

**RECLAMATION**  
*Managing Water in the West*

# Flaming Gorge Working Group

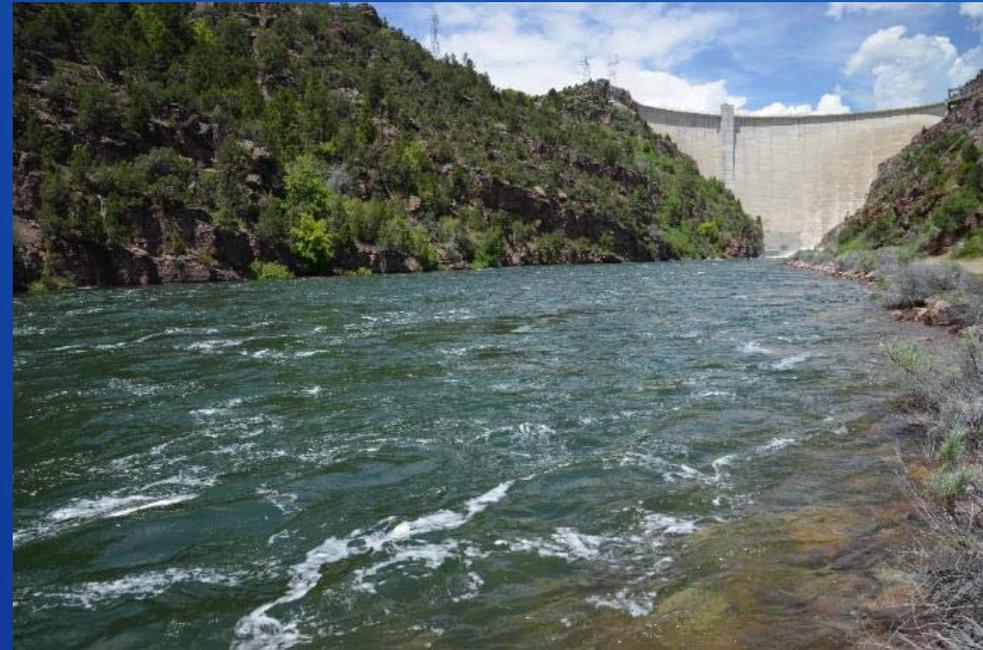
## Fall 2018

Hydrology and Operations Overview  
August 27, 2018

**Jed Parker, P.E.**  
Engineer  
Upper Colorado Region

# Outline

- **Typical Year Release Scenario**
- Review of 2018 Hydrology & Operations
- Forecasted 2018-2019 Operations
- Planned Operational Changes
- Questions/Discussion



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# **Typical Year Release Scenario Under Larval Trigger Study Plan (LTSP)**

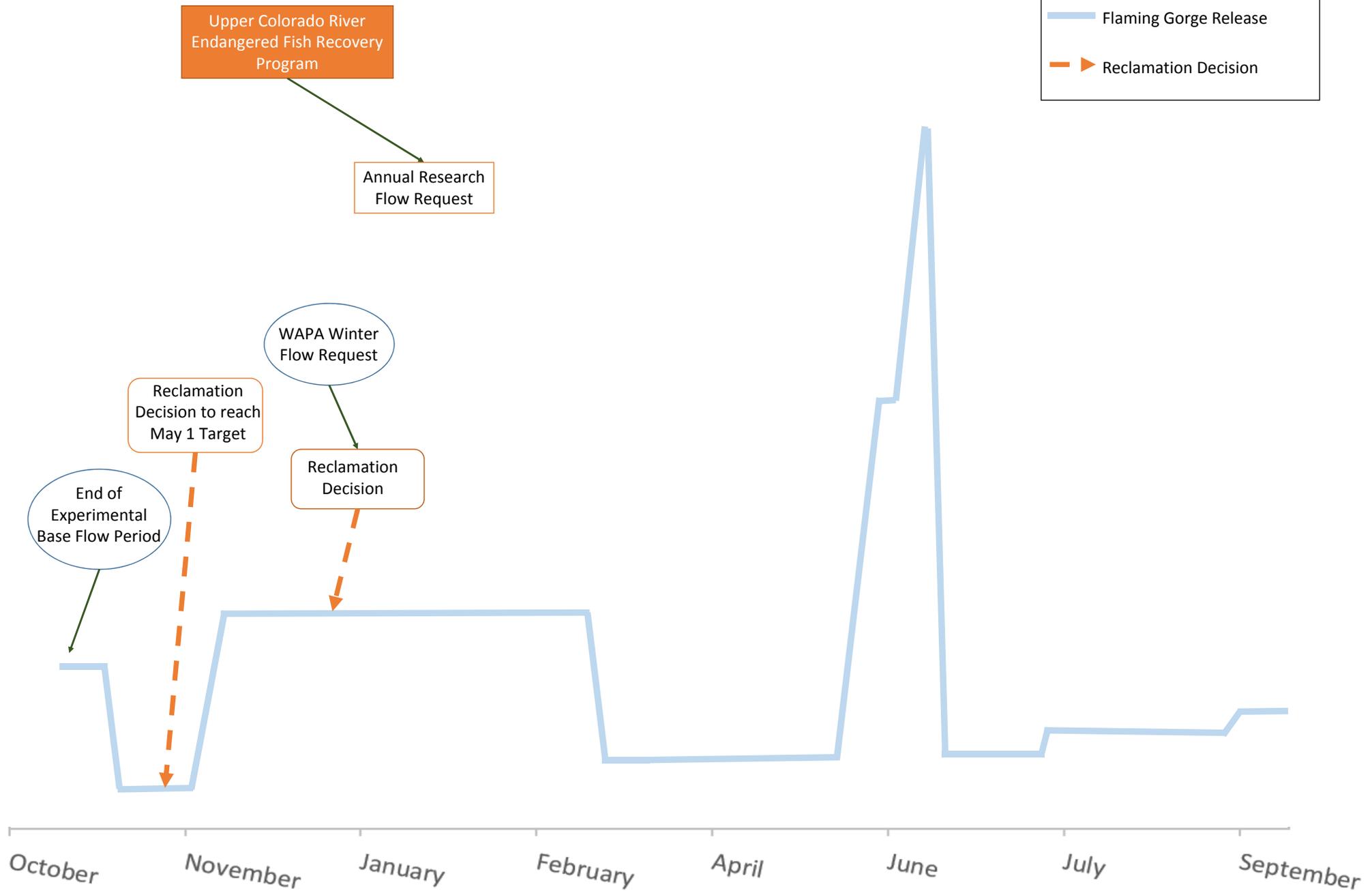
- **Glossary of Terms**

- **2005 EIS – Operation of Flaming Gorge Dam Final Environmental Impact Statement**
- **2006 ROD – Reclamation-specific Record of Decision adopting 2005 EIS and other commitments**
- **Larval Trigger Study Plan (LTSP) – Plan outlining spring peak flows for benefit of razorback sucker within confines of 2005 EIS and 2006 ROD**

# Typical Flaming Gorge Release Scenario (WY 2018)

**LEGEND**

- Flaming Gorge Release
- Reclamation Decision



# May 1 Elevation Target

- **2005 EIS & 2006 ROD dictates May 1 target reservoir elevations according to the following:**

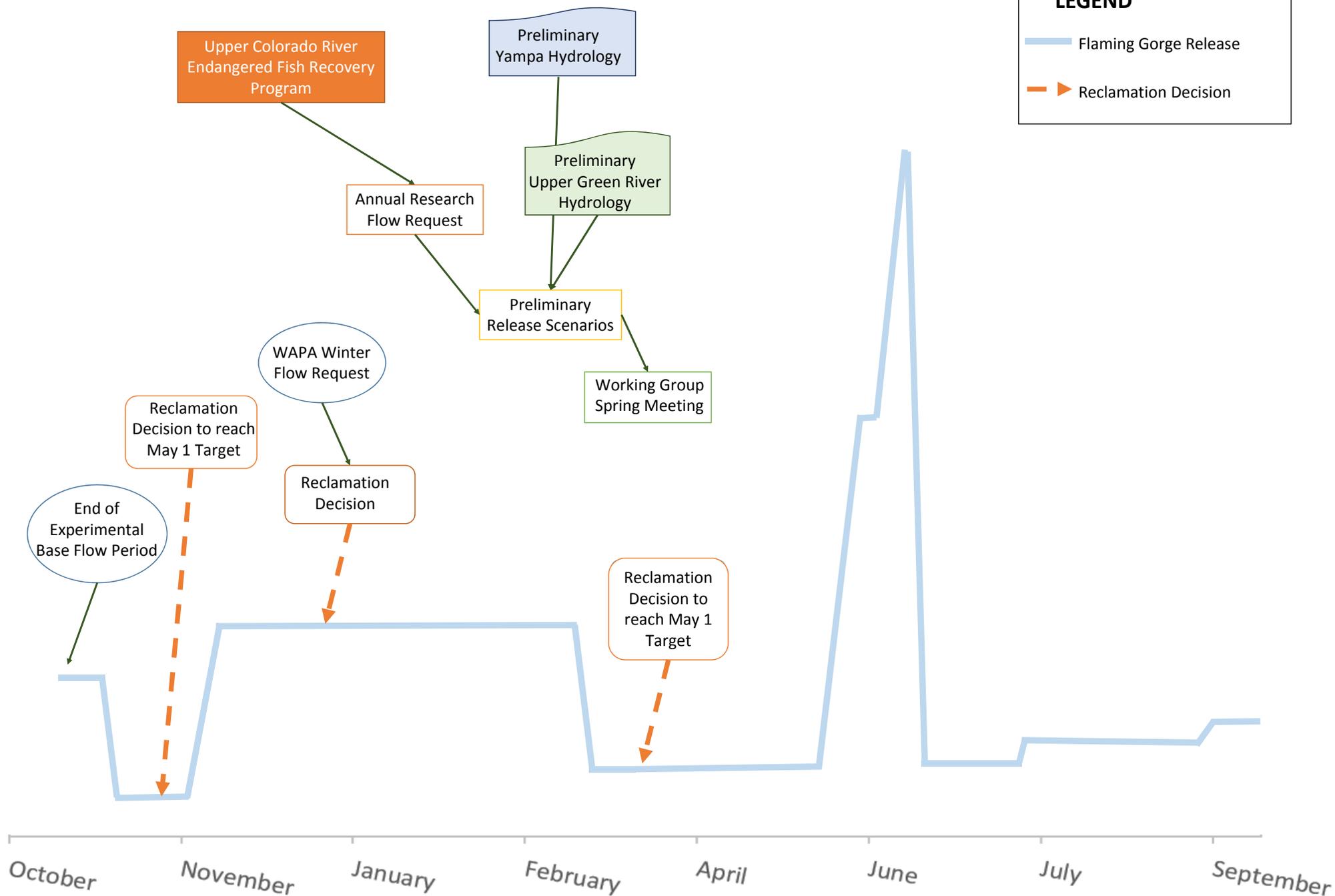
Inflow Forecast Exceedance	May 1 Target Elevation (feet)
1 to 10 (wet)	6023
10.1 to 30	6024
30.1 to 40	6025
40.1 to 59.9 (dry)	6027

- **Typical Oct, Nov, Mar, & Apr Releases are set to meet May 1 Target Elevations**

# Annual Flow Request

- **Produced by the Upper Colorado River Endangered Fish Recovery Program**
- **Details general research priorities for the benefit of endangered fish**
- **2018 Request Priorities:**
  - **Implement Larval Trigger Study Plan (Spring Peak)**
  - **Experimental Base Flows (July – September)**

# Typical Flaming Gorge Release Scenario (WY 2018)



# Larval Trigger Study Plan (LTSP)

- Requests that Reclamation ensure Green River flows at the Jensen Gage are within the design matrix

Peak Flow (x) as Measured at Jensen, Utah	Proposed Study Wetlands <sup>(a, b)</sup>	Number of Days (x) Flow to Be Exceeded and Corresponding Hydrologic Conditions <sup>(c)</sup>		
		$1 \leq x < 7$	$7 \leq x < 14$	$x \geq 14$
$8,300 \leq x < 14,000$ cfs	Stewart Lake (f), Above Brennan (f), Old Charley Wash (s) <sup>(d)</sup>	Dry	Moderately dry	Moderately dry and average (below median)
$14,000 \leq x < 18,600$ cfs	Same as previous plus Escalante Ranch (f), Bonanza Bridge (f), Johnson Bottom <sup>e</sup> (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

# Experimental Base Flows

- Requests that Reclamation ensures base flow period Green River flows stay within the following levels:

Hydrologic classification	Reach 2, Middle Green River flows		Reach 3, Lower Green River flows	
	2000 (Muth et al.)	Proposed	2000 (Muth et al.)	Proposed
Dry (10% of years, 0 to 10% exceedance)	26-31 m <sup>3</sup> /s (900-1,100 ft <sup>3</sup> /s)	48-51 m <sup>3</sup> /s (1,700-1,800 ft <sup>3</sup> /s)	37-74 m <sup>3</sup> /s (1,300-2,600 ft <sup>3</sup> /s)	48-57 m <sup>3</sup> /s (1,700-2,000 ft <sup>3</sup> /s)
Moderately dry (20% of years)	31-43 m <sup>3</sup> /s (1,100-1,500 ft <sup>3</sup> /s)	51-57 m <sup>3</sup> /s (1,800-2,000 ft <sup>3</sup> /s)	42-96 m <sup>3</sup> /s (1,500-3,400 ft <sup>3</sup> /s)	57-65 m <sup>3</sup> /s (2,000-2,300 ft <sup>3</sup> /s)
Average (40% of years)	43-68 m <sup>3</sup> /s (1,500-2,400 ft <sup>3</sup> /s)	57-74 m <sup>3</sup> /s (2,000-2,600 ft <sup>3</sup> /s)	51-119 m <sup>3</sup> /s (1,800-4,200 ft <sup>3</sup> /s)	65-79 m <sup>3</sup> /s (2,300-2,800 ft <sup>3</sup> /s)
Moderately wet (20% of years)	68-79 m <sup>3</sup> /s (2,400-2,800 ft <sup>3</sup> /s)	62-79 m <sup>3</sup> /s (2,200-2,800 ft <sup>3</sup> /s)	77-133 m <sup>3</sup> /s (2,700-4,700 ft <sup>3</sup> /s)	74-91 m <sup>3</sup> /s (2,600-3,200 ft <sup>3</sup> /s)
Wet (10% of years, 90 to 100% exceedance)	79-85 m <sup>3</sup> /s (2,800-3,000 ft <sup>3</sup> /s)	68-85 m <sup>3</sup> /s (2,400-3,000 ft <sup>3</sup> /s)	91-133 m <sup>3</sup> /s (3,200-4,700 ft <sup>3</sup> /s)	79-108 m <sup>3</sup> /s (2,800-3,800 ft <sup>3</sup> /s)

# Spring Working Group Meeting

- **The Recovery Program presents the Annual Research Flow Request**
- **Reclamation presents preliminary release scenarios for a range of potential hydrologic classifications (dry, average, wet, etc.)**



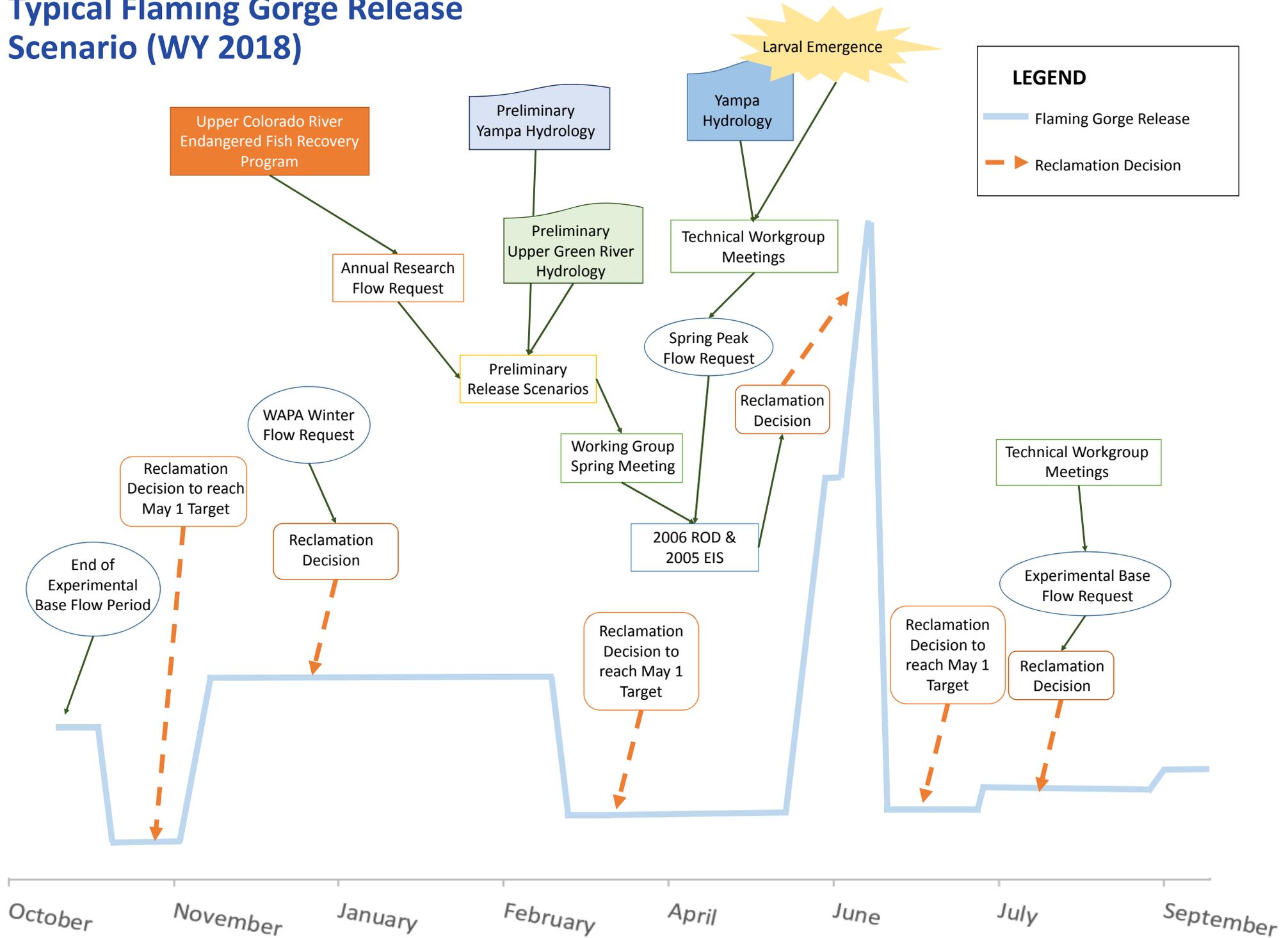
# LTSP Spring Peak

- **Reclamation determines the magnitude and duration of the spring peak using the following:**
  - **Flow request from the Flaming Gorge Technical Working Group**
  - **Feedback on the preliminary scenarios presented at the Spring Working Group Meeting**
  - **Other considerations that could impact the authorized purposes of Flaming Gorge Dam (2006 ROD and 2005 EIS)**

# Technical Working Group

- **Composed of biologists and hydrologists from Reclamation, the U.S. Fish and Wildlife Service, and the Western Area Power Administration (WAPA)**
- **Uses real-time hydrology and floodplain operational information to further refine the Annual Research Flow Request**
- **Makes flow requests to be considered by Reclamation**

# Typical Flaming Gorge Release Scenario (WY 2018)



# Summer Base Flow Request

- **Reclamation determines the magnitude and duration of summer base flows using the following:**
  - **Flow request from the Flaming Gorge Technical Working Group**
  - **Feedback on the preliminary scenarios presented at the Spring Working Group Meeting**
  - **Other considerations that could impact the authorized purposes of Flaming Gorge Dam (2006 ROD and 2005 EIS)**

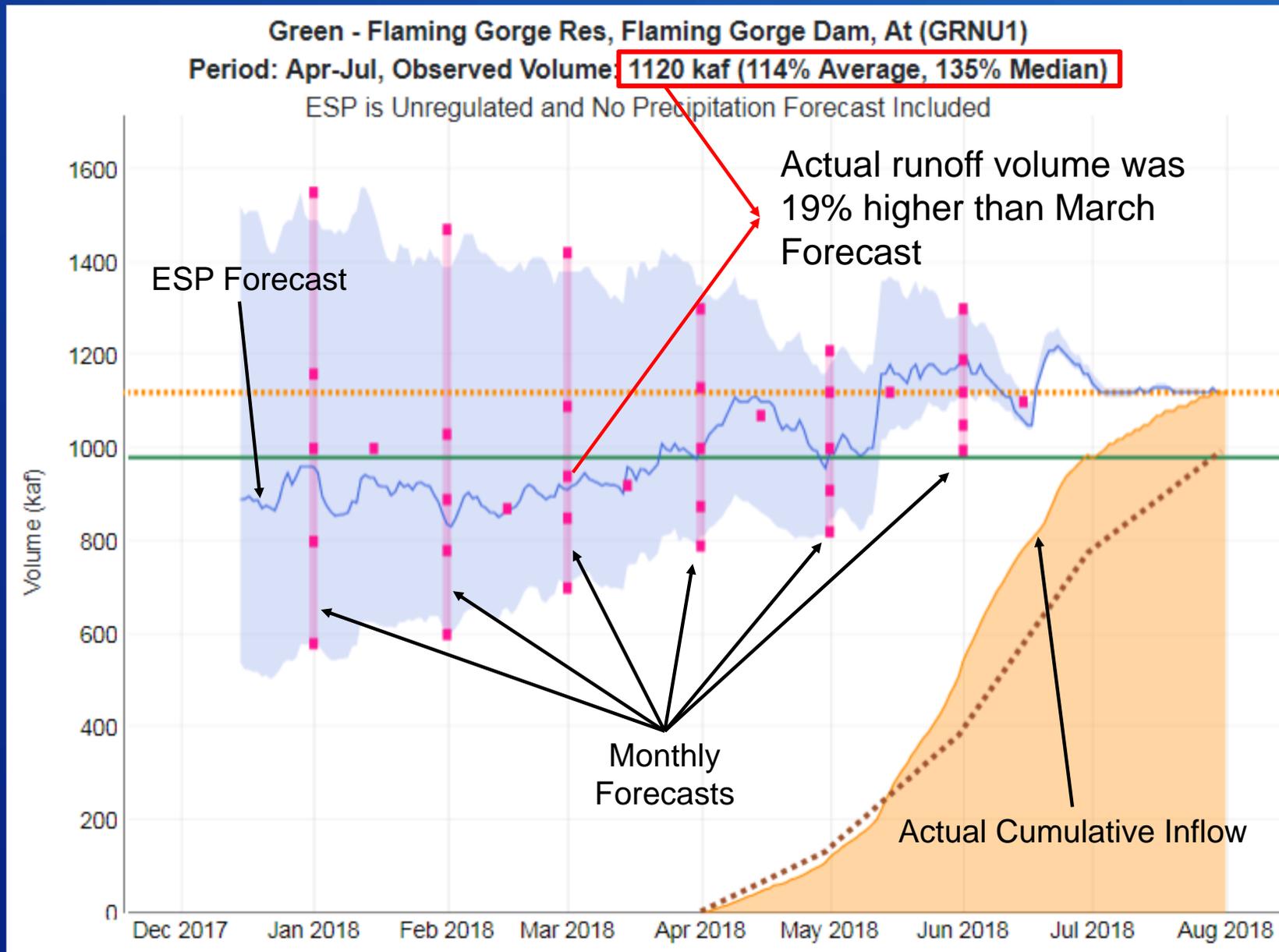
# Outline

- ✓ Typical Year Release Scenario
- **Review of 2018 Hydrology & Operations**
- Forecasted 2018-2019 Operations
- Planned Operational Changes
- Questions/Discussion



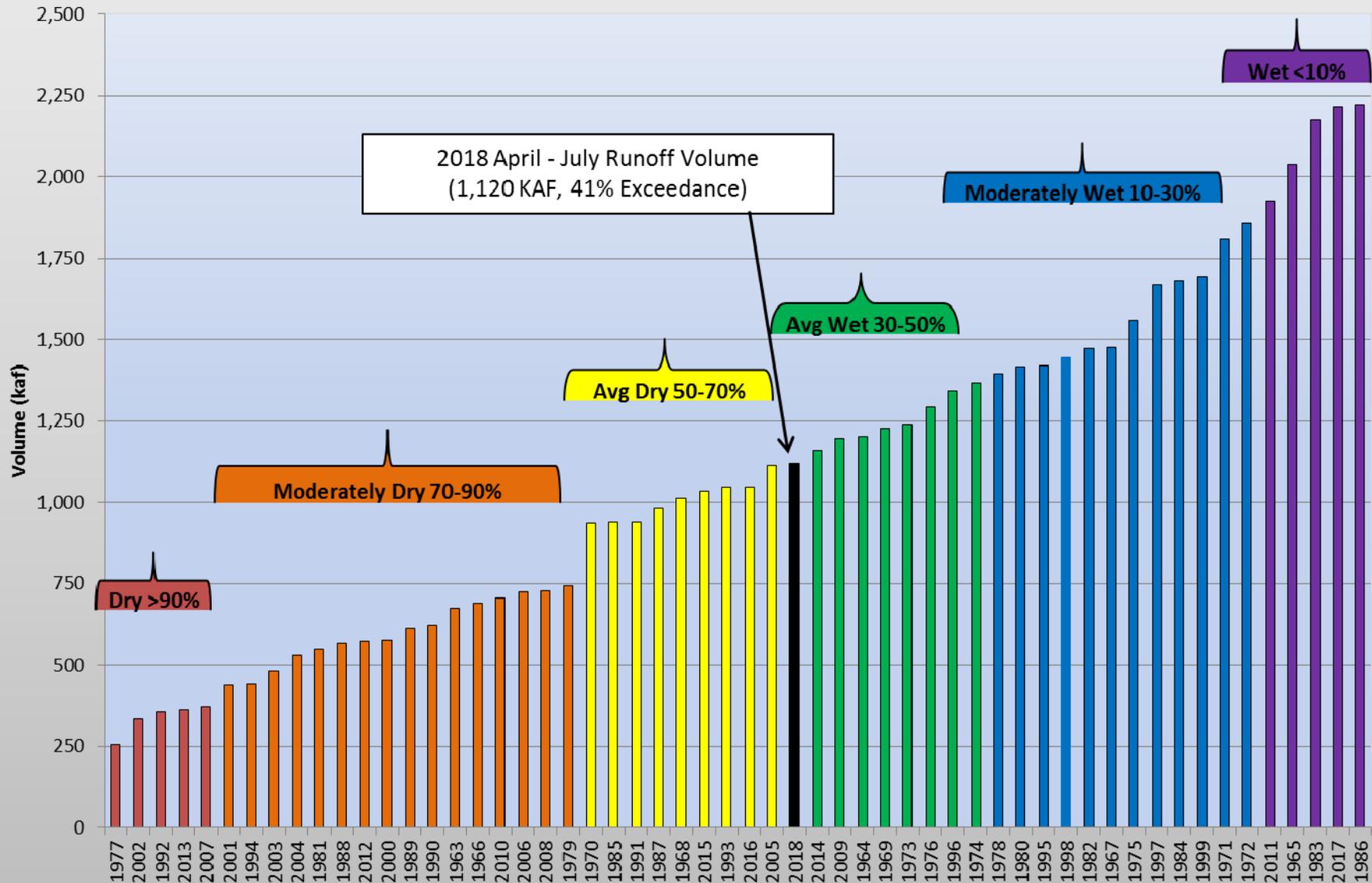
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# 2018 Snowpack season



# 2018 Forecast Operations - Inflow

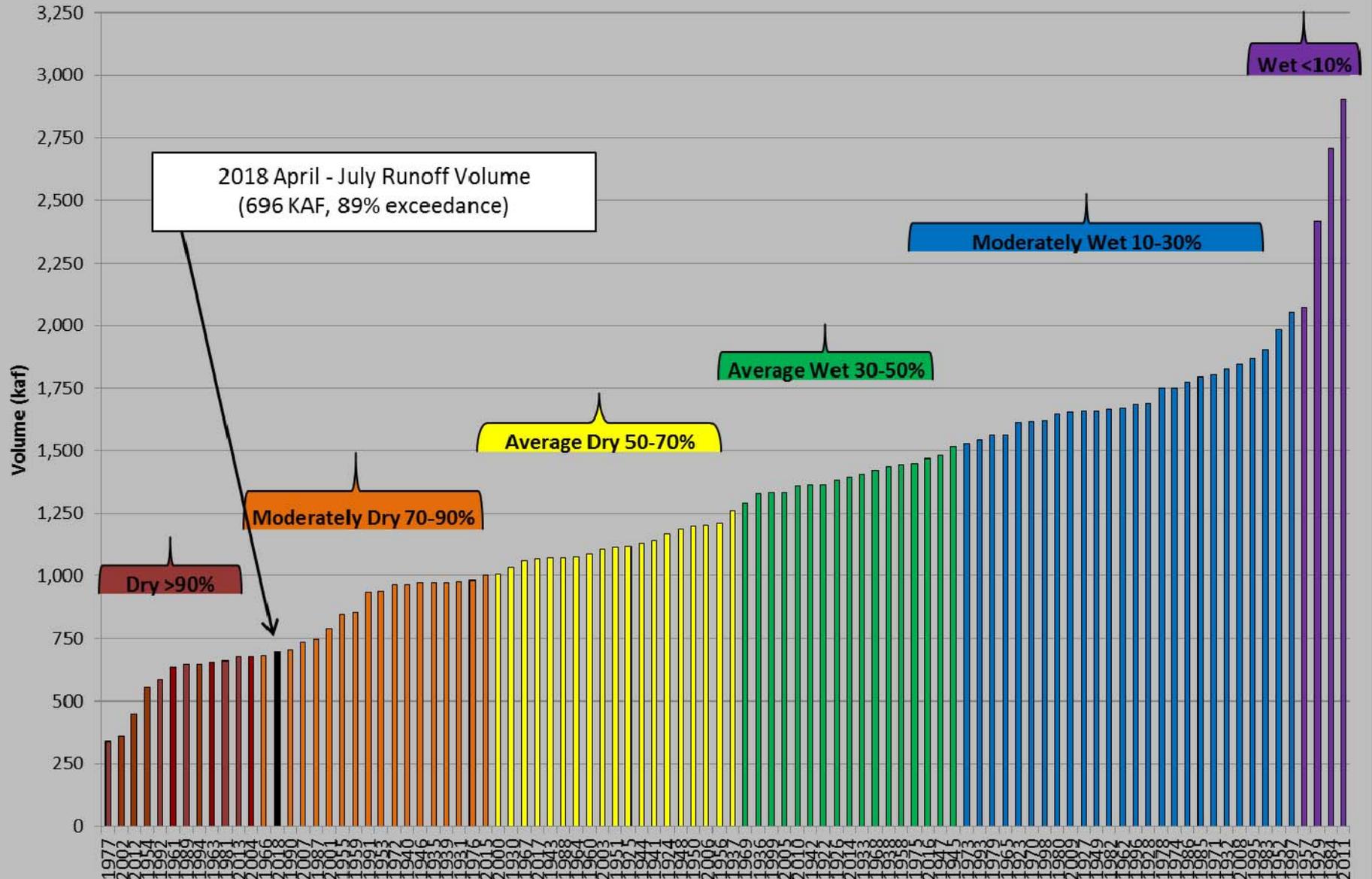
**Flaming Gorge Reservoir**  
**Historic April-July Unregulated Inflow Volume Ranking (1963-2017)**



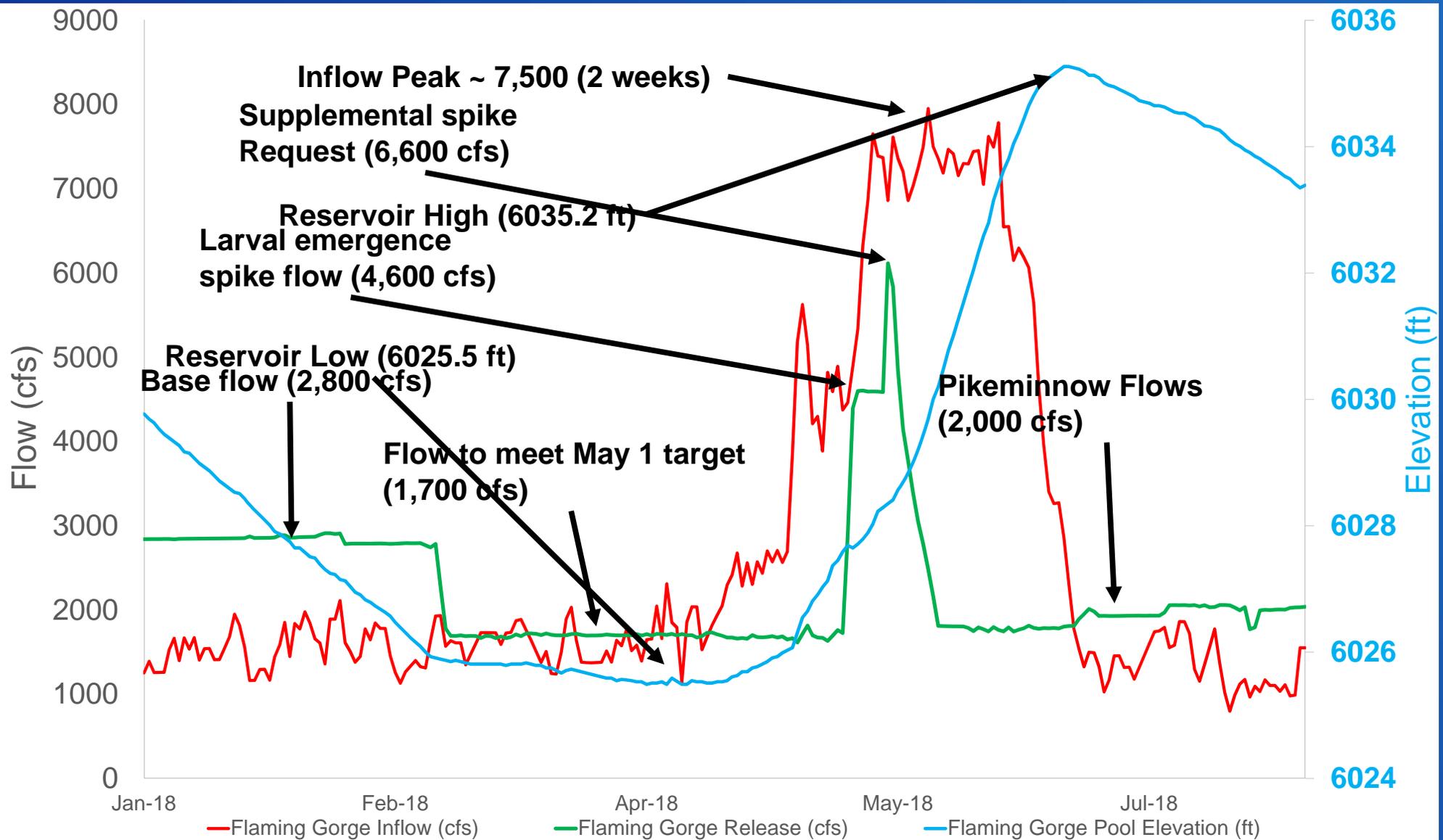
# 2018 Forecast Operations - Inflow

## Yampa River Basin - Maybell Plus Lily

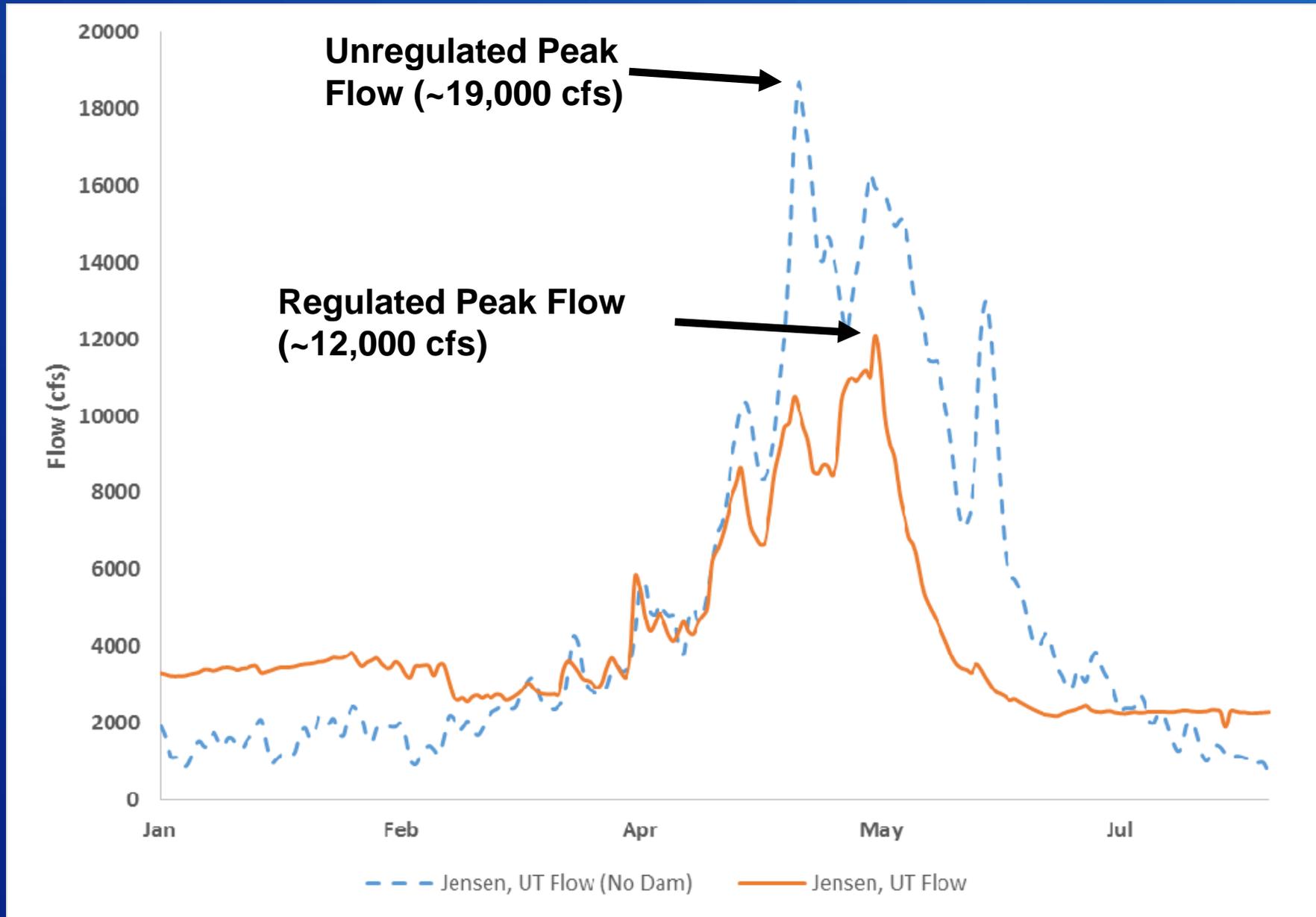
Historic April-July Unregulated Inflow Volume Ranking (1922-2017)



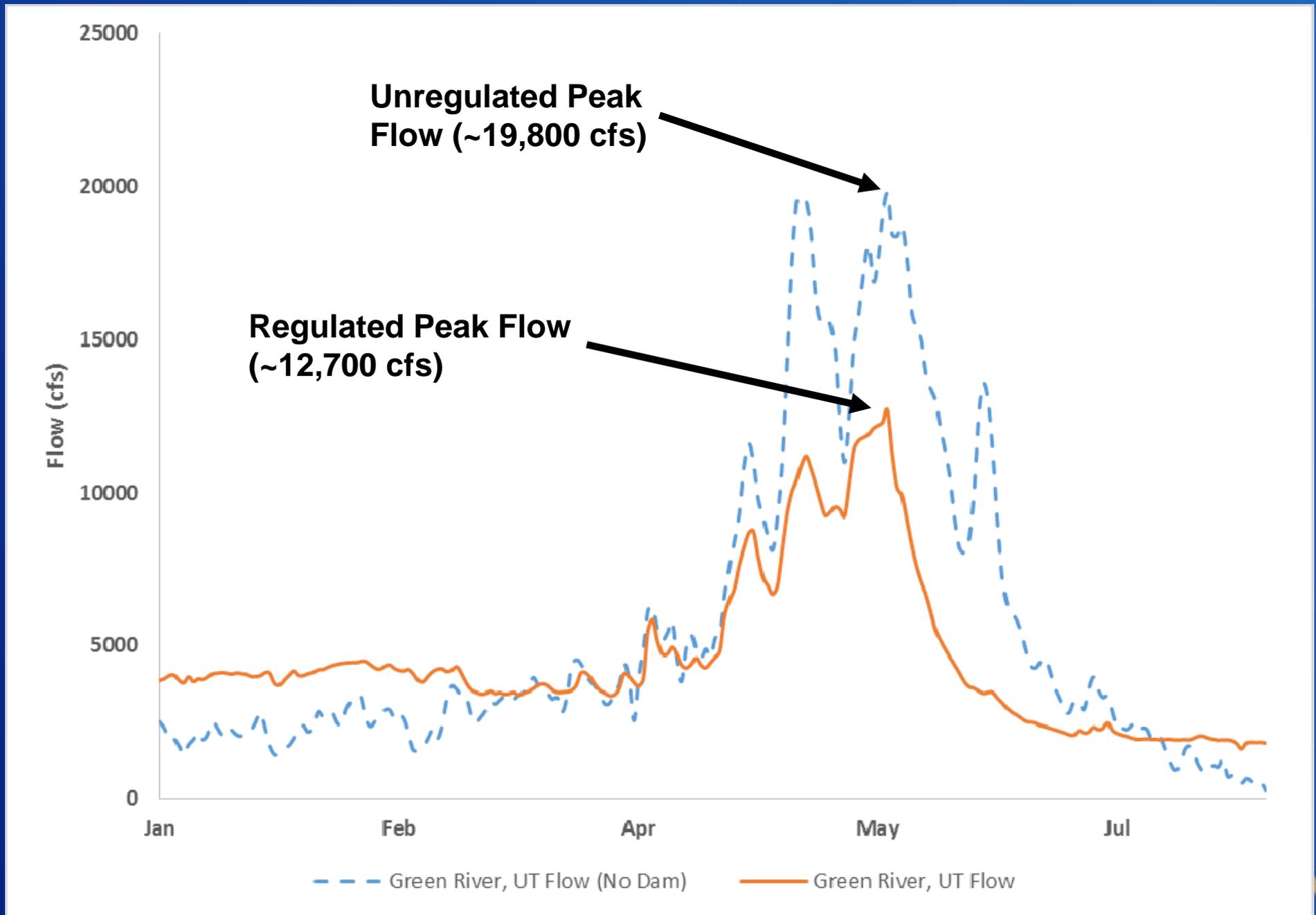
# 2018 Flaming Gorge Operations



# 2018 Jensen, UT Flows (Reach 2)



# 2018 Green River, UT Flows (Reach 3)



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- ☐ Planned Operational Changes
- ☐ Questions/Discussion

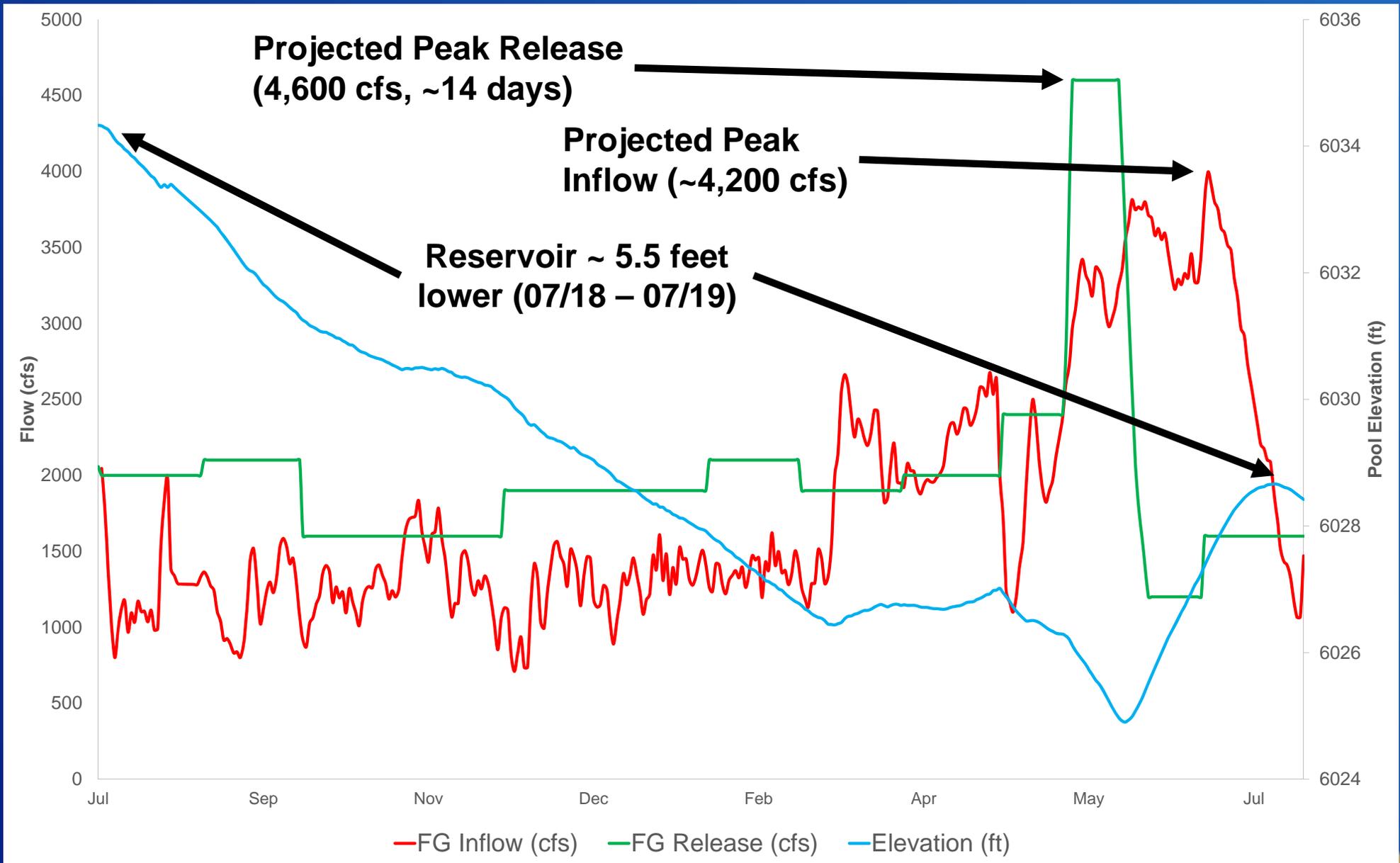


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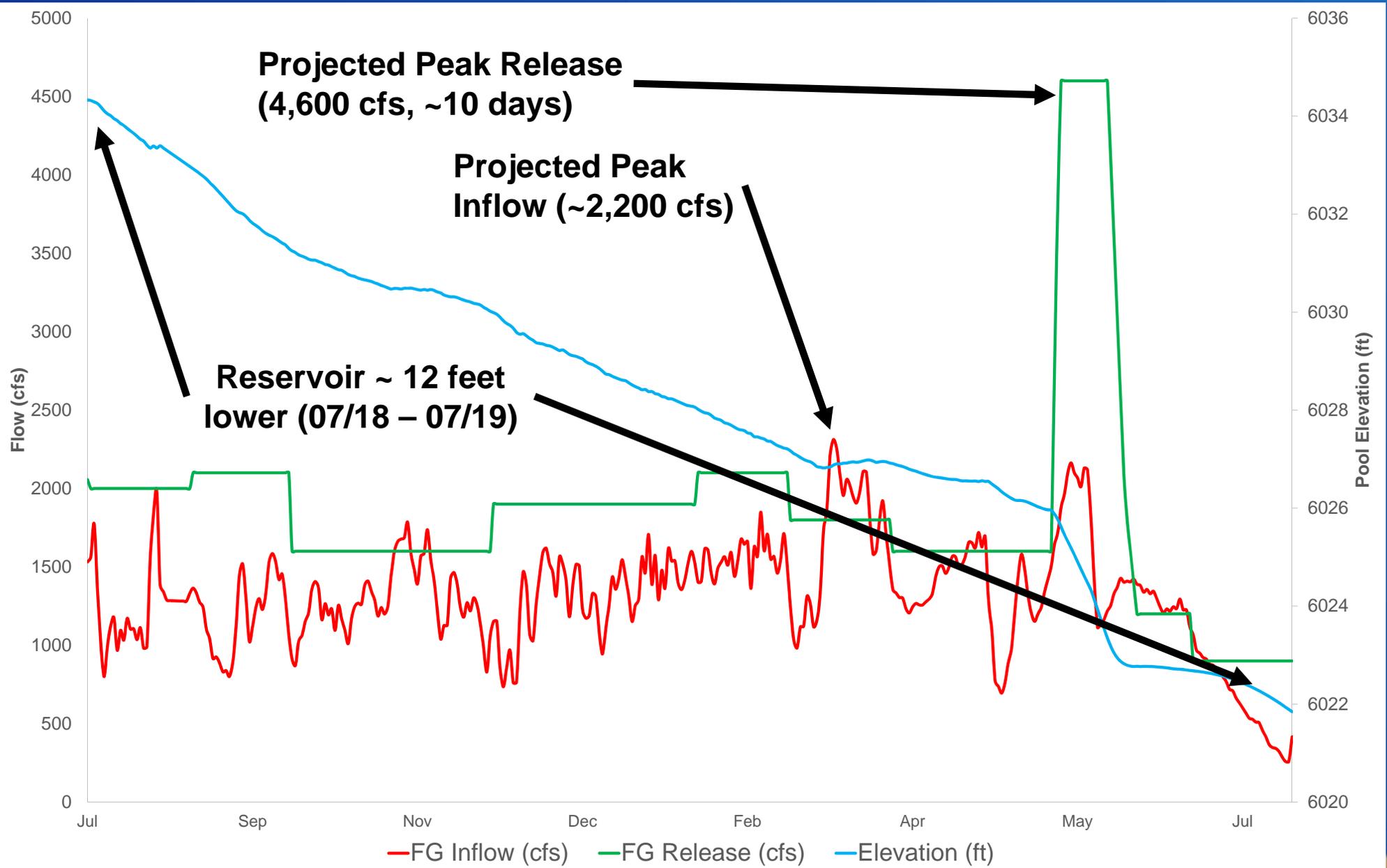
# 1-Year Outlooks

- **3 Operational Scenarios through July 2019**
  - Based off August Forecast from the Colorado River Basin Forecast Center
- **Minimum Probable (Dry - 90% Exceedance)**
- **Most Probable (50% Exceedance)**
- **Maximum Probable (Wet - 10% Exceedance)**
- **Forecast Uncertainty**
  - Highly dependent upon snowpack
  - Each scenario will change monthly

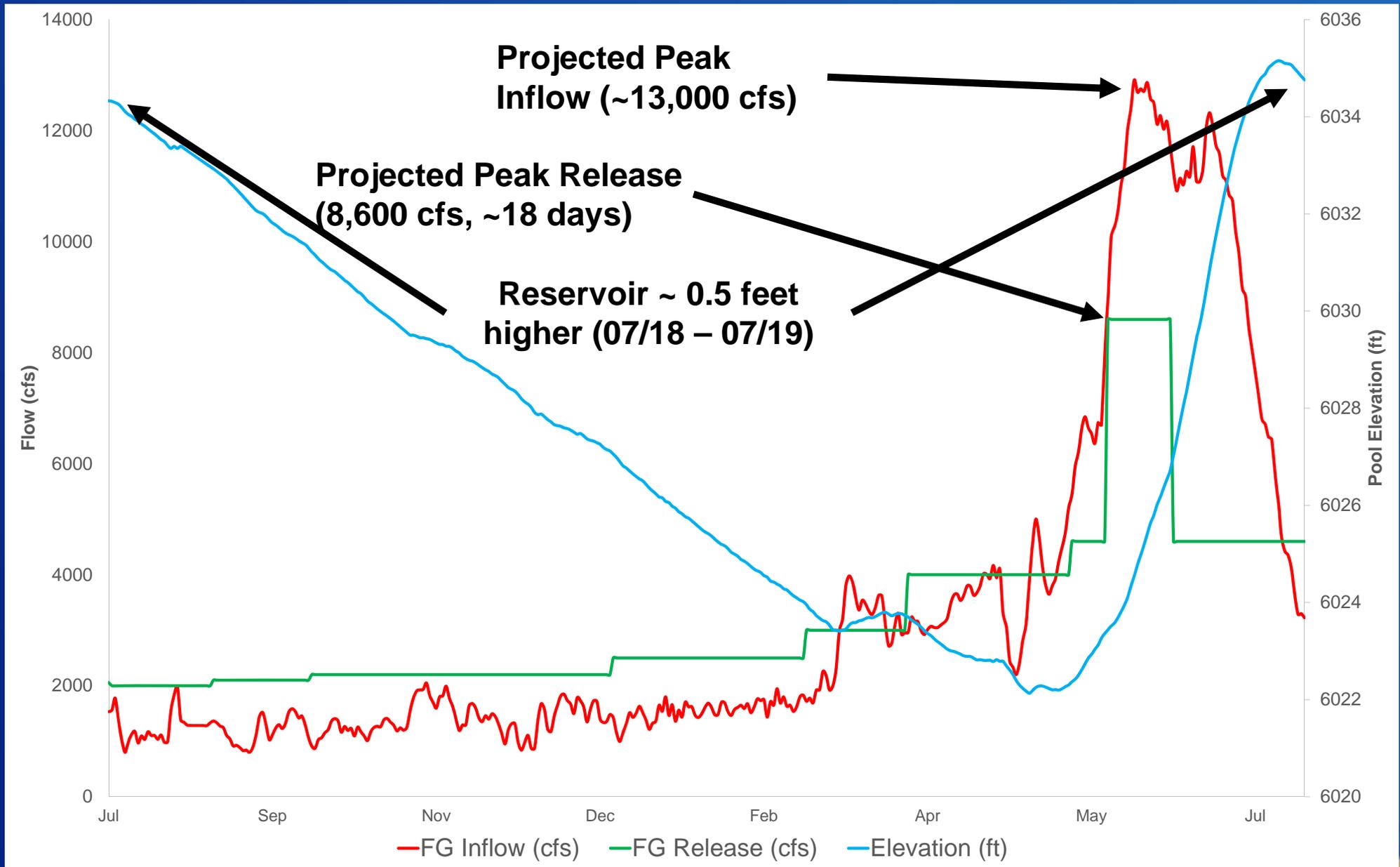
# 1-Year Outlook (Most Probable)



# 1-Year Outlook (Minimum Probable)



# 1-Year Outlook (Maximum Probable)



# Outline

- ✓ Typical Year Release Scenario
- ✓ Review of 2018 Hydrology & Operations
- ✓ Forecasted 2018-2019 Operations
- ☐ **Planned Operational Changes**
- ☐ Questions/Discussion



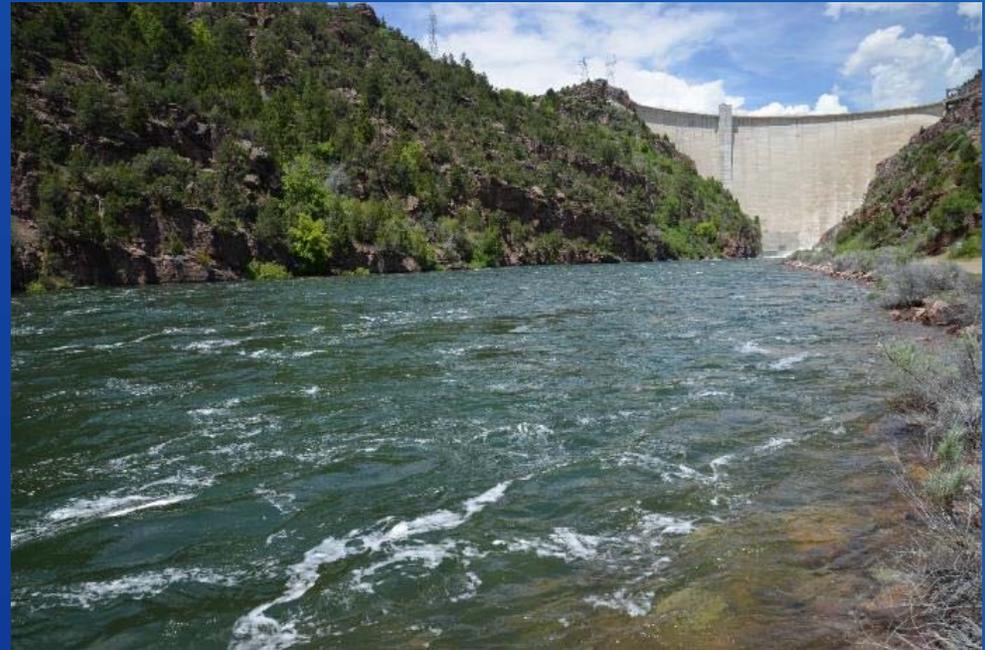
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# Planned Operational Changes

- **UDWR Electrofishing (9/5-9/6 – periodic 1,600 cfs releases) – Schedule in Appendix**
- **Dive Team Inspection (10/1 – 1,500 cfs (min 800 cfs))**
- **WAPA Winter Release (Unknown flow as of now)**

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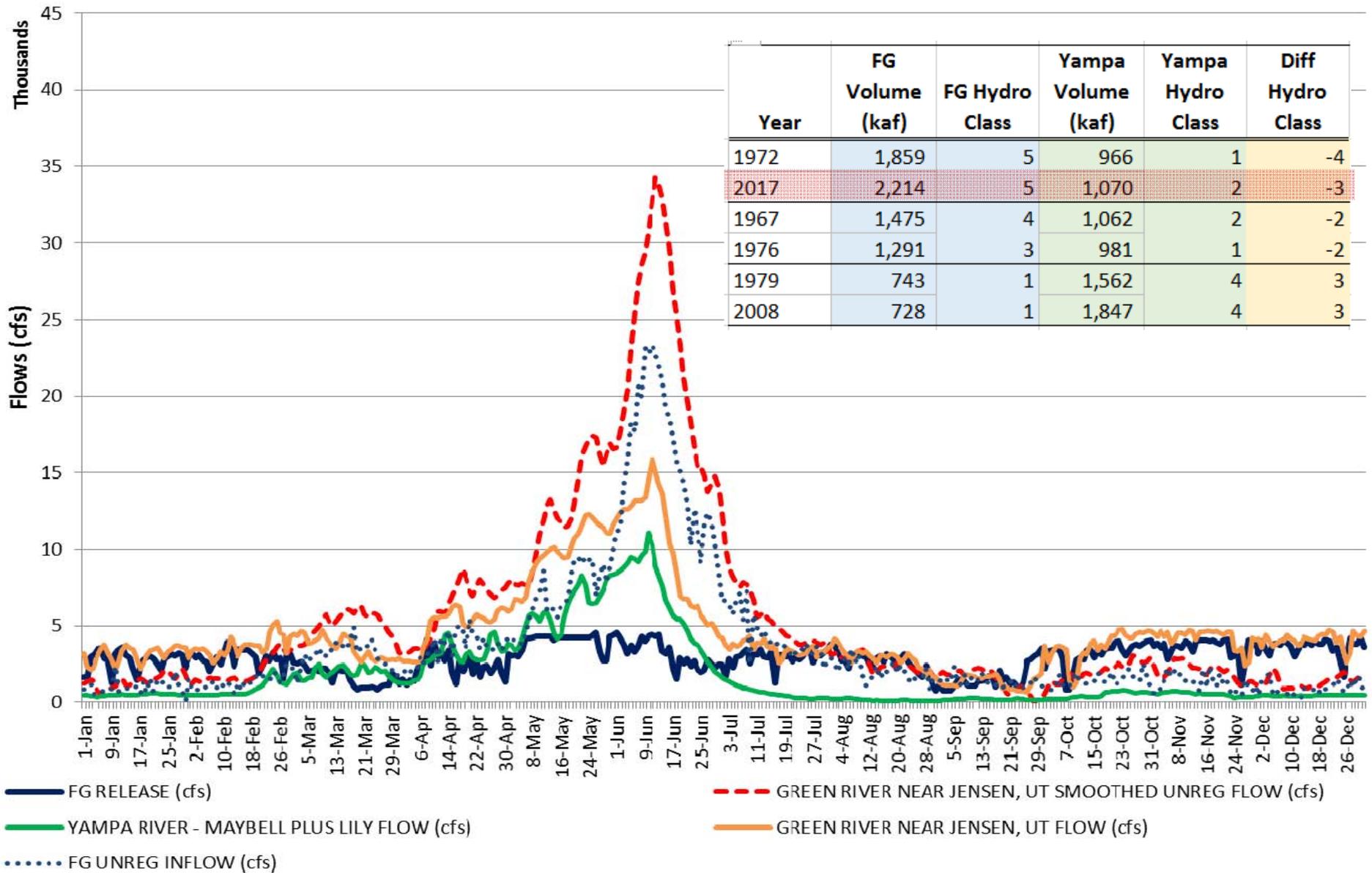
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**801-524-3816**

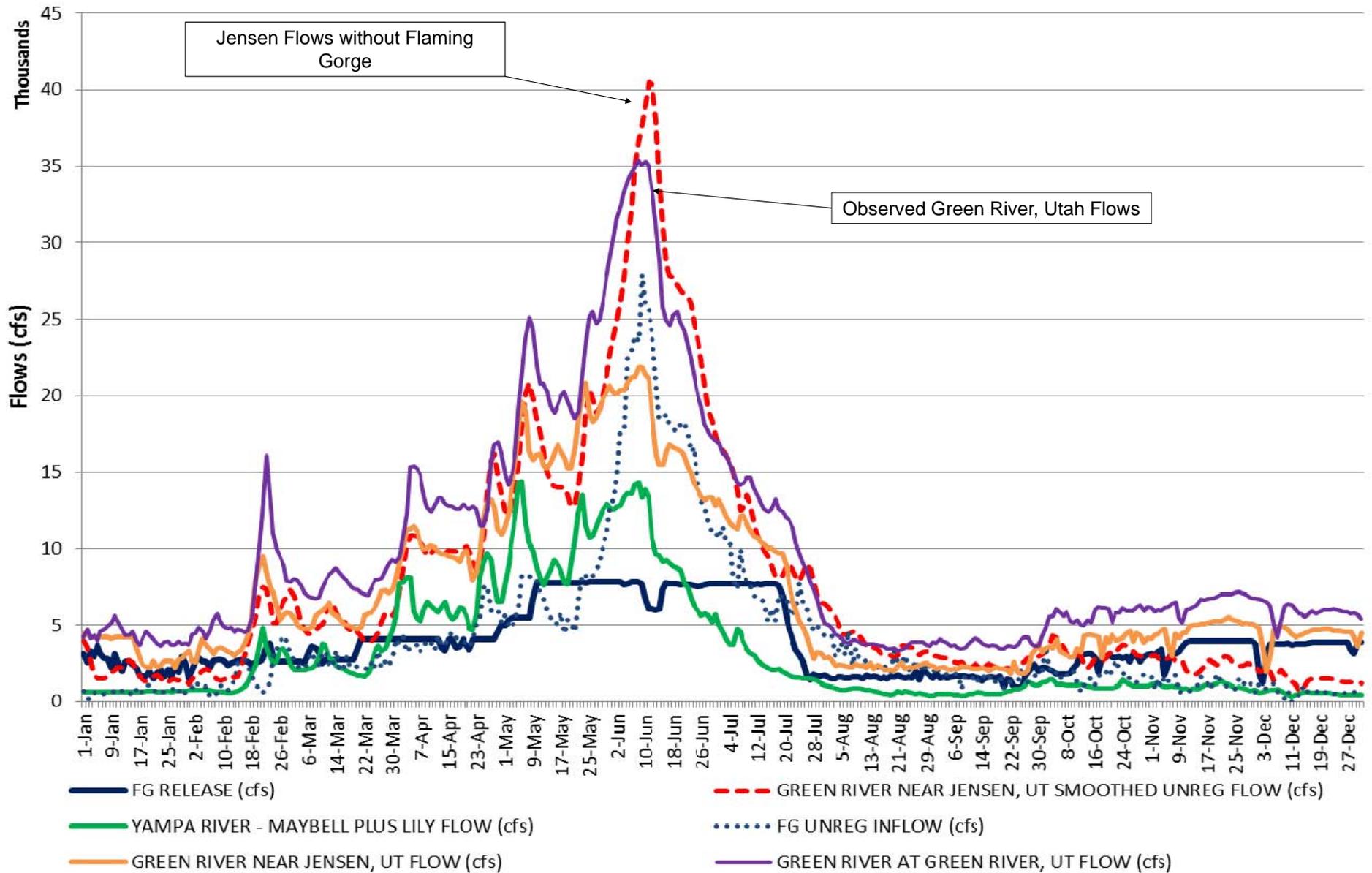
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# Flaming Gorge Releases and Green and Yampa River Flows 1972

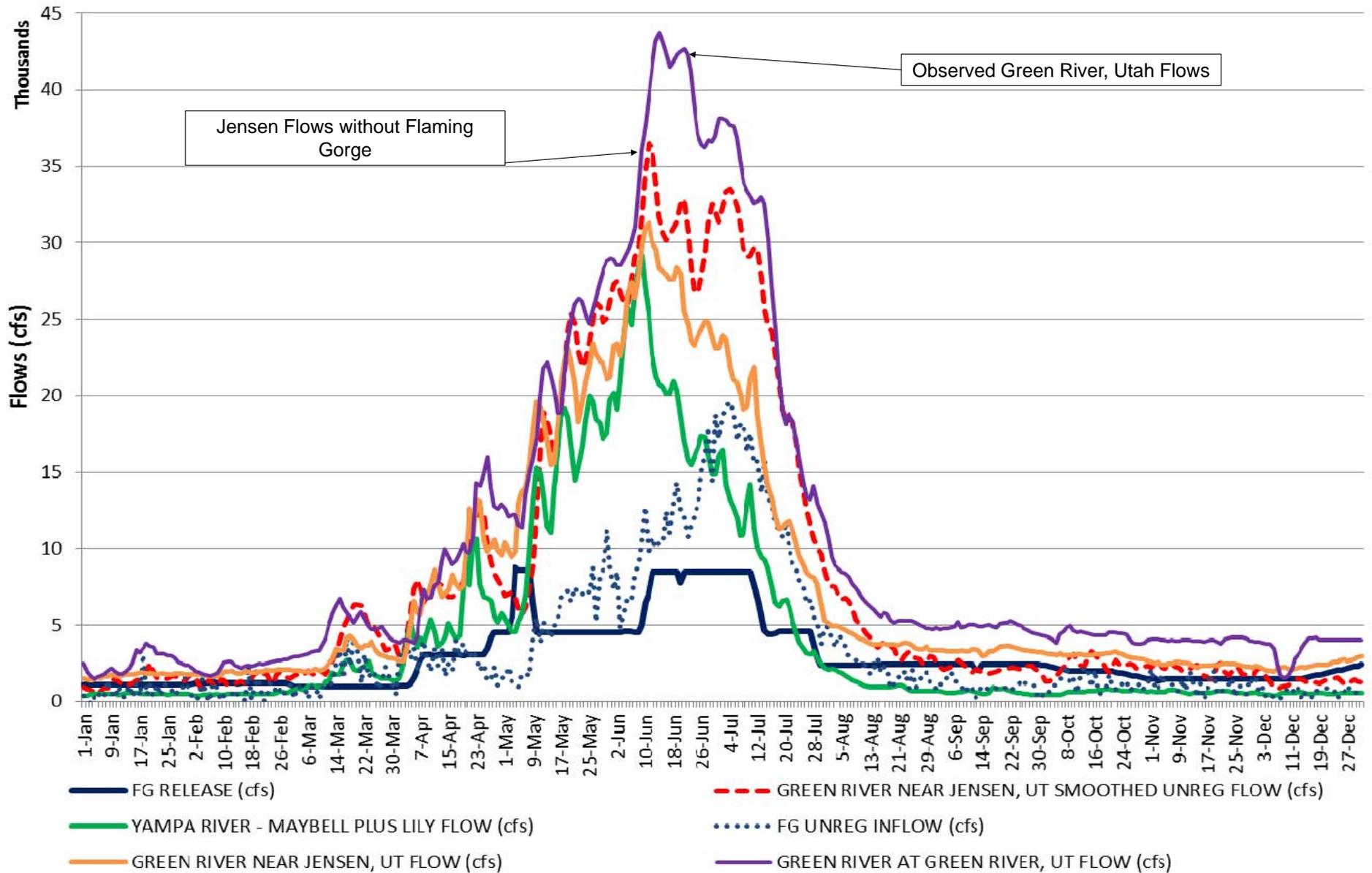


0=dry; 1=mod dry; 2=avg (blw med); 3=avg (abv med); 4=mod wet; 5=wet

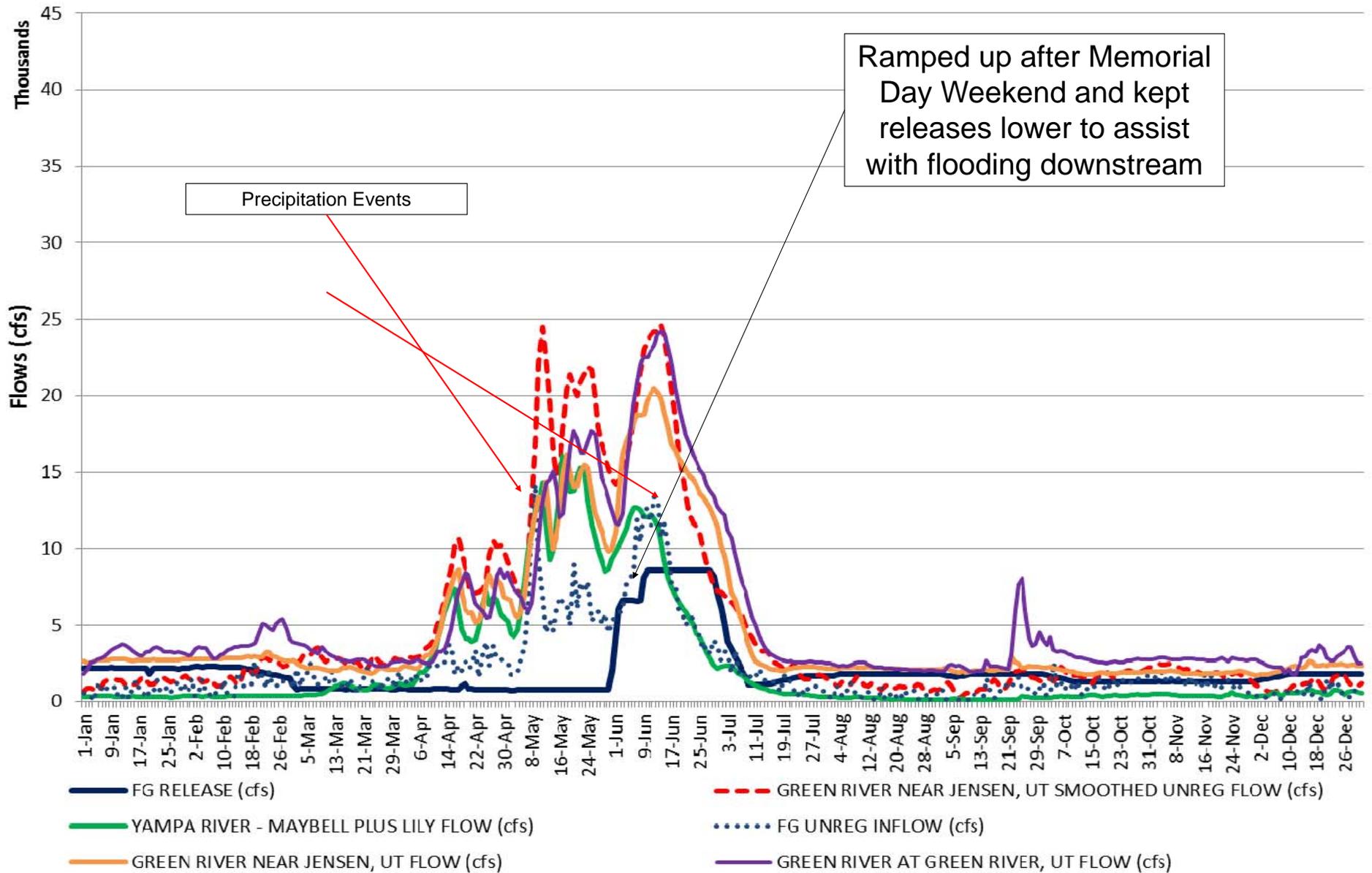
# Flaming Gorge Releases and Green and Yampa River Flows 1986



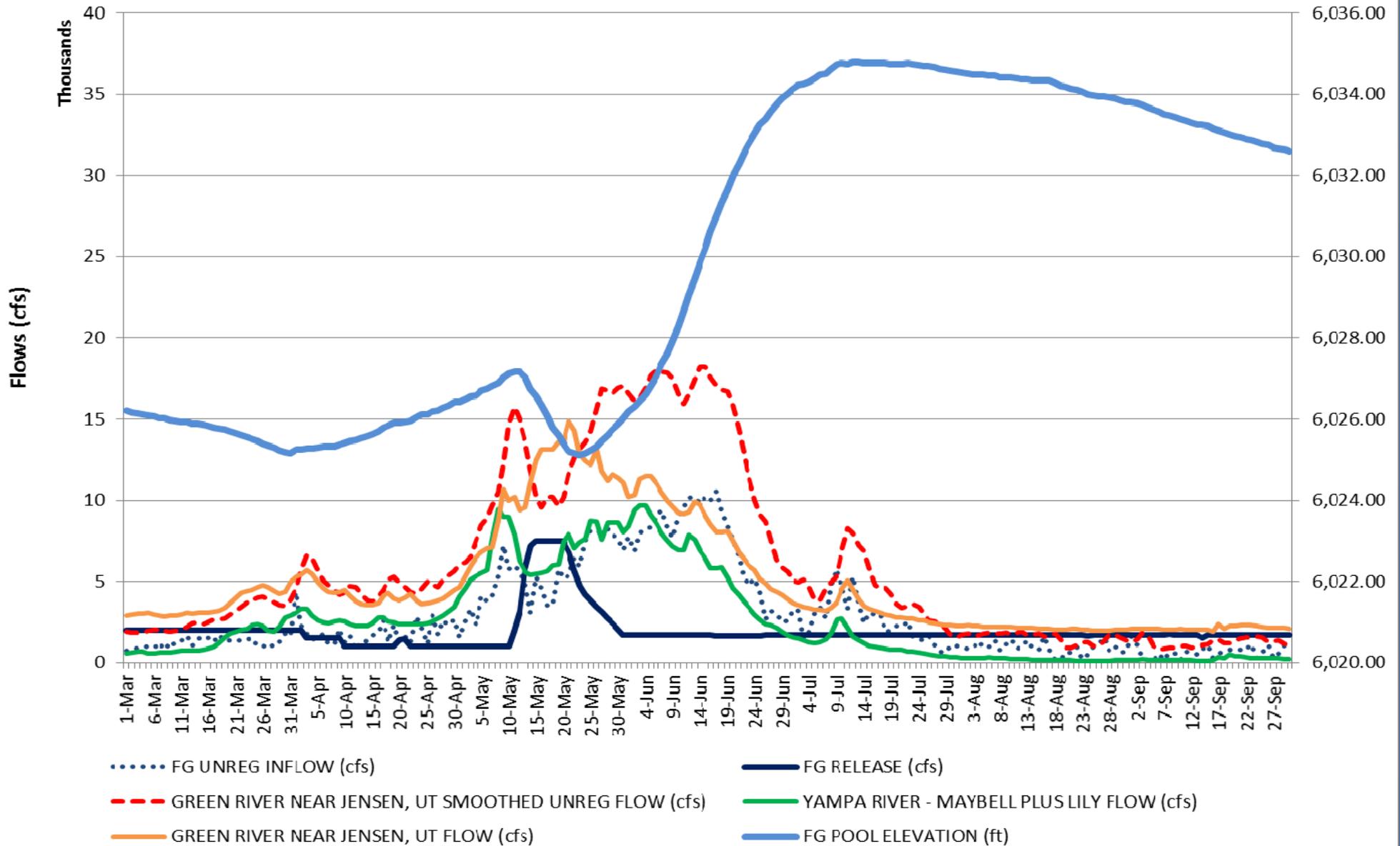
# Flaming Gorge Releases and Green and Yampa River Flows 2011



# Flaming Gorge Releases and Green and Yampa River Flows 2016



# Flaming Gorge Releases and Green and Yampa River Flows 2015



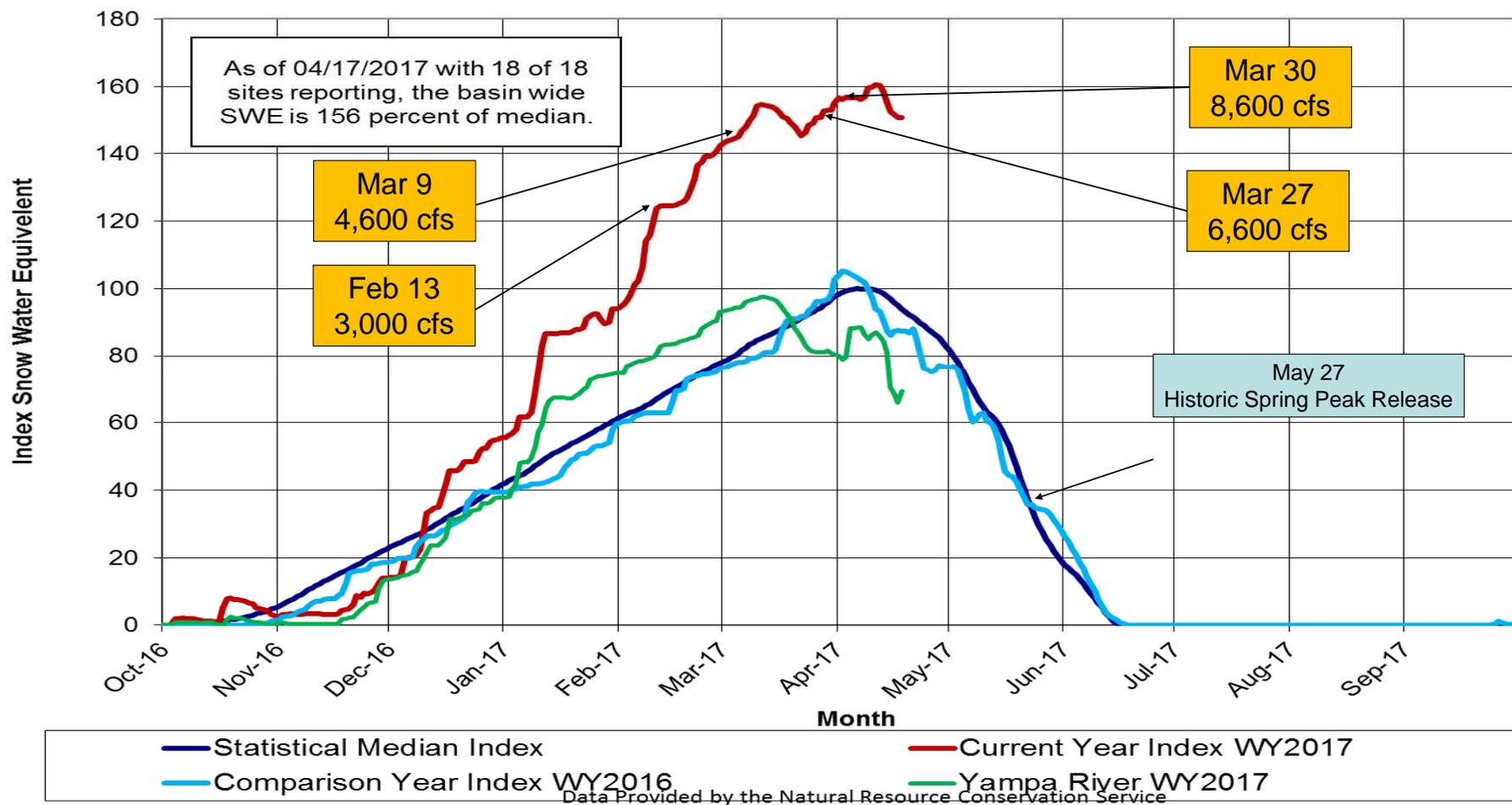
# CRSP Act Project Purposes

- Defined in Section 1 of the Act (43 U.S.C. § 620)
  - Authorized construction of FG and other projects;
  - Storing water for beneficial consumptive use;
  - Upper Basin states utilize their apportionments
  - Reclamation of arid and semiarid lands
  - Control of floods
  - Hydroelectric power generation

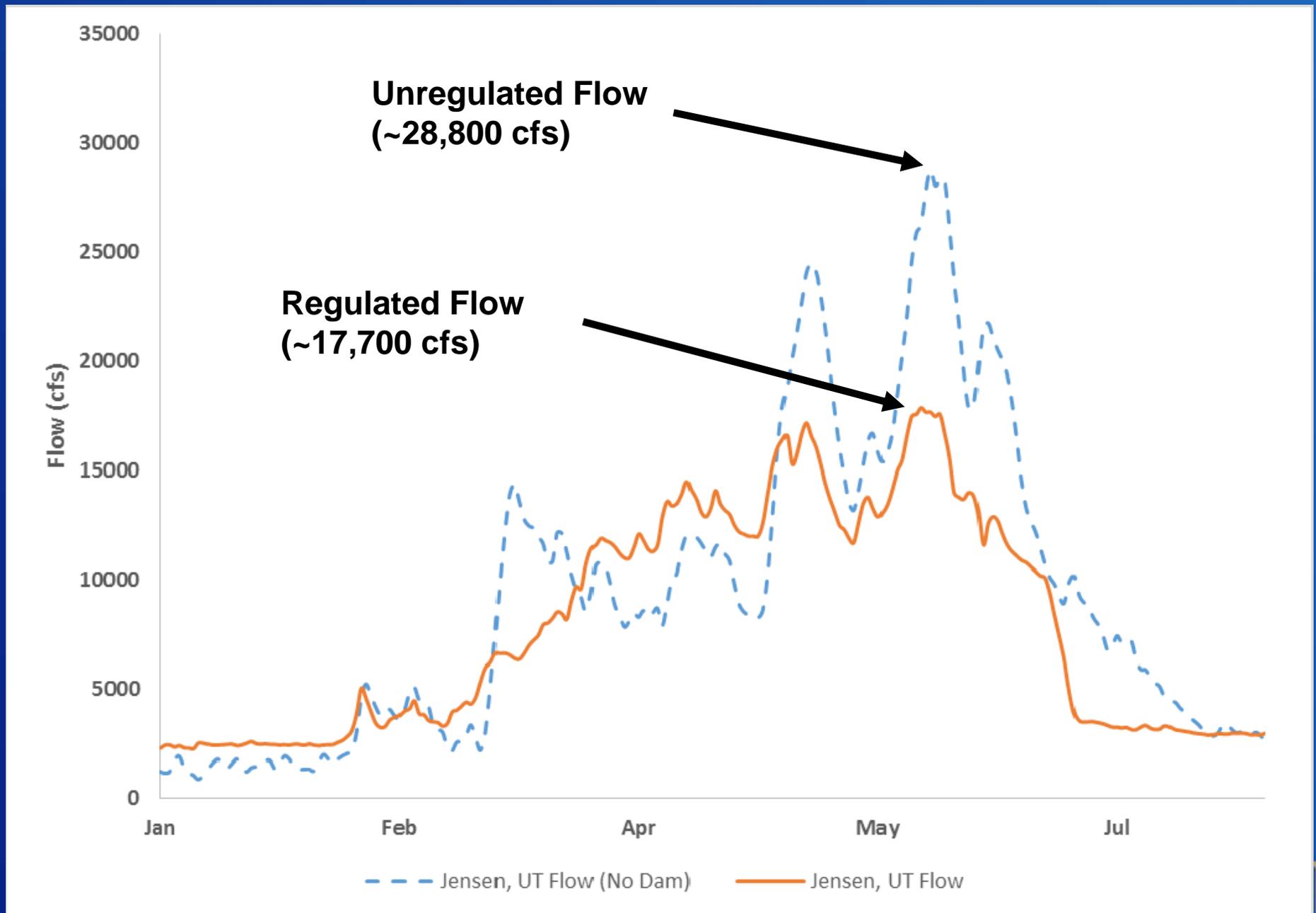
# Flaming Gorge Activities 2017

Jan	Feb	Mar	Apr
1230 KAF	1650	2260	2260
(126%)	KAF	KAF	KAF
	(168%)	(231%)	(231%)

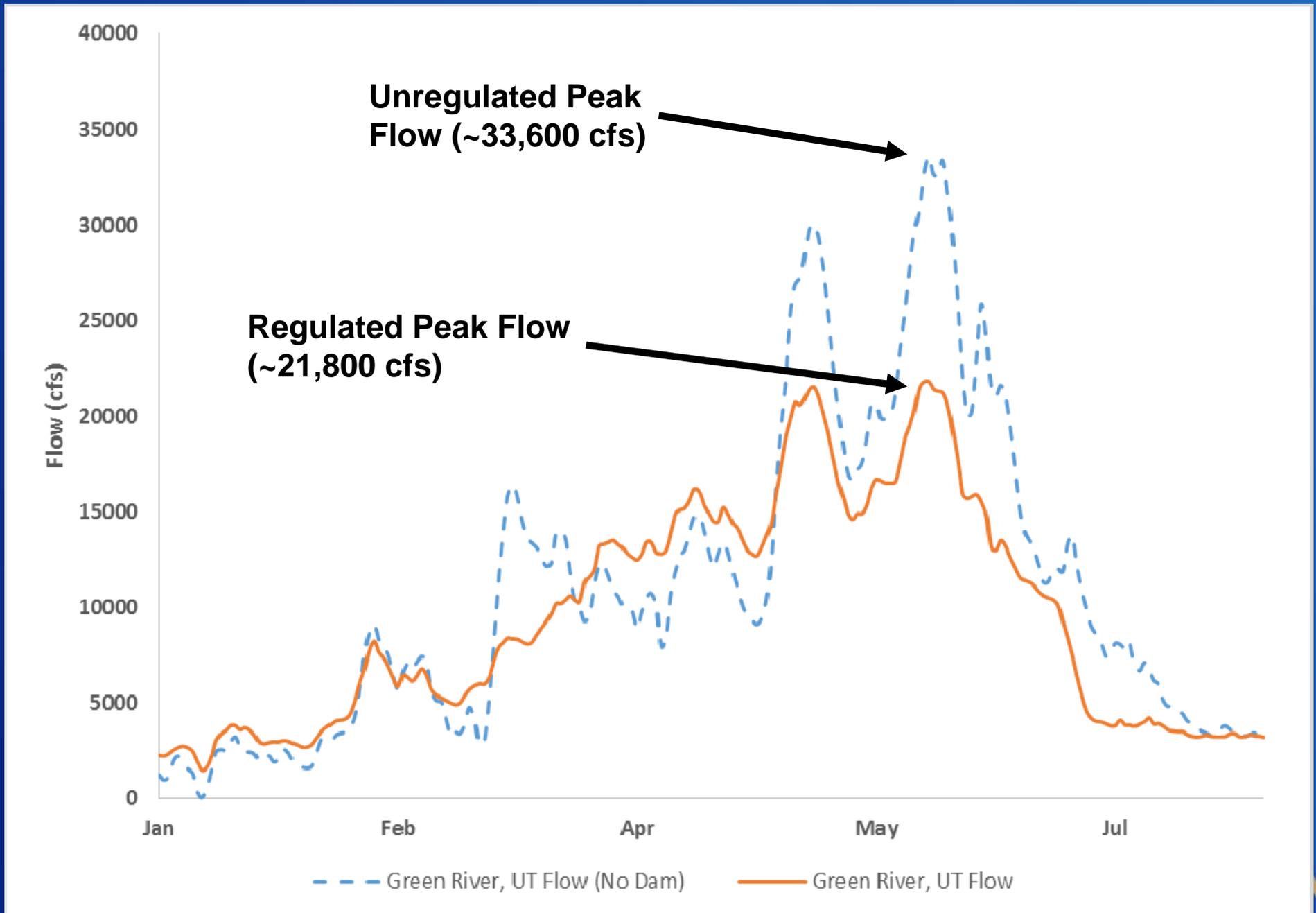
**Upper Green River Basin Snotel Tracking**  
Aggregate of 18 Snotel Sites above Flaming Gorge Reservoir



# 2017 Jensen, UT Flows (Reach 2)



# 2017 Green River, UT Flows (Reach 3)



# Sept 4-5 Electrofishing Schedule

Flaming Gorge Dam Release Schedule			
Time (MST)			
	9/4/2018	9/5/2018	9/6/2018
0:00	1,374	1,600	1,374
1:00	1,374	1,600	1,374
2:00	1,374	1,374	1,374
3:00	1,491	1,491	1,491
4:00	1,491	1,491	1,491
5:00	1,491	1,491	1,491
6:00	2,227	2,227	2,227
7:00	2,227	2,227	2,227
8:00	2,227	2,227	2,227
9:00	2,227	2,227	2,227
10:00	2,227	2,227	2,227
11:00	2,227	2,227	2,227
12:00	2,227	2,227	2,227
13:00	2,227	2,227	2,227
14:00	2,227	2,227	2,227
15:00	2,374	2,374	2,374
16:00	2,374	1,600	2,374
17:00	2,374	1,600	2,374
18:00	2,374	1,600	2,374
19:00	1,600	1,600	2,374
20:00	1,600	1,600	2,374
21:00	1,600	1,600	2,374
22:00	1,600	1,600	1,374
23:00	1,600	1,374	1,374
<b>Average</b>	<b>1,922</b>	<b>1,835</b>	<b>2,000</b>