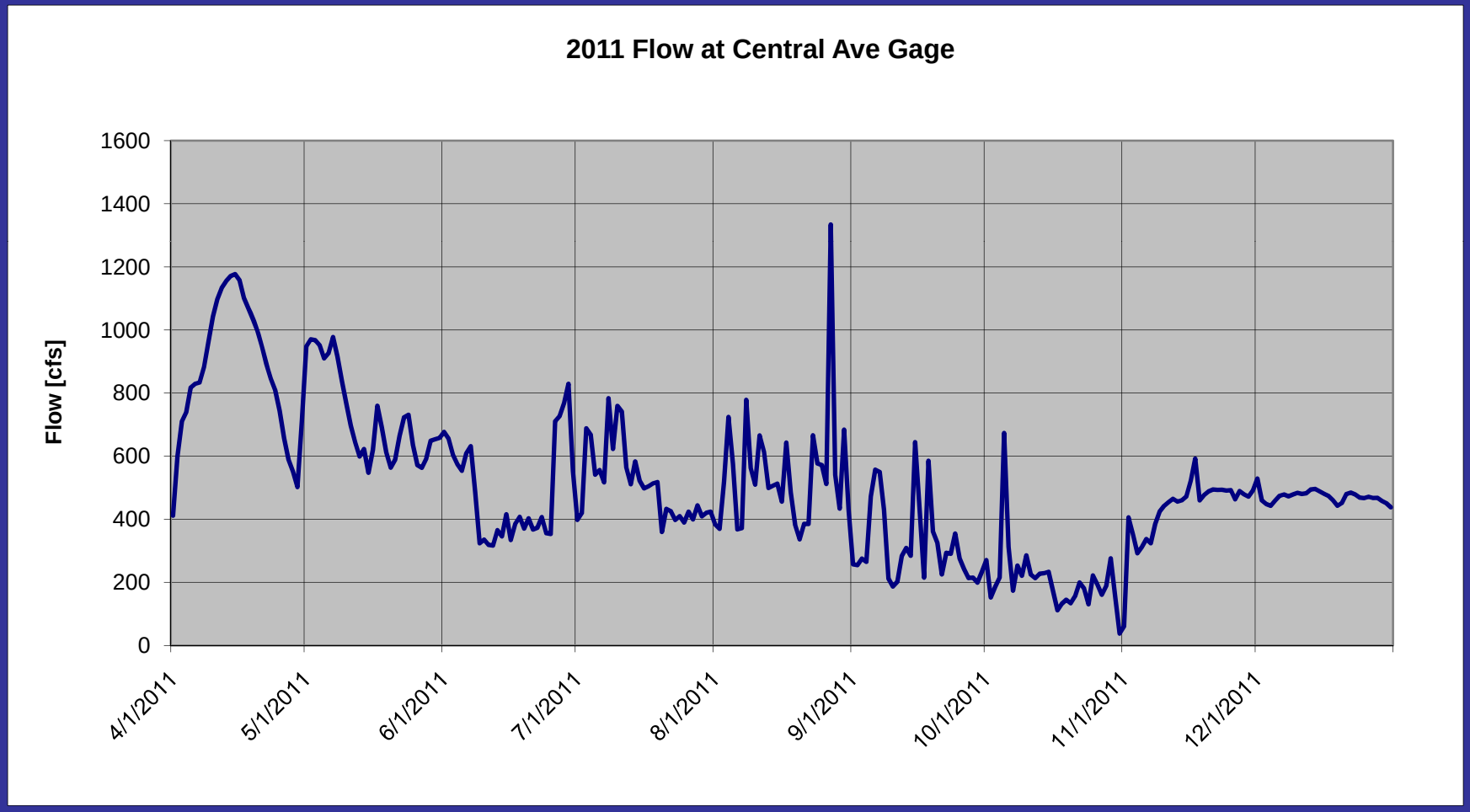


JEMEZ CANYON DAM

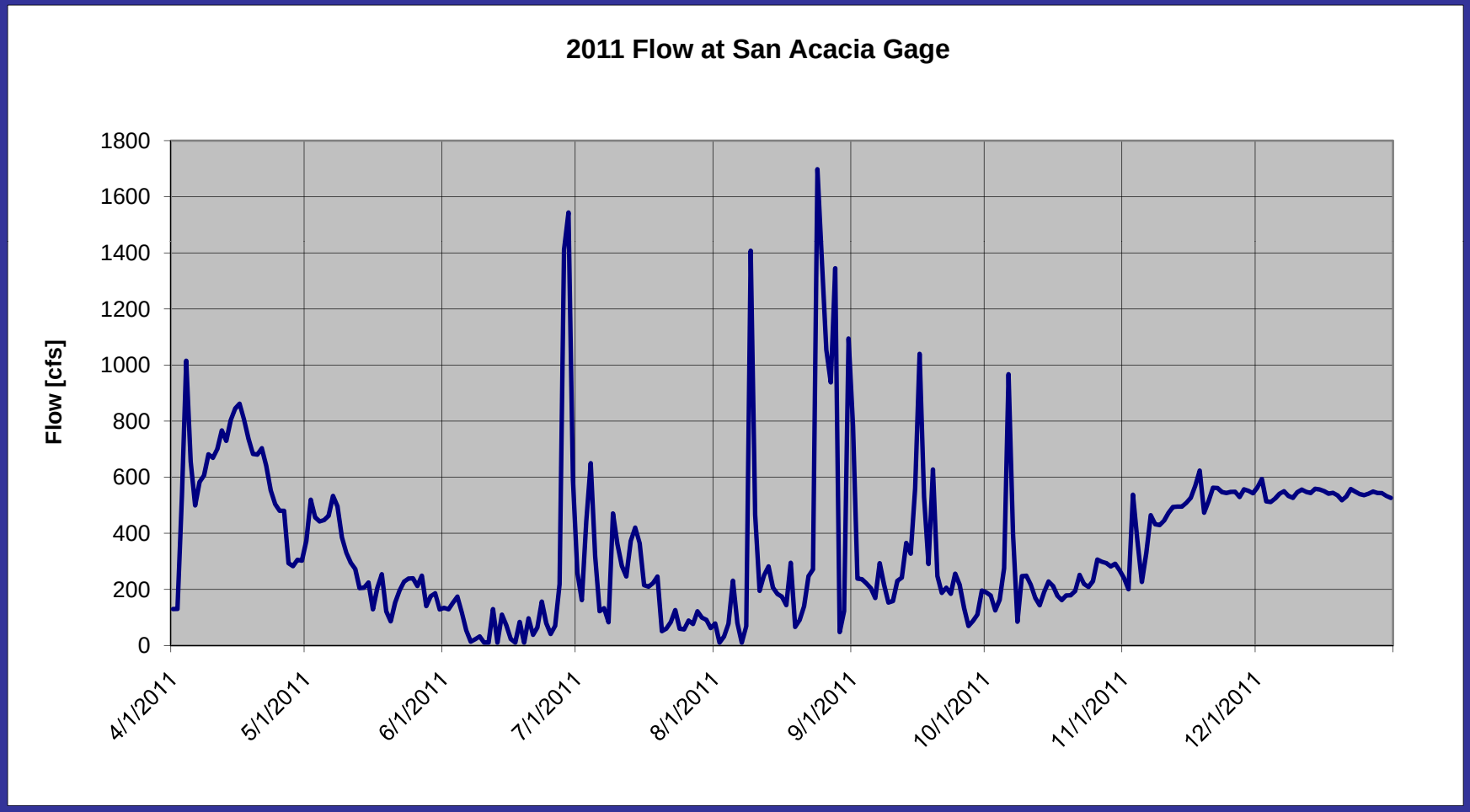
Estimated Hydrograph below Jemez Reservoir



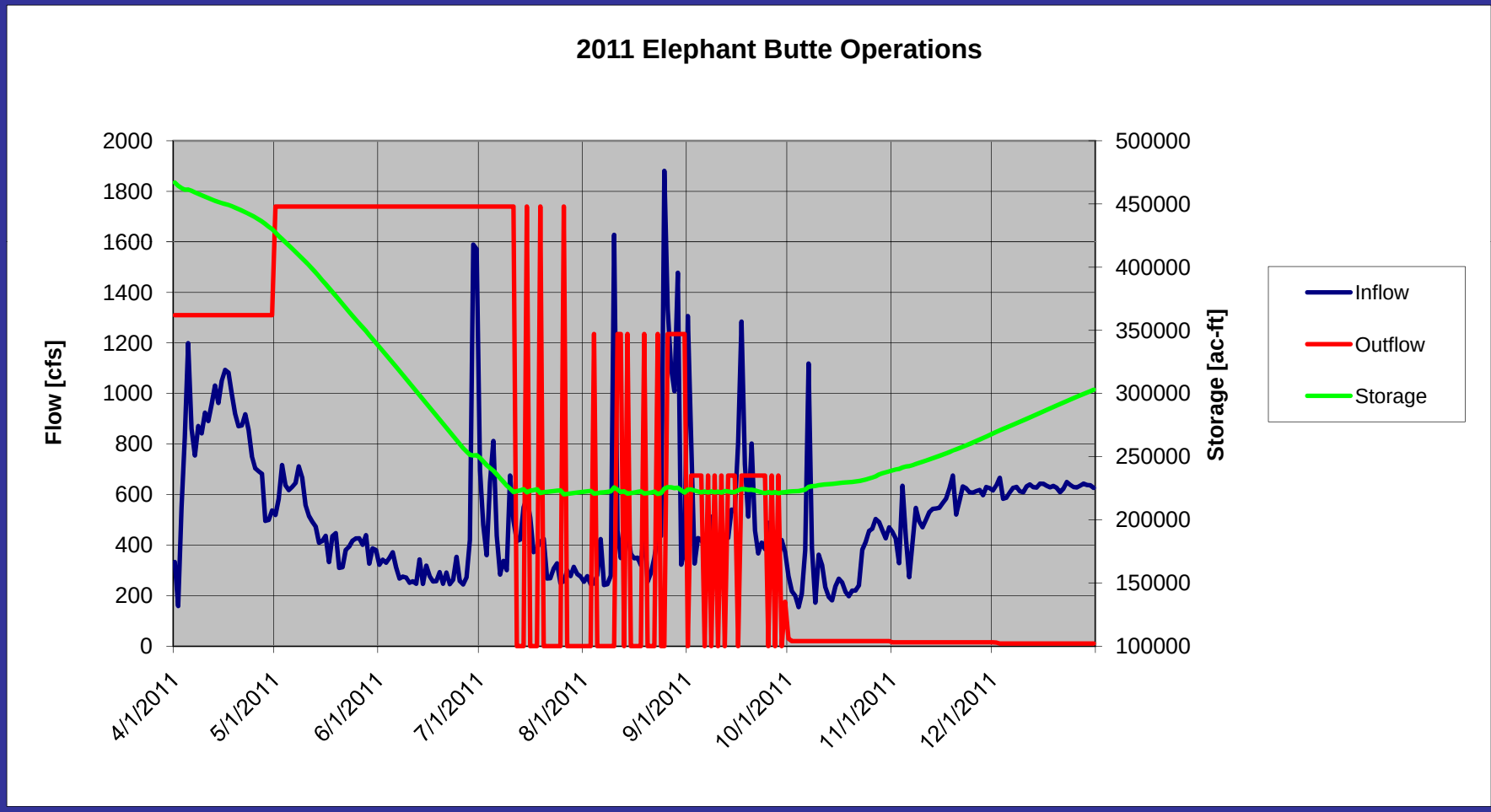
Estimated Hydrograph at Central Ave.



Estimated Flow at San Acacia



Proposed Elephant Butte Operations



Maximum Elevation = 4338’. Minimum Elevation= 4314’