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RECLAMATION



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

2020 Annual Operating Plan April 1 Runoff Forecast

April 16, 2020

Definitions 1.1

- **Native/natural Rio Grande water:** water that comes directly from the Rio Grande Basin
- **San Juan-Chama water:** water imported from San Juan Basin of Colorado River into Rio Grande Basin through San Juan-Chama Project
- **Rio Grande Compact:** agreement between Colorado, New Mexico, and Texas apportioning Rio Grande water between the three states



Definitions 1.2

- **Article VII:** article of the Rio Grande Compact that dictates storage in some reservoirs. If Rio Grande Project storage is less than 400,000 ac-ft in Elephant Butte and Caballo, no storage of Rio Grande water can take place at El Vado except to satisfy P&P needs or as relinquishment credit
- **cfs** – cubic feet per second (flowrate)
- **Acre-foot** – volume of water needed to cover one acre to depth of one foot de
- **Hydrograph** – graph of flowrate over time
- **The District** – Middle Rio Grande Conservancy District (MRGCD)



Definitions 1.3

- The City/Water Authority – Albuquerque Bernalillo County Water Utility Authority (ABCWUA)
- NRCS – Natural Resources Conservation Service
- Supplemental water – water leased by Reclamation to augment flows in support of Rio Grande Silvery Minnow as outlined in 2016 Biological Opinion
- P&P – Prior & Paramount lands of the six Middle Rio Grande Pueblos

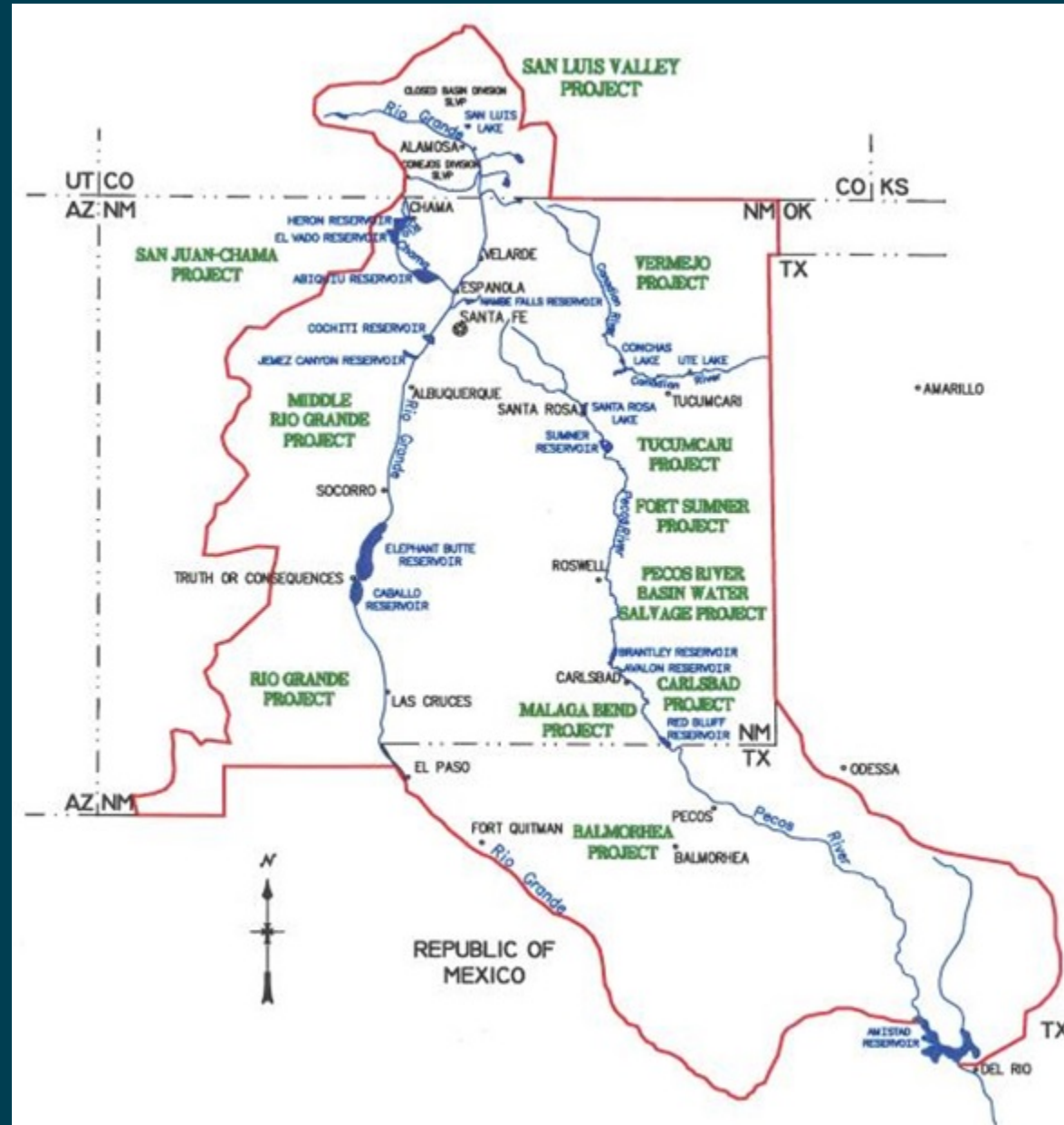


Definitions 1.4

- EBID – Elephant Butte Irrigation District
- EP1 – El Paso County Water Improvement District No. 1
- HCCRD – Hudspeth County Conservation & Reclamation District
- IBWC – International Boundary and Water Commission, US Section
- 1906 Convention – Convention between the United States and Mexico, signed May 21, 1906
- OA – 2008 Operating Agreement for the Rio Grande Project, between EBID, EP1, Reclamation



Map of Reclamation's Albuquerque Area Office Projects

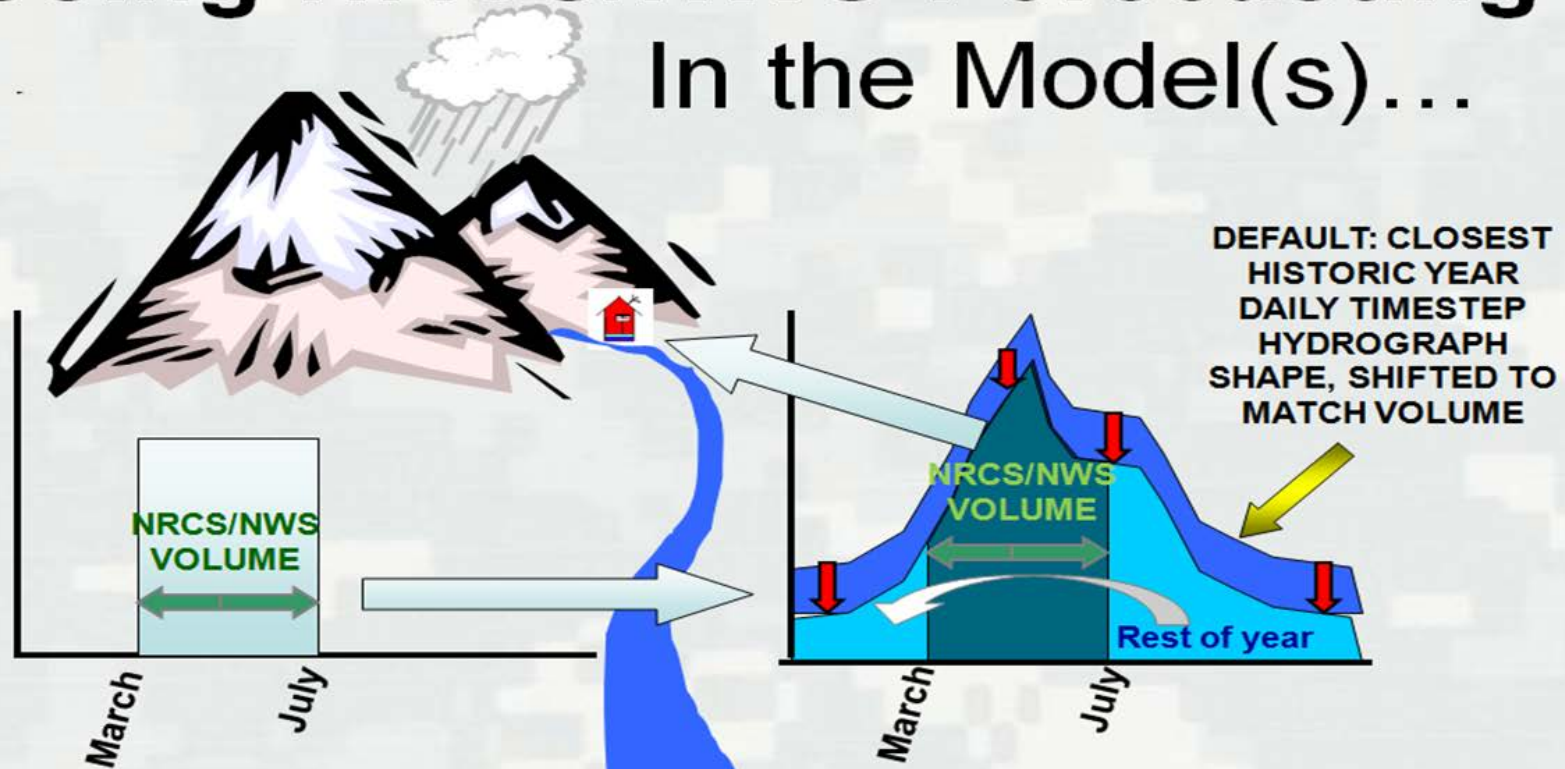


What Drives the Process

- Volume forecast from 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



Using NRCS/NWS Forecasting In the Model(s)...



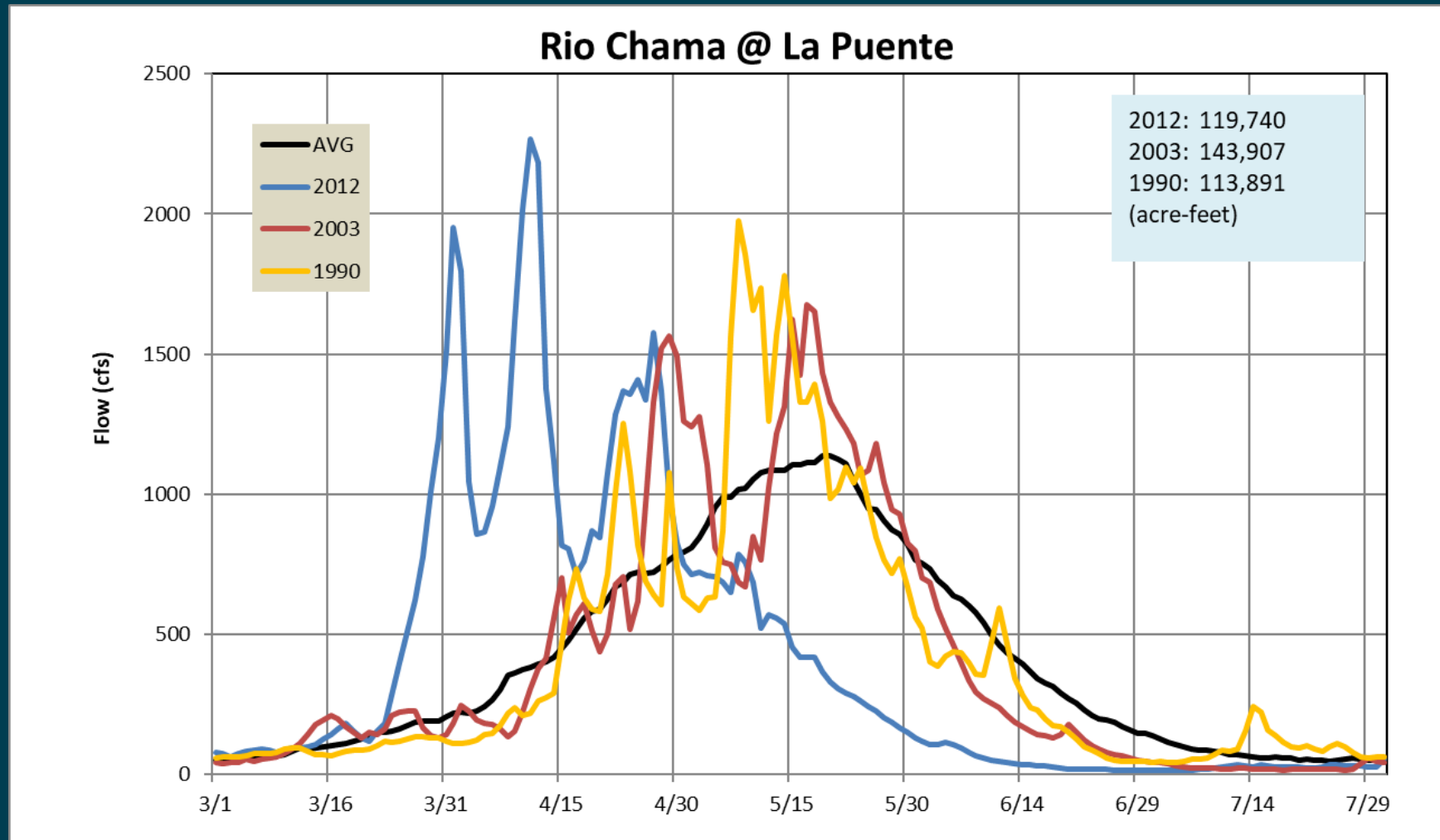
NRCS/NWS



BUILDING STRONG®



Similar Year Hydrographs



Reservoirs by Agency and Water Source



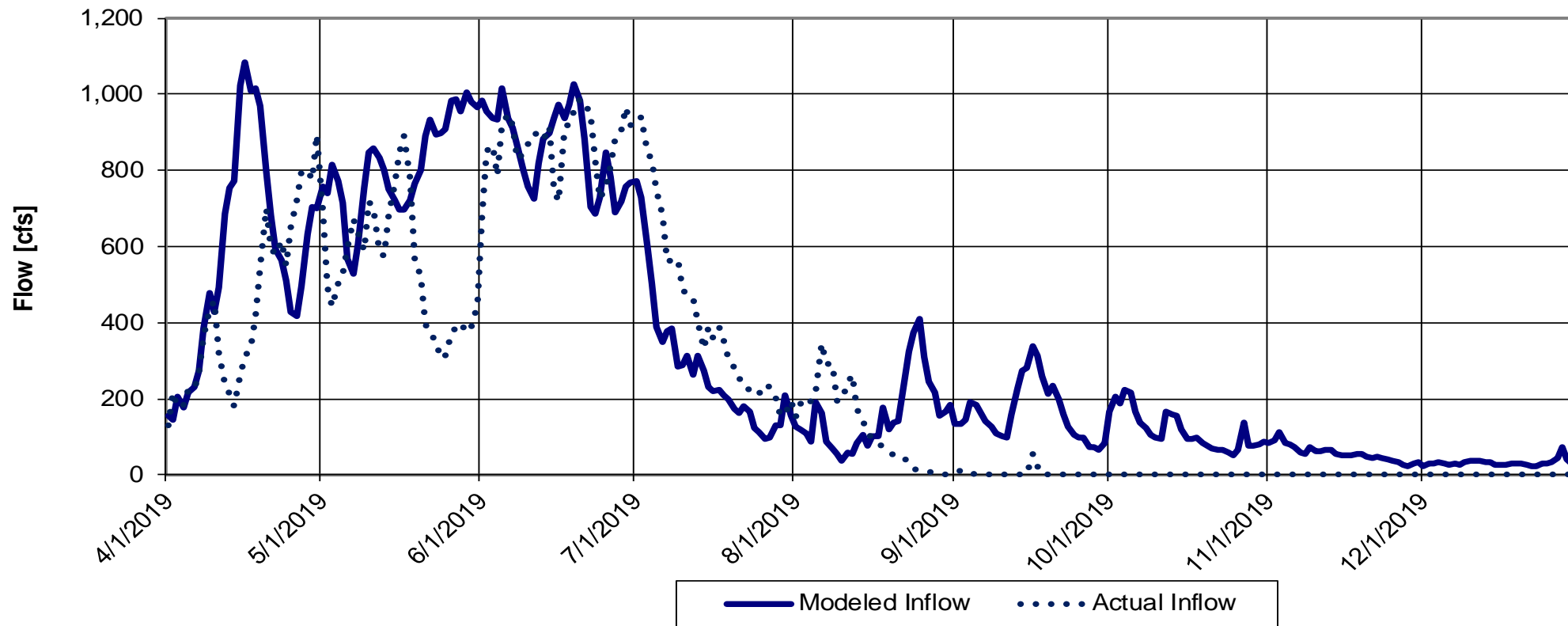
<u>Operated By:</u>	Reclamation	Corps	Water Supply	Recreation	Flood Control	Sediment Control
<u>Dams:</u>						
HERON						
EL VADO						
ABIQUIU						
NAMBE FALLS						
GALISTEO						
COCHITI						
JEMEZ CANYON						
ELEPHANT BUTTE						
CABALLO						



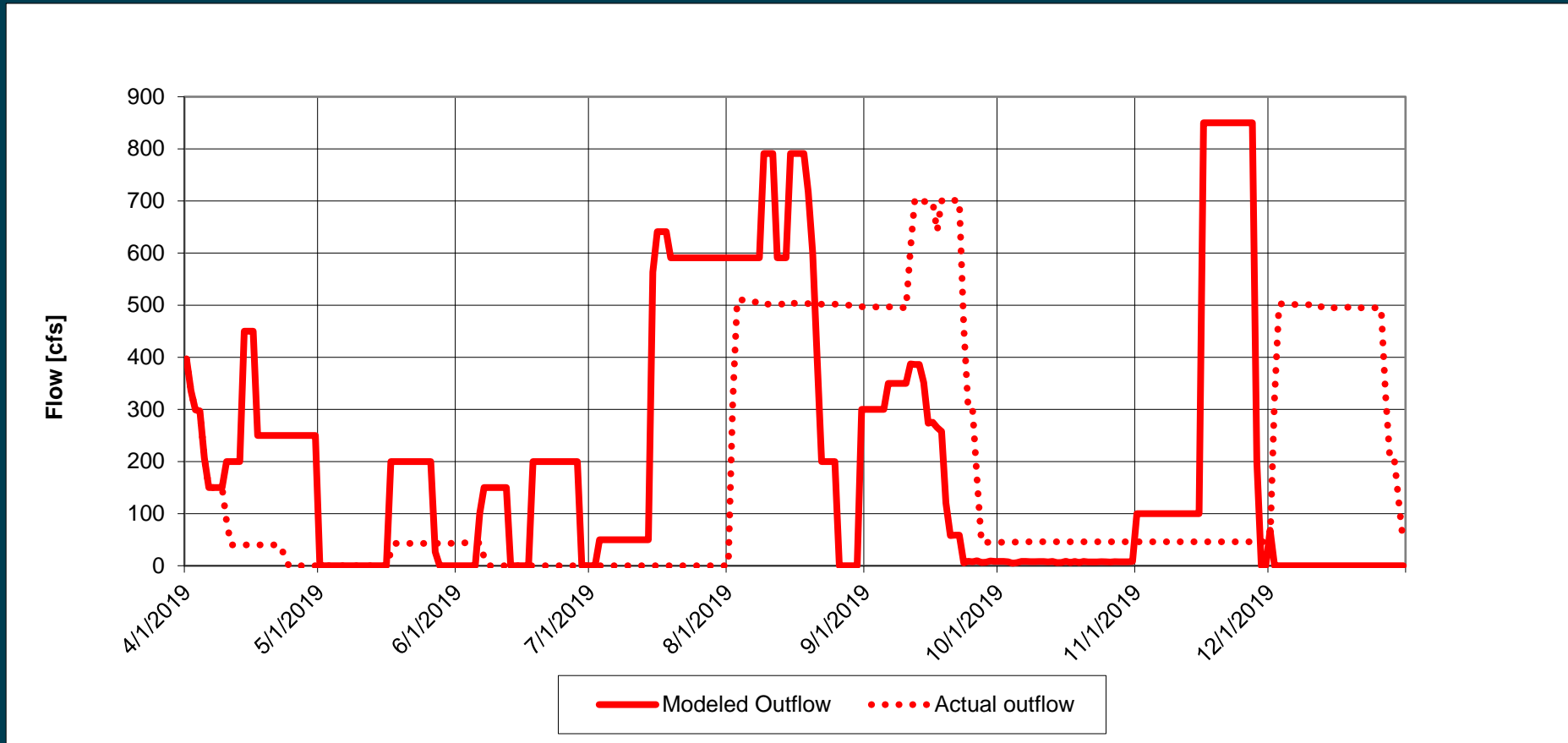
2019: The Year in Review



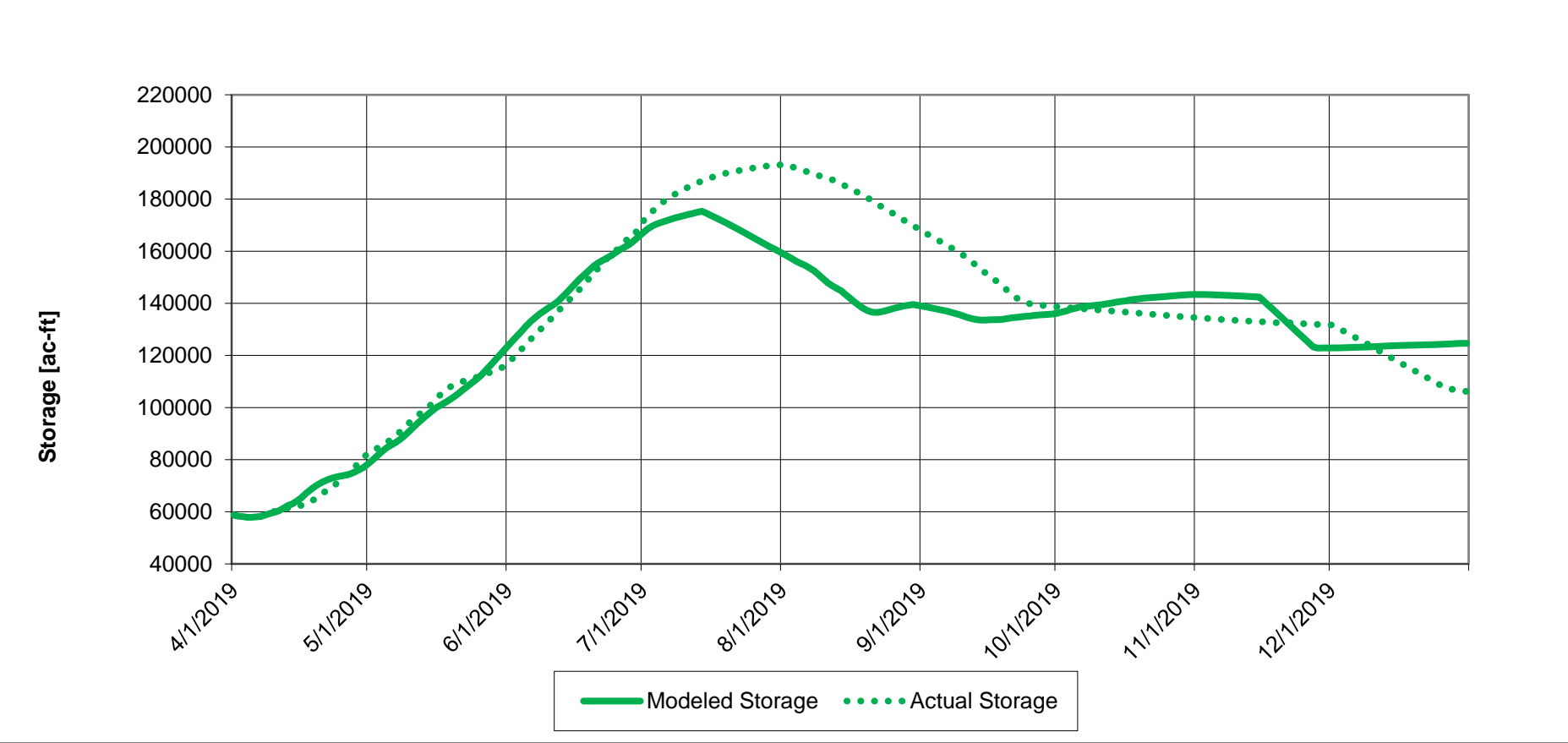
Heron Reservoir Inflow



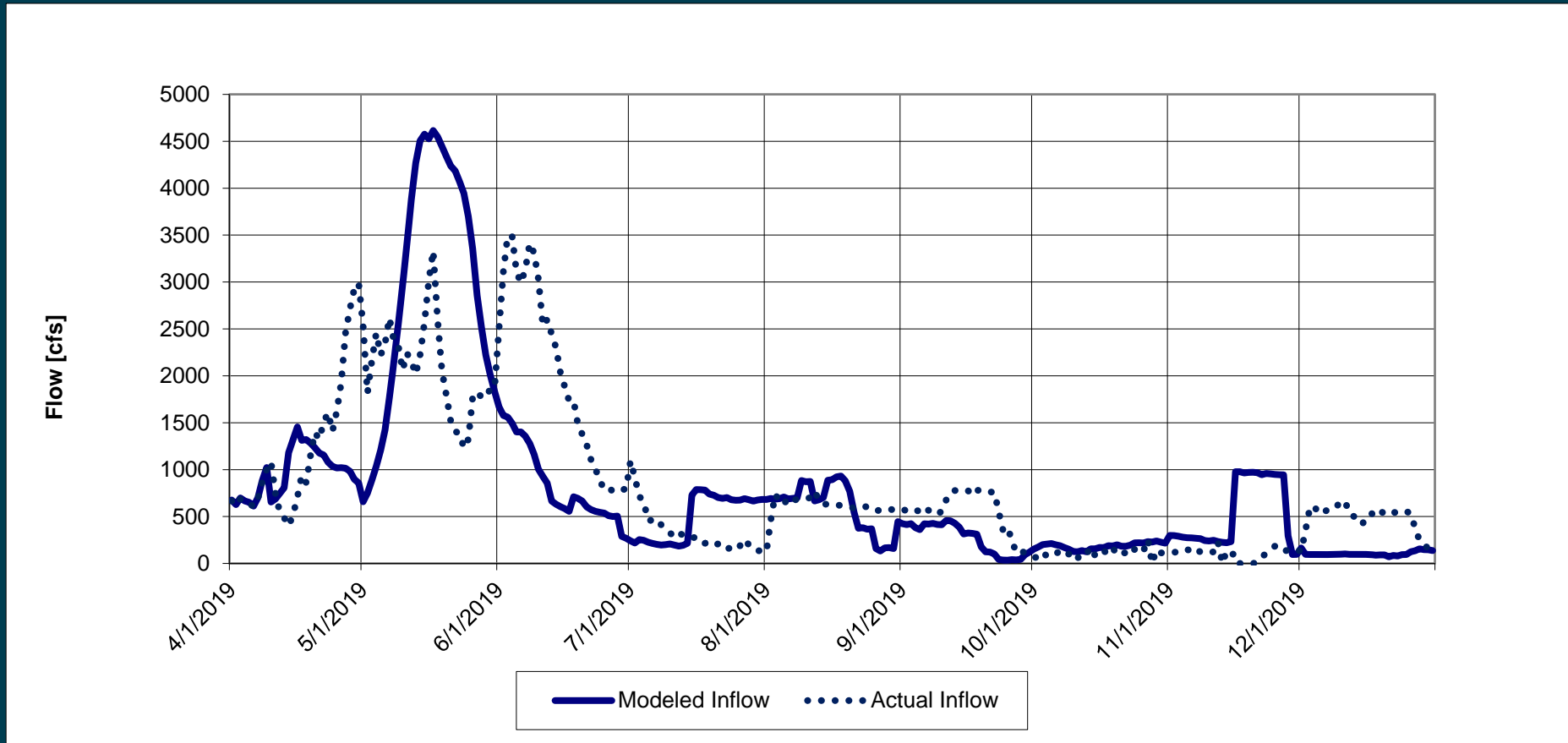
Heron Reservoir Outflow



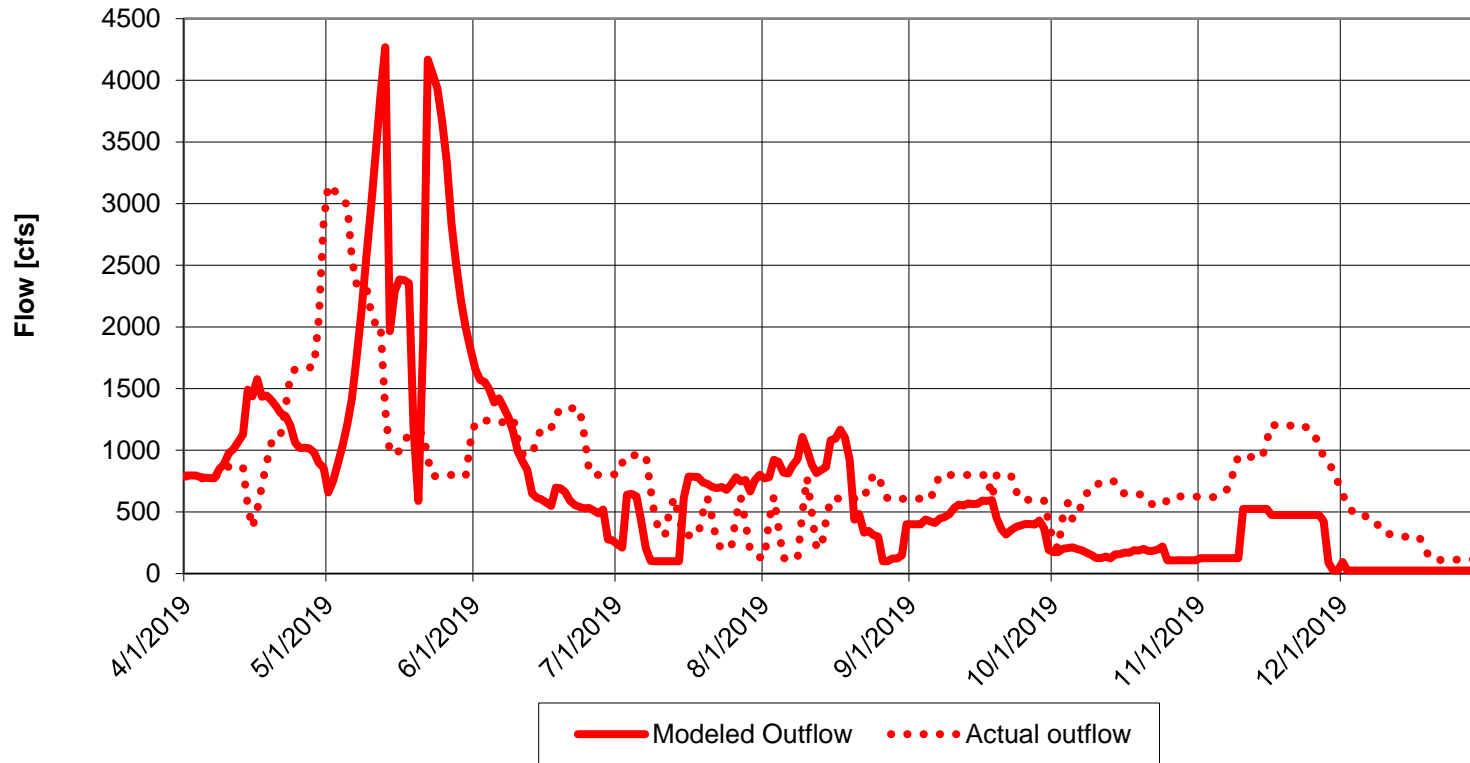
Heron Reservoir Storage



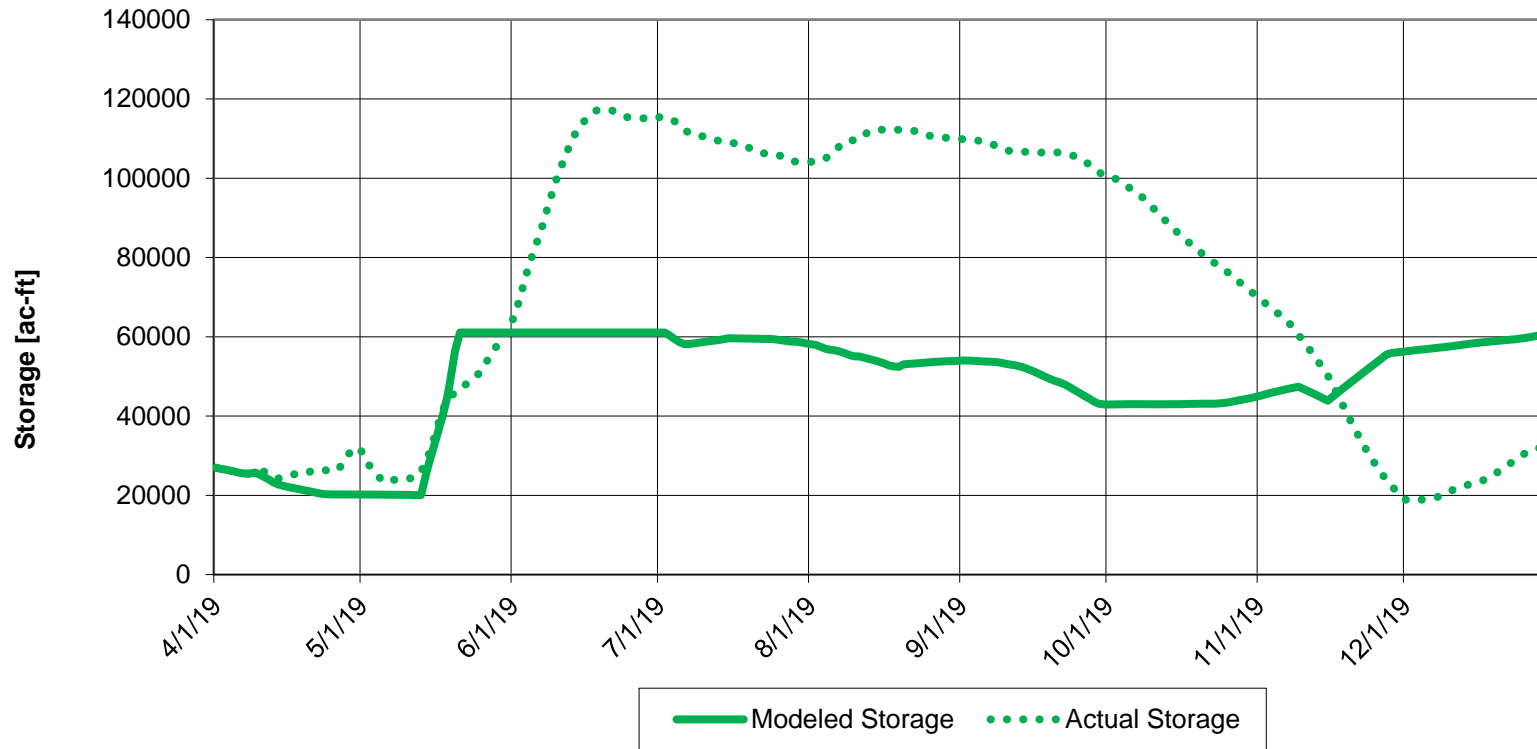
El Vado Reservoir Inflow



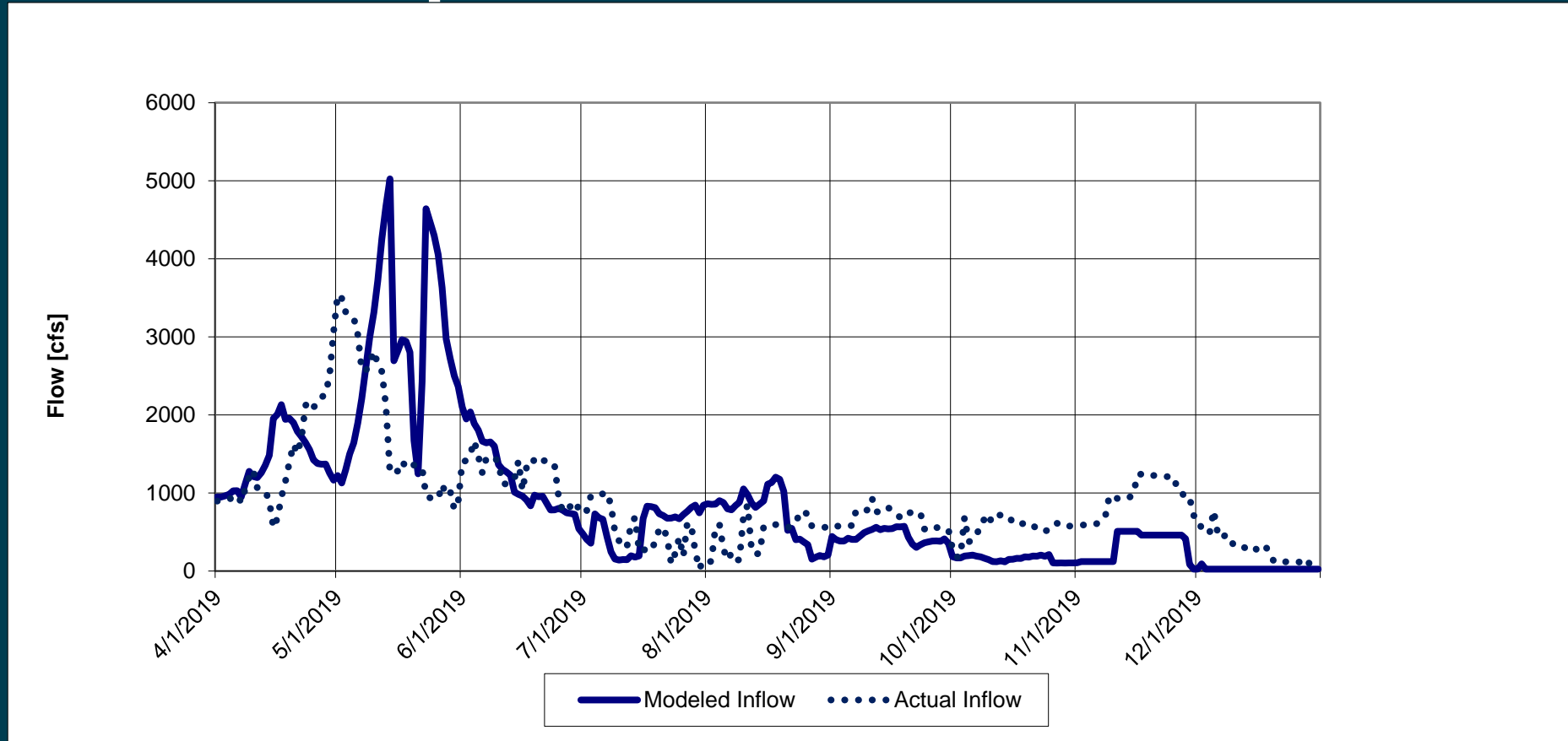
El Vado Reservoir Outflow



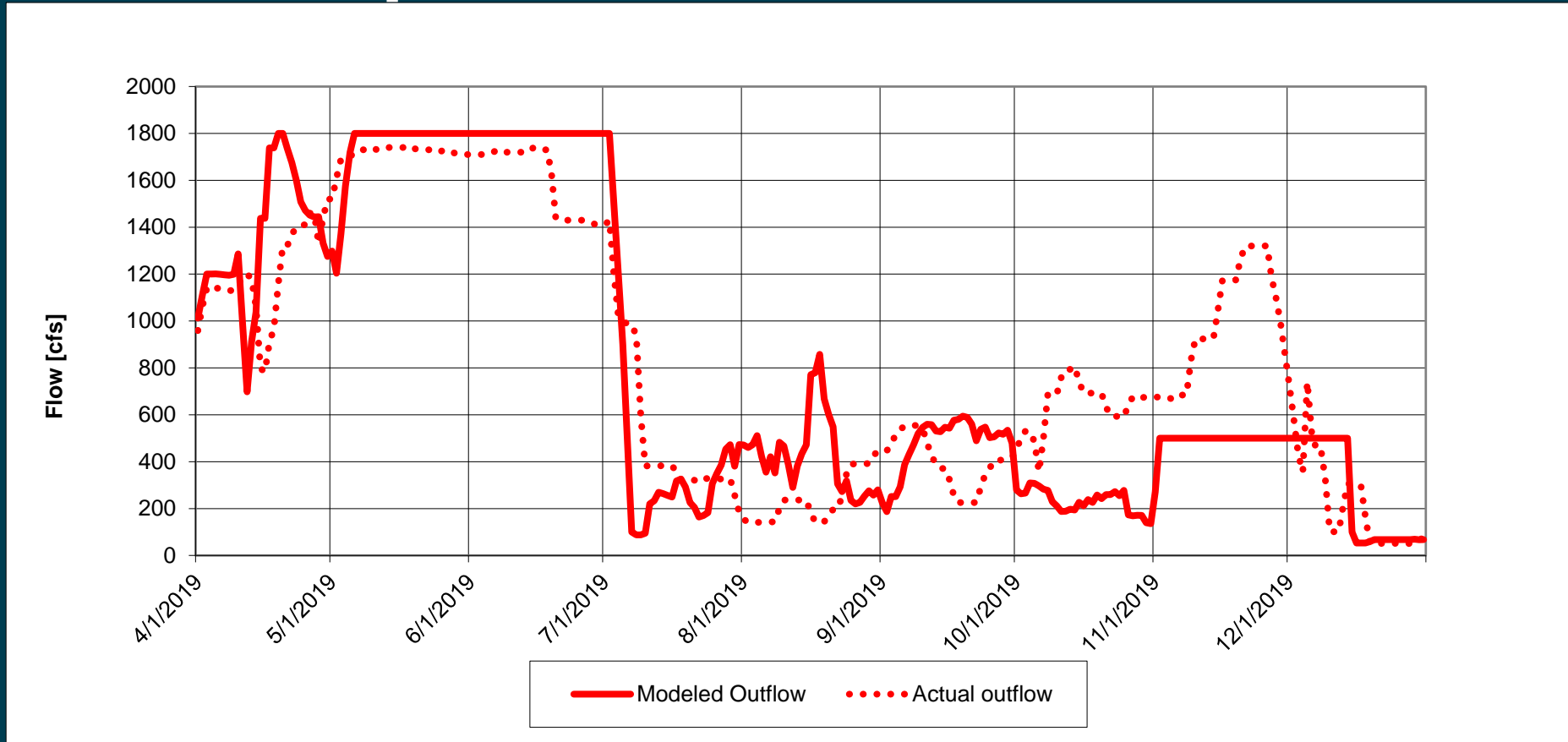
El Vado Reservoir Storage



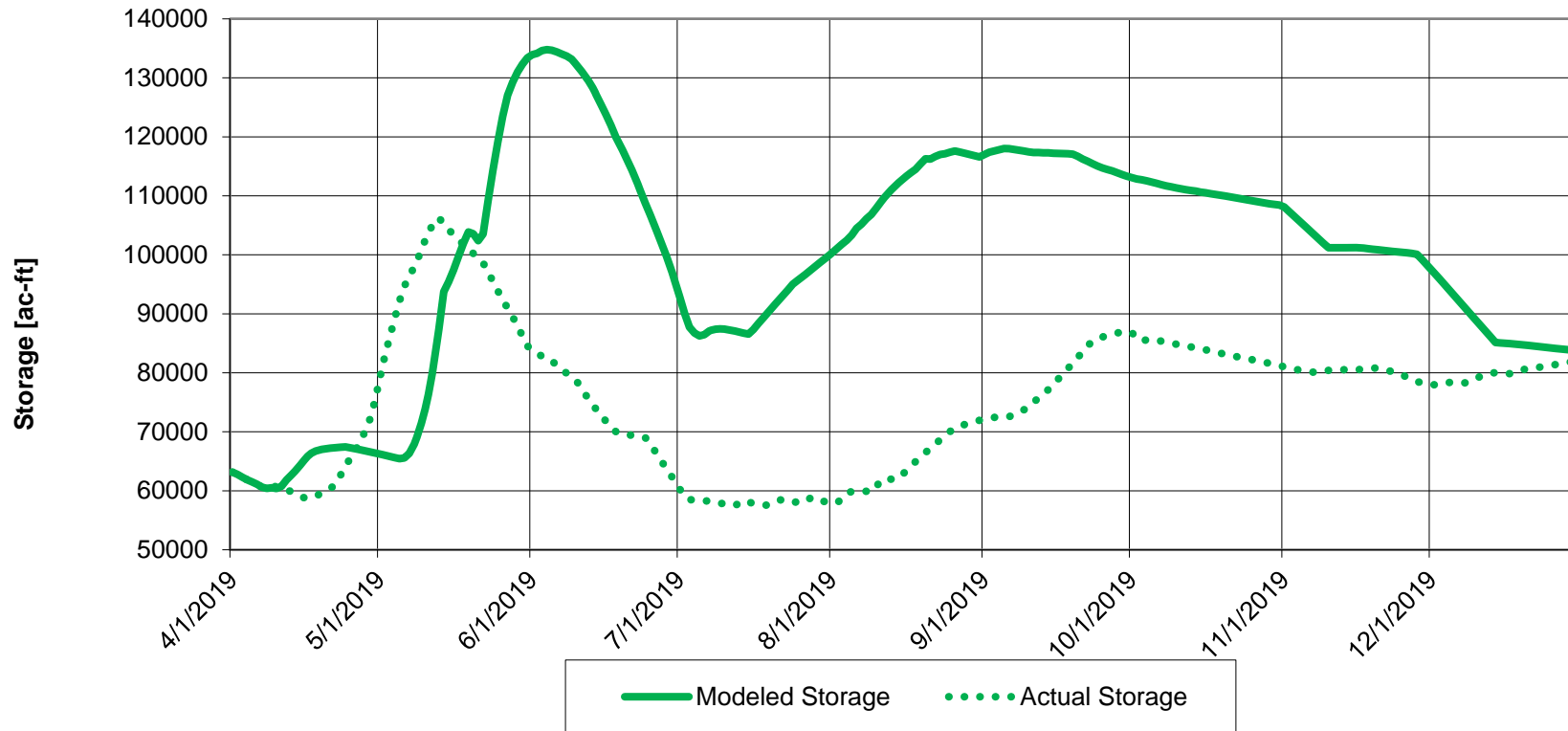
Abiquiu Reservoir Inflow



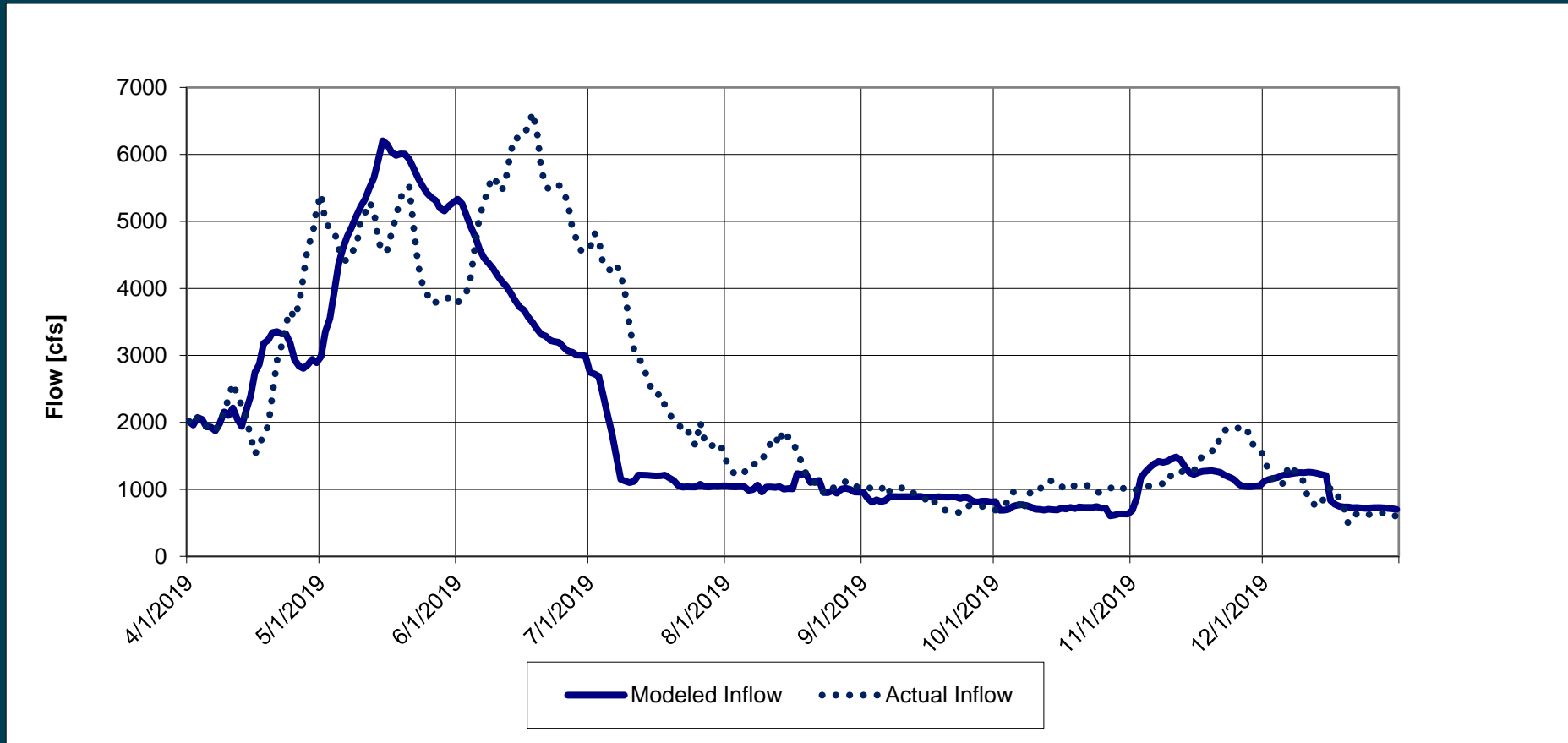
Abiquiu Reservoir Outflow



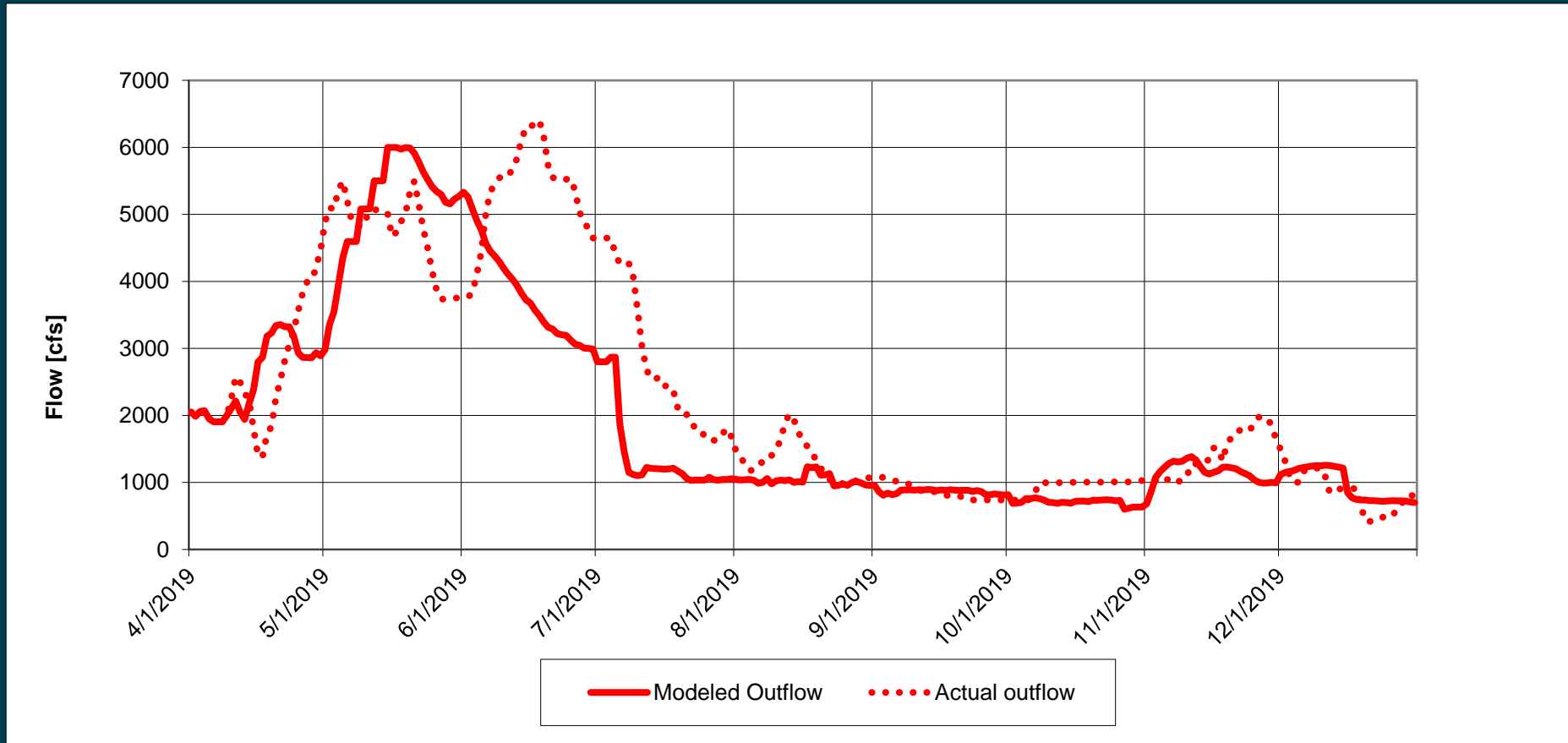
Abiquiu Reservoir Storage



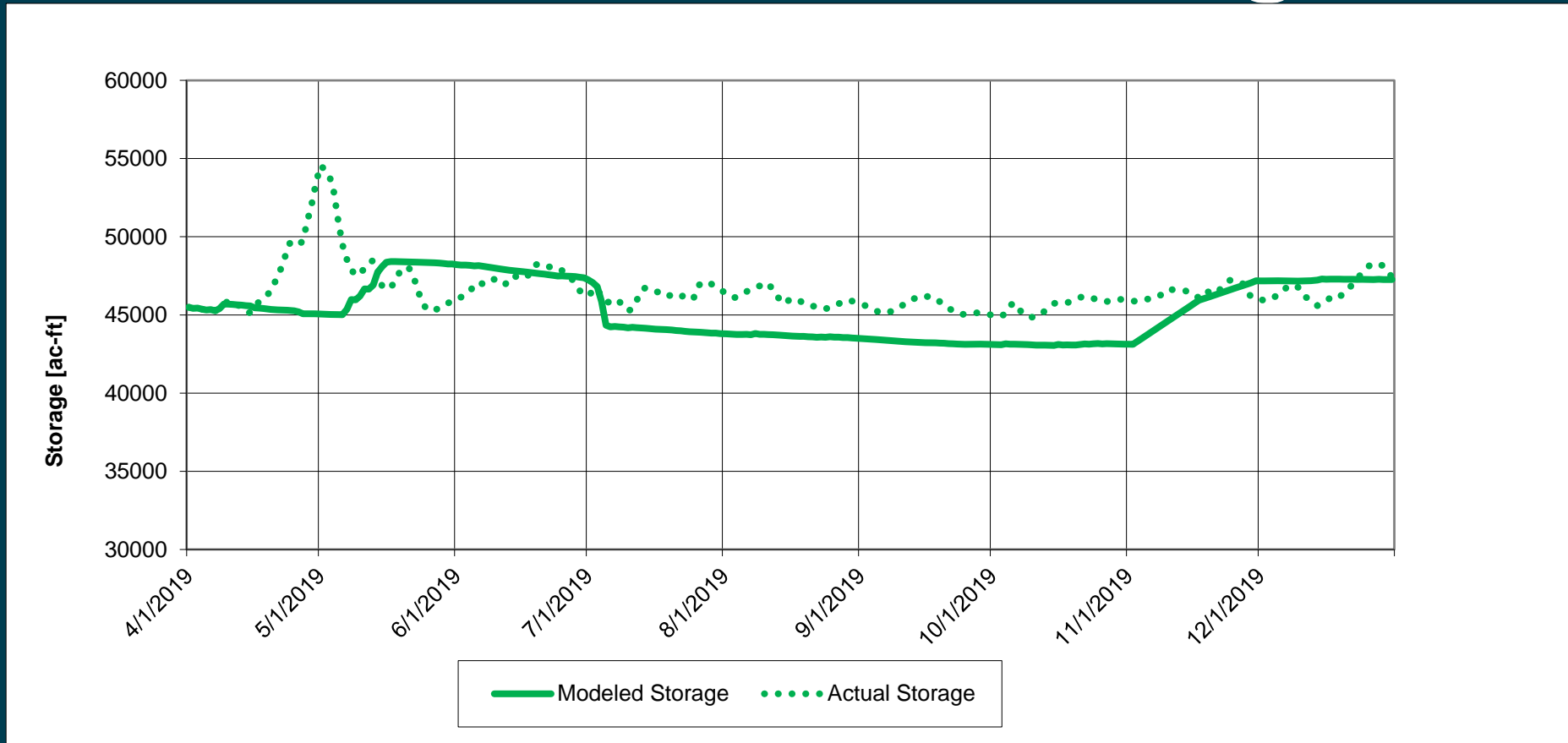
Cochiti Reservoir Inflow



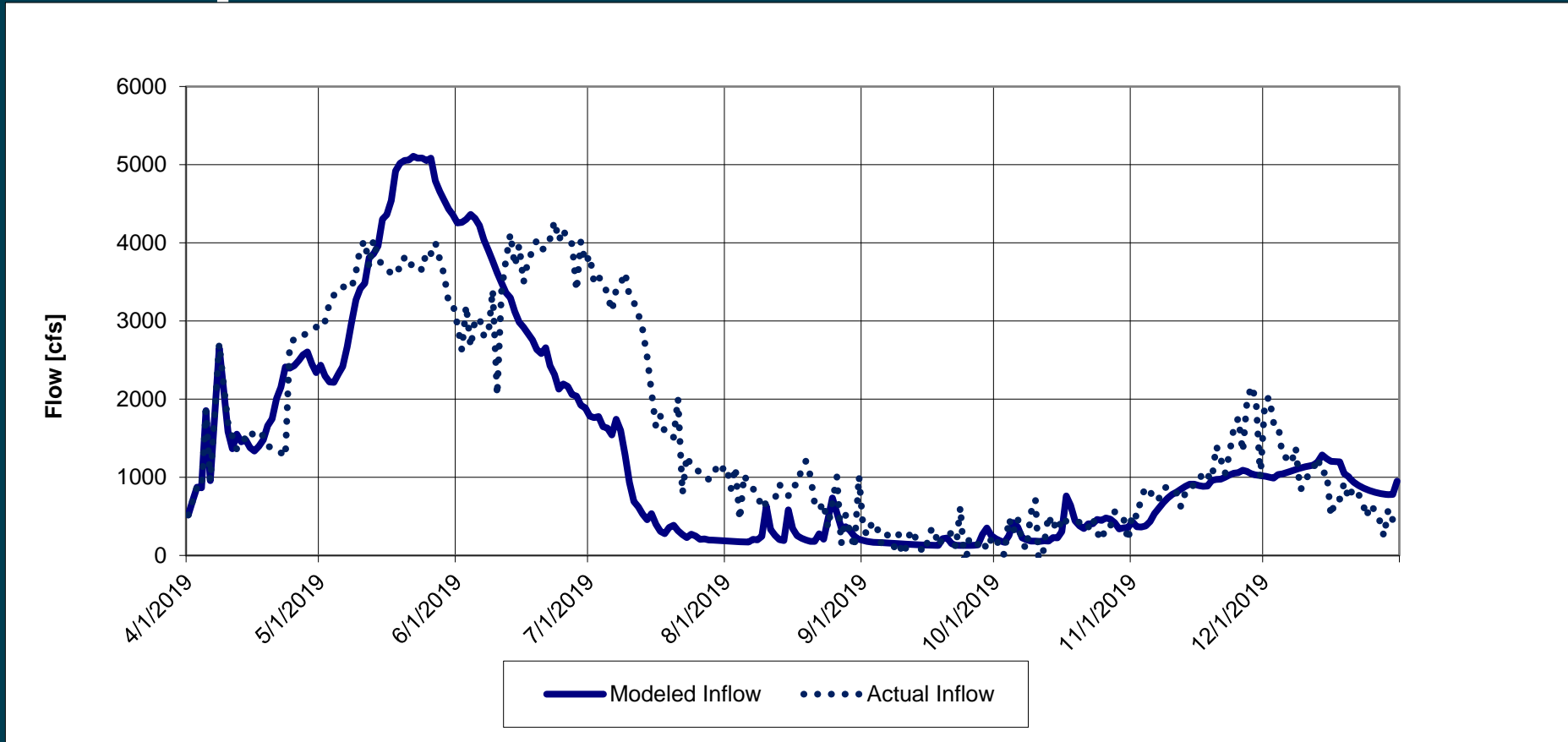
Cochiti Reservoir Outflow



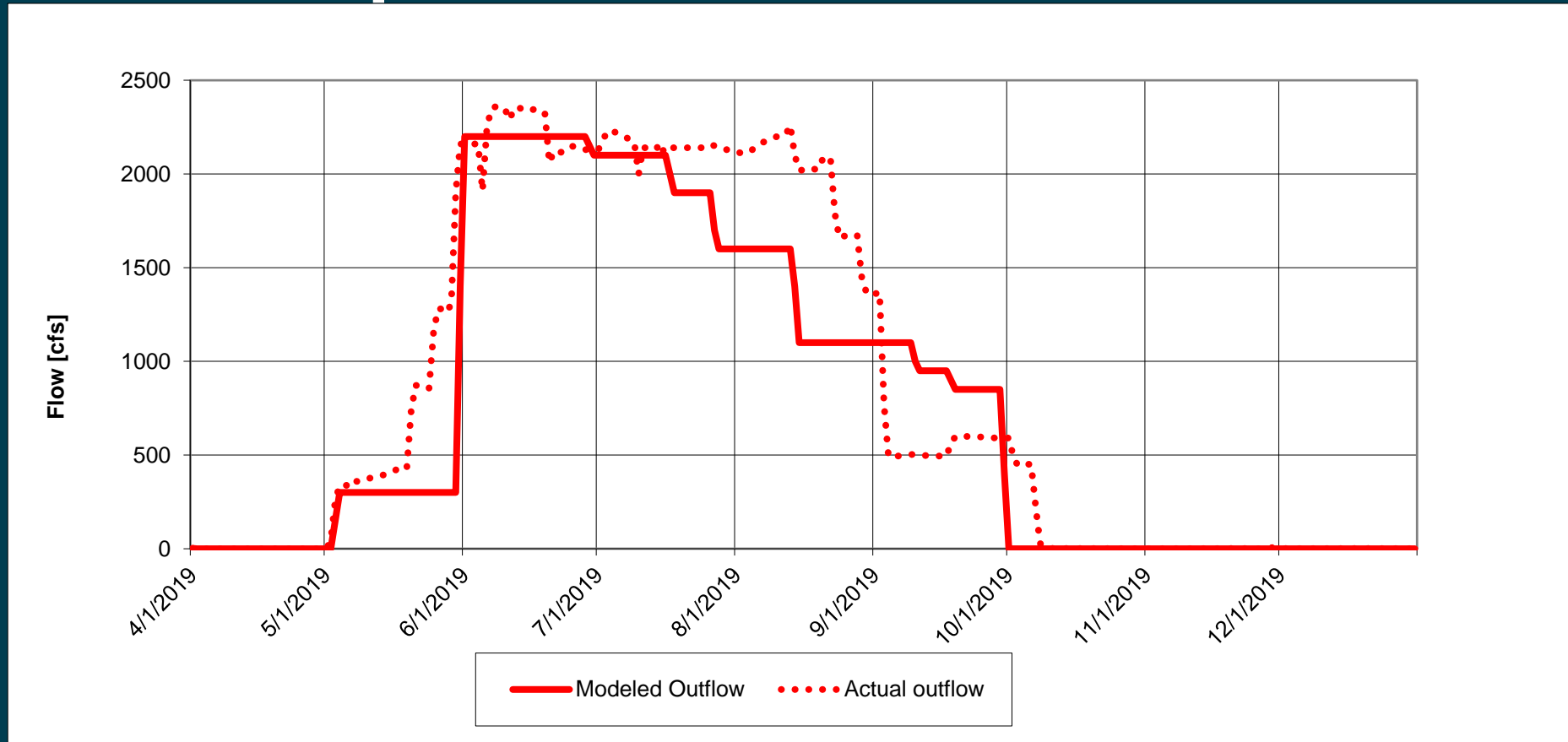
Cochiti Reservoir Storage



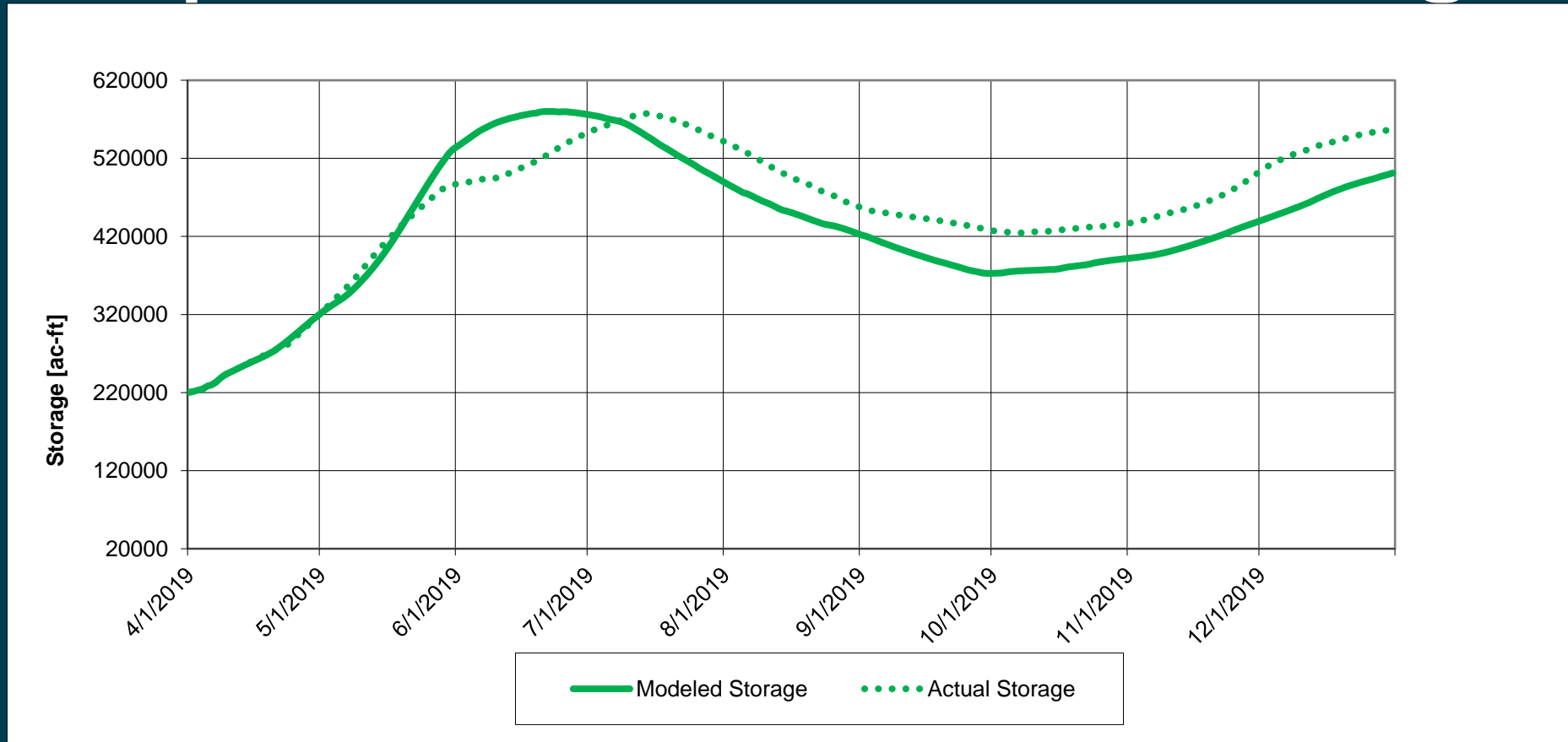
Elephant Butte Reservoir Inflow



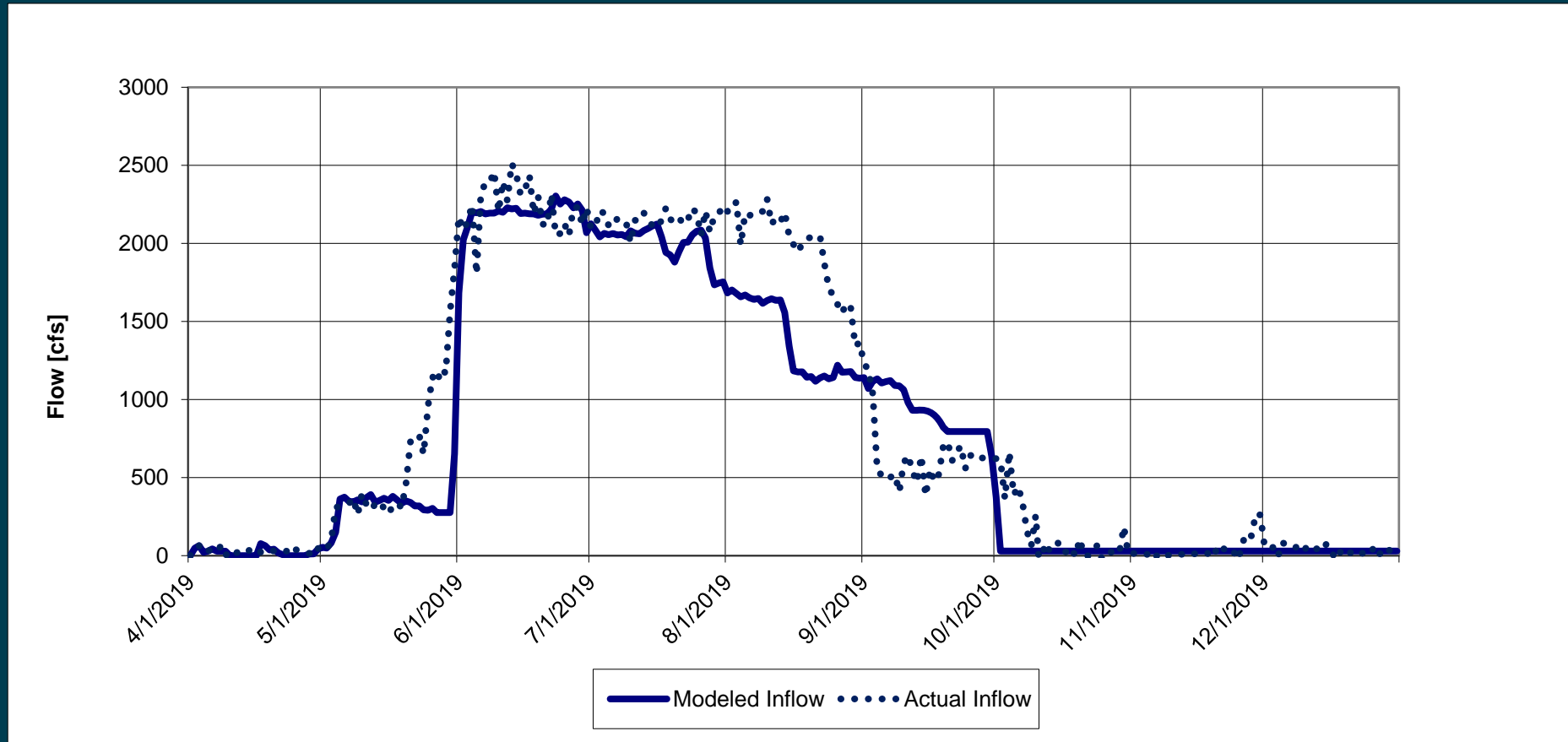
Elephant Butte Reservoir



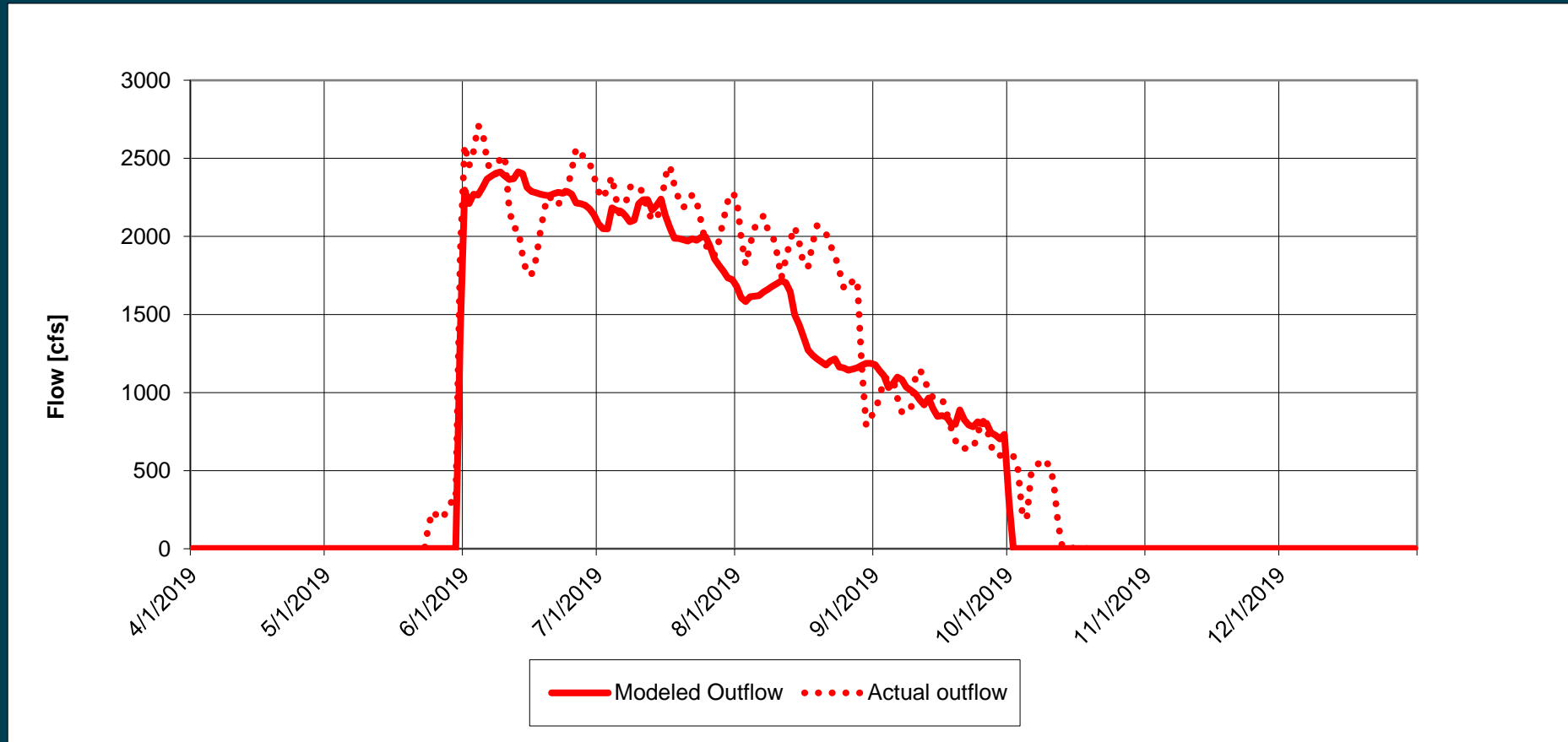
Elephant Butte Reservoir Storage



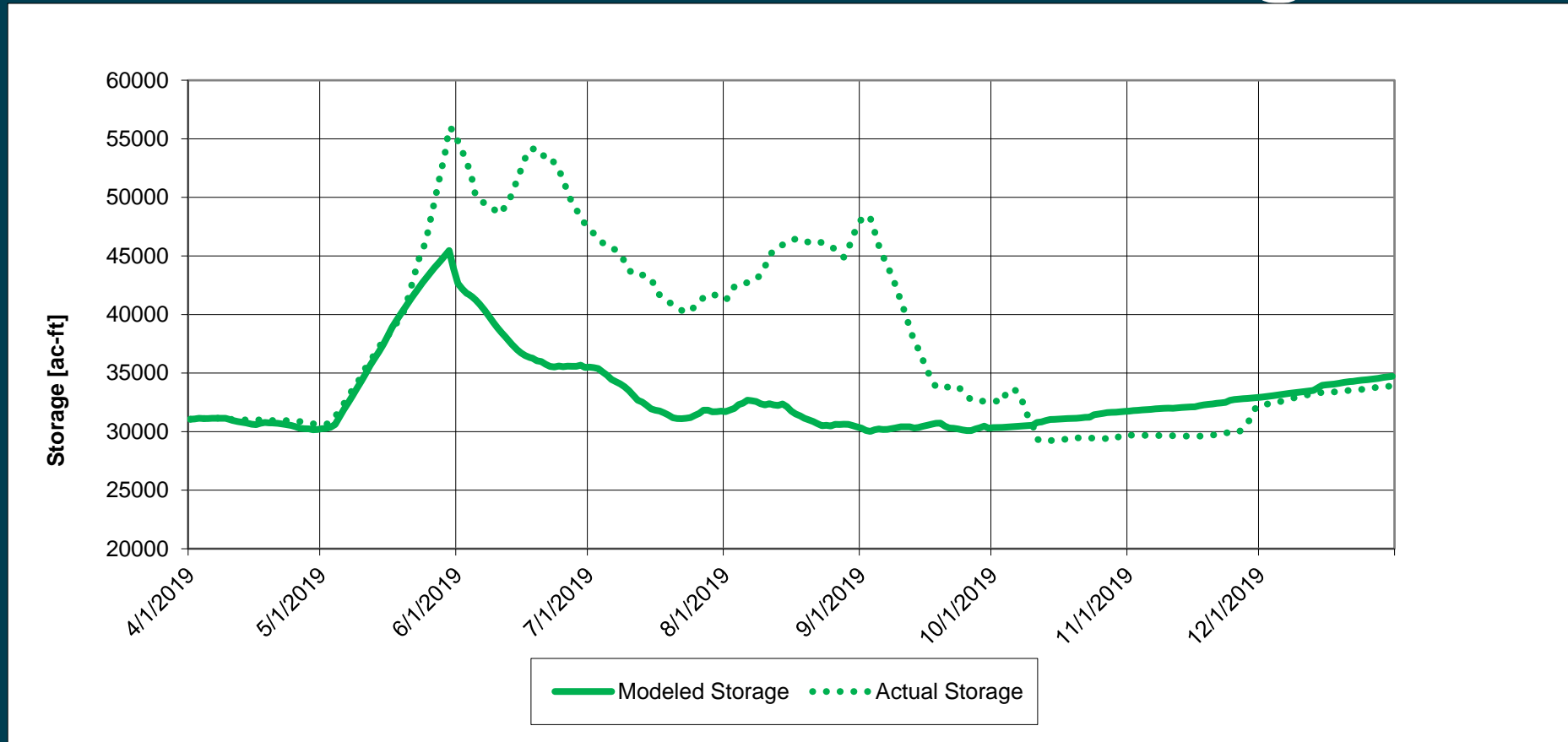
Caballo Reservoir Inflow



Caballo Reservoir Outflow



Caballo Reservoir Storage



2019 Rio Grande Project Operations

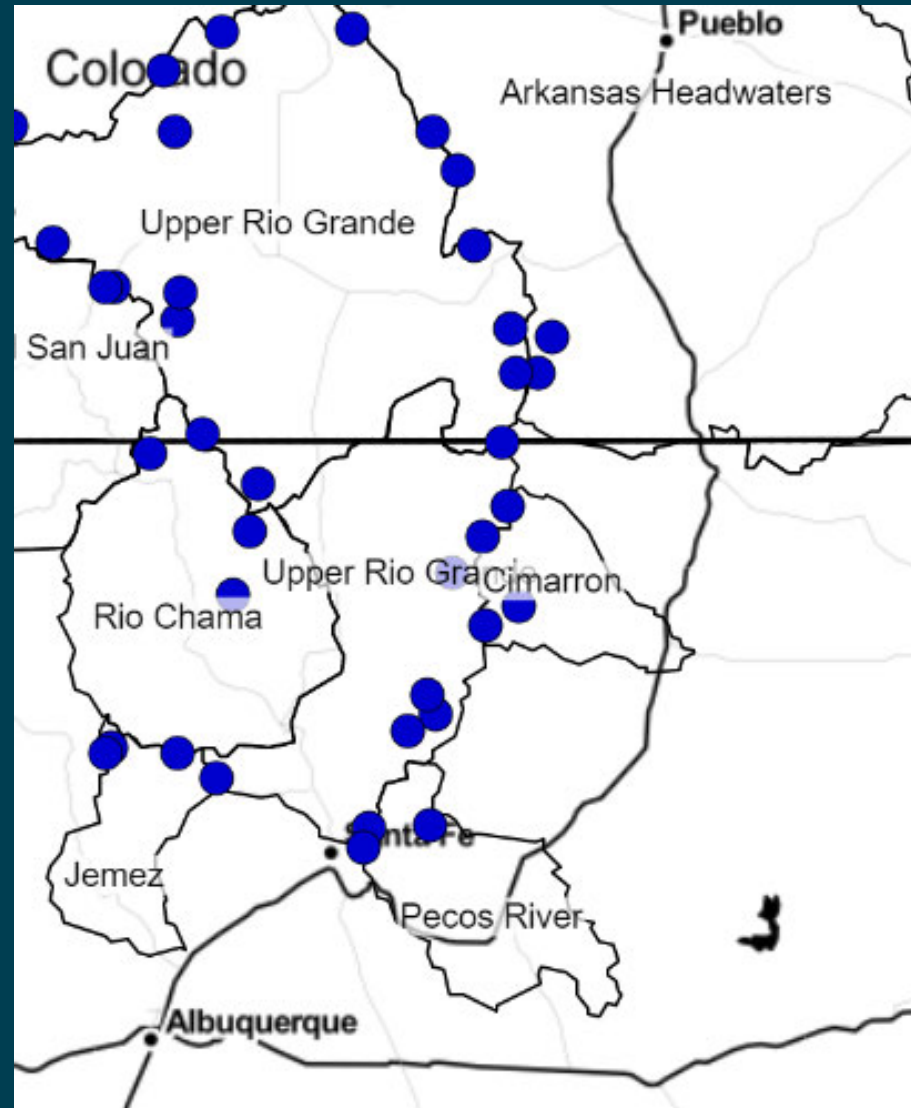
- Release season – May 24 to October 12
- Released – 453,580 ac-ft
- Bonita Lateral – 888 ac-ft
- HCCRD – 29,341 ac-ft



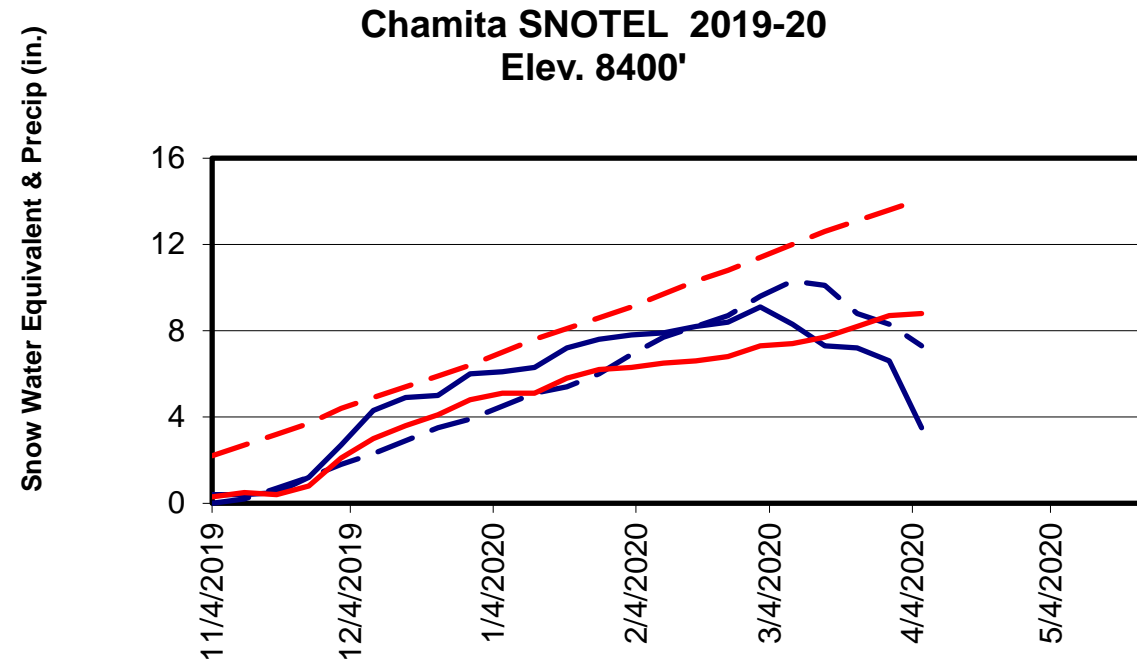
Current Snow Conditions



SNOTEL Locations

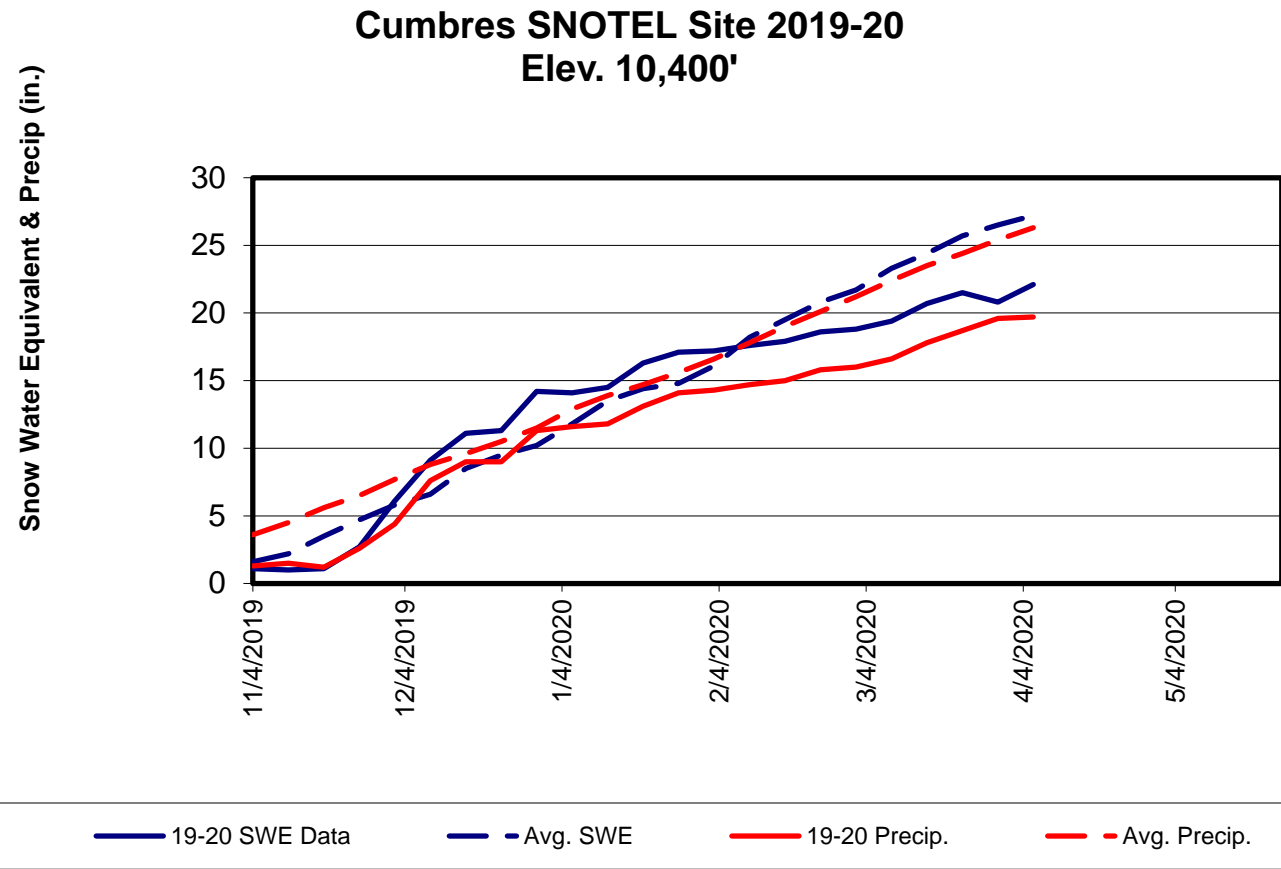


Rio Chama Snow Data

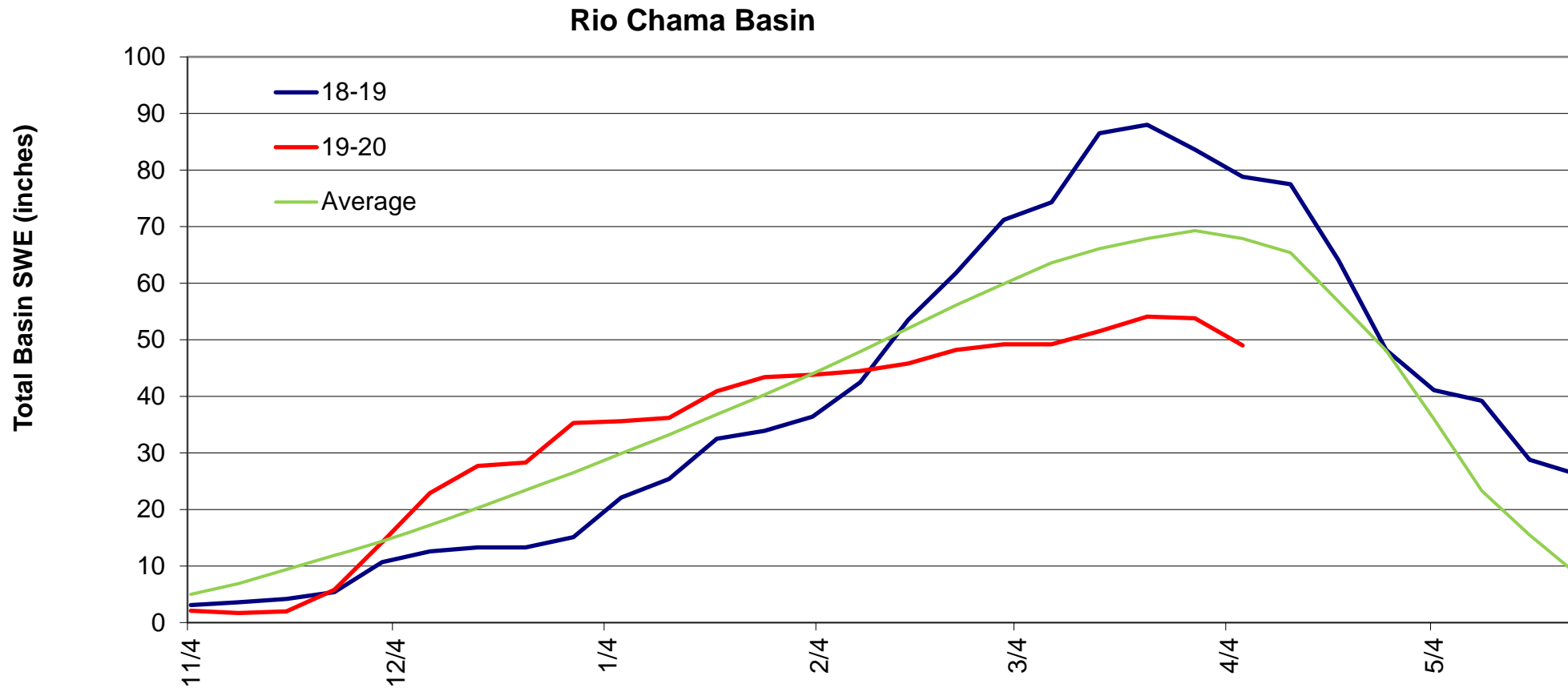


Rio Chama Snow Data

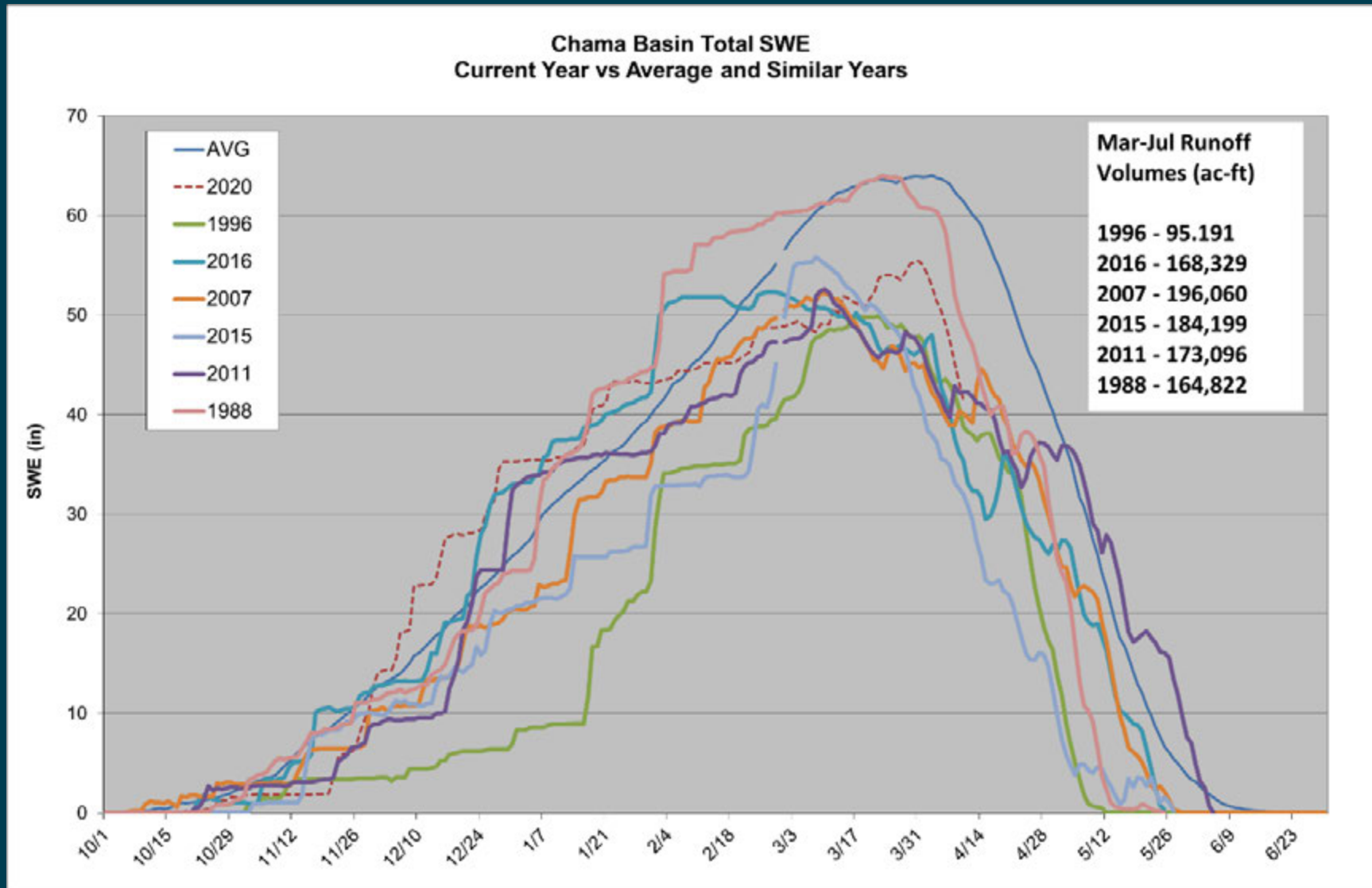
(continued)



Rio Chama Snow Comparison

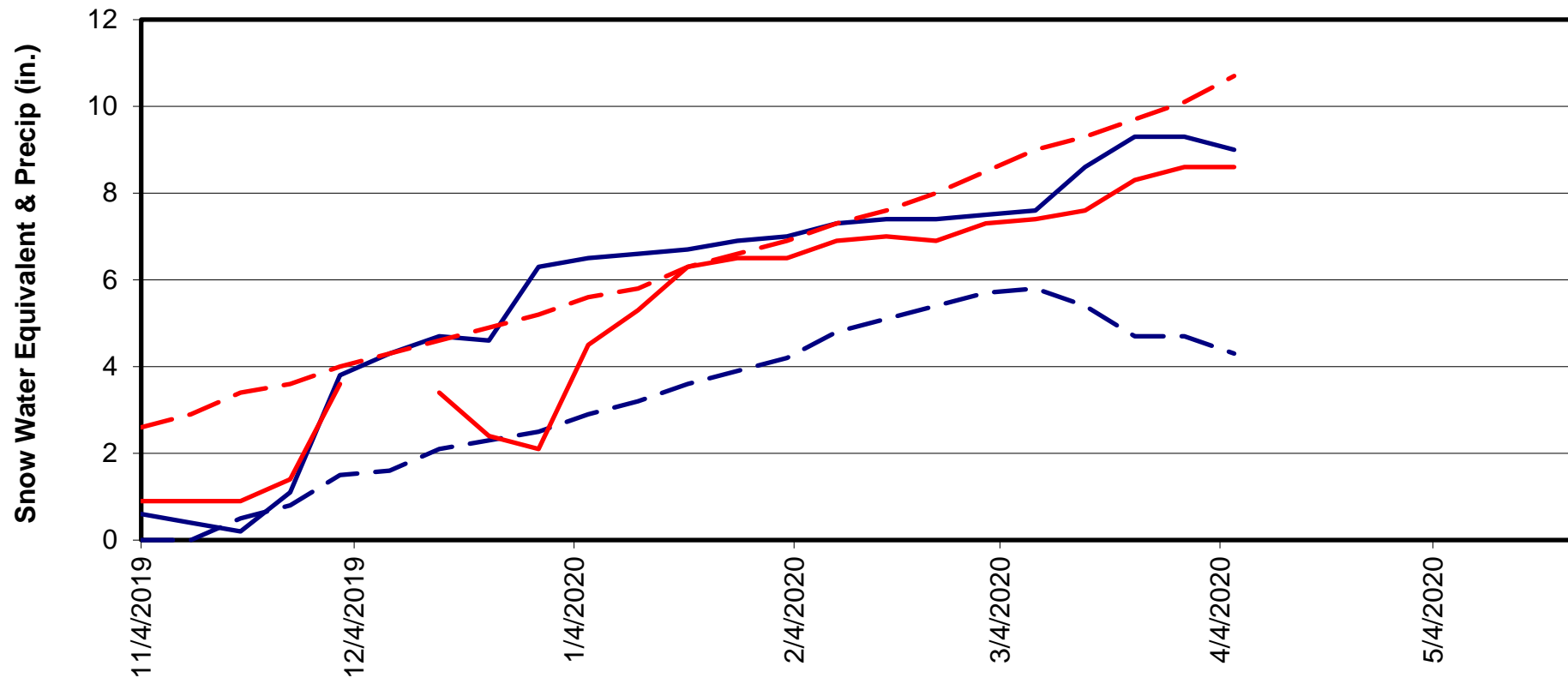


Similar Snowpack Years



Rio Grande Snow Data

Upper Rio Grande SNOTEL 2019-20
Elev. 9,400'



— '19-20 SWE data

- - Avg. SWE

— '19-20 Precip. data

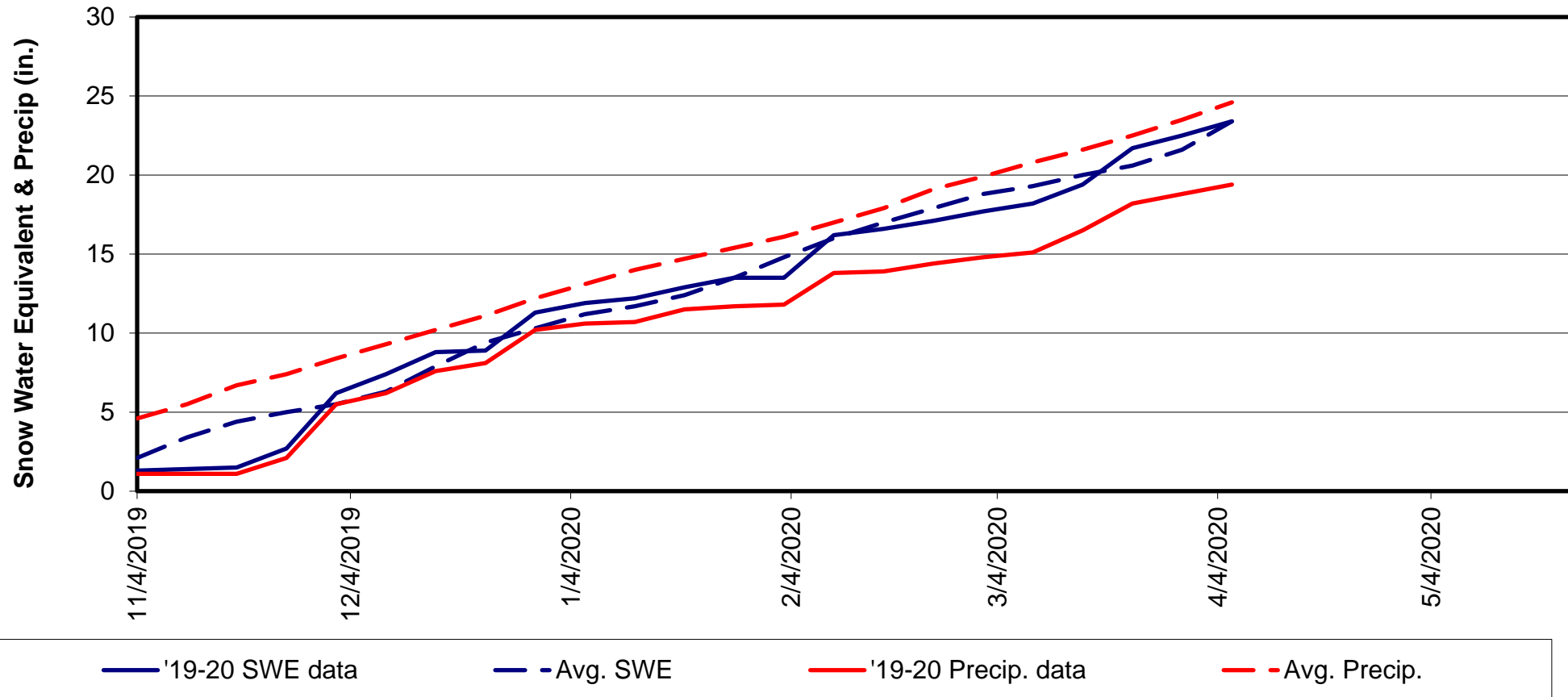
- - Avg. Precip.



Rio Grande Snow Data

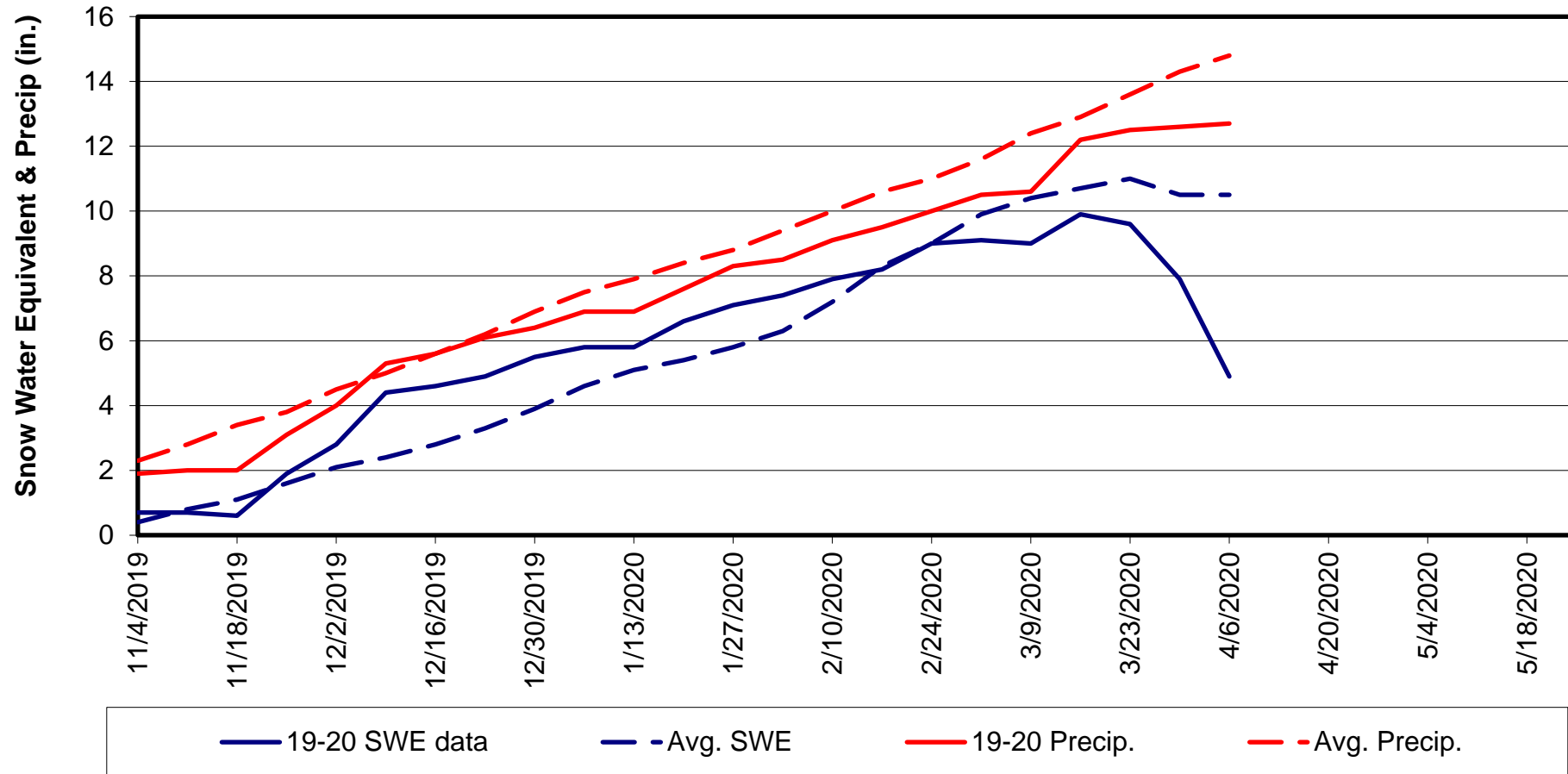
(continued)

Beartown SNOTEL 2019-20
Elev. 11,600'



Sangre de Cristo Snow Data

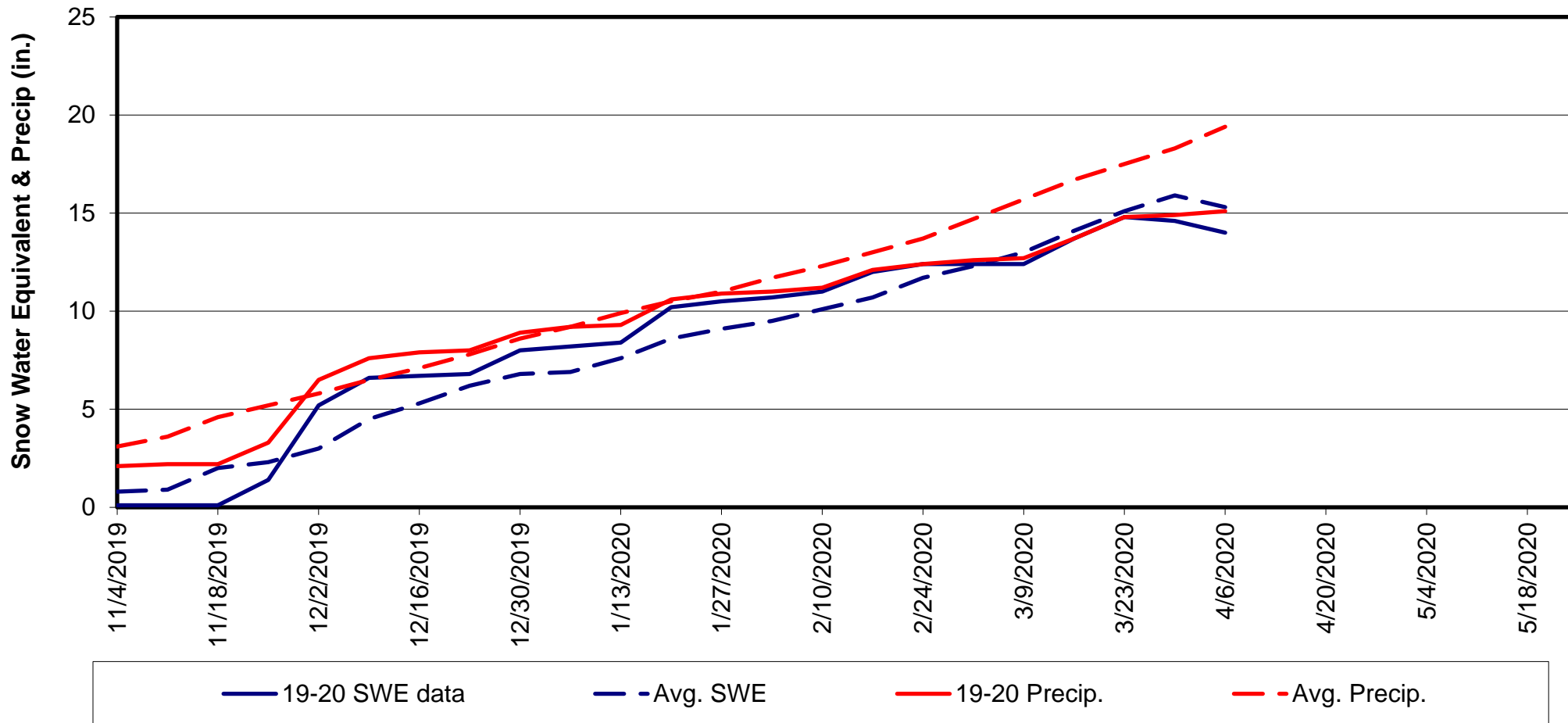
Gallegos Peak SNOTEL 2019-20
Elev. 9,800'



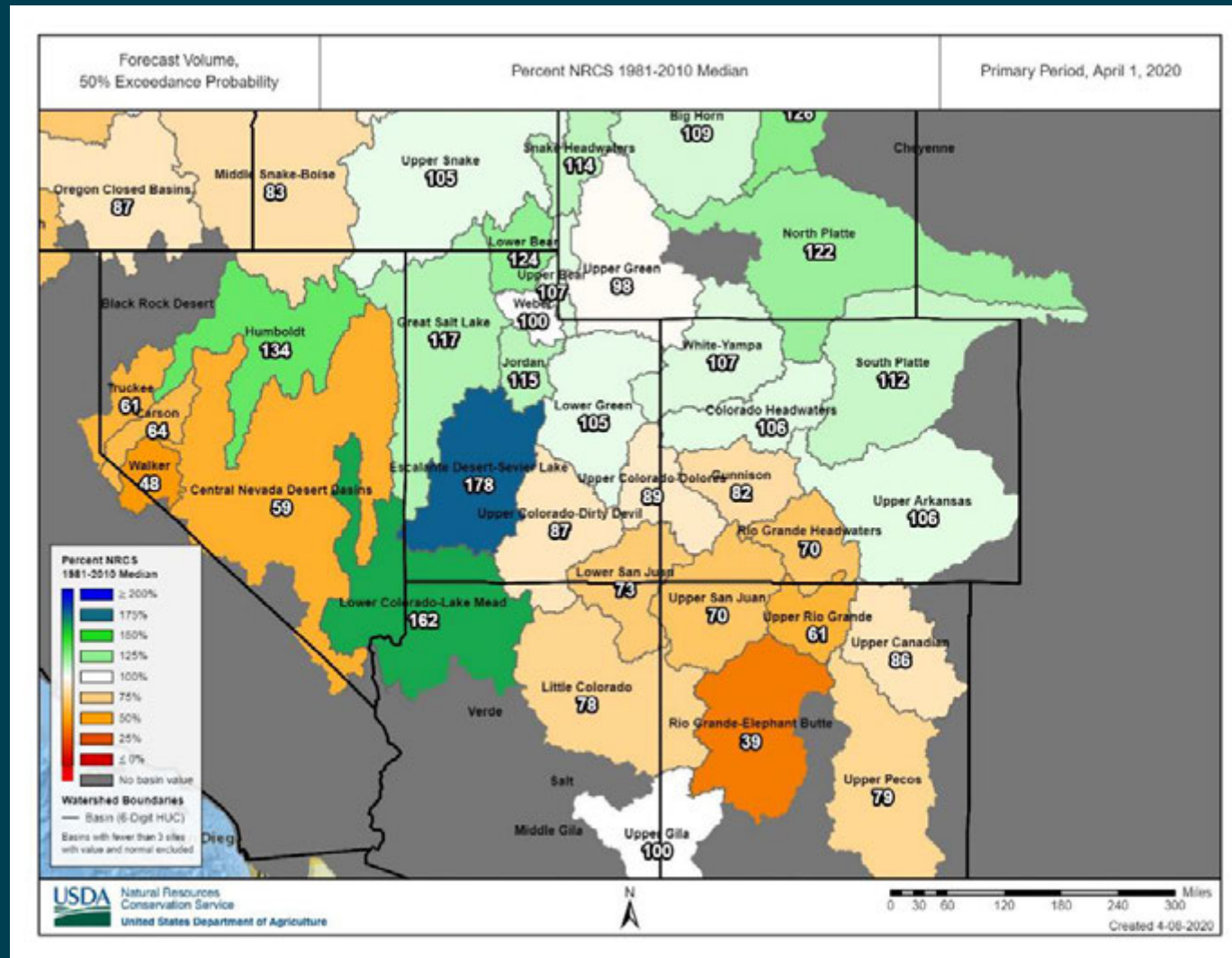
Sangre de Cristo Snow Data

(continued)

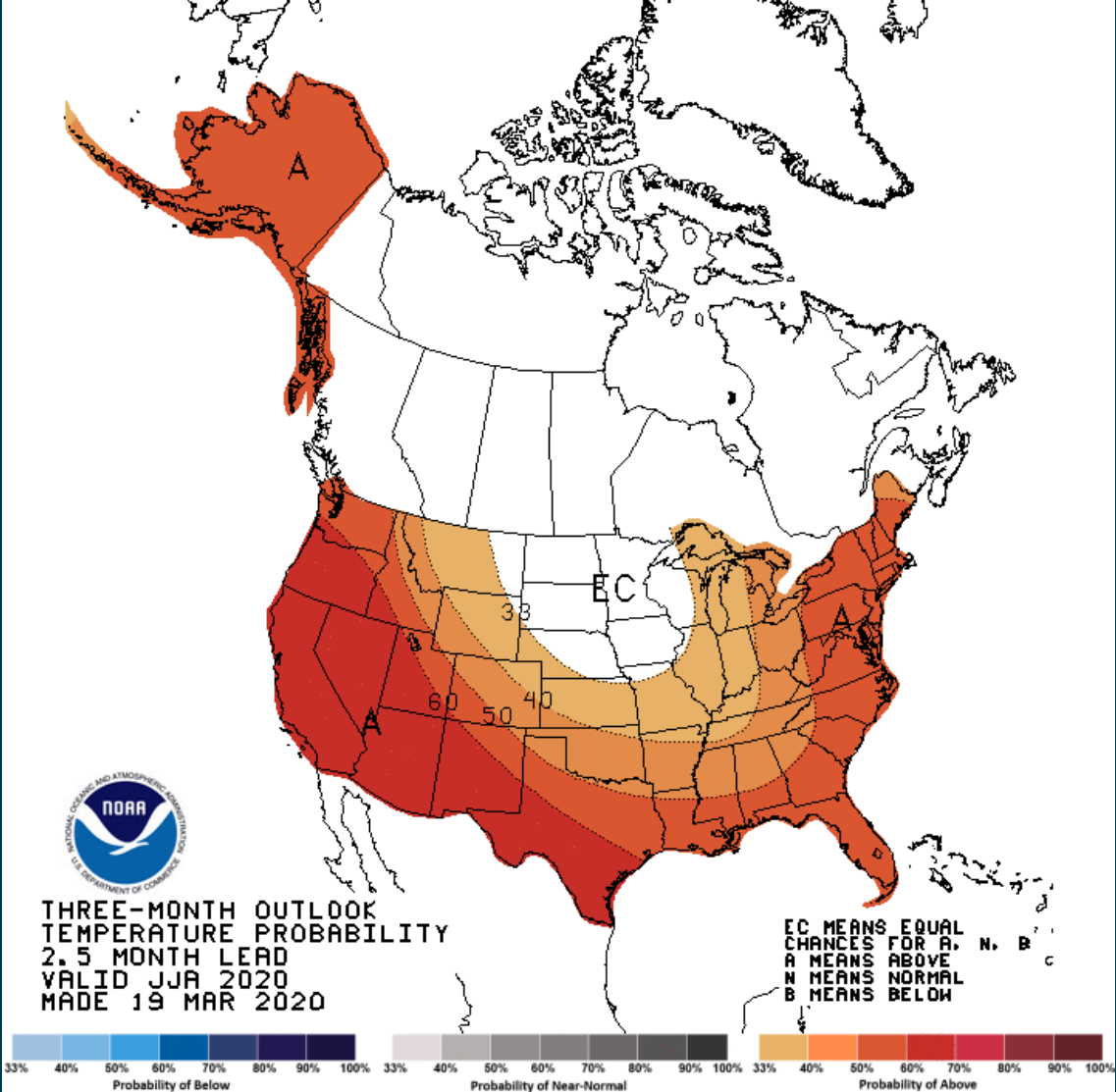
Wesner Springs SNOTEL 2019-20
Elev. 11,120'



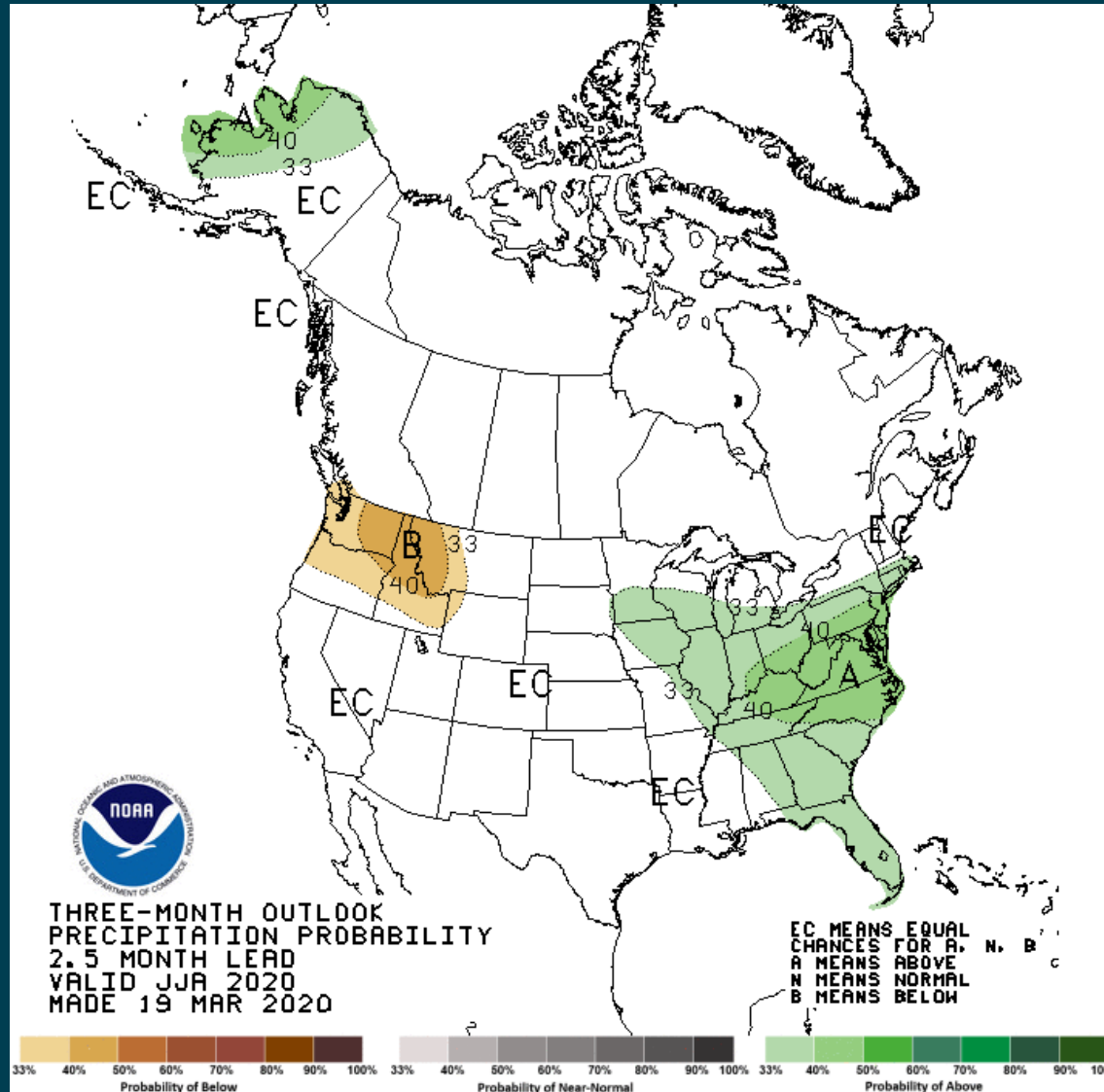
Western U.S. River Basin Streamflow Forecast



Monsoon Season Temperature Outlook



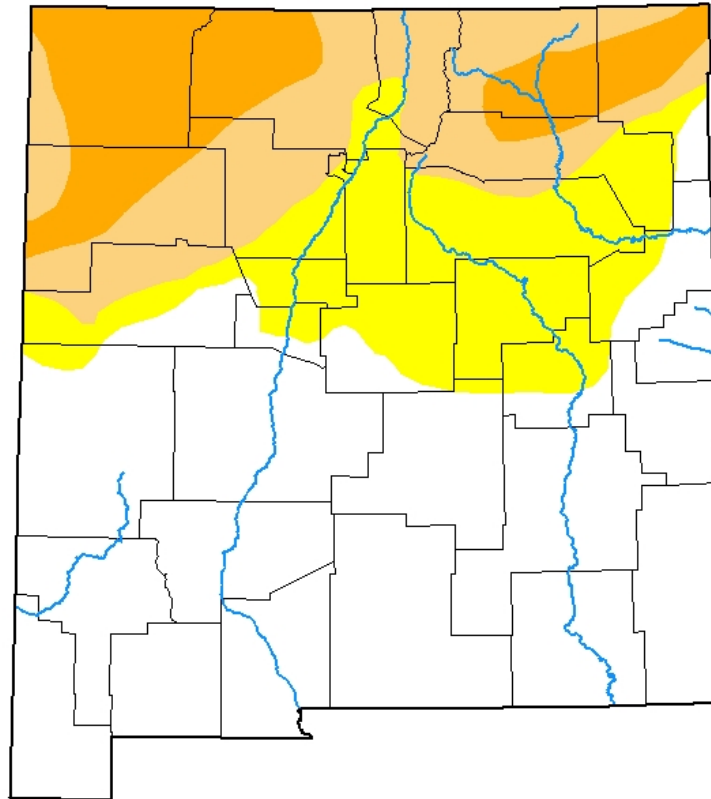
Monsoon Season Precipitation Outlook









U.S. Drought Monitor – New Mexico

U.S. Drought Monitor New Mexico

March 31, 2020
(Released Thursday, Apr. 2, 2020)
Valid 8 a.m. EDT



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

David Simeral
Western Regional Climate Center



droughtmonitor.unl.edu



2020 Water Operations Modeling



Major Assumptions / Results

- April 1 50% most probable forecast
- Storage of water for Prior & Paramount lands
- Back into Article VII restrictions by June
- MRGCD only stores as much as possible up to elevation restriction while out of Article VII restrictions
- Irrigation through late September

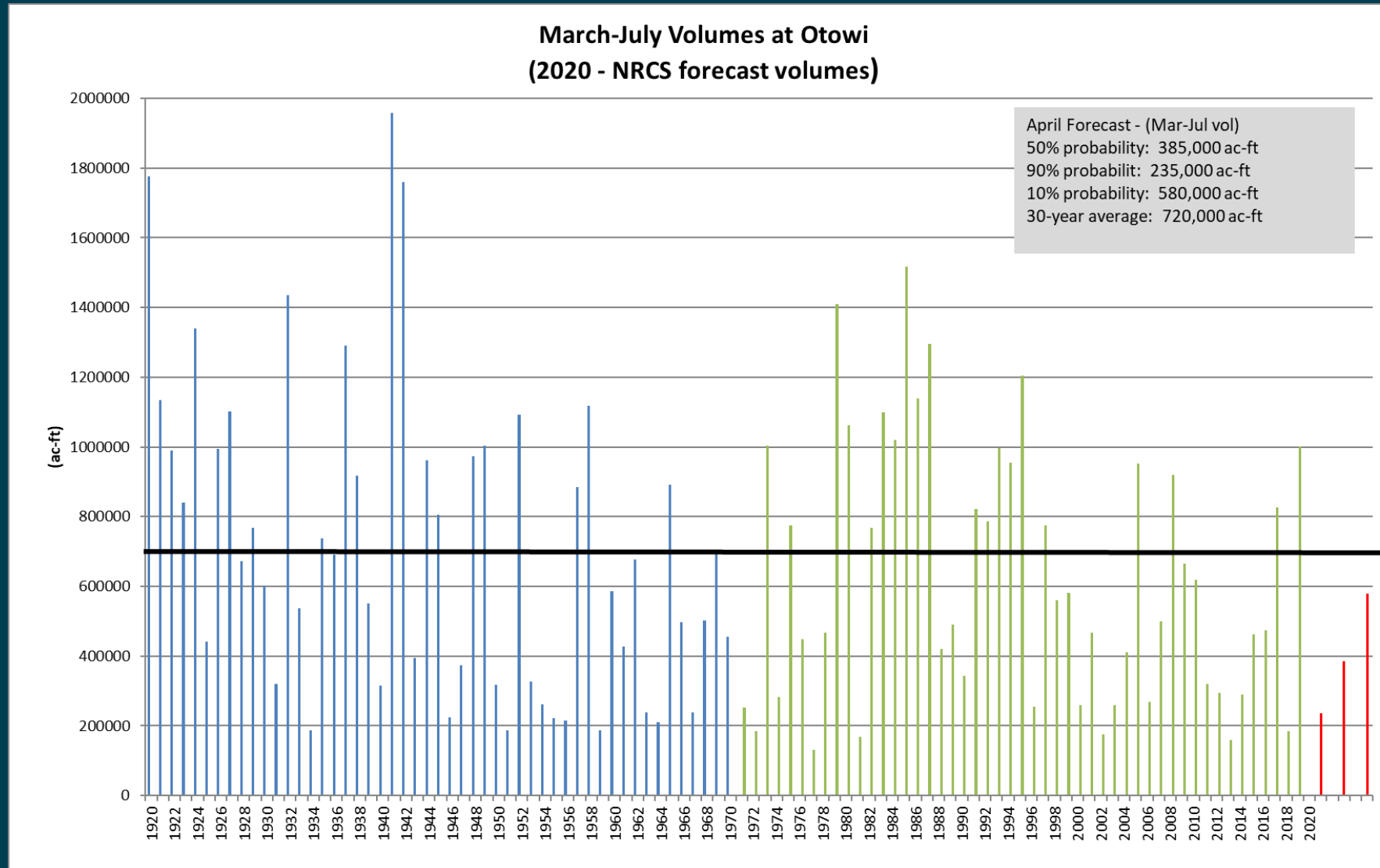


April Forecast Data

Location	Most Probable Percent of Average 2019	Most Probable Percent of Average 2020	April 1 50% Probability Volume, ac-ft 2020
Rio Grande nr Del Norte	140%	69%	355,000
El Vado Reservoir Inflow	142%	56%	125,000
Rio Grande at Otowi	142%	53%	385,000
Nambe Reservoir Inflow	114%	77%	5,000
Jemez blw Jemez Dam	138%	39%	13,400
Rio Blanco @ Diversion	137%	65%	35,000
Navajo River @ Diversion	131%	62%	40,000



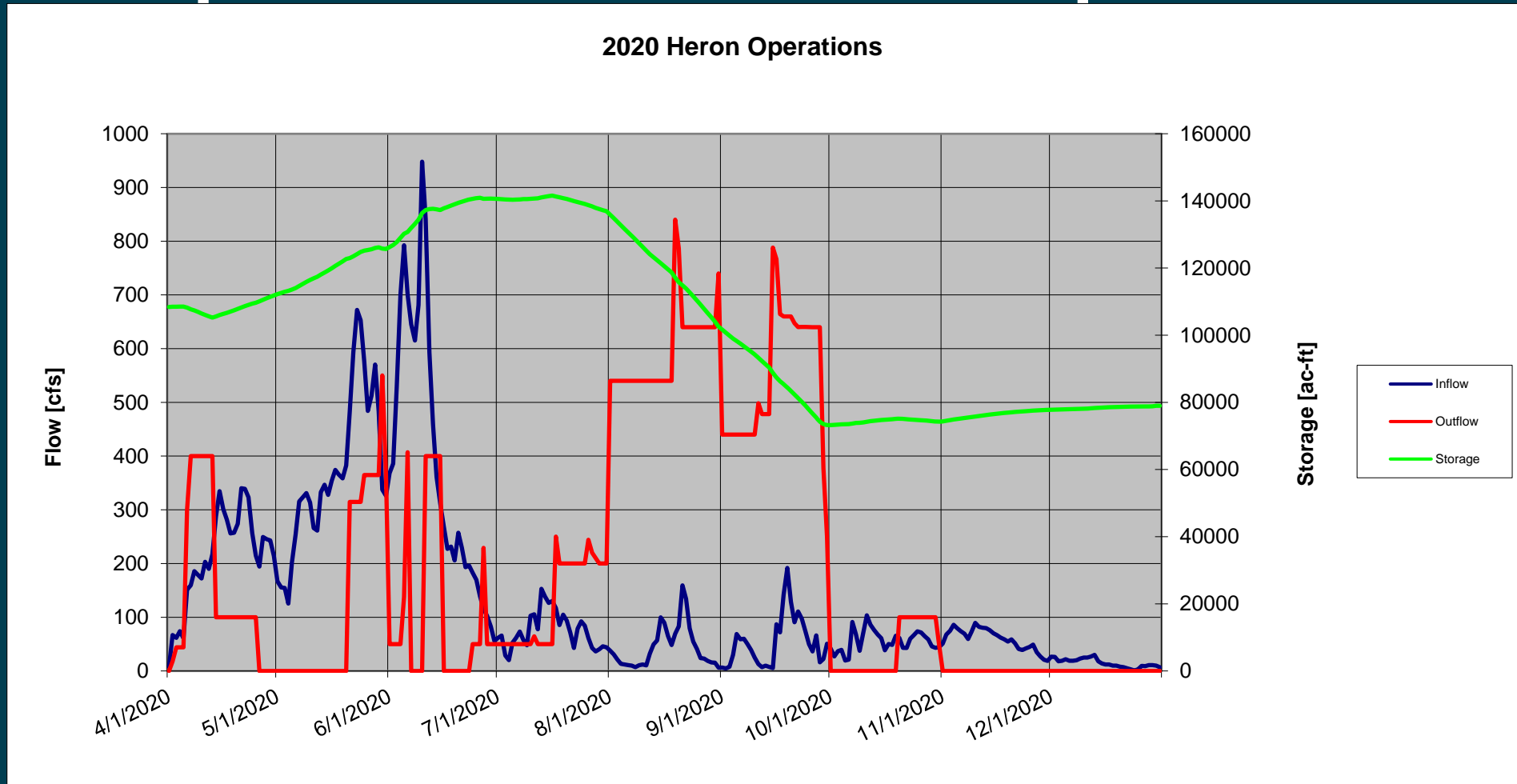
Historic Mar-Jul Flow Volumes at Otowi



Heron Reservoir



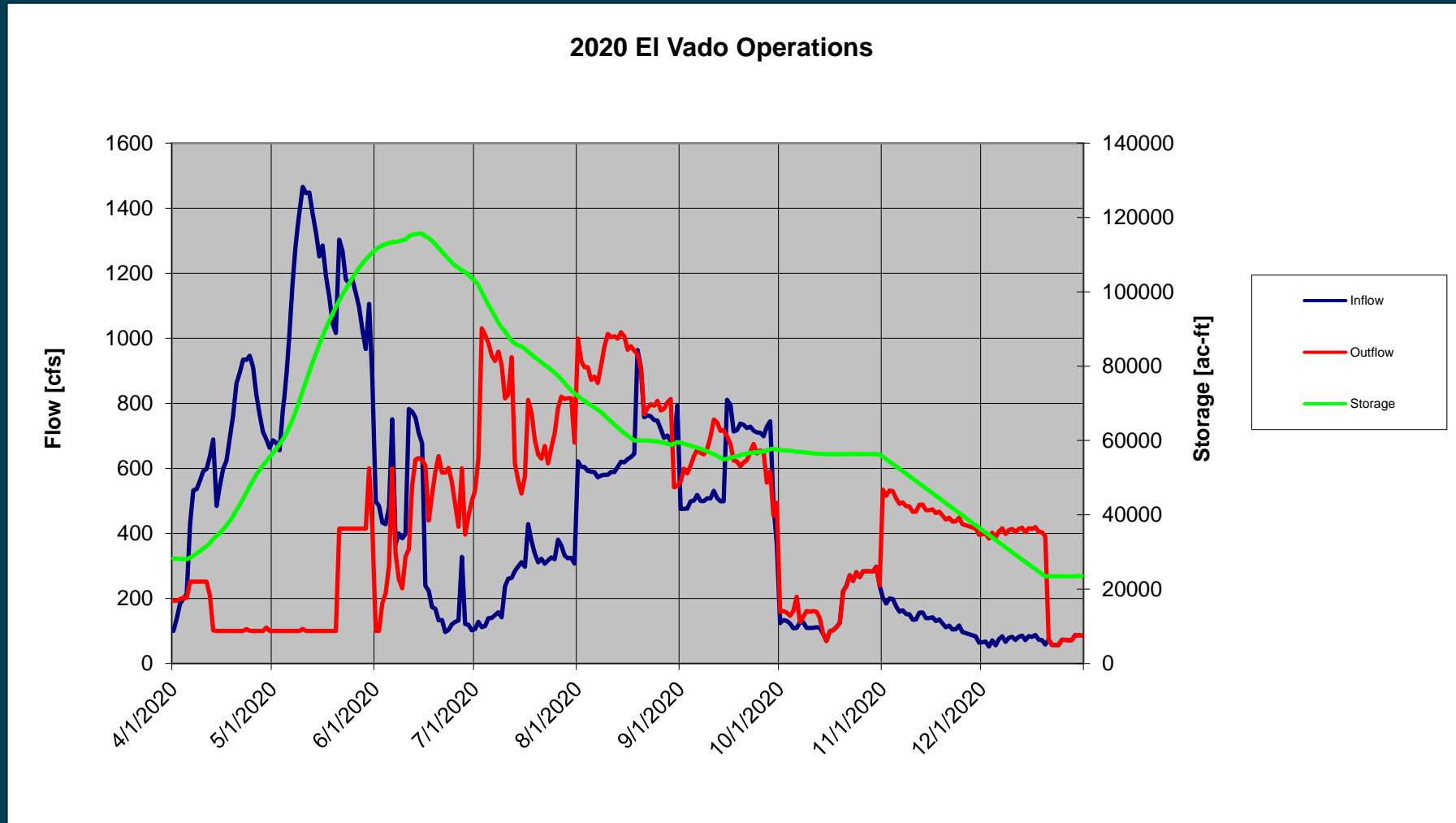
Proposed 2020 Heron Operations



El Vado Reservoir



Proposed 2020 El Vado Operations



El Vado Dam Construction Update

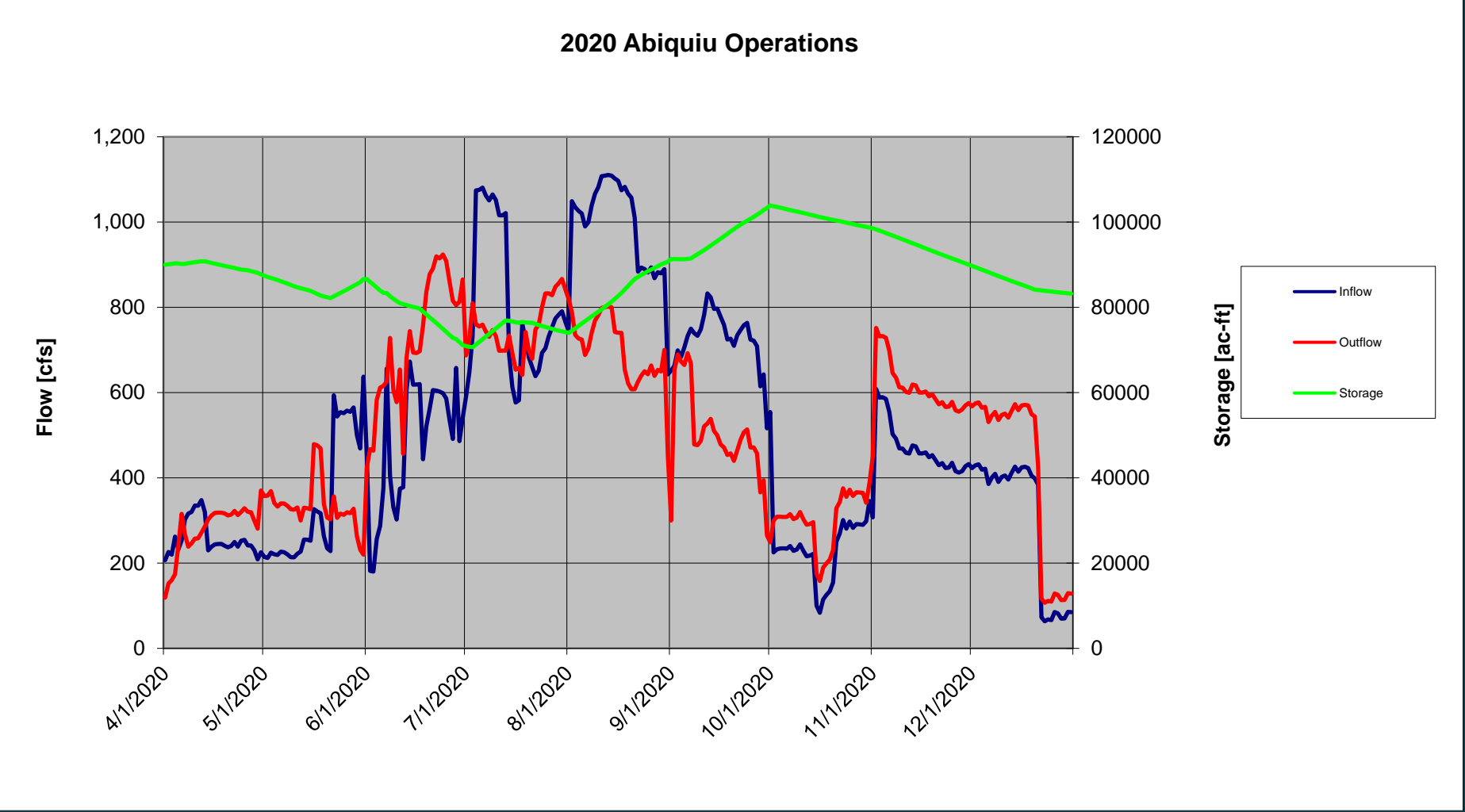
- On track to begin construction in 2021 with installation of geomembrane over steel faceplates and grouting inside dam
- Currently finishing final designs and final contracting steps
- Reclamation will attempt to maintain water operations to extent possible during three years of construction
- Reclamation not considering modifications to inlet tower as they do not align with Safety of Dams project



Abiquiu Lake

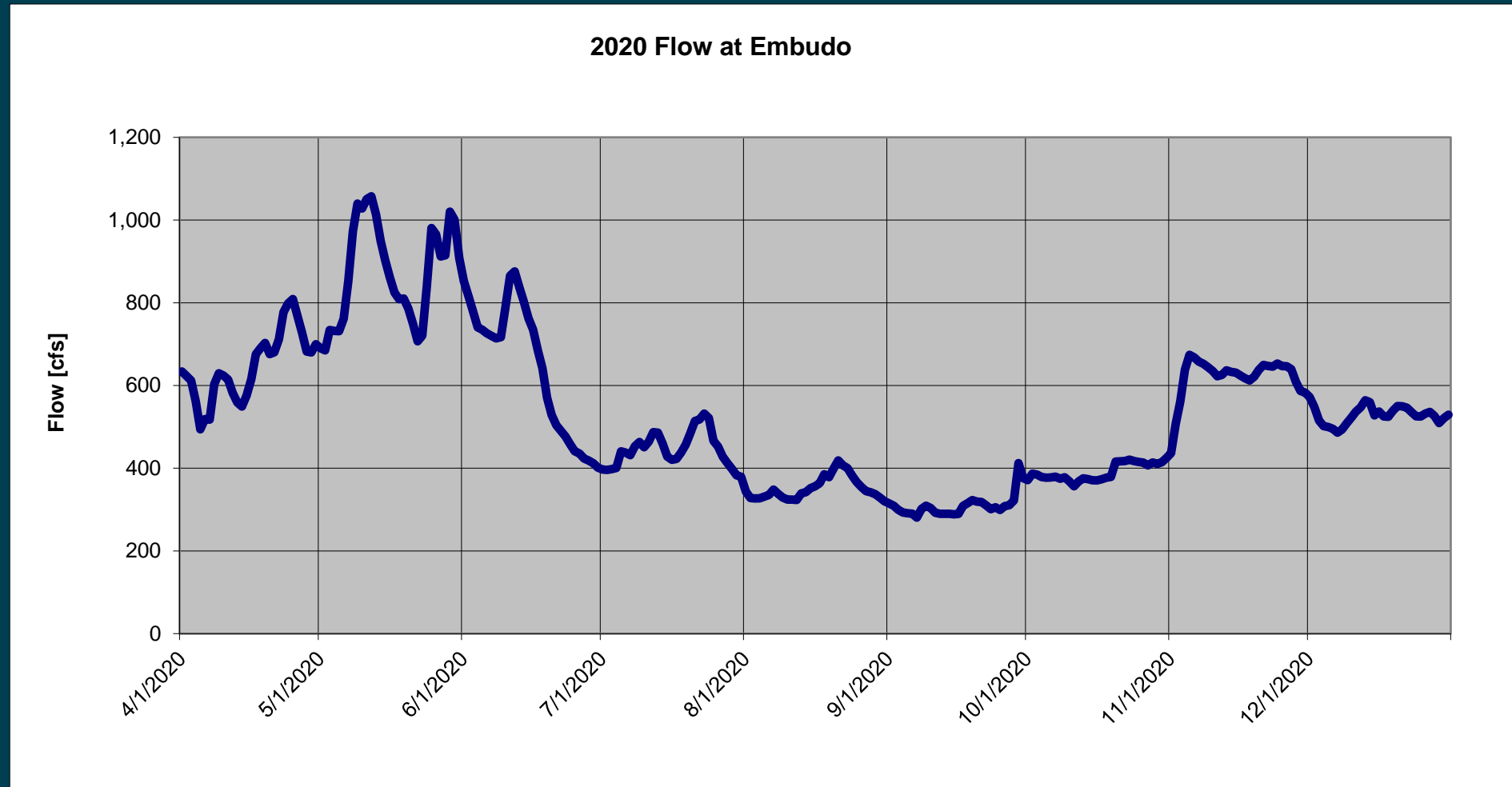


Proposed 2020 Abiquiu Operations



Estimated Hydrograph at Embudo

Rio Grande main stem



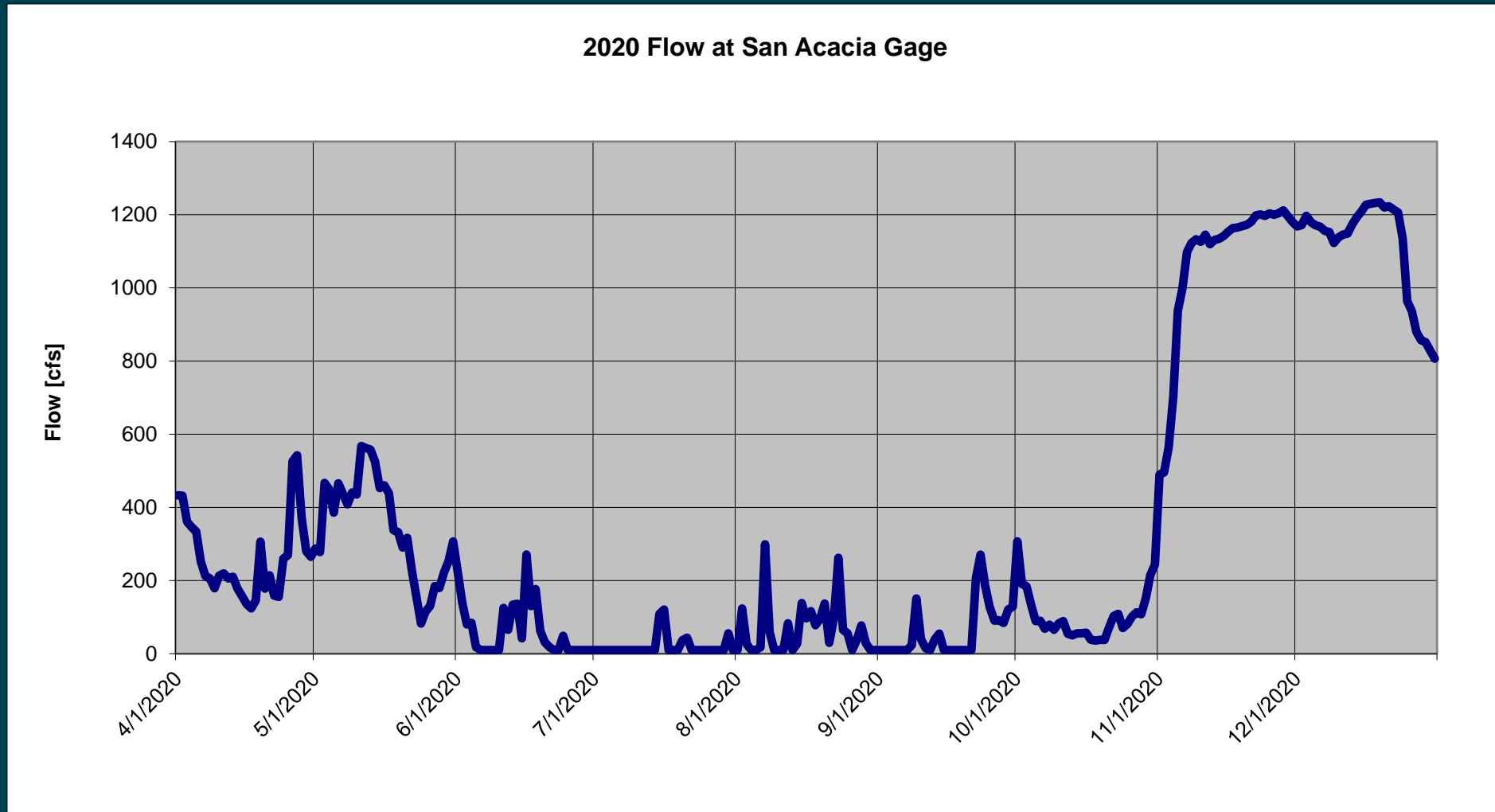
Cochiti Lake



Proposed 2020 Cochiti Operations



Estimated Hydrograph at San Acacia



2020 Rio Grande Project Operations

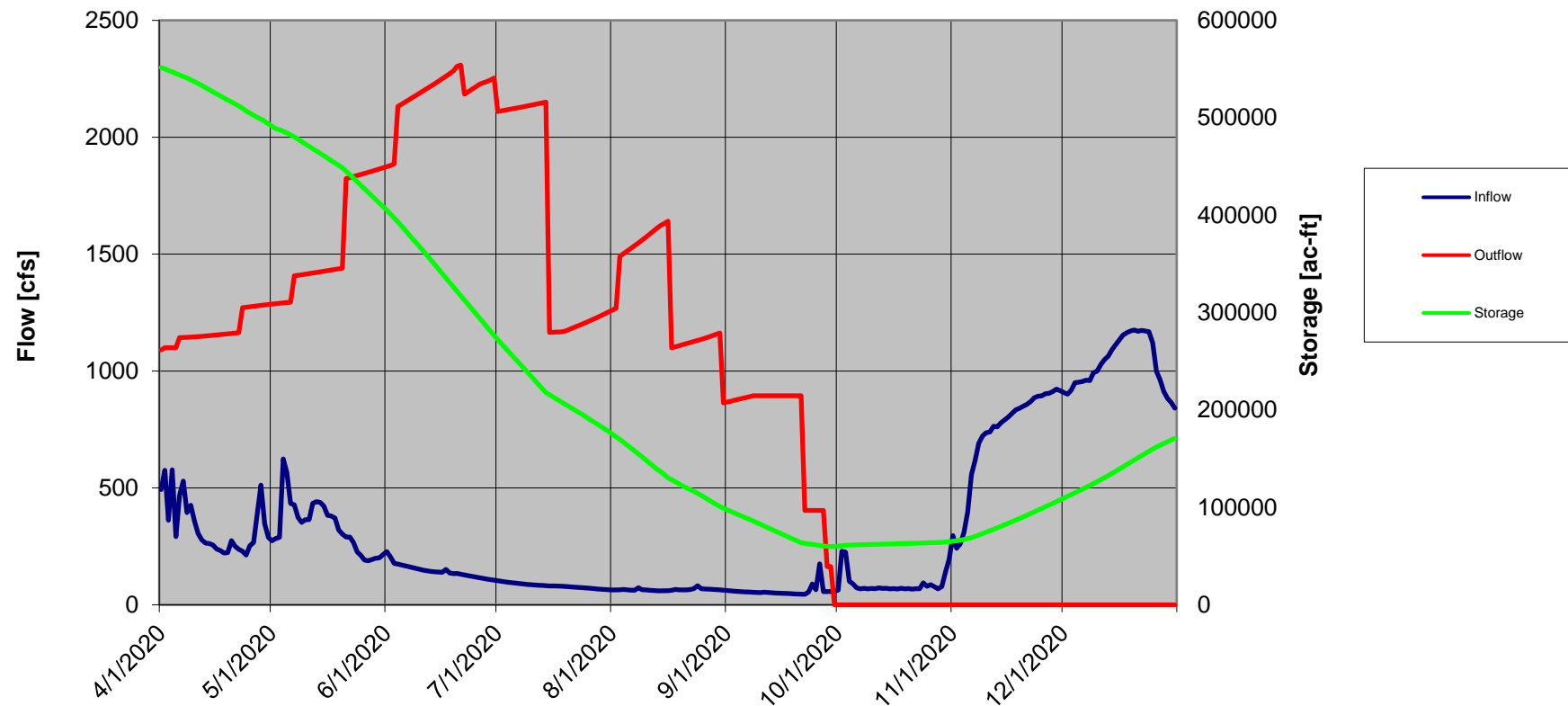


Elephant Butte Dam



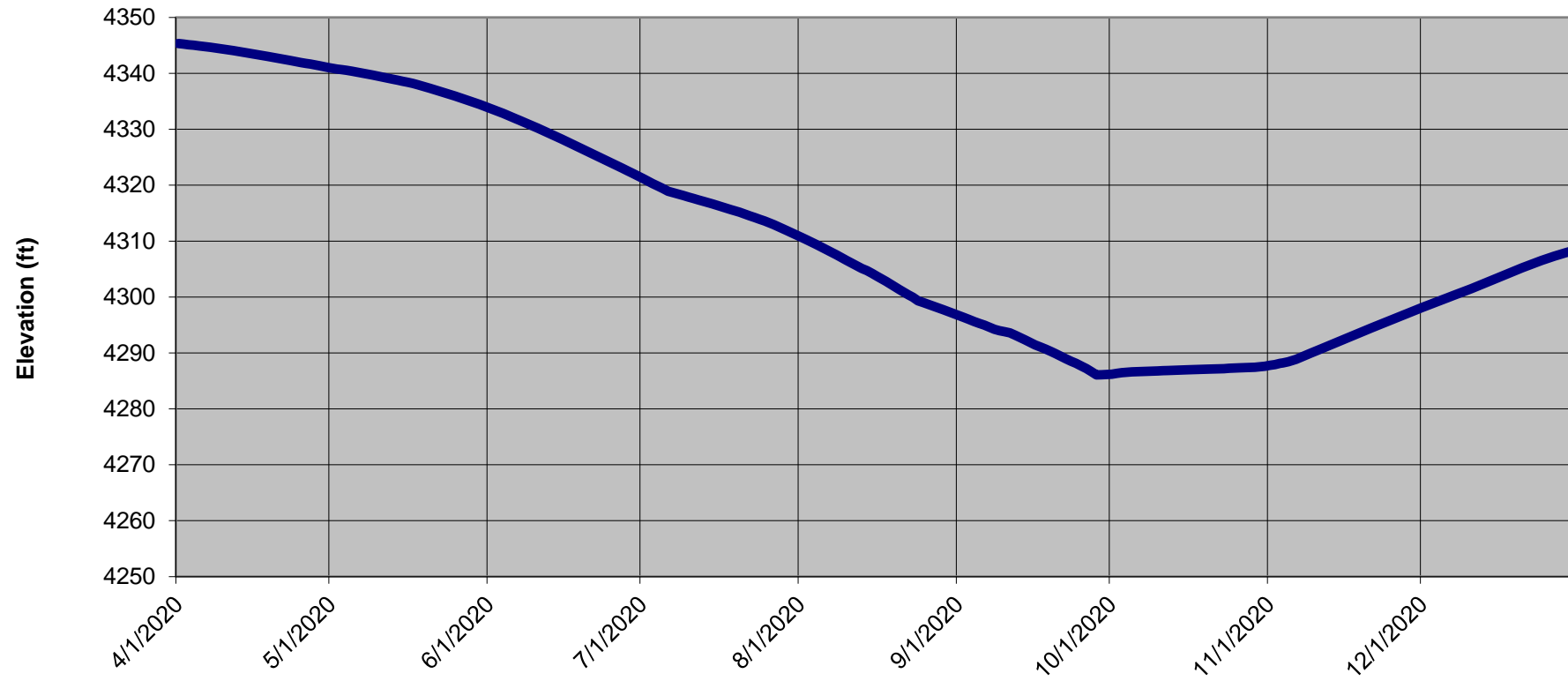
Proposed Elephant Butte Operations

2020 Elephant Butte Operations



Elephant Butte Projected Levels

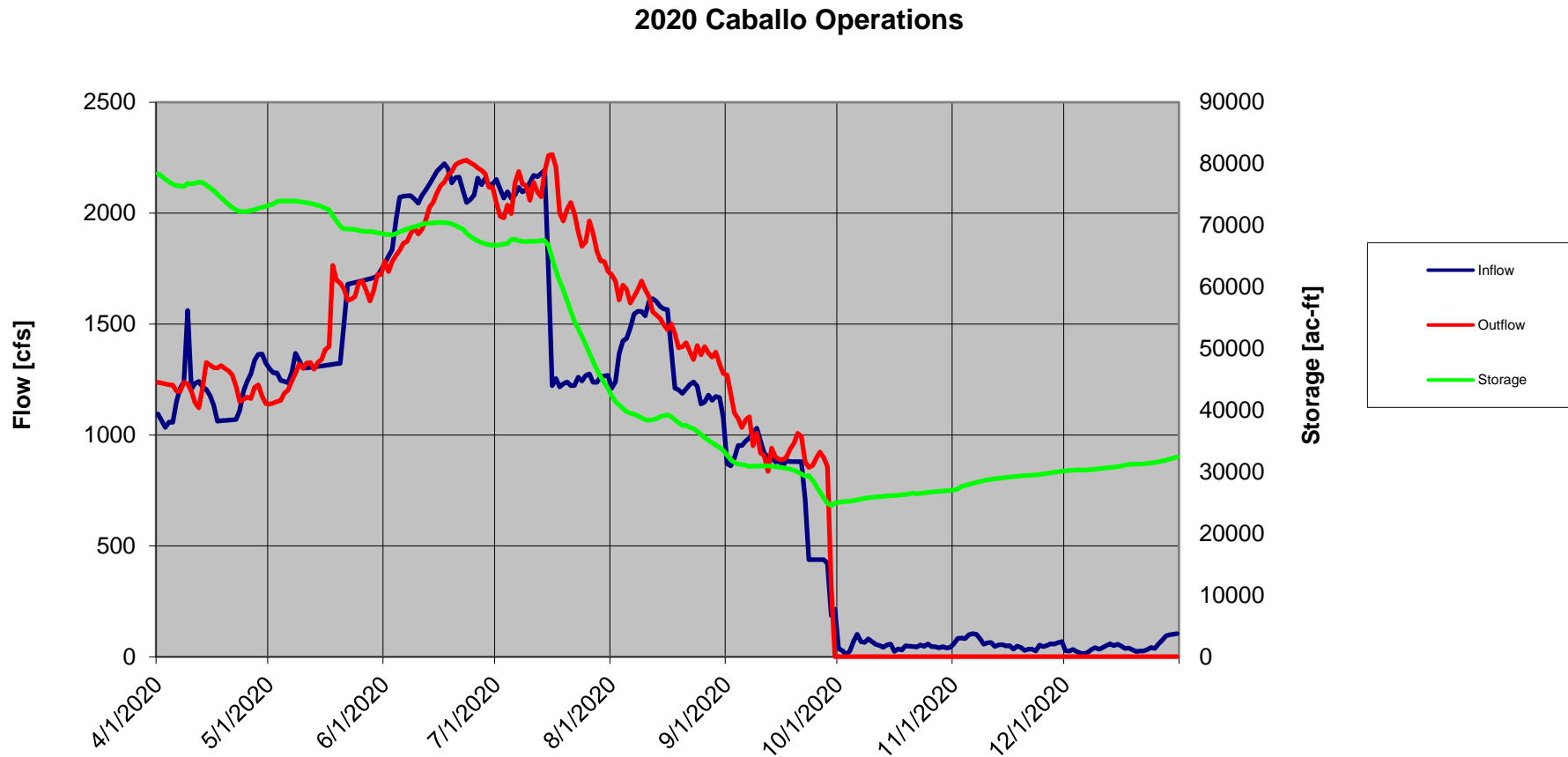
2020 Elephant Butte Elevation



Caballo Dam

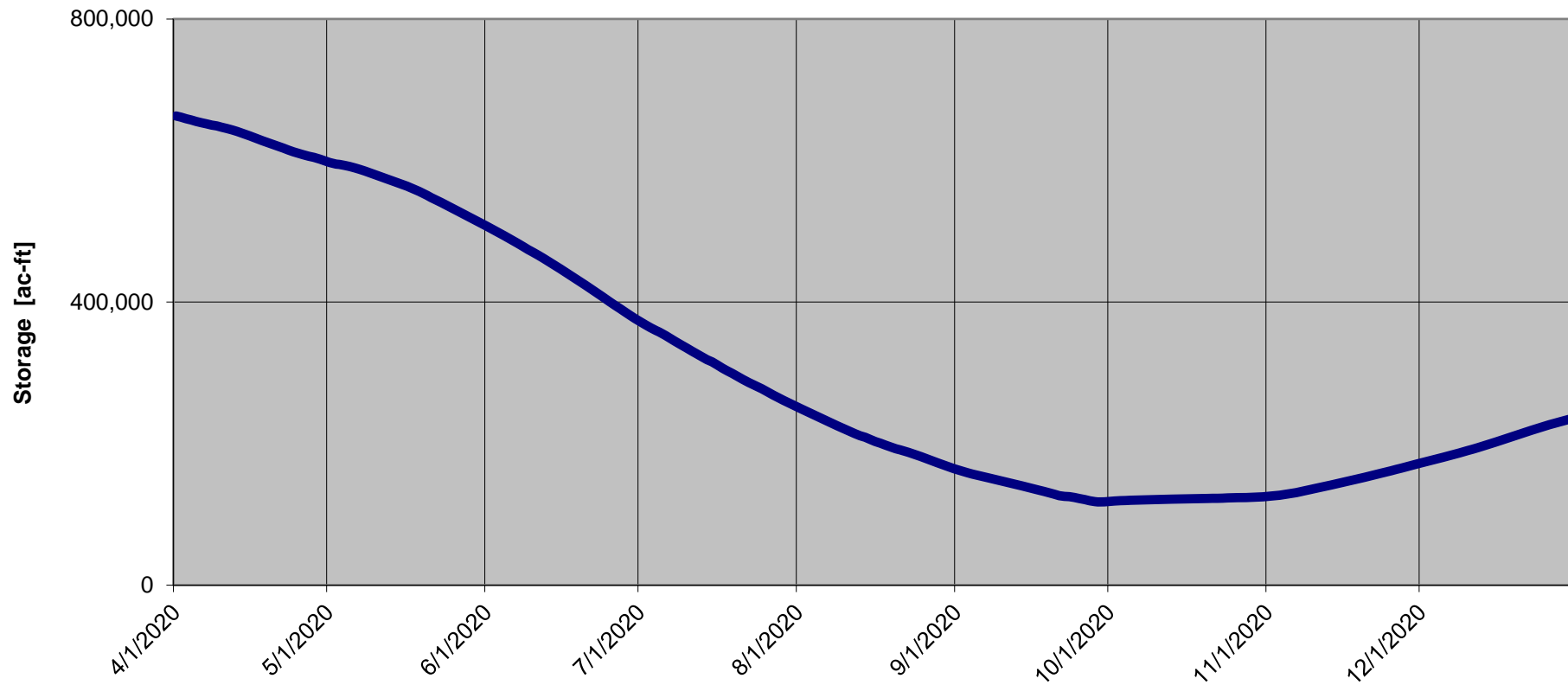


Proposed Caballo Operations



Article VII: In or Out

2020 Rio Grande Project Usable Storage



Questions / Comments

<https://www.usbr.gov/uc/albuq/water/aop/index.html>



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