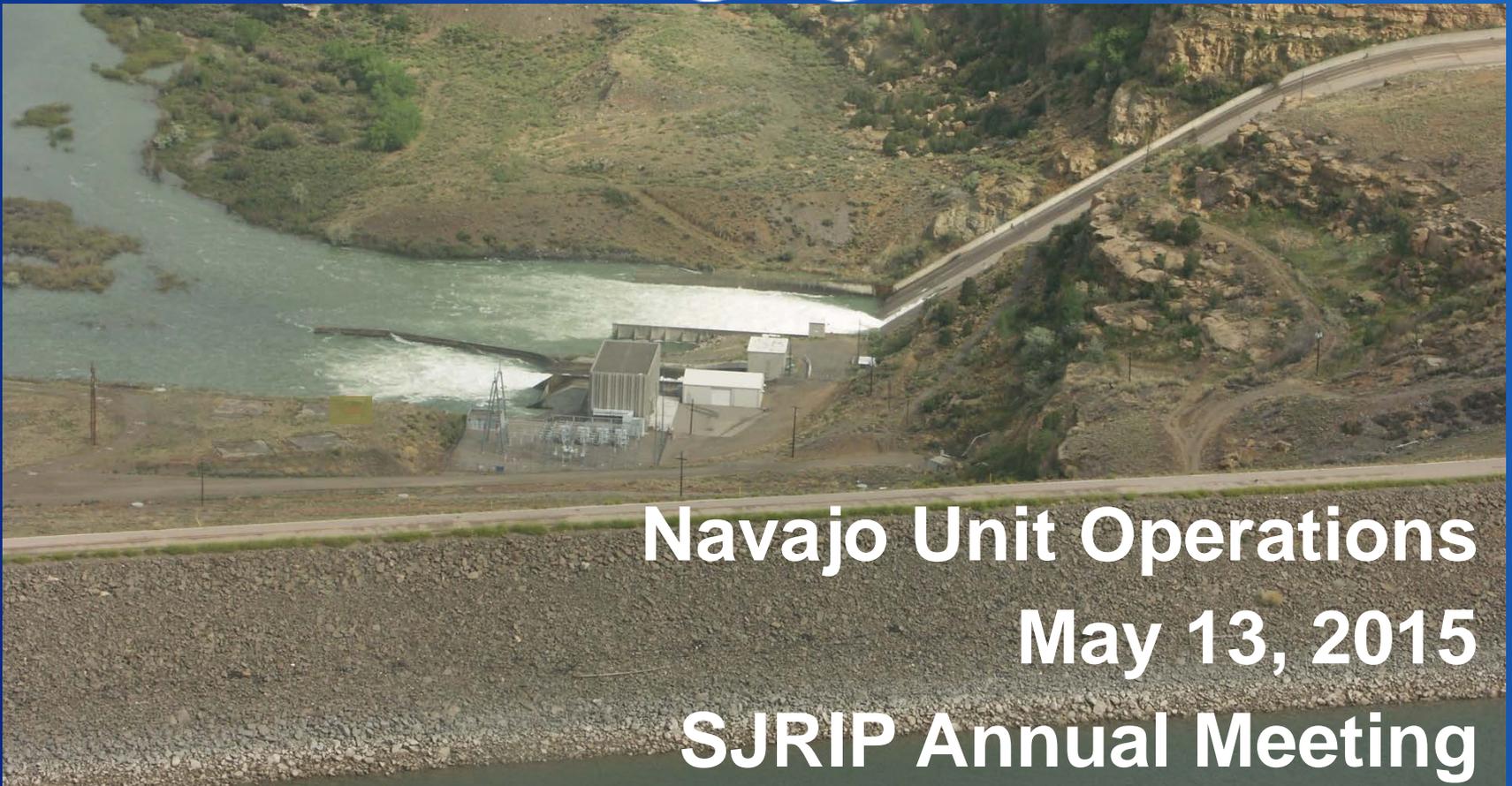


RECLAMATION

Managing Water in the West



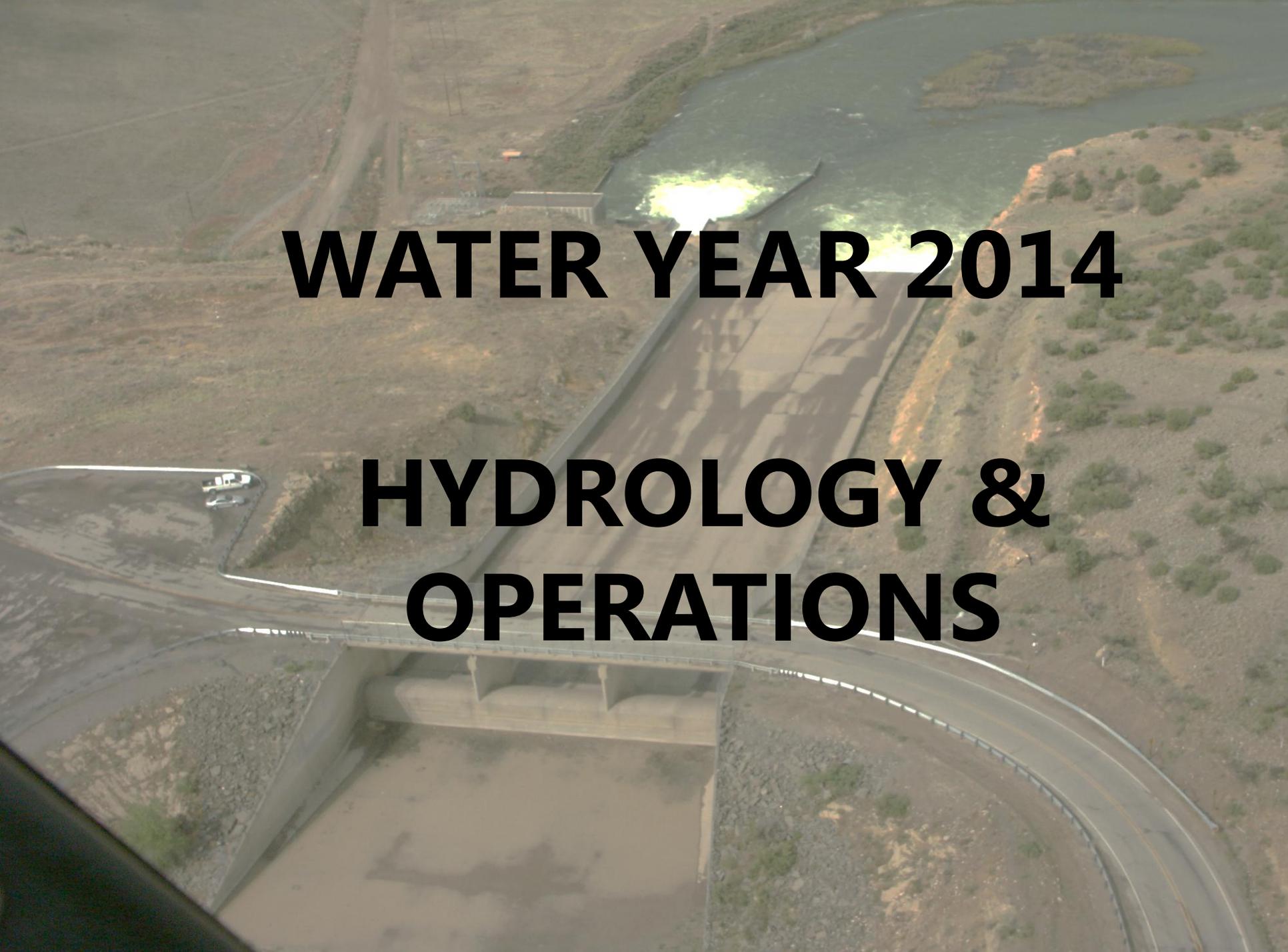
Navajo Unit Operations

May 13, 2015

SJRIP Annual Meeting



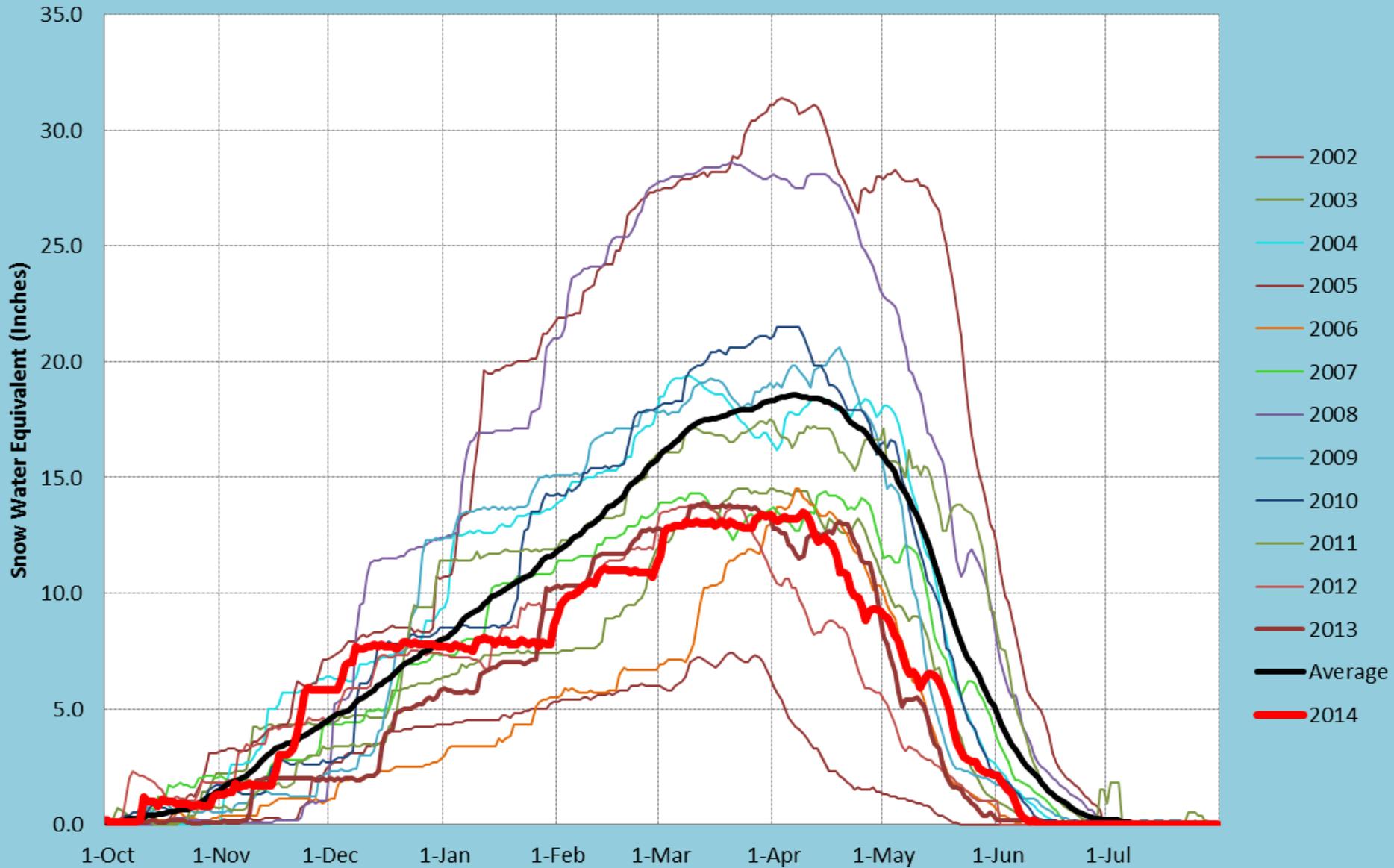
U.S. Department of the Interior
Bureau of Reclamation

An aerial photograph of a large concrete dam and reservoir. The reservoir is filled with water, and a bright reflection of the sun is visible on its surface. The dam structure is prominent, with a road curving around its base. The surrounding landscape is arid and hilly. The text "WATER YEAR 2014" is overlaid in large, bold, black letters across the upper portion of the image.

WATER YEAR 2014

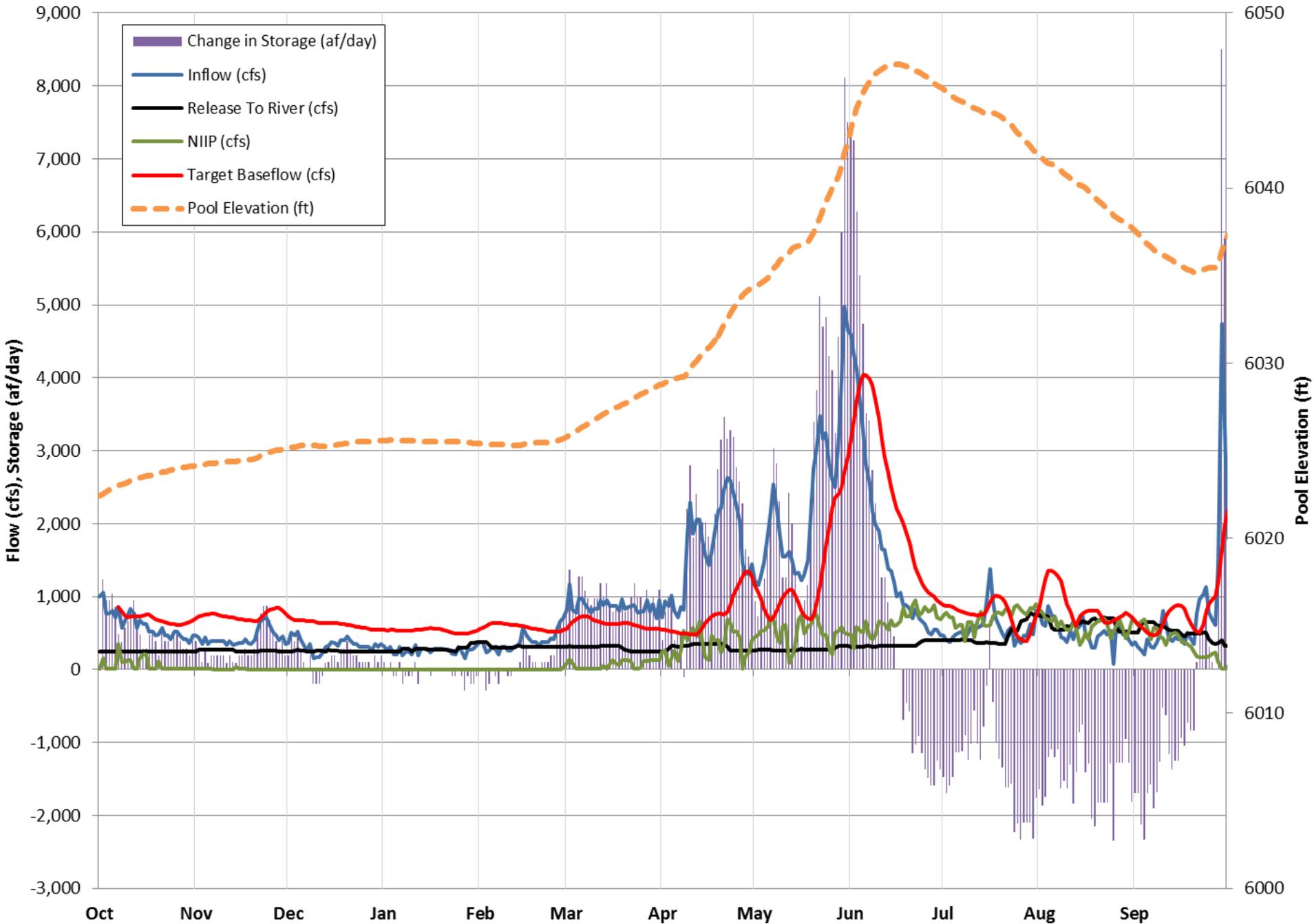
**HYDROLOGY &
OPERATIONS**

Navajo Reservoir SNOTEL SWE from 2002-2014



RECLAMATION

Navajo Reservoir Operations WY 2014



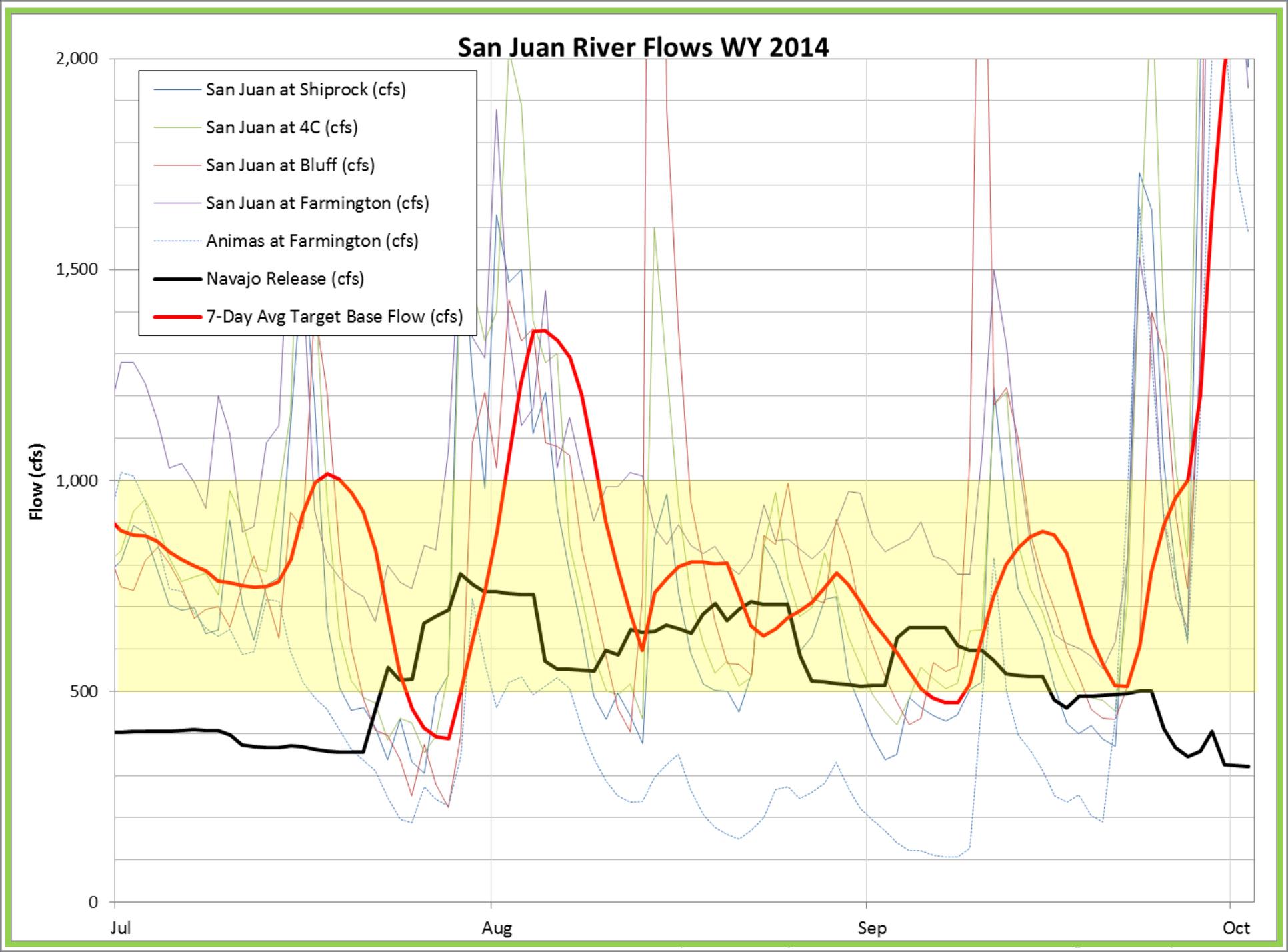
San Juan River Flows WY 2014

- San Juan at Shiprock (cfs)
- San Juan at 4C (cfs)
- San Juan at Bluff (cfs)
- San Juan at Farmington (cfs)
- Animas at Farmington (cfs)
- Navajo Release (cfs)
- 7-Day Avg Target Base Flow (cfs)

Flow (cfs)

2,000
1,500
1,000
500
0

Jul Aug Sep Oct

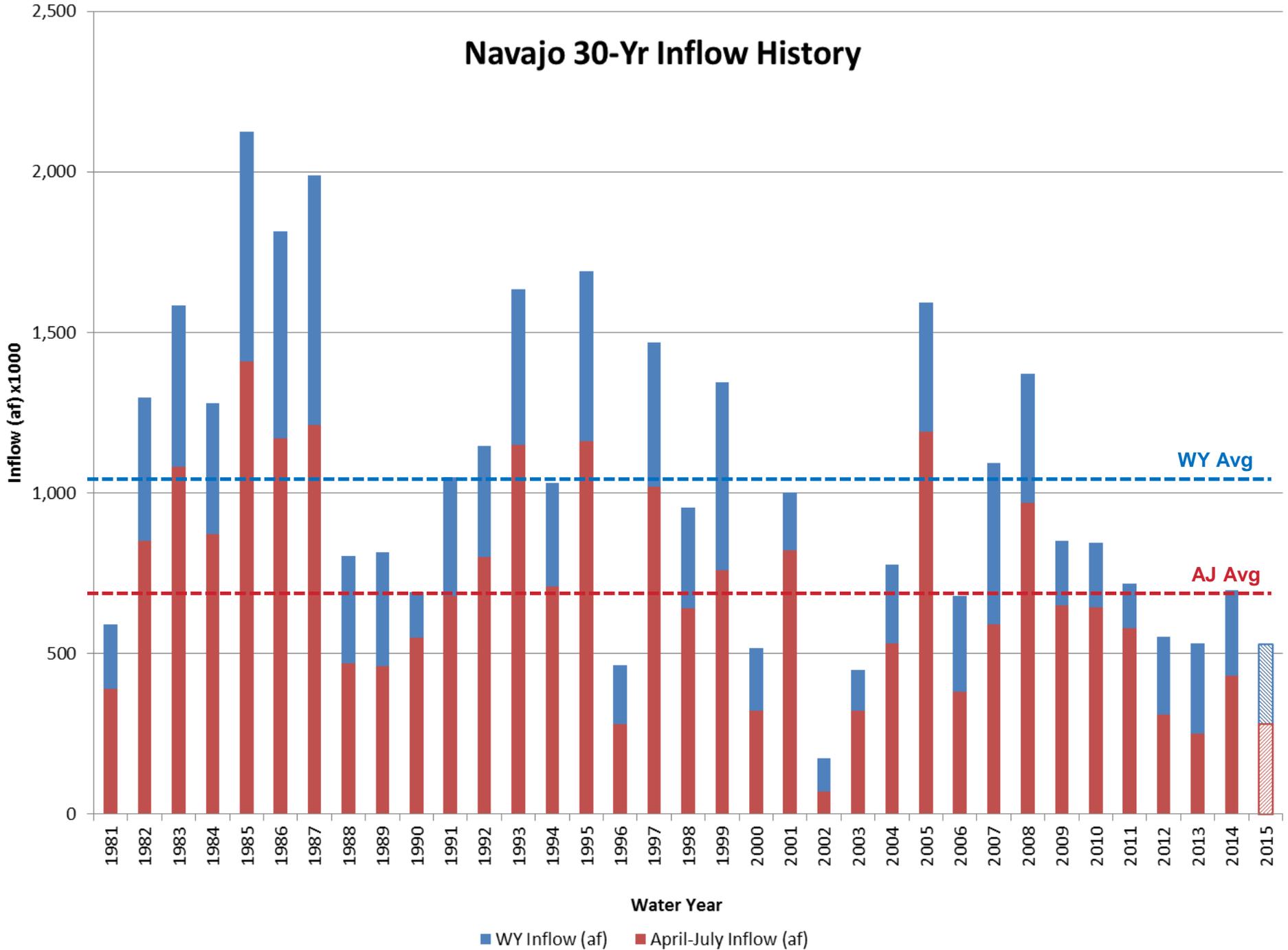


Annual Flow Statistics		# OF DAYS MEETING FLOW				YEARS MEETING GOAL			
YEAR	Hydrograph Released	>9,975 cfs	>7,760 cfs	>4,850 cfs	>2,425 cfs	>9,975 cfs	>7,760 cfs	>4,850 cfs	>2,425 cfs
	<i>Minimum Target</i>	5	10	21	10	10	6	4	2
1998	2-wk	0	4	35	66	1	1	0	0
1999	1-wk	0	1	31	72	2	2	0	0
2000	ns 1-wk	0	0	6	40	3	3	1	0
2001	2-wk	0	4	36	56	4	4	0	0
2002	none	0	0	0	0	5	5	1	1
2003	none	0	0	0	14	6	6	2	0
2004	none	0	0	1	26	7	7	3	0
2005	full+	11	18	52	85	0	0	0	0
2006	1-wk	0	0	8	24	1	1	1	0
2007	2-wk	0	3	21	56	2	2	0	0
2008	3-wk	6	25	62	121	0	0	0	0
2009	1-wk	0	0	20	41	1	1	1	0
2010	none	0	0	0	19	2	2	2	0
2011	1-wk	0	7	12	29	3	3	3	0
2012	1-wk	0	0	6	10	4	4	4	0
2013	none	0	0	0	0	5	5	5	1
2014	none	0	0	0	22	6	6	6	0



**INTERIM 2015
NAVAJO
OPERATIONS**

Navajo 30-Yr Inflow History



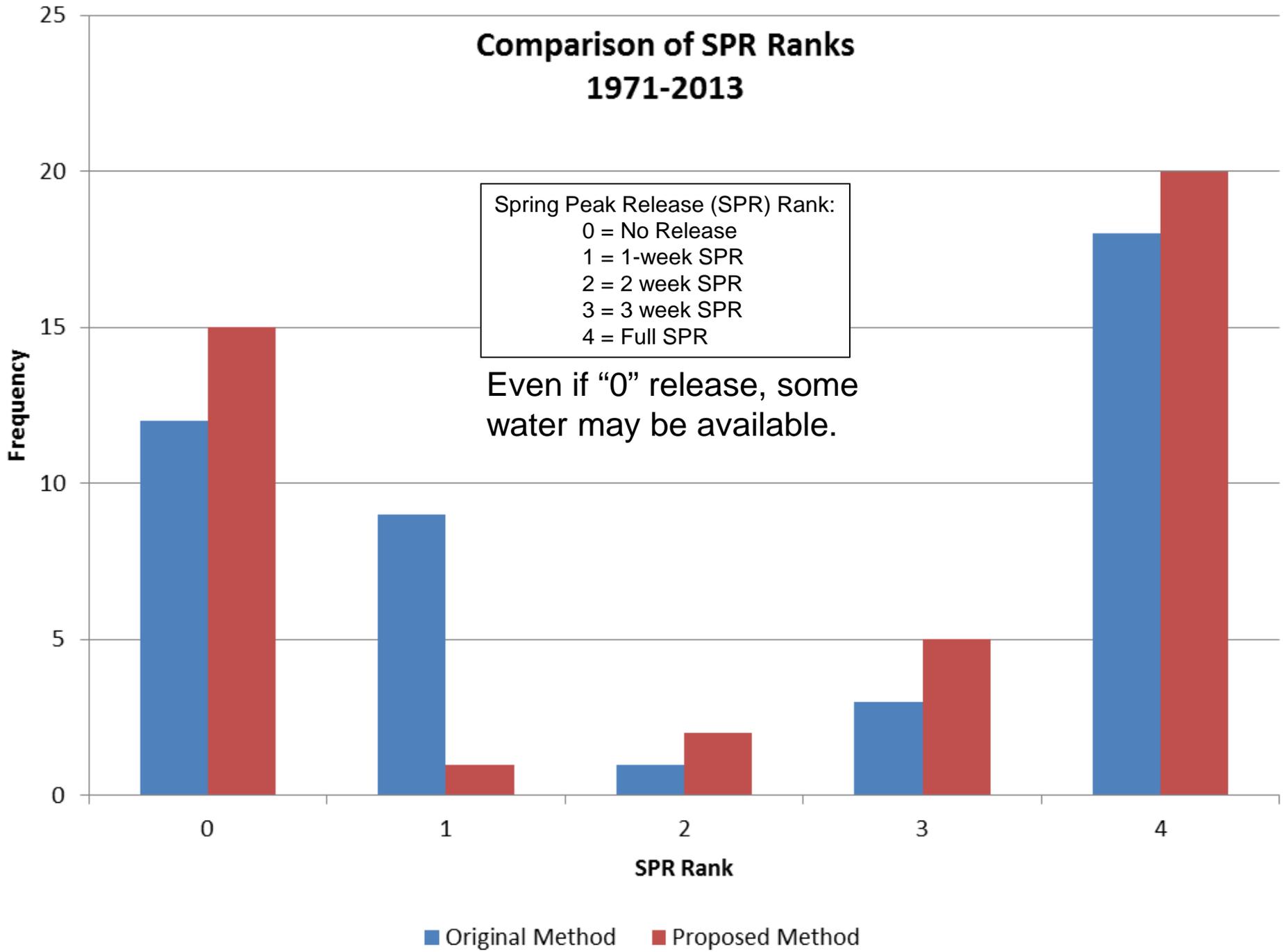
Navajo New Operations 2015

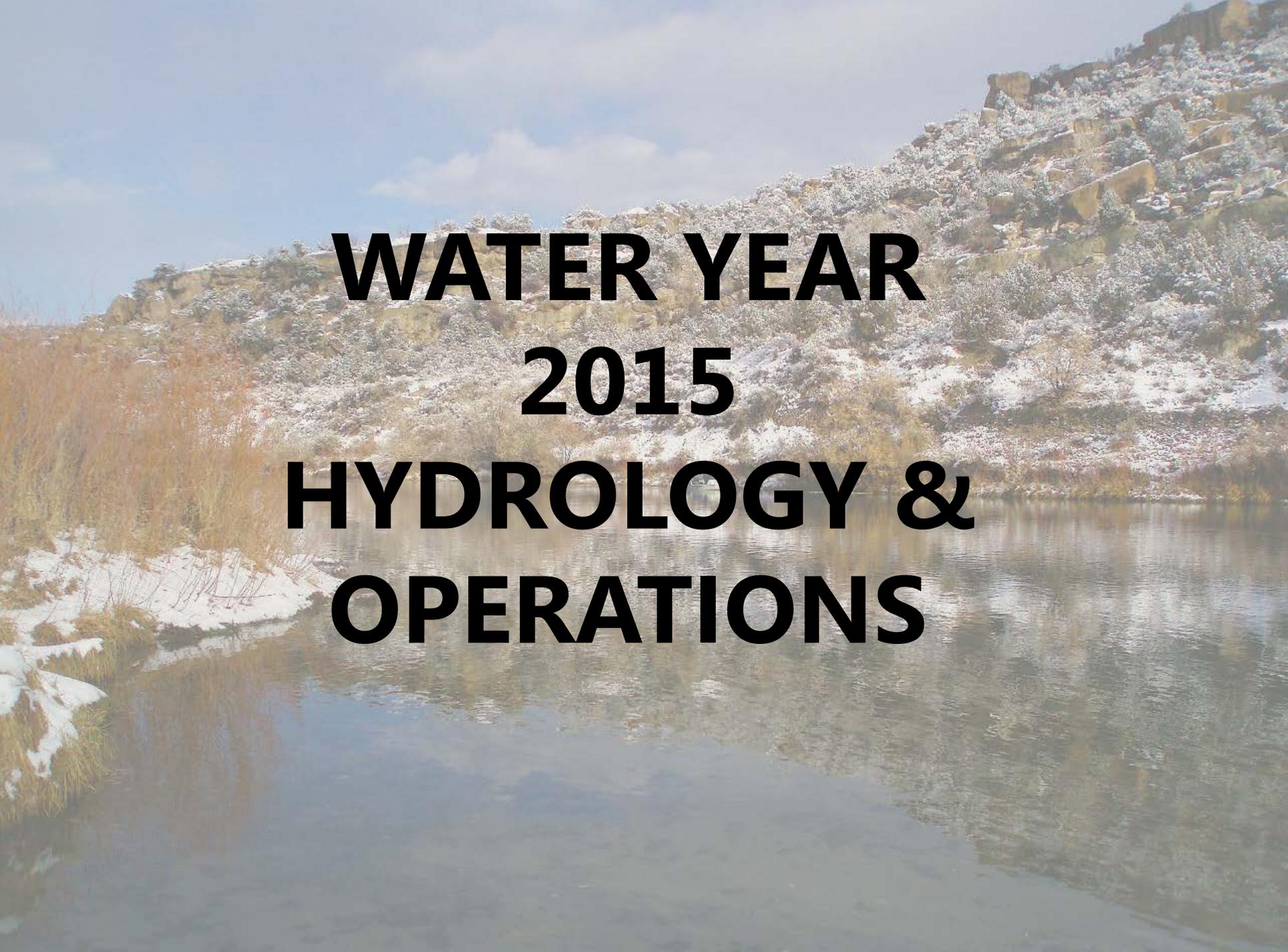
February 2015 E-Flows Workshop

- Available Water for Spring Peak Release calculated using End of Water Year Storage Target (EWYST) of 6063 ft (with 6050 ft option).
- Minimizes the risks of both shortage and spill in the reservoir.
- Navajo will be operated to meet EWYST by the end of each water year (with all contracts and TBF met). Any volume over the EWYST is available for Spring Peak Releases or other adaptive management deemed useful by the SJRIP.
- Available Water not used by the SJRIP will be released by the rules set in the Flow Recommendations.
- In dry years, reservoir may come short of EWYST (i.e. contracts and TBF will be met, but no water available for spring peak release).
- Will need to build-up to these levels (difficult during drought, but could happen with one average year)

RECLAMATION

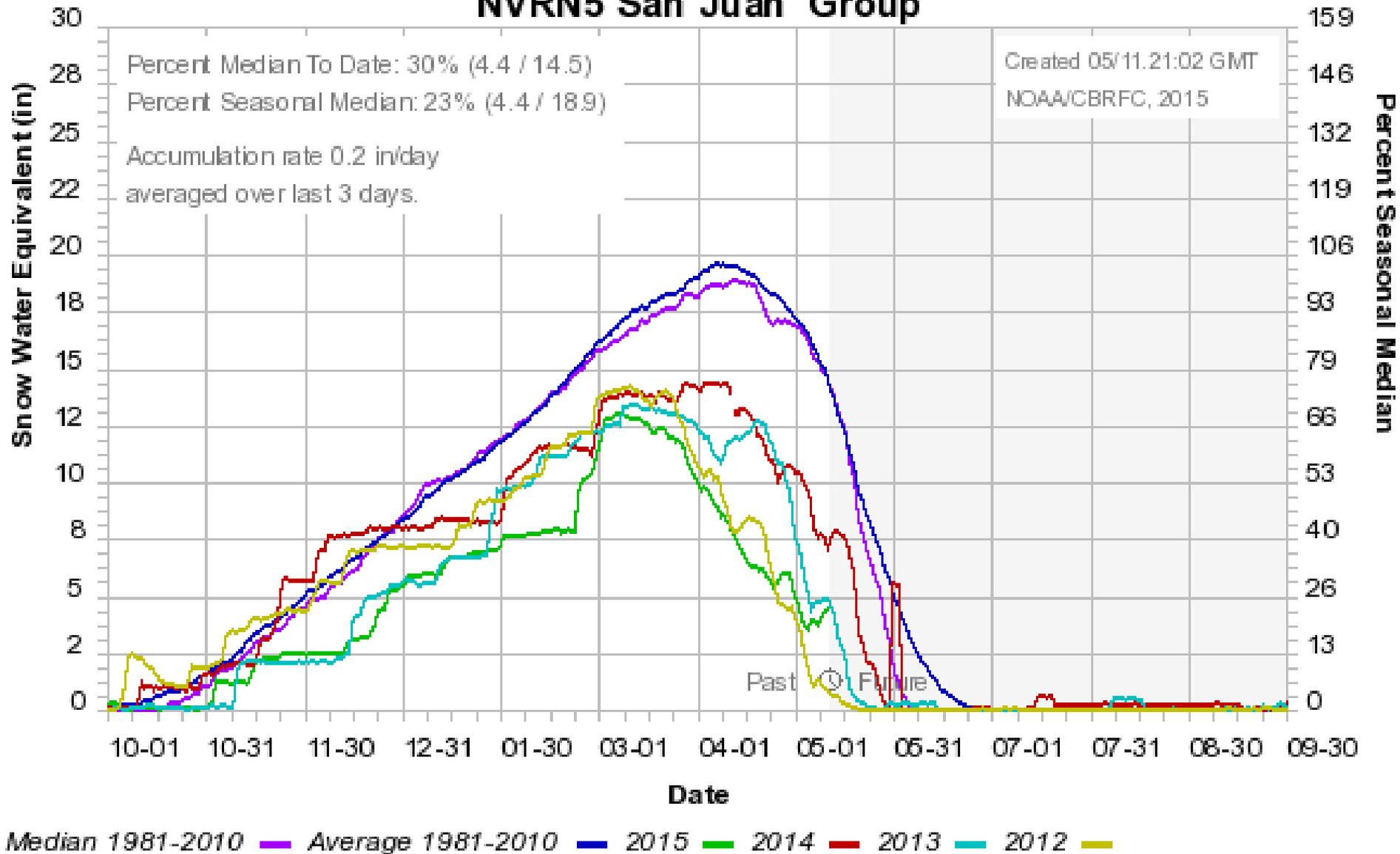
Comparison of SPR Ranks 1971-2013



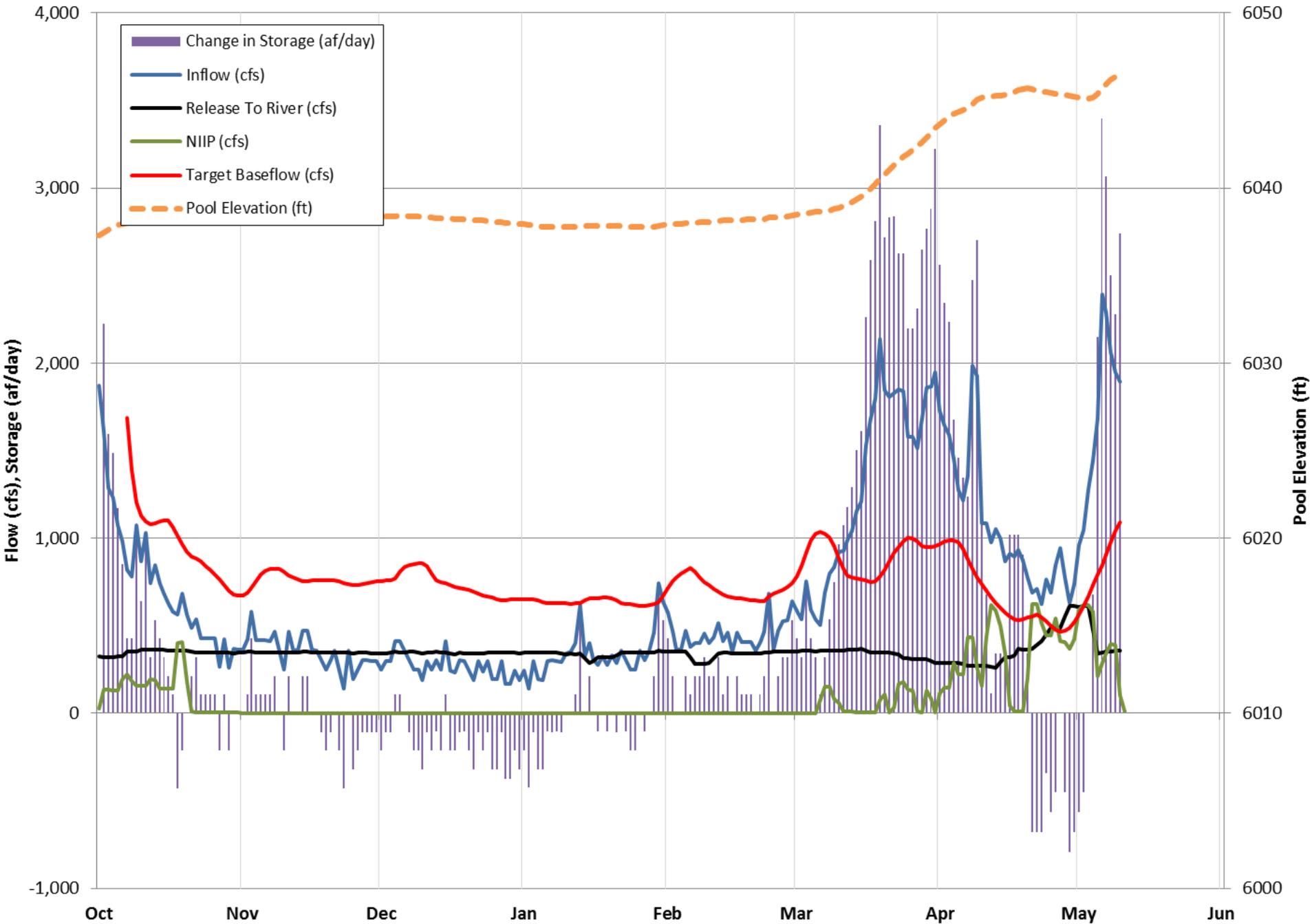
A scenic view of a river flowing through a valley. The hills are covered in a light layer of snow, and the grasses are dry and brown. The sky is blue with some clouds. The text is overlaid on the center of the image.

**WATER YEAR
2015
HYDROLOGY &
OPERATIONS**

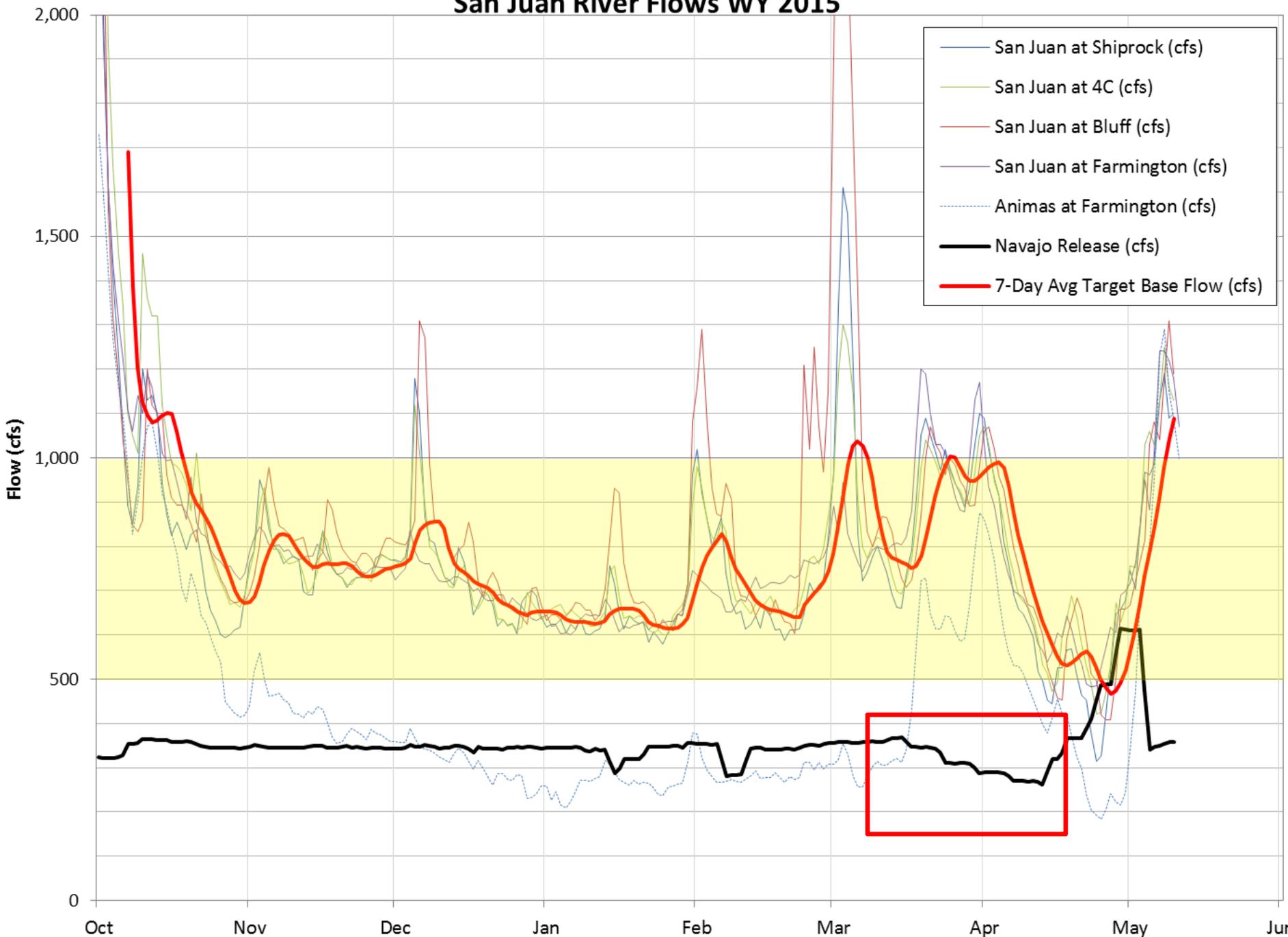
Colorado Basin River Forecast Center NVRN5 San Juan Group



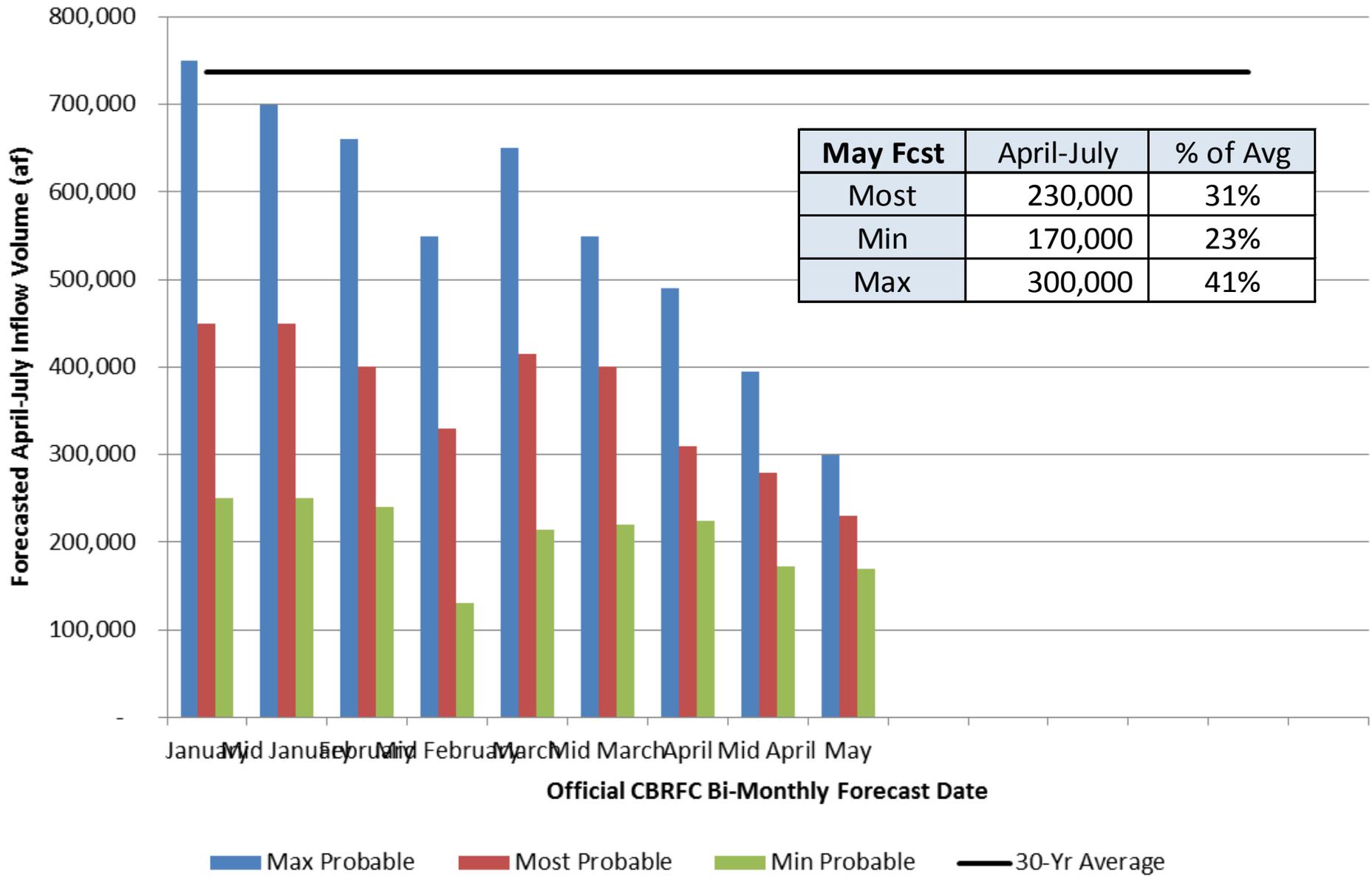
Navajo Reservoir Operations WY 2015



San Juan River Flows WY 2015

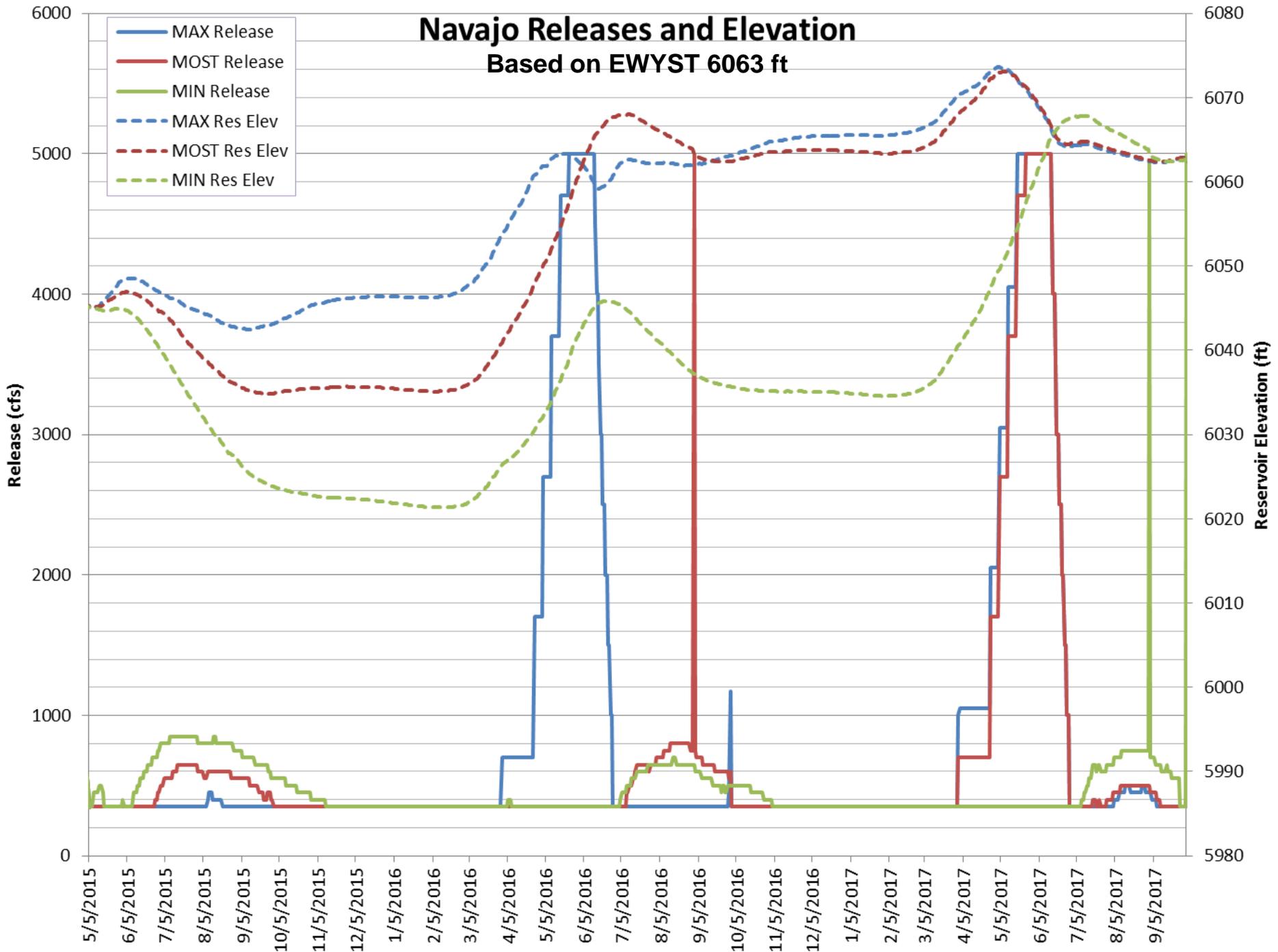


Forecasted April-July Modified Unregulated Inflow Volume

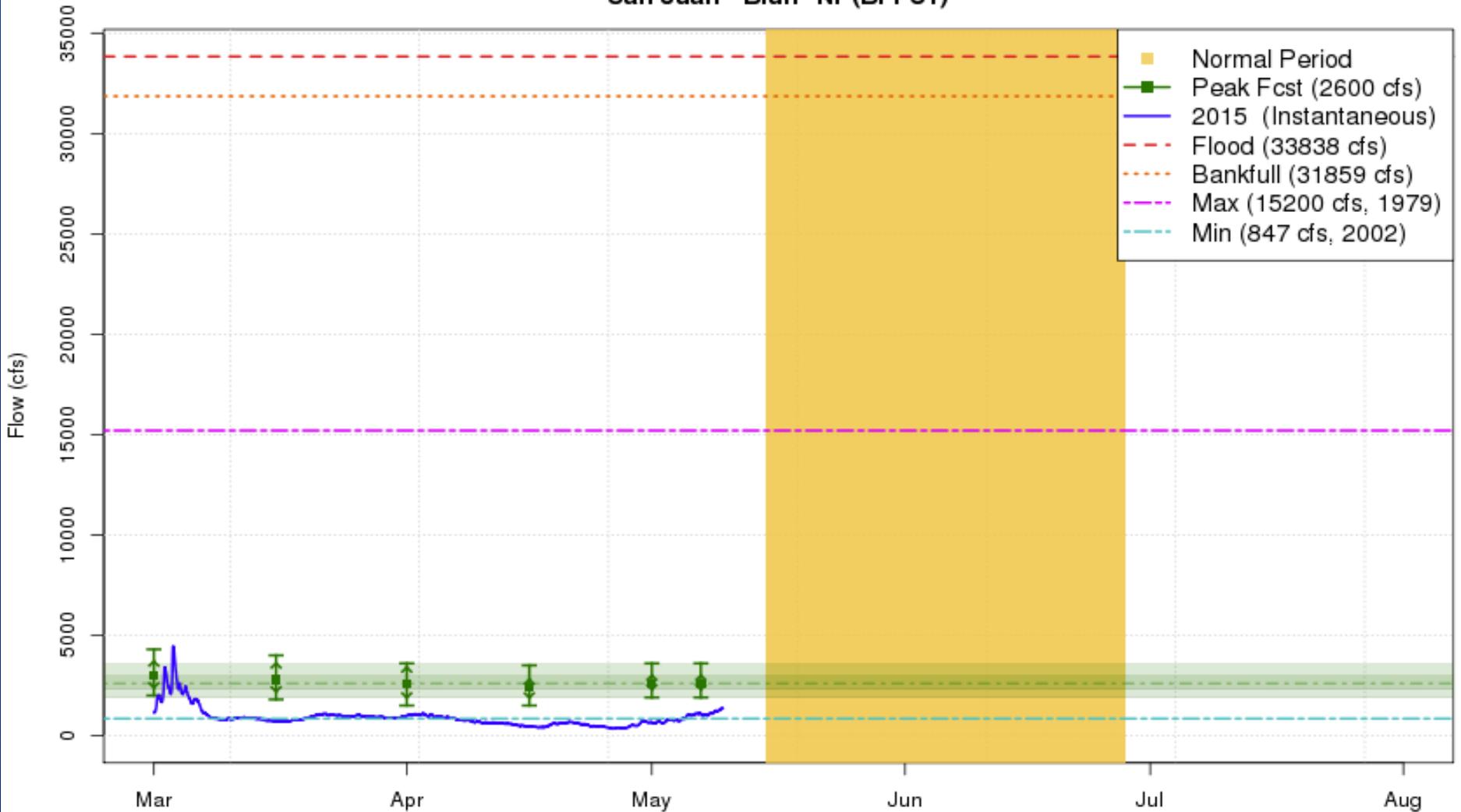


Navajo Releases and Elevation

Based on EWYST 6063 ft



2015 Mean Daily Peak Flow Forecast San Juan - Bluff- Nr (BFFU1)



These graphics are updated approximately every two weeks between 3/1 and 5/1

Plot Created 2015-05-09 11:23:22

CBRFC / NWS / NOAA

RECLAMATION

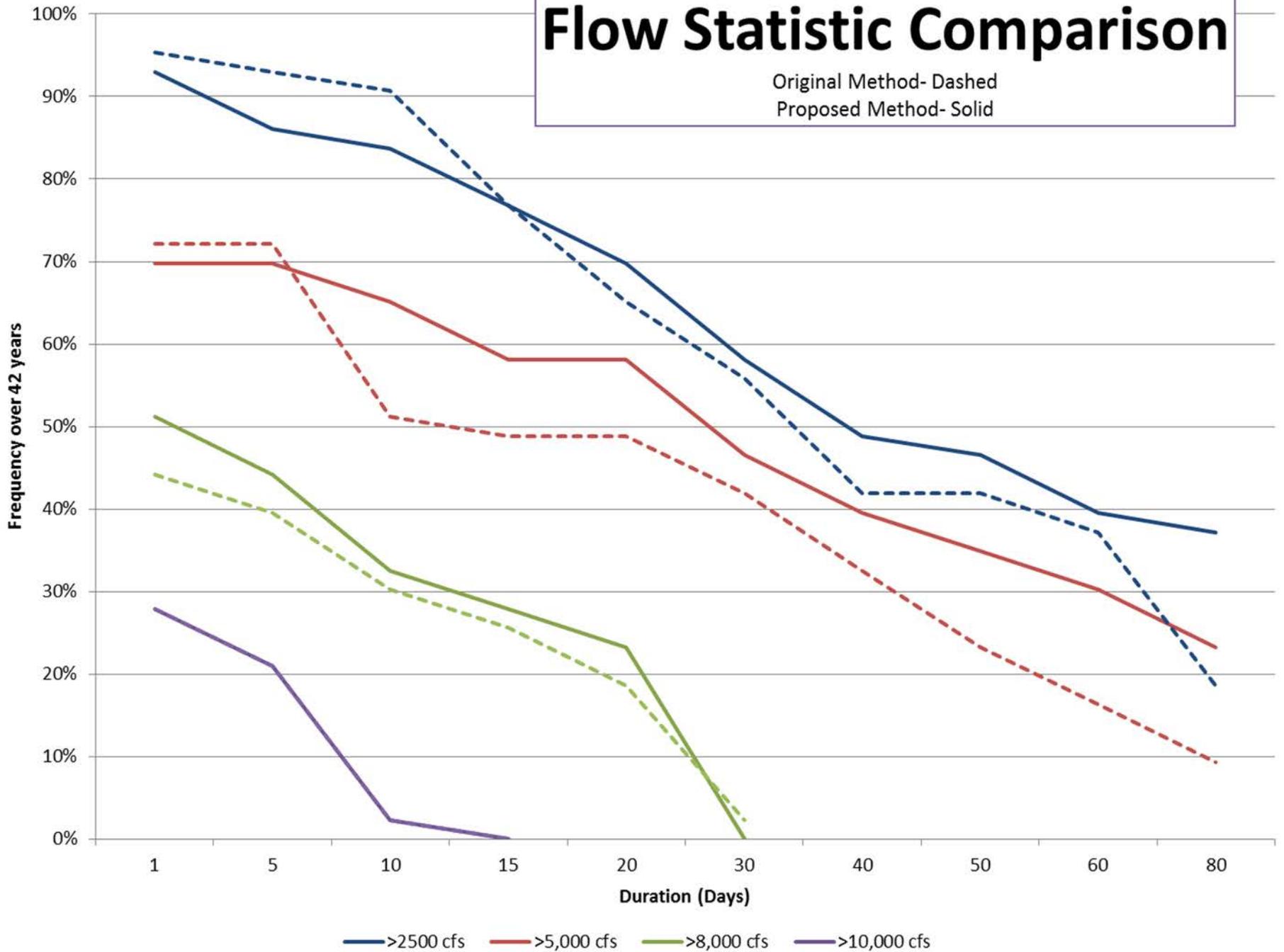
Annual Flow Statistics		# OF DAYS MEETING FLOW				YEARS MEETING GOAL			
YEAR	Hydrograph Released	>9,975 cfs	>7,760 cfs	>4,850 cfs	>2,425 cfs	>9,975 cfs	>7,760 cfs	>4,850 cfs	>2,425 cfs
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2004	none	0	0	1	26	7	7	3	0
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2011	1-wk	0	7	12	29	3	3	3	0
2012	1-wk	0	0	6	10	4	4	4	0
2013	none	0	0	0	0	5	5	5	1
2014	none	0	0	0	22	6	6	6	0
2015	none	0	0	0	0	7	7	7	1

RECLAMATION

RECLAMATION

Flow Statistic Comparison

Original Method- Dashed
Proposed Method- Solid



PRELIMINARY AVAILABLE WATER CALCULATION 2015

CBRFC Forecast Date: 5/4/2015

Water Year	End of Water Year Storage Target (ft)	MIN PROBABLE FORECAST		MOST PROBABLE FORECAST		MAX PROBABLE FORECAST	
		Available Water over base (af)	Spring Peak Release **	Available Water over base (af)	Spring Peak Release **	Available Water over base (af)	Spring Peak Release **
2015	6063	0	0	0	0	0	0
	6050*	0	0	0	0	0	0
2016	6063	0	0	47,736	0	435,266	Type 4
	6050*	0	0	195,616	Type 2	596,134	Type 4
2017	6063	42,671	0	433,837	Type 4	465,695	Type 4
	6050*	197,030	Type 2	588,196	Type 4	620,055	Type 4

* Note that use of the maximum Available Water affects the following water year's Available Water calculation. Only EWYST of 6063ft is modeled.

** Available Water is the total volume available over the minimum base release from the reservoir (350 cfs). The Spring Peak Release assigned is the closest prescribed hydrograph from the flow recommendations based on the Available Water volume. Any remaining Available Water will be available to the SJRIP for other uses, or will be evacuated from the reservoir through Operational Spill. Operational Spill will not be required unless the end of water year storage is over 6063 ft.

Volume including 350 cfs base (af)	Volume over 350 cfs base (af)	Release Type	Release Description
90,483	83,207	Type 1	1-week at 5,000 cfs with 3-day ramps on either side
150,347	138,545	Type 2	2 weeks at 5,000 cfs with 3-day ramps on either side
229,686	212,331	Type 3	3-weeks at 5,000 cfs with 3-day ramps on either side
418,512	374,777	Type 4	3-weeks at 5,000 cfs with full ramps on either side

Available Water forecast twice per month from January-July using CBRFC forecasts