

RECLAMATION

Managing Water in the West

Flaming Gorge Working Group Meeting

Hydrology and Operations

August 30, 2016



U.S. Department of the Interior
Bureau of Reclamation

Heather E. Patno
Hydraulic Engineer (hydrologic)
Upper Colorado Region

Presentation Outline

- Authorities
- Record of Decision – Process
- Record of Decision – Parameters
- Forecasted and Observed 2016 Operations
- Questions / Discussion

Presentation Outline

- **Authorities**
- Record of Decision – Process
- Record of Decision – Parameters
- Forecasted and Observed 2016 Operations
- Questions / Discussion

Authorities

- Colorado River Compact of 1922
- Upper Colorado River Basin Compact of 1948
 - Allocated water among the Upper Basin states
- Colorado River Storage Project Act of 1956 (CRSP Act)
 - Enacted to facilitate development of the water and power resources of the Upper Basin
- 1992 Biological Opinion
- 2006 Record of Decision on FG Operations

Presentation Outline

- Authorities and Purposes
- **Record of Decision – Process**
- Record of Decision – Parameters
- Forecasted and Observed 2016 Operations
- Questions / Discussion

Flaming Gorge Decision Process

Operations under the Record of Decision (2006 ROD)

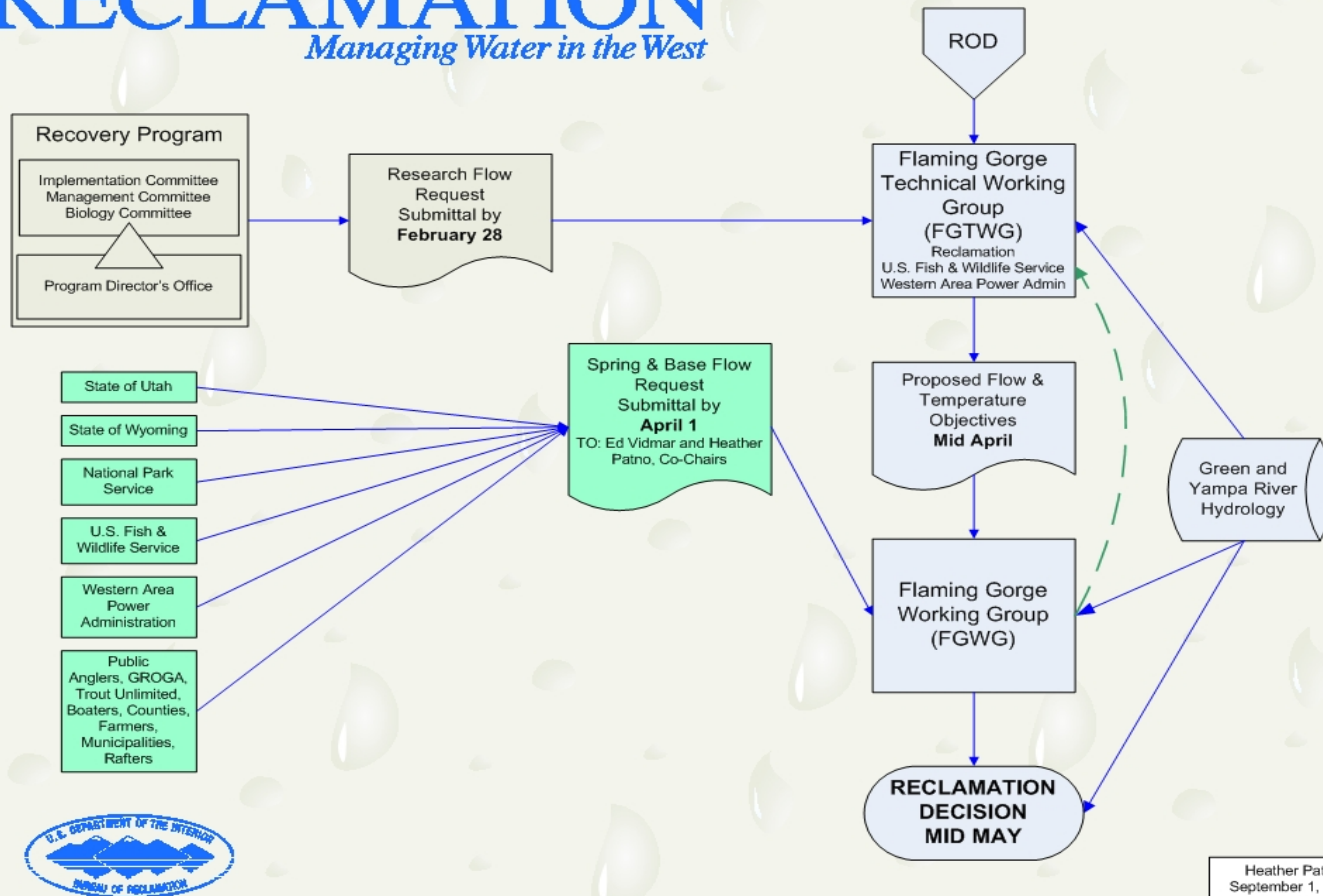
Four Step Process for Decision Making

1. Recovery Program Request for Research Flows
<http://www.coloradoriverrecovery.org/>
ESA Section 7 Compliance and allows the States of Colorado, Utah, and Wyoming to continue utilizing their authorized apportionment under the 1922 Compact
2. Flaming Gorge Technical Working Group
Informal Section 7 Compliance
3. Flaming Gorge Working Group
Public Input and Comments
4. Reclamation makes the final decision of how to operate.

RECLAMATION

Flaming Gorge Process

RECLAMATION *Managing Water in the West*



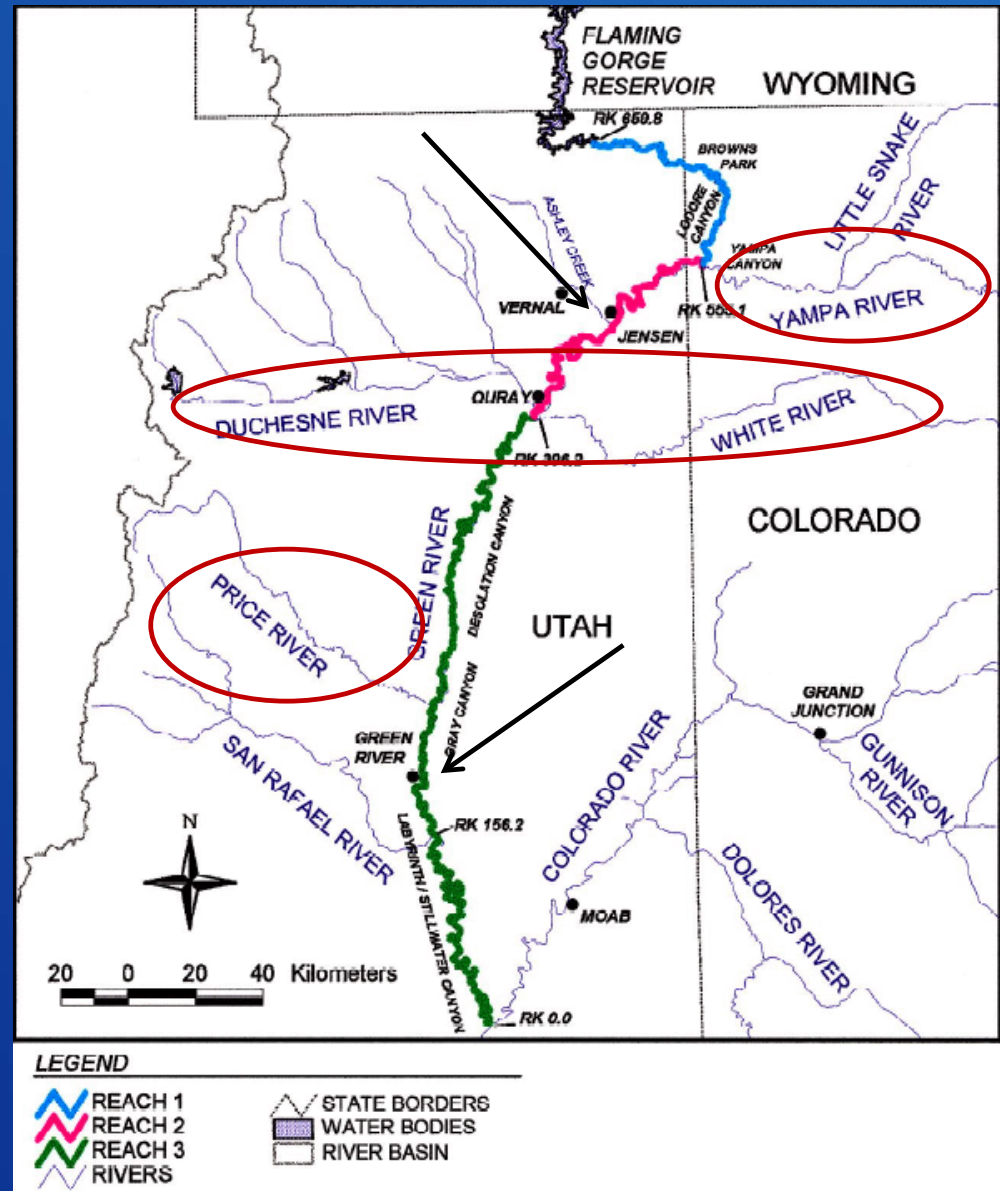
RECLAMATION

Presentation Outline

- Authorities and Purposes
- Record of Decision – Process
- **Record of Decision – Parameters**
- Forecasted and Observed 2016 Operations
- Questions / Discussion

Geographic Scope

- Reach 1 (Blue)
 - Flaming Gorge Dam to Yampa River Confluence
- Reach 2 (Pink)
 - Yampa River Confluence to White River confluence
- Reach 3 (Green)
 - White River confluence to confluence of Green and Colorado Rivers



RECLAMATION

Percentage Exceedances and Hydrologic Classifications

Hydrologic Classification

Percentage Exceedance Range

Wet

<10

Moderately Wet

30 to 10.1

Average

70 to 30.1

Moderately Dry

90 to 70.1

Dry

>90

RECLAMATION

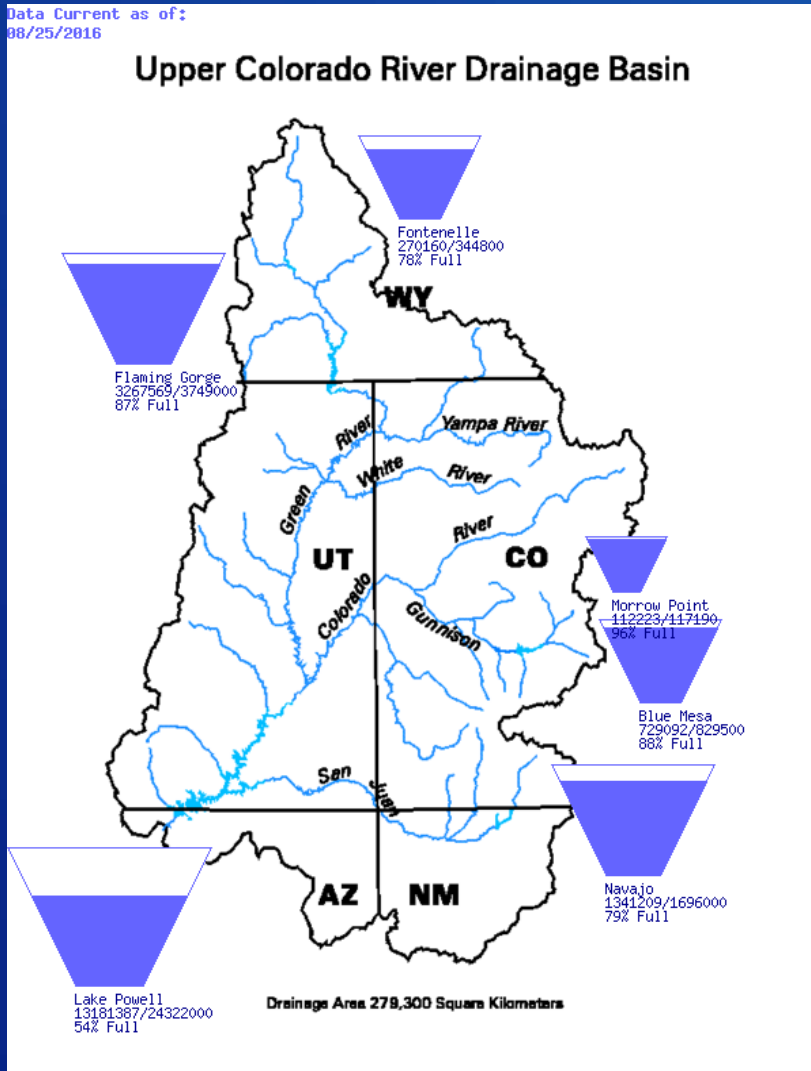
Condensed Table 5.5.—Flow and temperature recommendations by hydrologic condition for **Reach 2 (Yampa River to White River) to benefit endangered fishes in the Green River downstream of Flaming Gorge Dam.^a**

	Hydrologic Condition ^b				
	Wet (0 to 10% Exceedance)	Moderately Wet (10 to 30% Exceedance)	Average (30 to 70% Exceedance)	Moderately Dry (70 to 90% Exceedance)	Dry (90 to 100% Exceedance)
<i>SPRING PEAK FLOW</i>					
<i>Magnitude</i>	≥ 26,400 cfs	≥ 20,300 cfs	≥ 18,600 cfs in 1 of 2 avr yrs; ≥ 8,300 cfs in other avr yrs	≥ 8,300 cfs	
<i>Duration</i>	>22,700 cfs 2 weeks +, and >18,600 cfs >4 weeks	>18,600 cfs for 2 weeks or more	>18,600 cfs at least 2 weeks in 1 of 4 avr yrs.	at least 1 week.	2 days or more except in dry years (≥ 98% exceedance)
<i>Timing</i>	Peak flows should coincide with peak flows in the Yampa River				
	Hydrologic Condition ^b				
	Wet (0 to 10% Exceedance)	Moderately Wet (10 to 30% Exceedance)	Average (30 to 70% Exceedance)	Moderately Dry (70 to 90% Exceedance)	Dry (90 to 100% Exceedance)
<i>SUMMER THROUGH WINTER BASE FLOW</i>					
<i>Mean flow</i>	2,800 - 3,000 cfs	2,400 - 2,800 cfs	1,500 - 2,400 cfs	1,100 - 1,500 cfs	900 - 1,100 cfs
<i>Approximate period</i>	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1

Presentation Outline

- Authorities and Purposes
- Record of Decision – Process
- Record of Decision – Parameters
- **Forecasted and Observed 2016 Operations**
- Questions / Discussion

Current Conditions: CRSP System Storage



Storage Conditions (% Full)

- Fontenelle – 78%
- Flaming Gorge – 87%
- Blue Mesa – 88%
- Navajo – 79%
- Glen Canyon – 54%

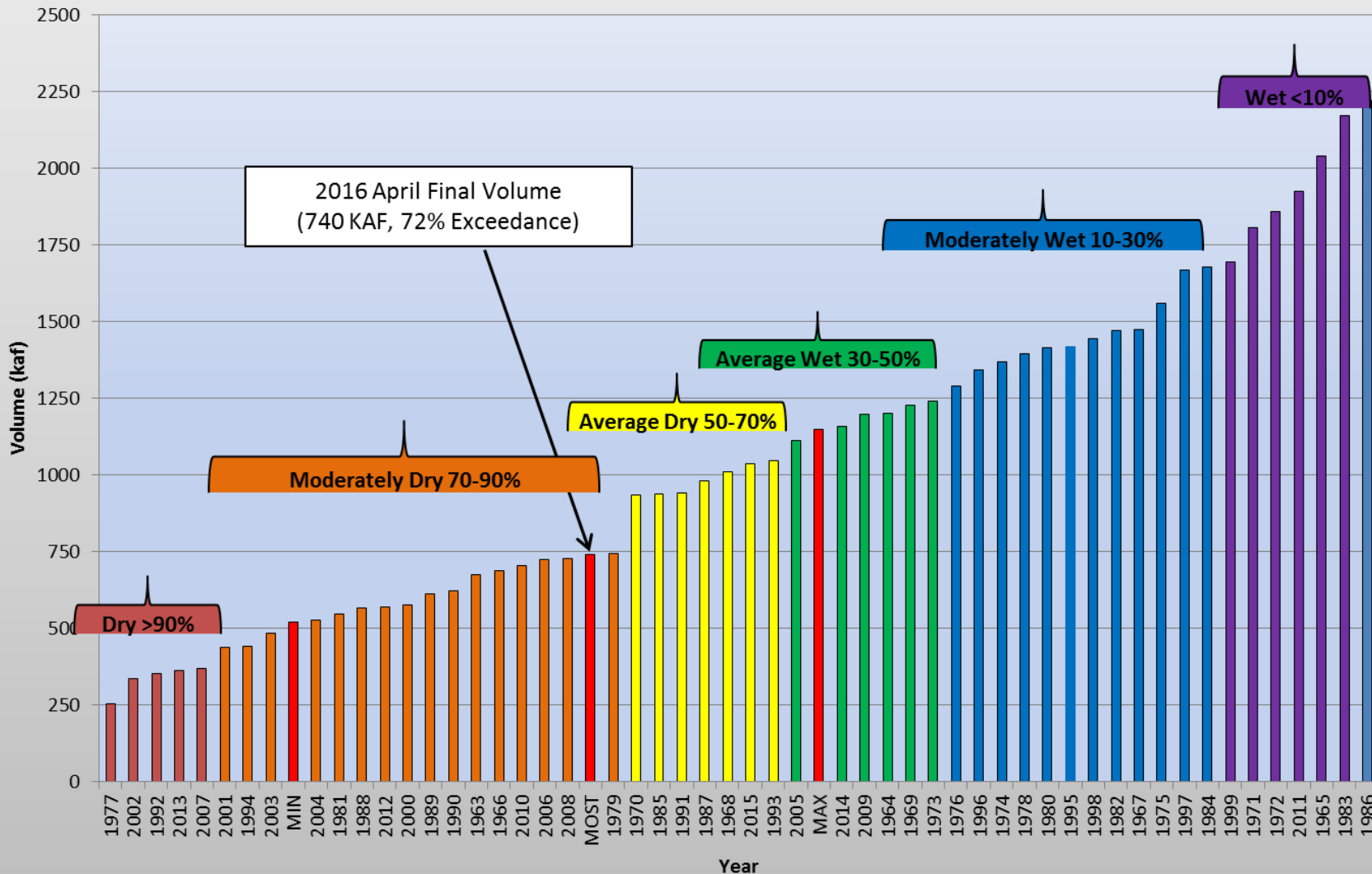
Observed April-July Inflow (%Avg)

- Fontenelle – 90%
- Flaming Gorge – 107%
- Blue Mesa – 89%
- Navajo – 76%
- Glen Canyon – 92%

RECLAMATION

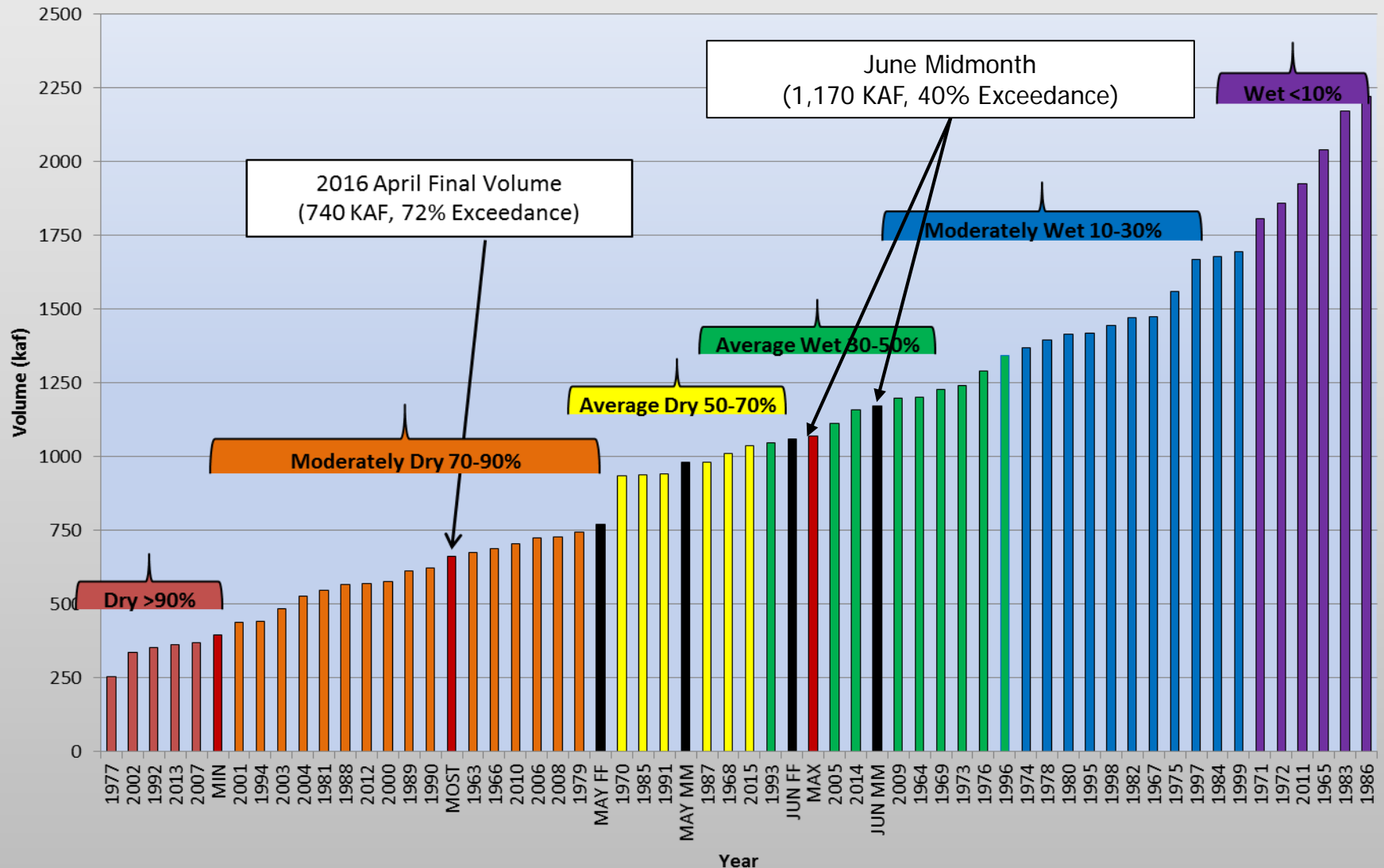
Flaming Gorge Reservoir

Historic April-July Unregulated Inflow Volume Ranking (1963-2015)



Flaming Gorge Reservoir

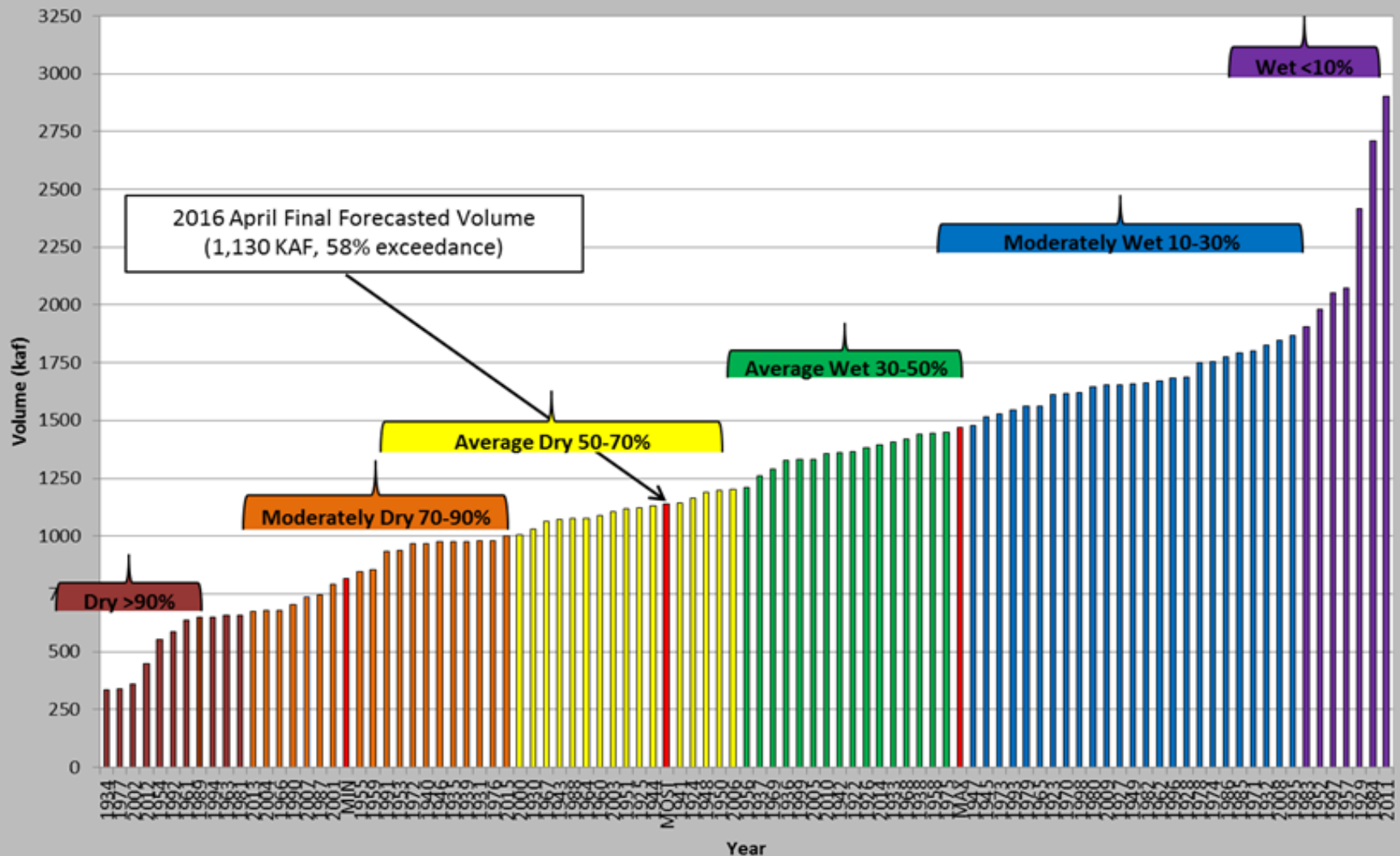
Historic April-July Unregulated Inflow Volume Ranking (1963-2015)



RECLAMATION

Yampa River Basin - Maybell Plus Lily

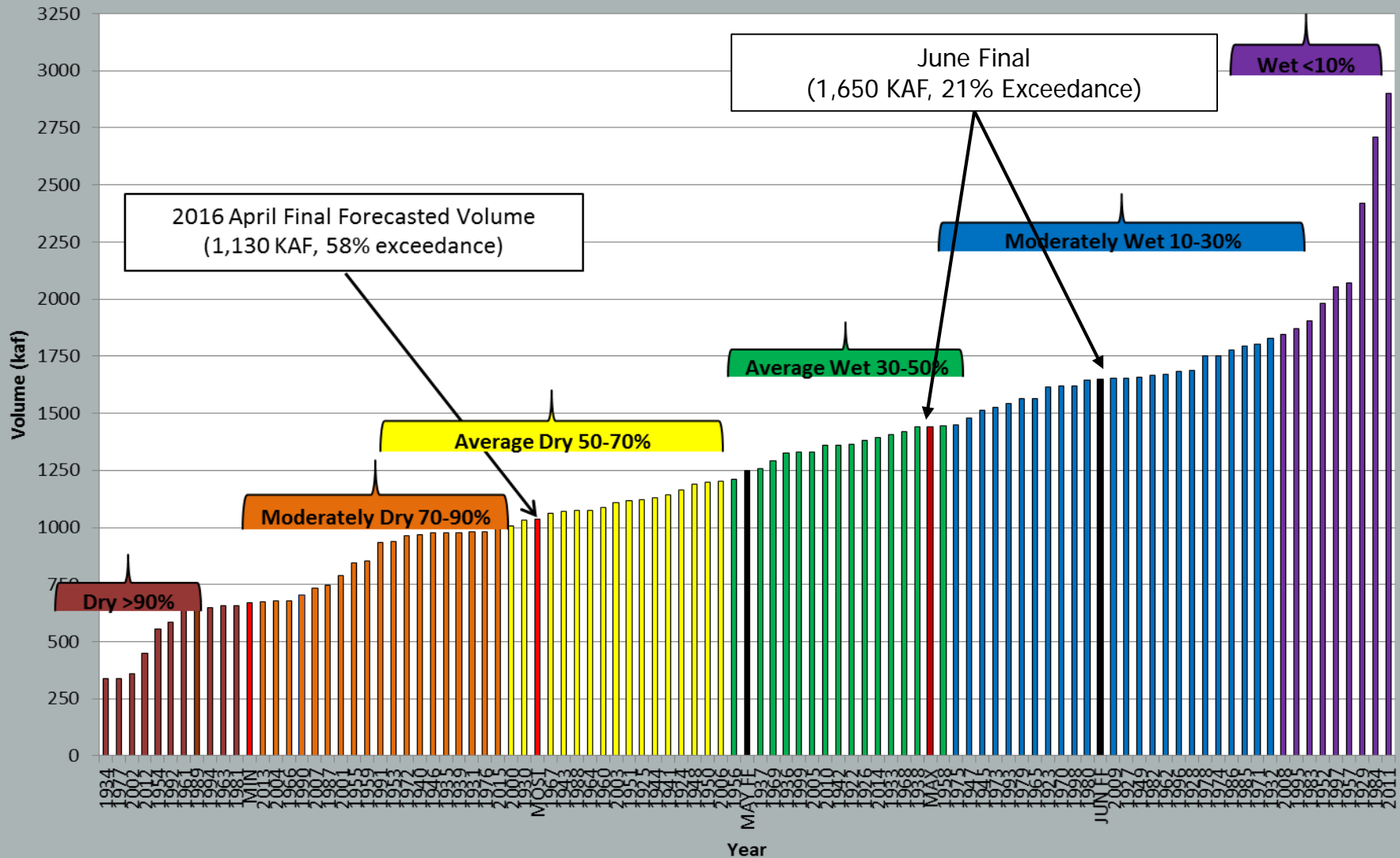
Historic April-July Unregulated Inflow Volume Ranking (1922-2015)



RECLAMATION

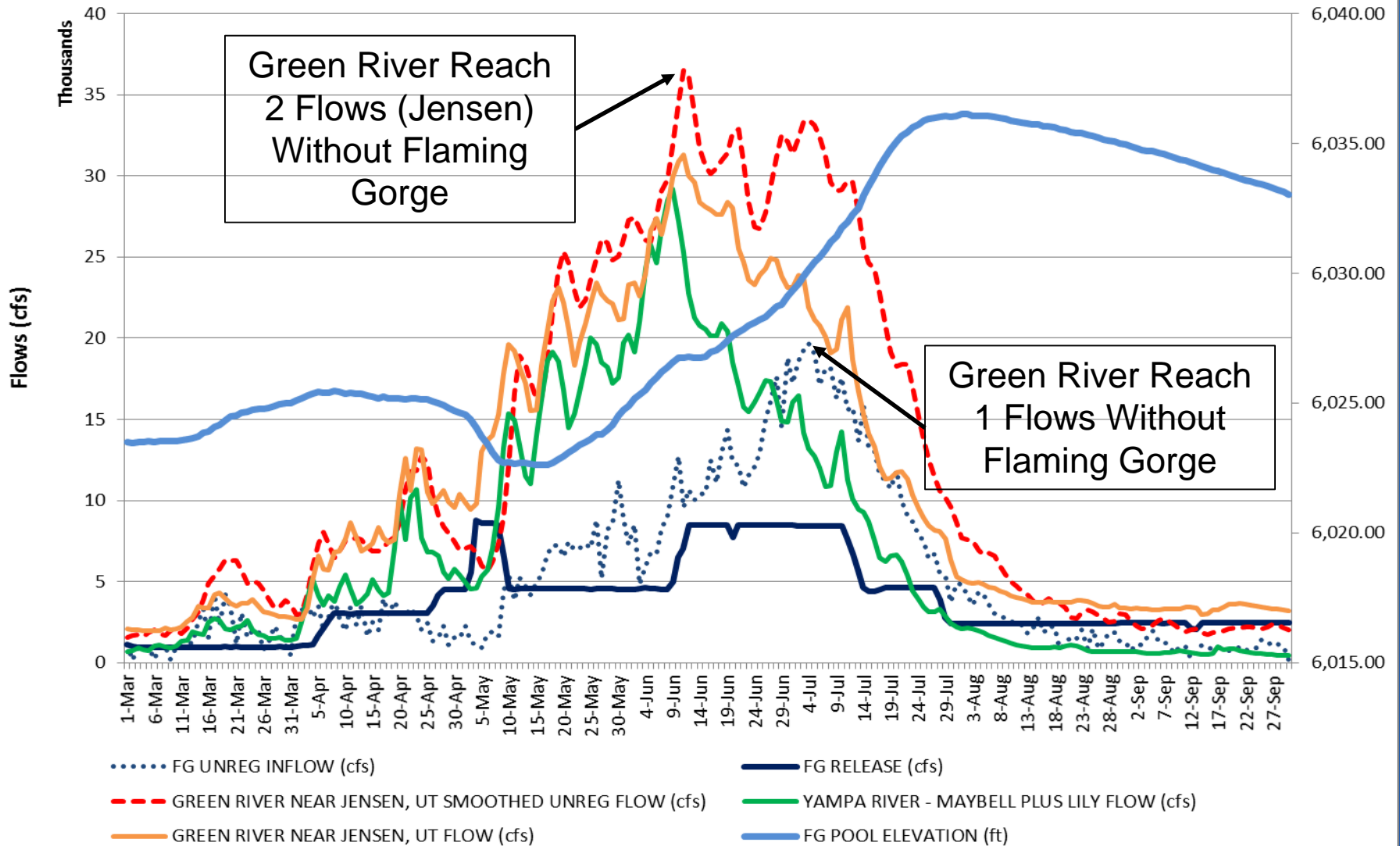
Yampa River Basin - Maybell Plus Lily

Historic April-July Unregulated Inflow Volume Ranking (1922-2015)

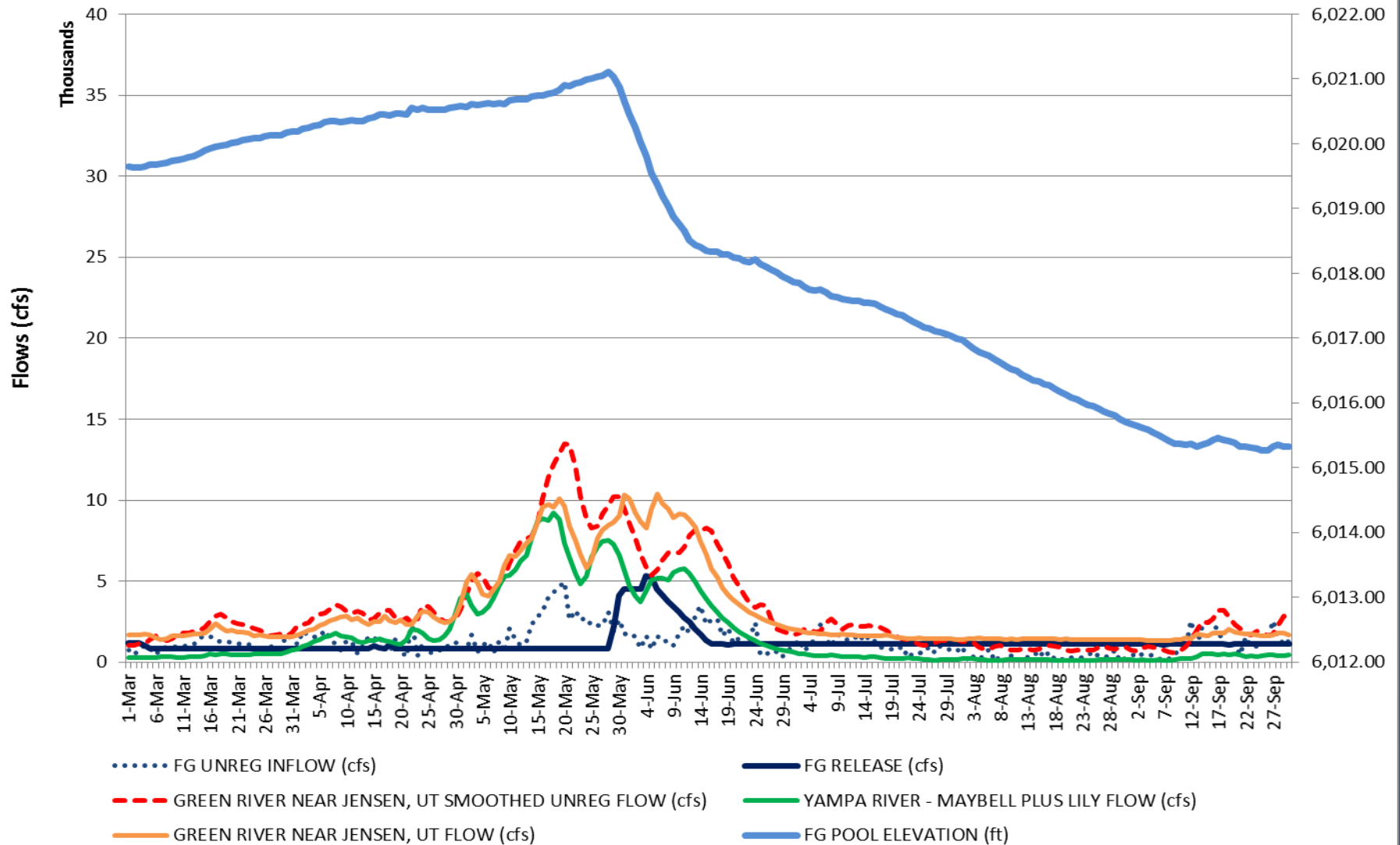


RECLAMATION

Flaming Gorge Releases and Green and Yampa River Flows 2011

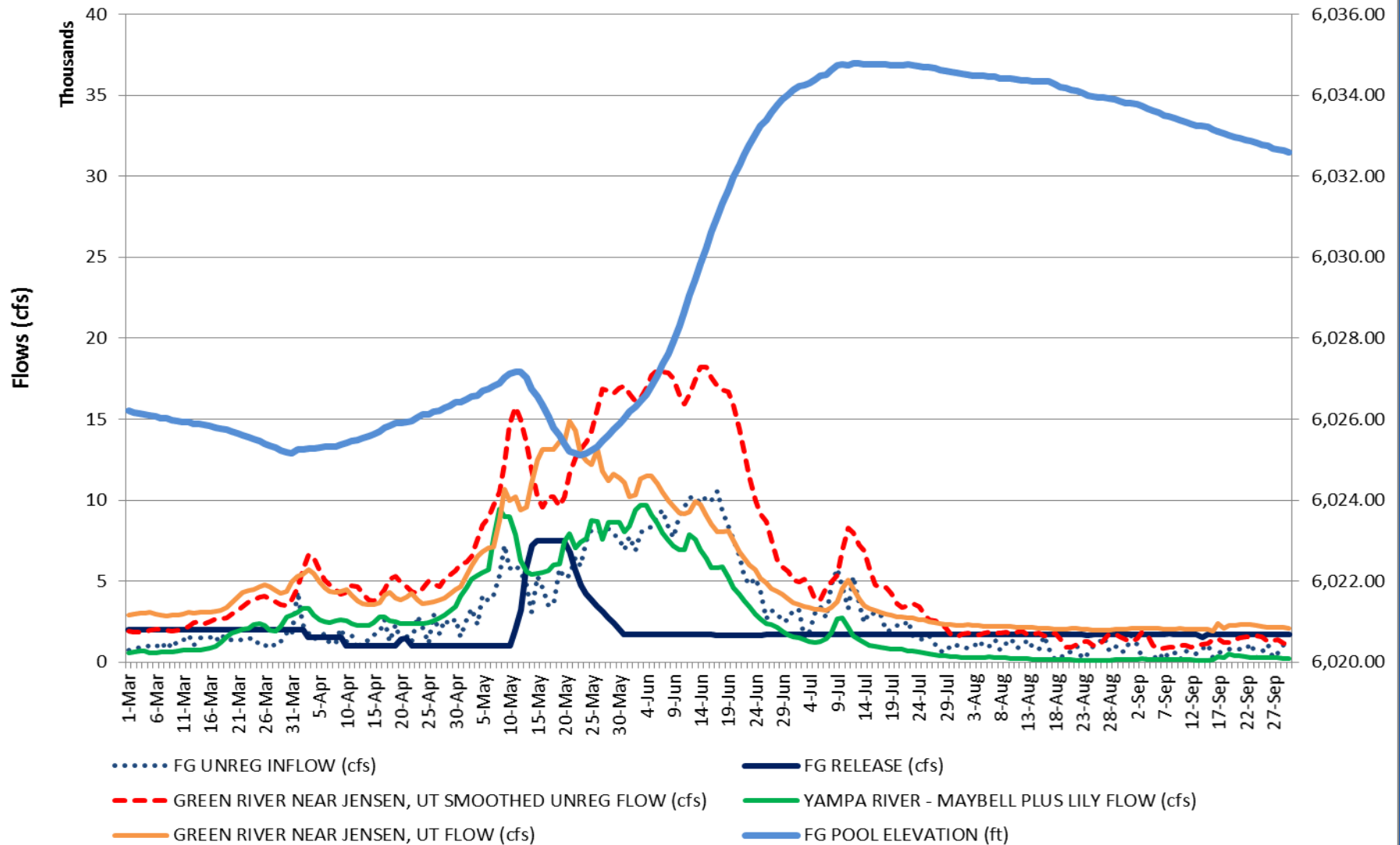


Flaming Gorge Releases and Green and Yampa River Flows 2013



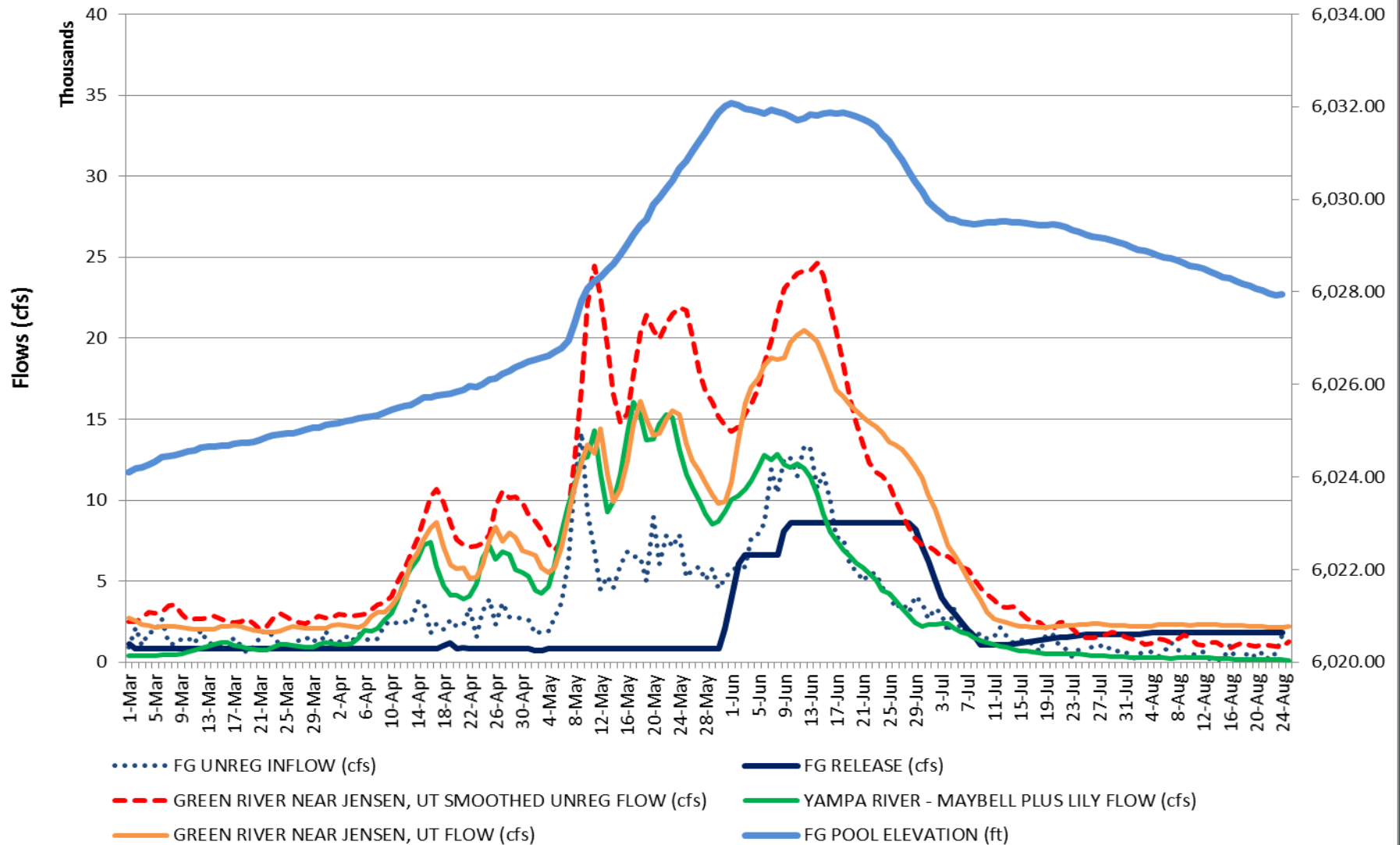
RECLAMATION

Flaming Gorge Releases and Green and Yampa River Flows 2015



RECLAMATION

Flaming Gorge Releases and Green and Yampa River Flows 2016



RECLAMATION

Larval Trigger Study Plan

TABLE 2. Matrix to Be Used in Studying the Effectiveness of a Larval Trigger

Peak Flow (x) as Measured at Jensen, Utah	Proposed Study Wetlands ^(a, b)	Number of Days (x) Flow to Be Exceeded and Corresponding Hydrologic Conditions ^(c)		
		$1 \leq x < 7$	$7 \leq x < 14$	$x \geq 14$
$8,300 \leq x < 14,000$ cfs	Stewart Lake (f), Above Brennan (f), Old Charley Wash (s)	Dry	Moderately dry	Moderately dry and average (below median)
$14,000 \leq x < 18,600$ cfs	Same as previous plus Thunder Ranch (f), Bonanza Bridge (f), Johnson Bottom (s), Stirrup (s), Leota 7 (s)	Average (below median)	Average (below median)	Average (below median)
$18,600 \leq x < 20,300$ cfs	Same as previous	Average (above median)	Average (above median)	Average (above median)
$20,300 \leq x < 26,400$ cfs	Same as previous plus Baeser Bend (s), Wyasket (s), additional Leota units (7a and 4), Sheppard Bottom (s)	Moderately wet	Moderately wet	Moderately wet
$x \geq 26,400$ cfs	Same as previous	Wet	Wet	Wet

(a) f = flow-through wetland, s = single-breach wetland

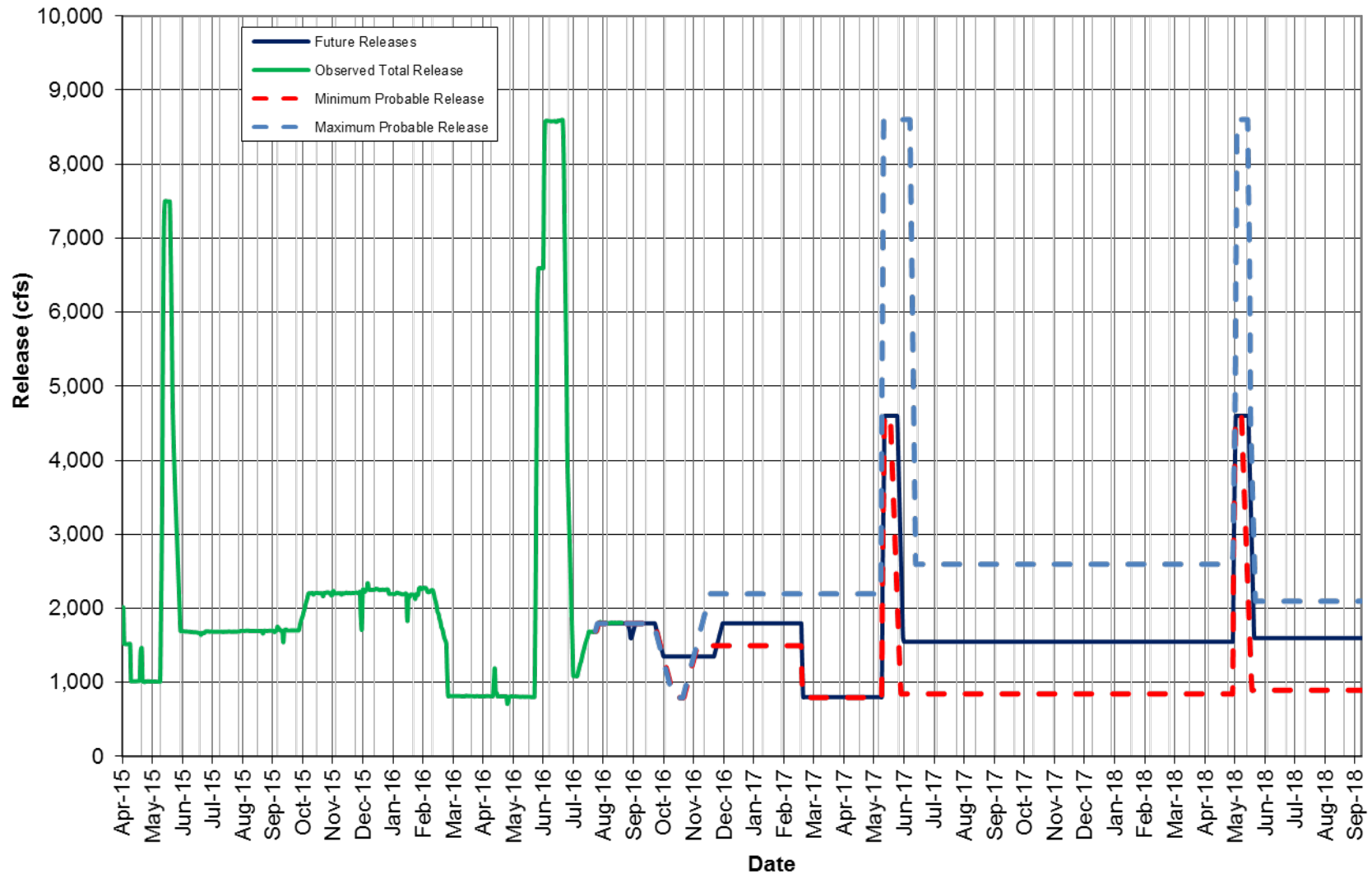
(b) Up to eight wetlands would be sampled in a given year with the three in the lowest flow category being sampled in all years.

(c) Refer to Table 1 for exceedance percentages and peak flow recommendations for each hydrologic condition. Note that the hydrologic conditions presented are the driest that could support a particular combination of peak flow magnitude and duration. For any combination, wetter hydrology could also support an experiment.

RECLAMATION

Flaming Gorge Operations WY2015-2018

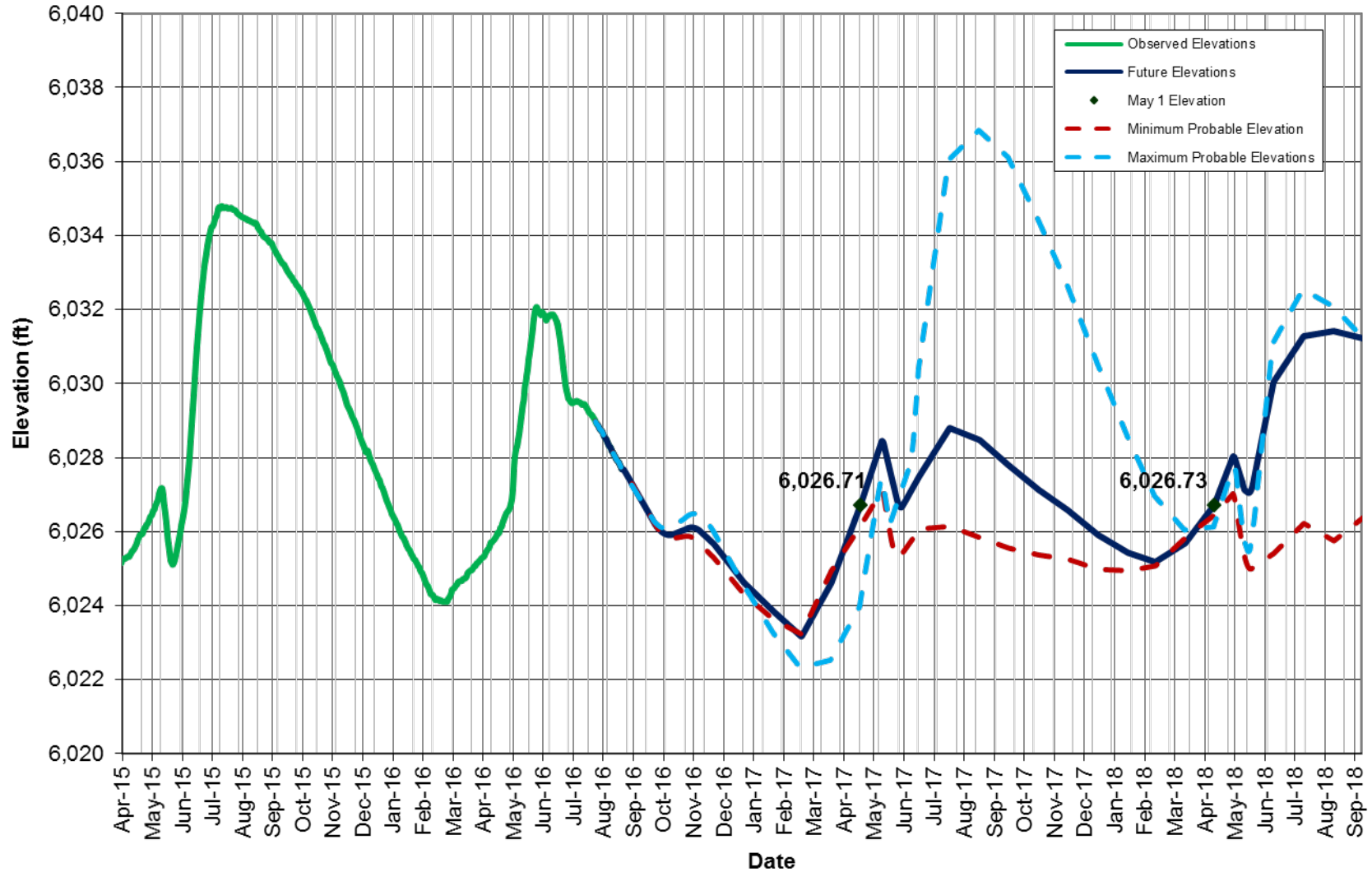
Most Probable Operations August Most Final Forecast



RECLAMATION

Flaming Gorge Operations WY2015-2018

Most Probable Operations August Most Final Forecast



RECLAMATION

Flaming Gorge Working Group

- Questions?
- Heather Patno
- hpatno@usbr.gov
- (801) 524-3883

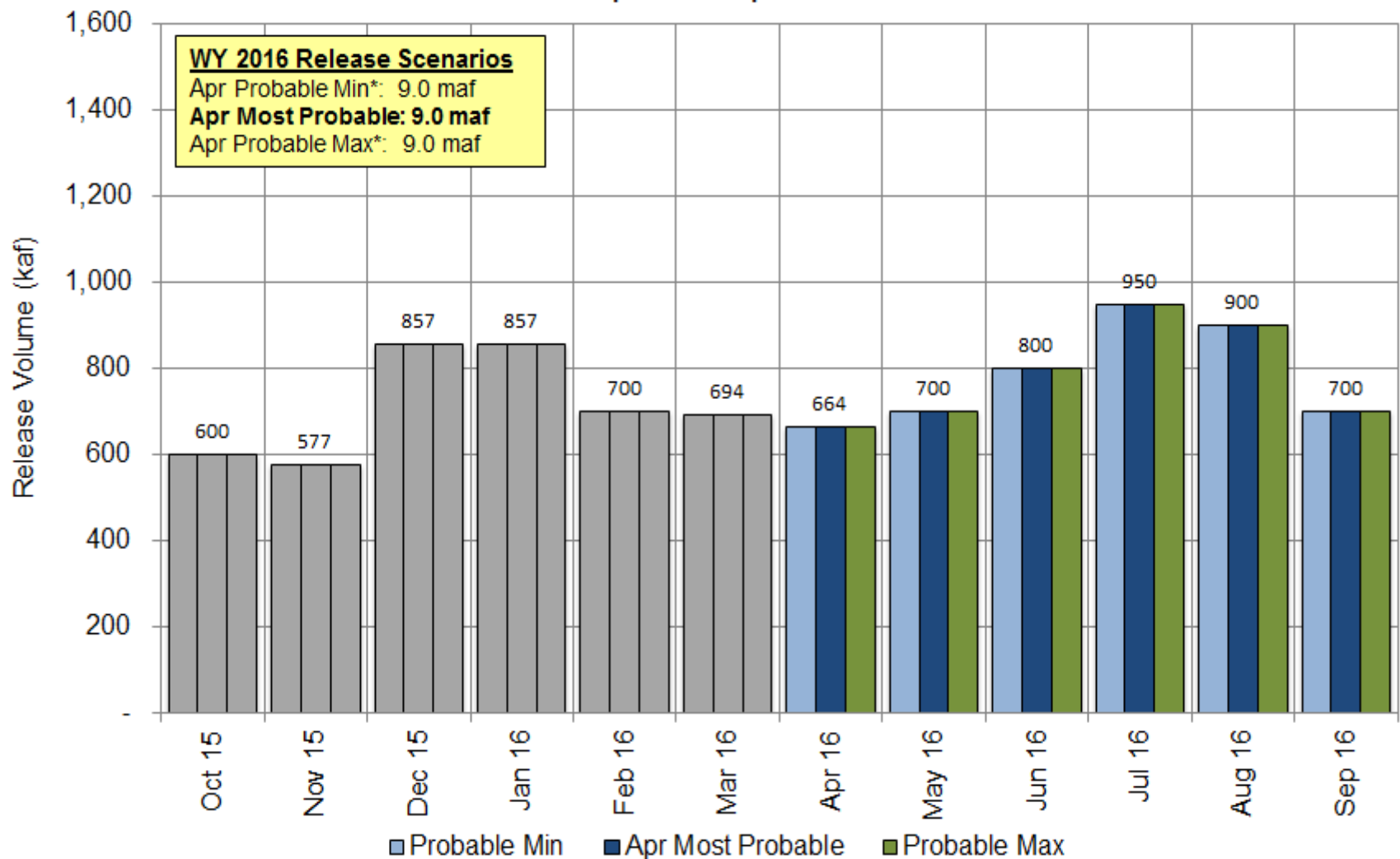


RECLAMATION

Projected Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2016

Updated April 2016



RECLAMATION

Lake Powell End of Month Elevations

Historic and Projected based on April 2016 Modeling

