RECLAMATION

Managing Water in the West

Flaming Gorge Working Group

Hydrology & Forecasted Operations

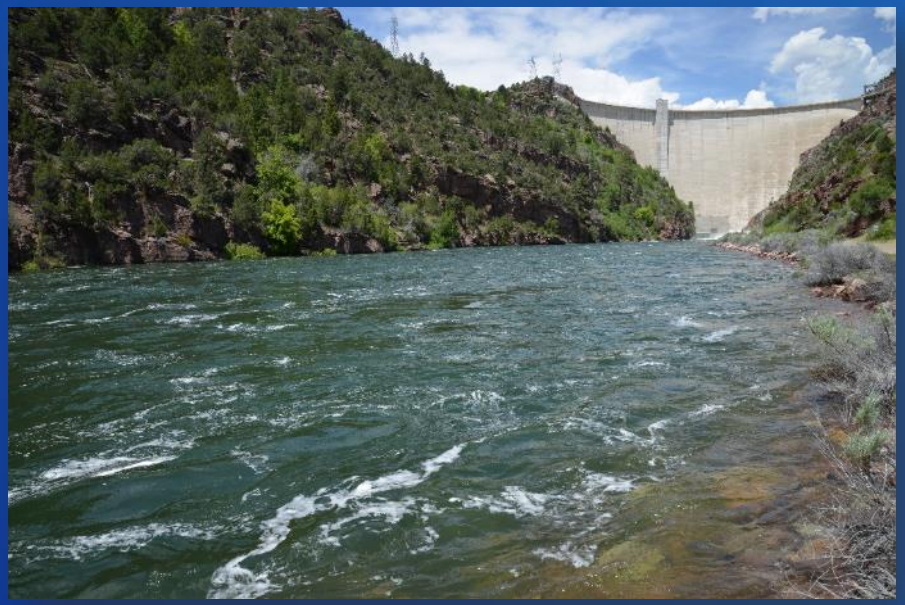
Vernal, Utah | April 19, 2018

Heather Patno & Jed Parker
Upper Colorado Region

U.S. Department of the Interior
Bureau of Reclamation

Outline

- Flaming Gorge and Colorado River Storage Project (CRSP)
- Base Operations
- Record of Decision
- 2017 Operations Review
- 2018 Forecast Operations
- Comparison to Historic Operations
- Ongoing Updates
- Questions/Discussion



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Flaming Gorge and CRSP

1956 Colorado River Storage Project Act

- **Authorized construction of Flaming Gorge Dam and other projects for:**
  - Allowing Upper Basin States to utilize their 1922 Colorado River Compact apportionments
  - Regulating flow of Colorado River (and its main tributaries)
  - Storing water for beneficial consumptive use
  - Reclamation of arid and semi-arid lands
  - Flood control
  - Hydroelectric power generation

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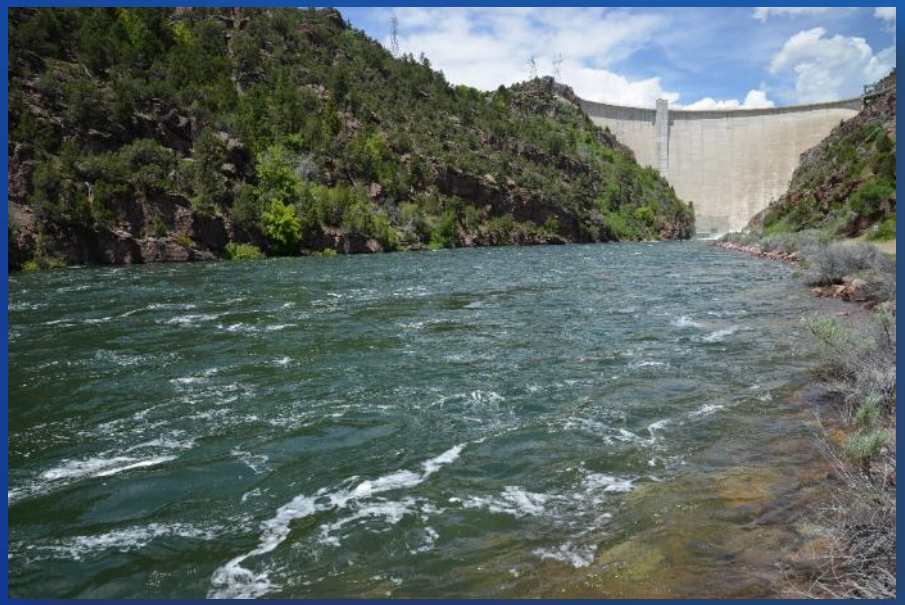

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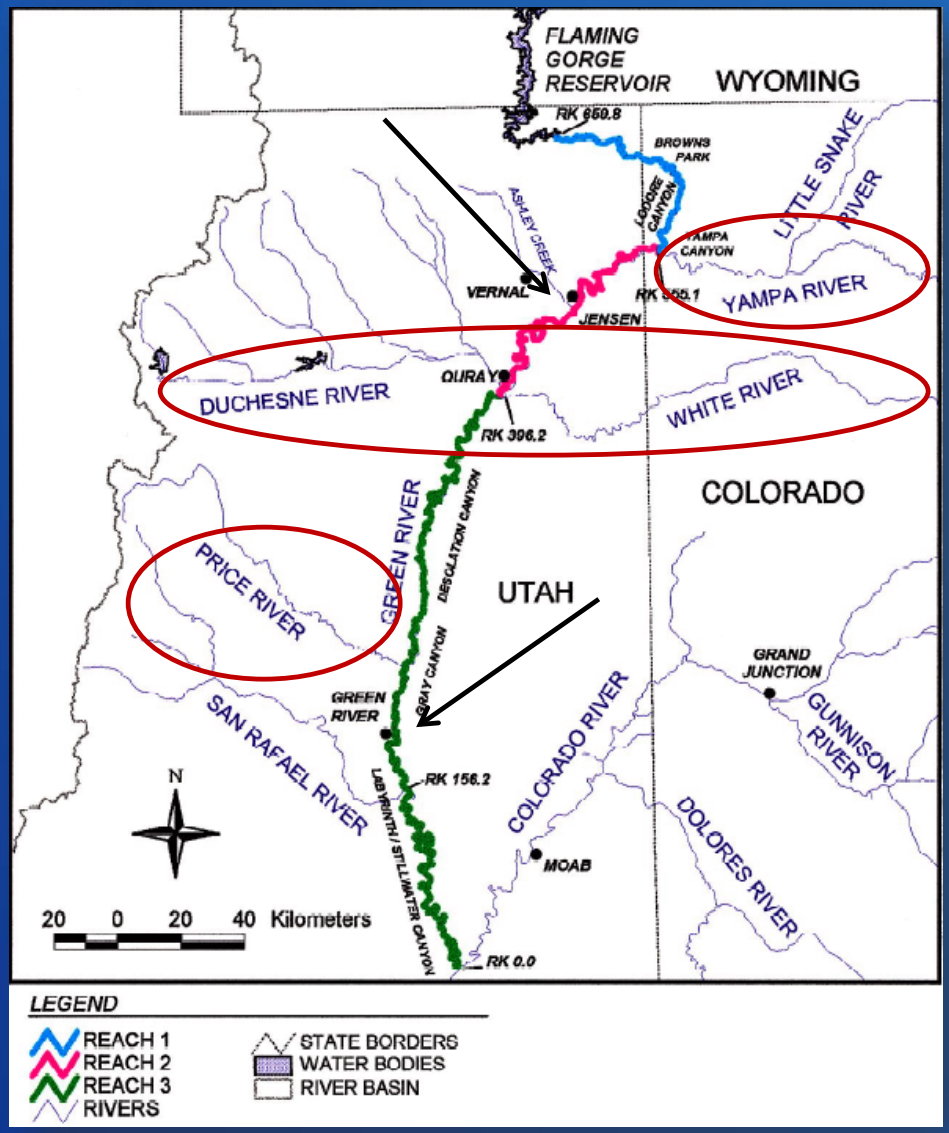
Base Operations – Geographic Scope

- **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



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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.

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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

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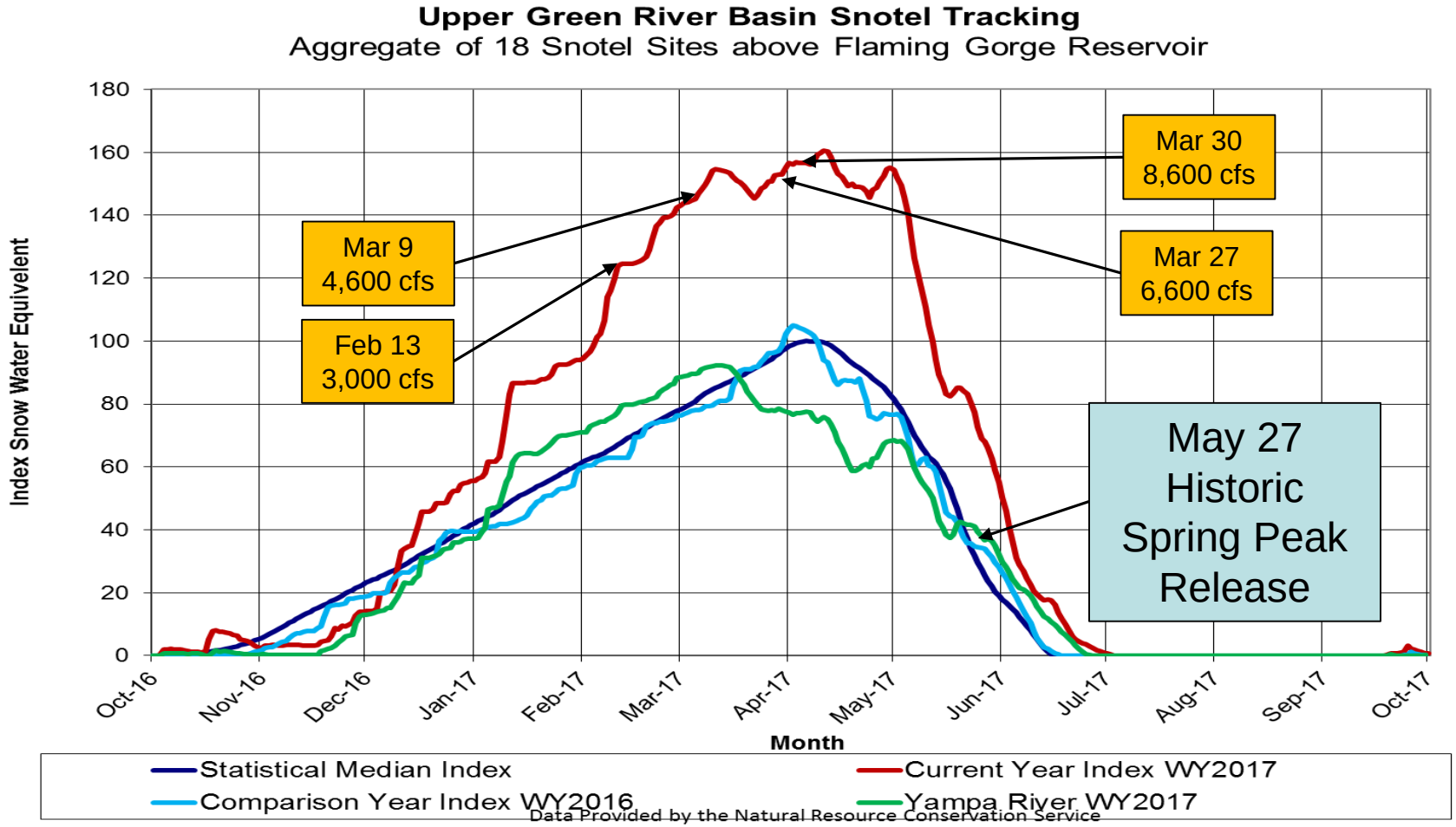
Flaming Gorge Activities 2017

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



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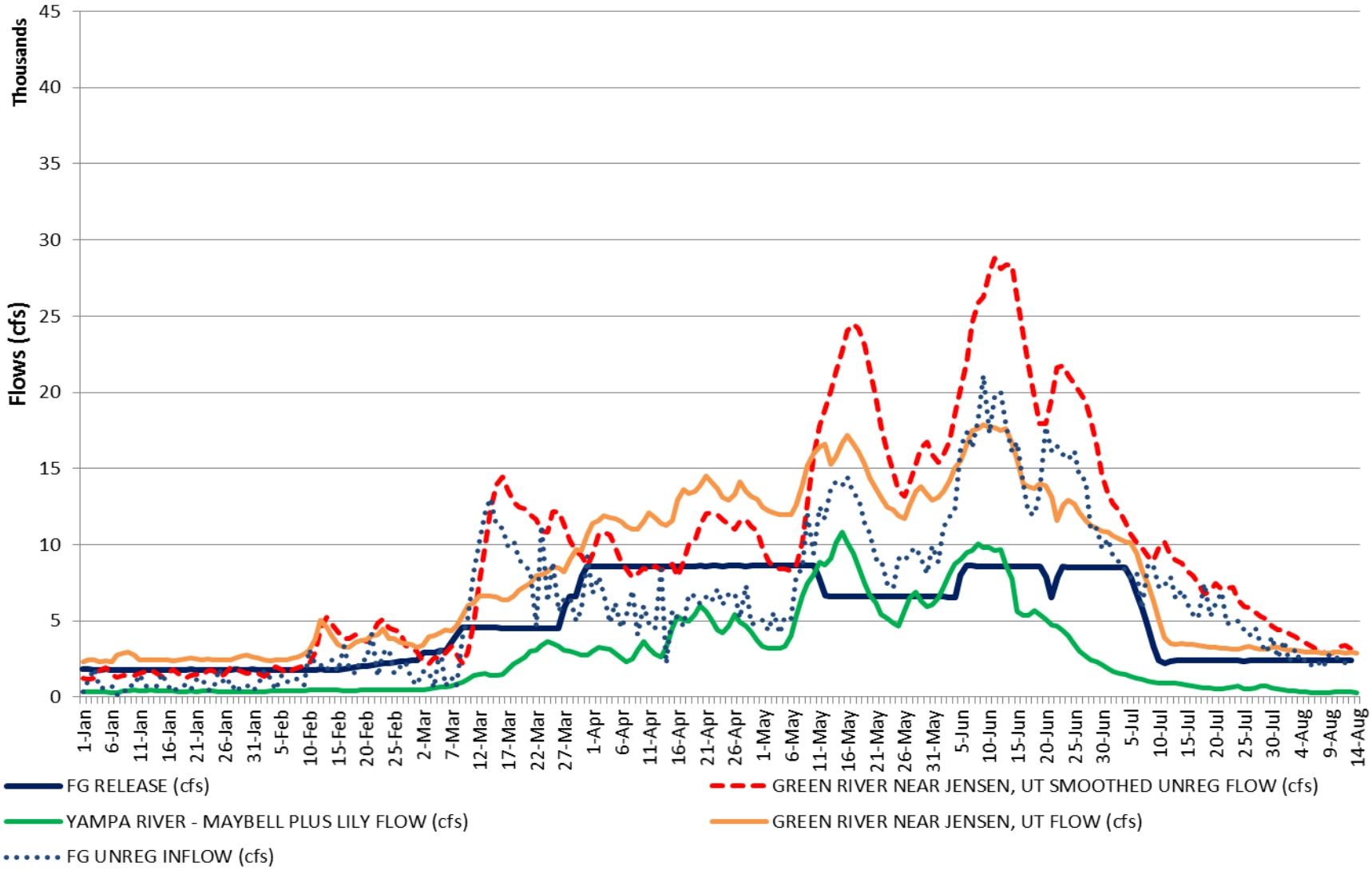
Flaming Gorge Releases and Green and Yampa River Flows
2017



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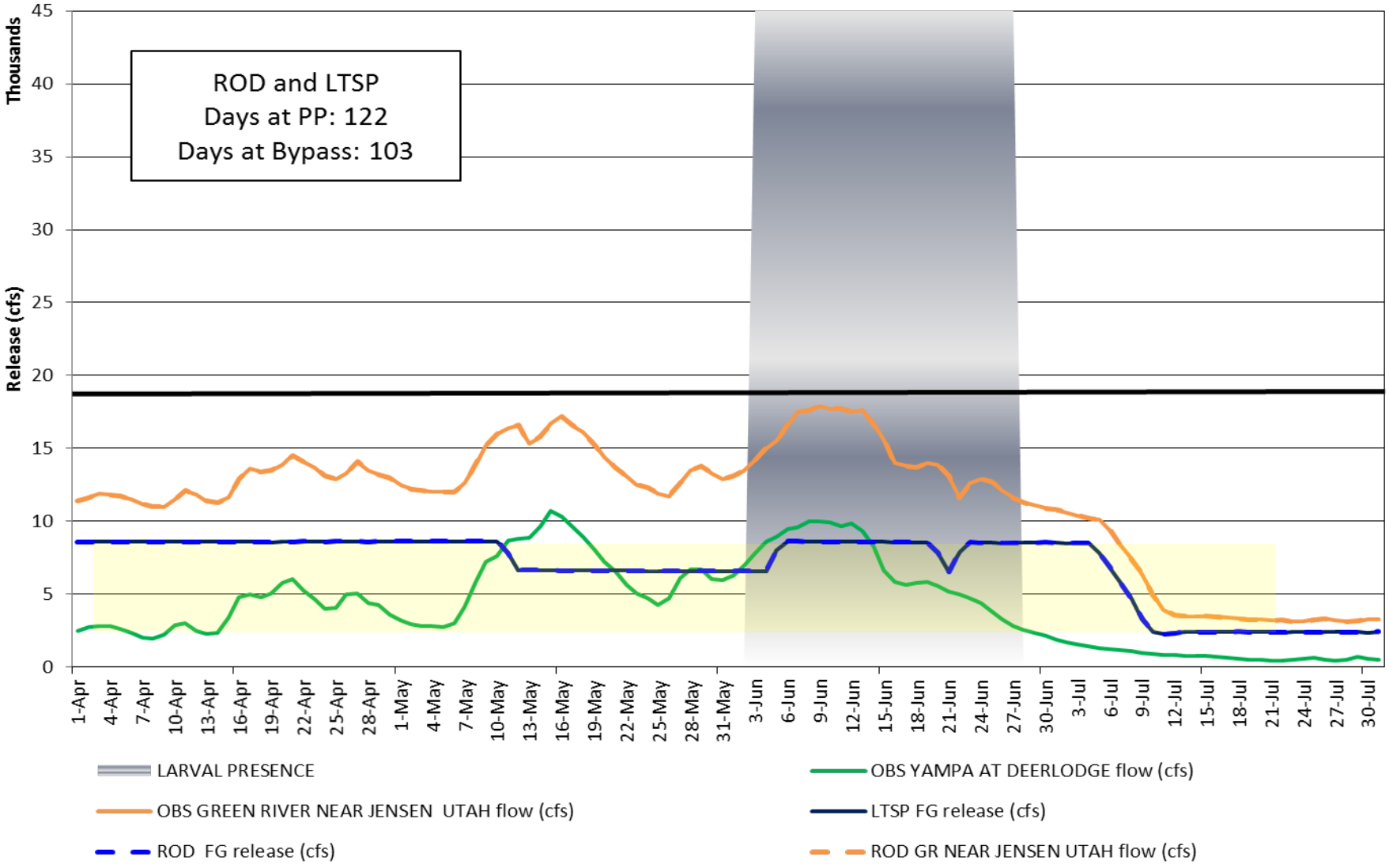
FG Release and Green River Flows
April-July 2017



Larval presence duration is estimated

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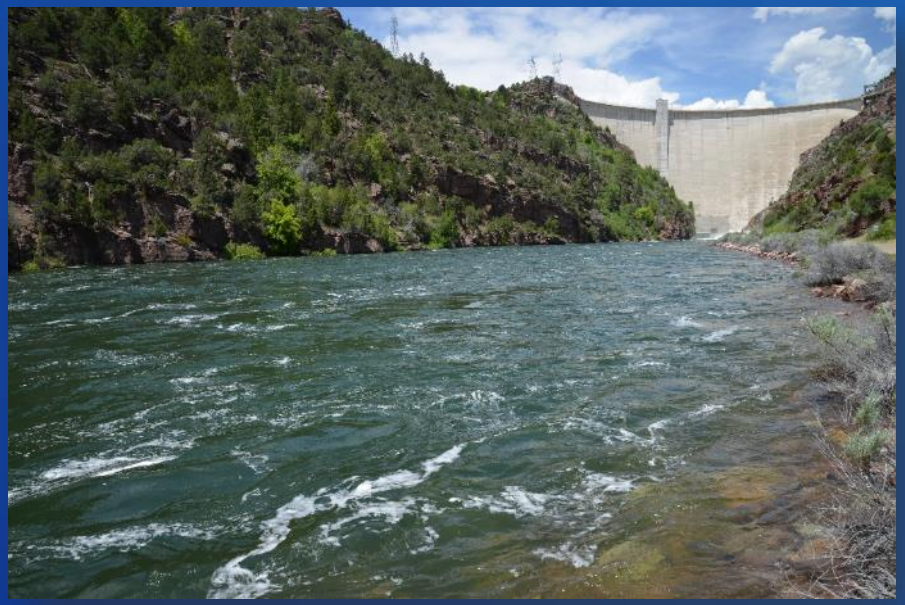

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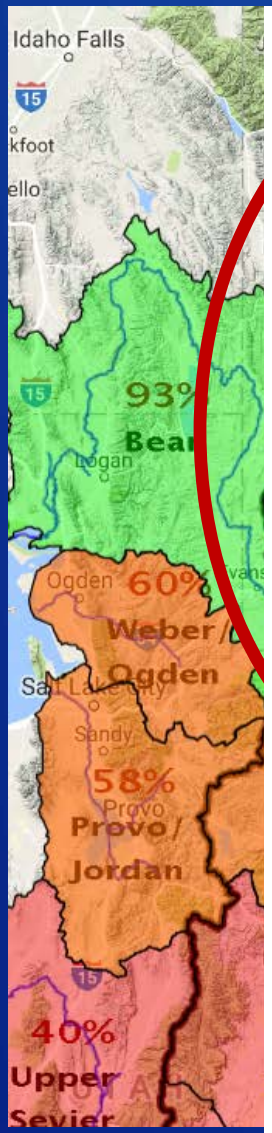
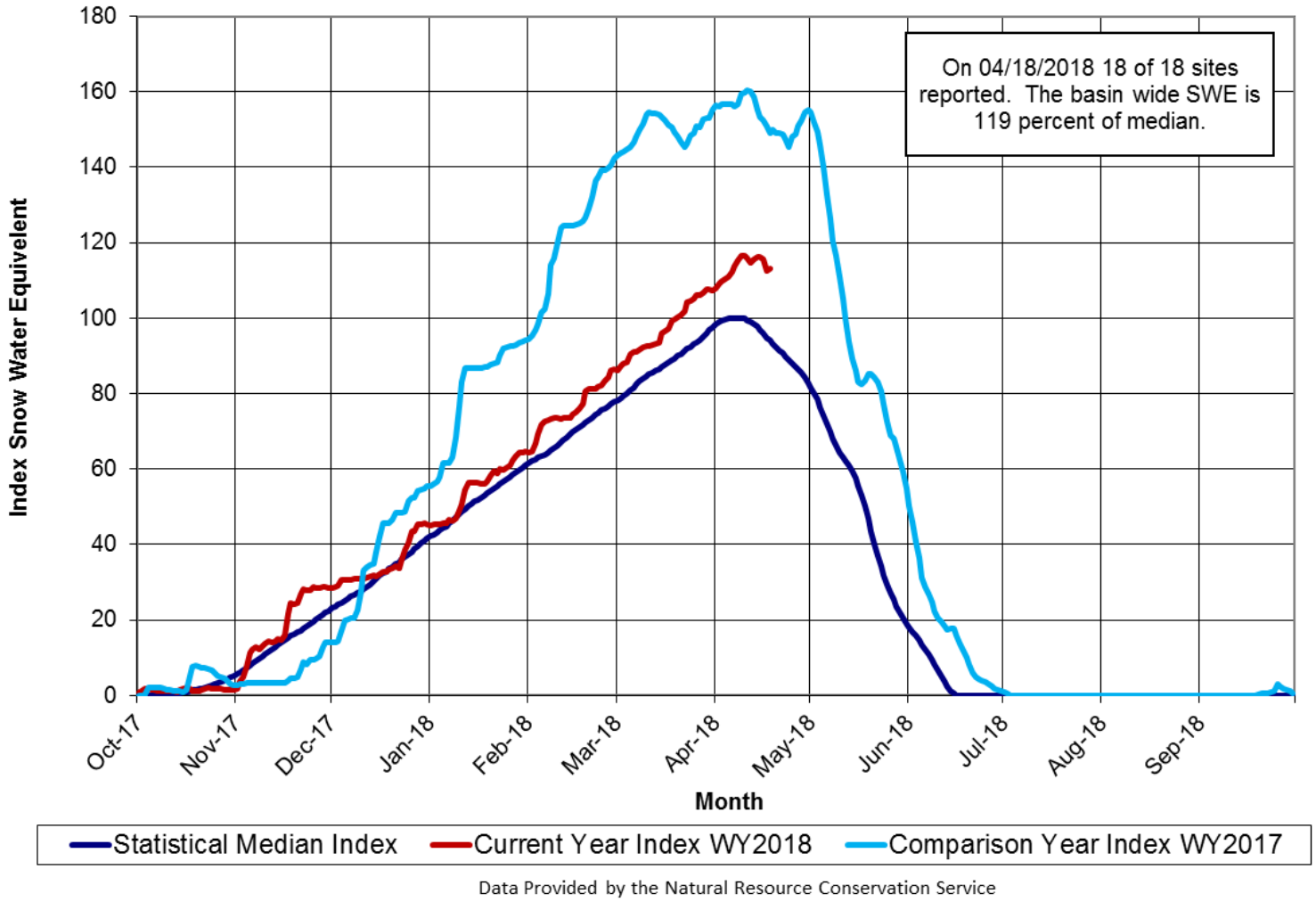
Snowpack above Flaming Gorge



Upper Green River Basin Snotel Tracking

Aggregate of 18 Snotel Sites in the Upper Green River Basin



Data Provided by the Natural Resource Conservation Service

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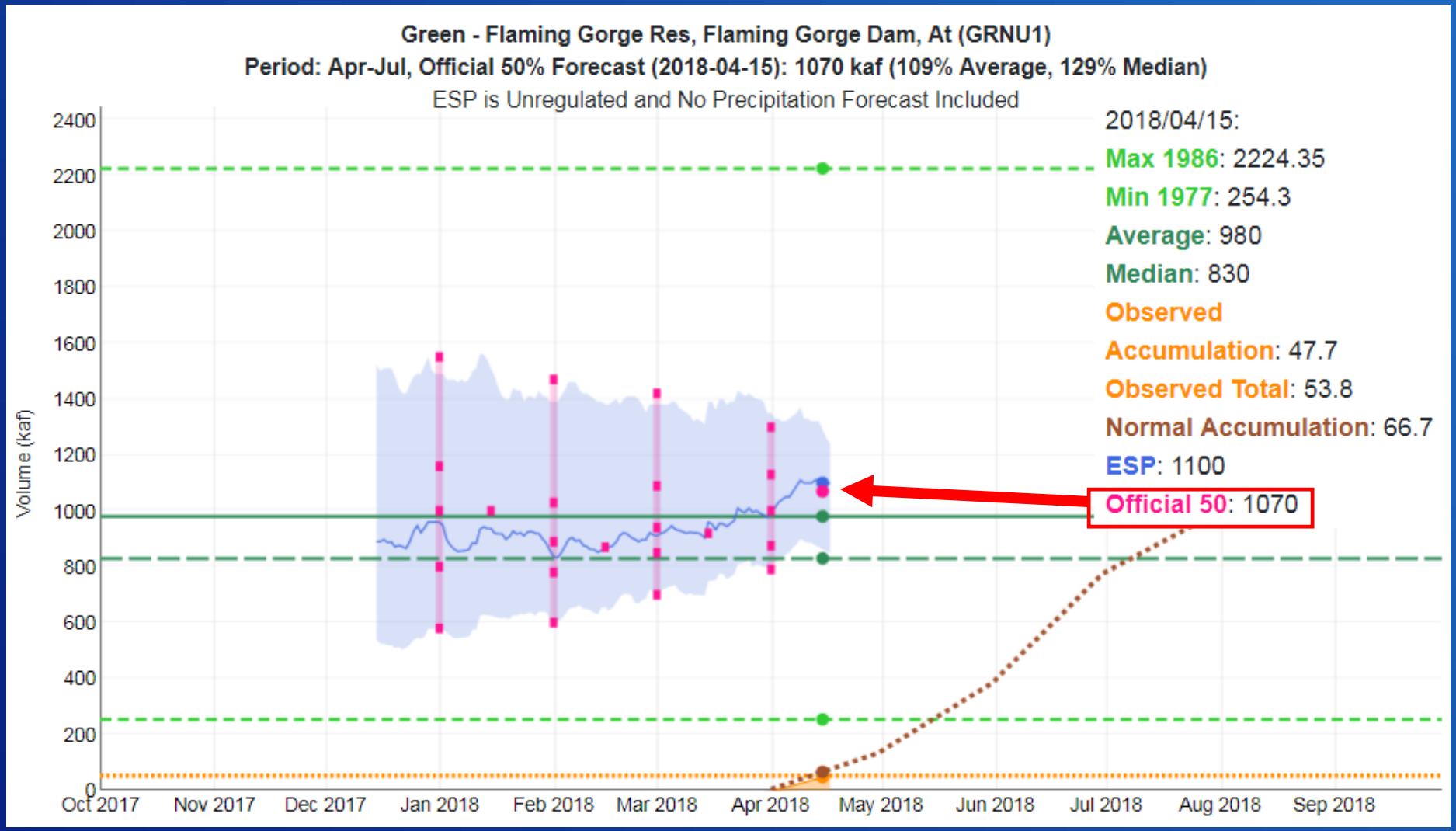
Flaming Gorge Forecast



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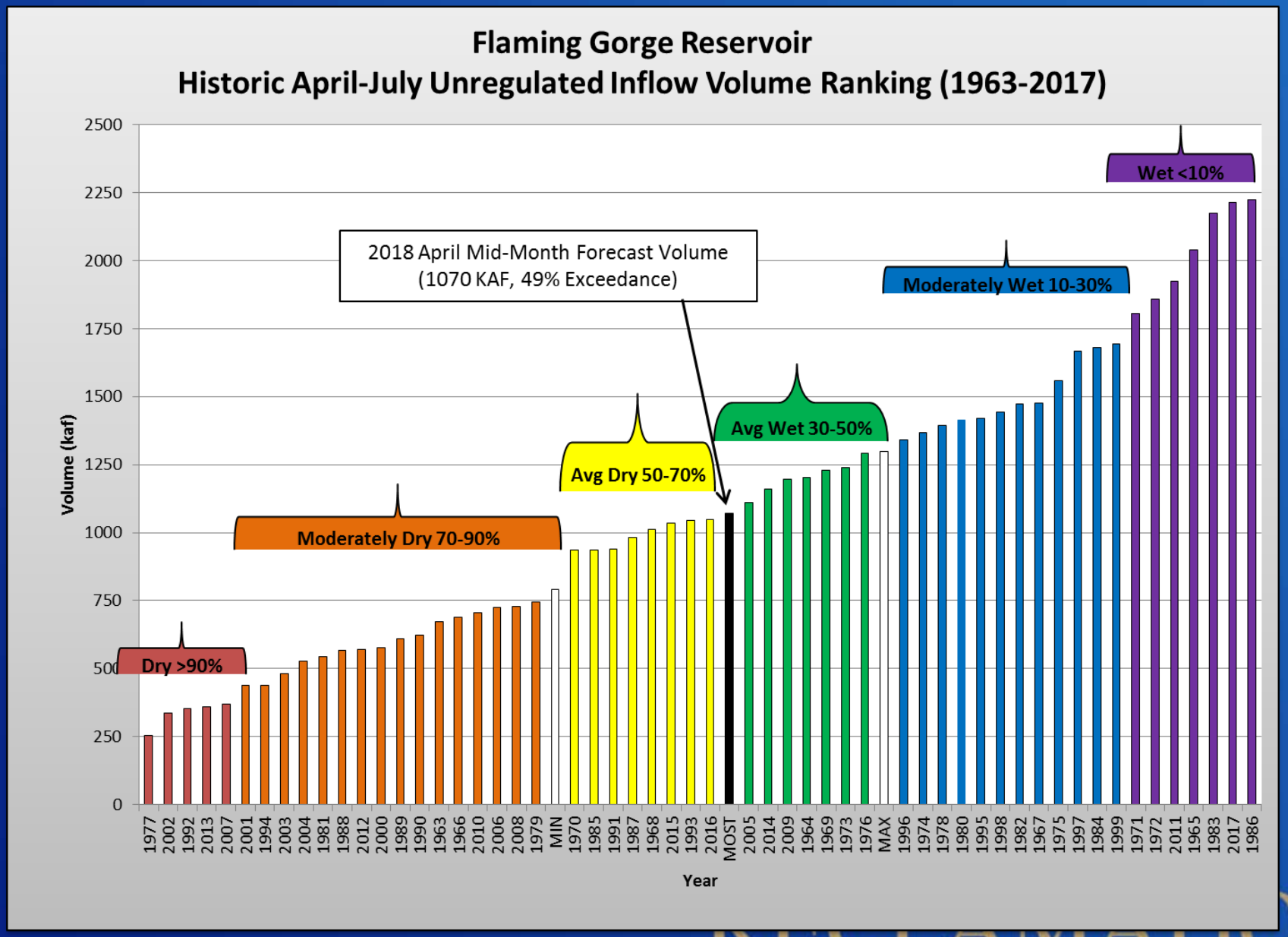
2018 Forecast Operations - Inflow



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)
SPRING PEAK FLOW					
Magnitude	≥ 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	
Duration	>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)
Timing	Peak flows should coincide with peak flows in the Yampa River				
	Hydrologic Condition [b]				
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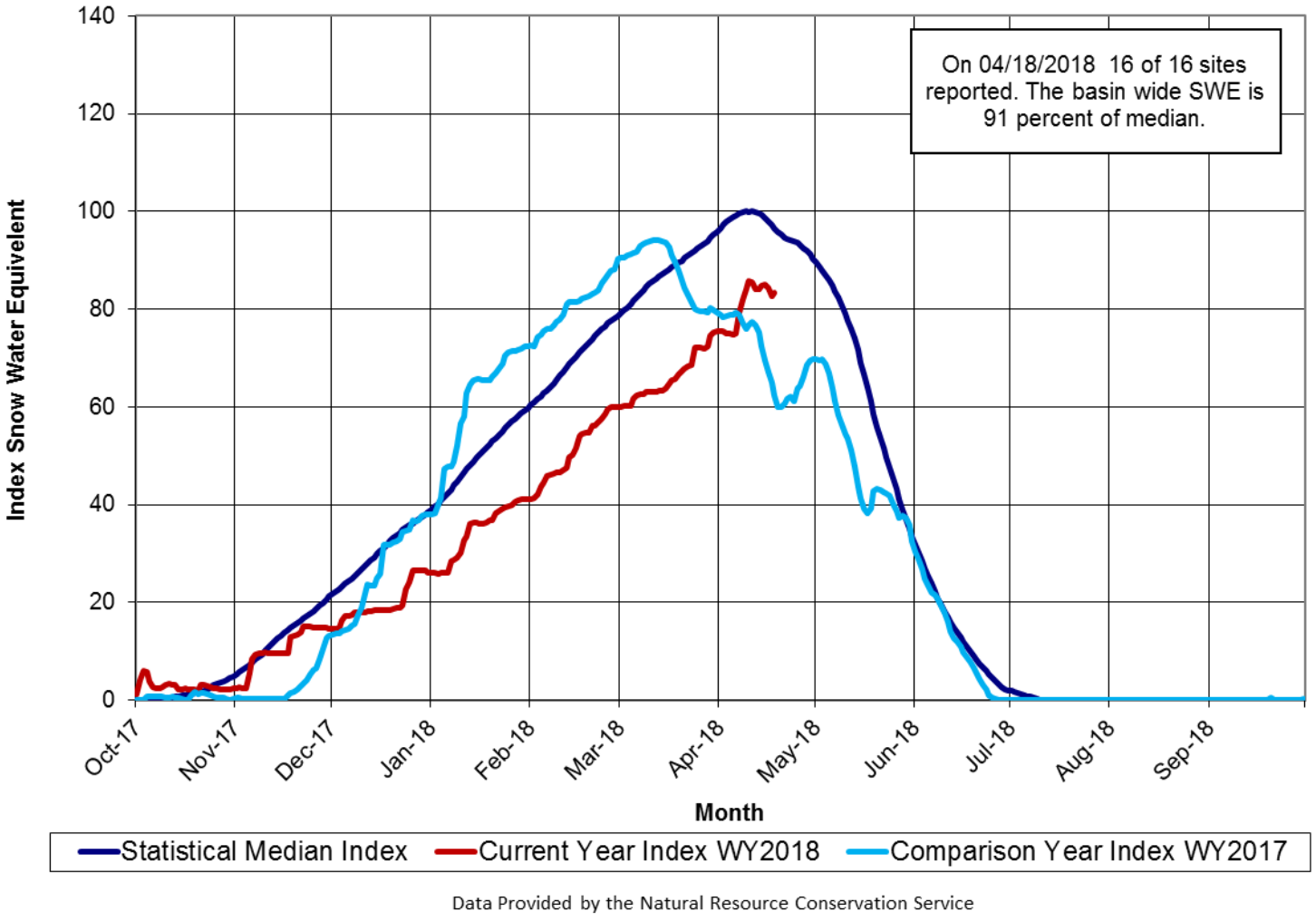
SUMMER THROUGH WINTER BASE FLOW					
Mean flow	2,800 - 3,000 cfs	2,400 - 2,800 cfs	1,500 - 2,400 cfs	1,100 - 1,500 cfs	900 - 1,100 cfs
Approximate period	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1

Yampa/White Basin Snowpack

Upper Yampa River Basin Snotel Tracking

Aggregate of 16 Snotel Sites in the Yampa River Basin



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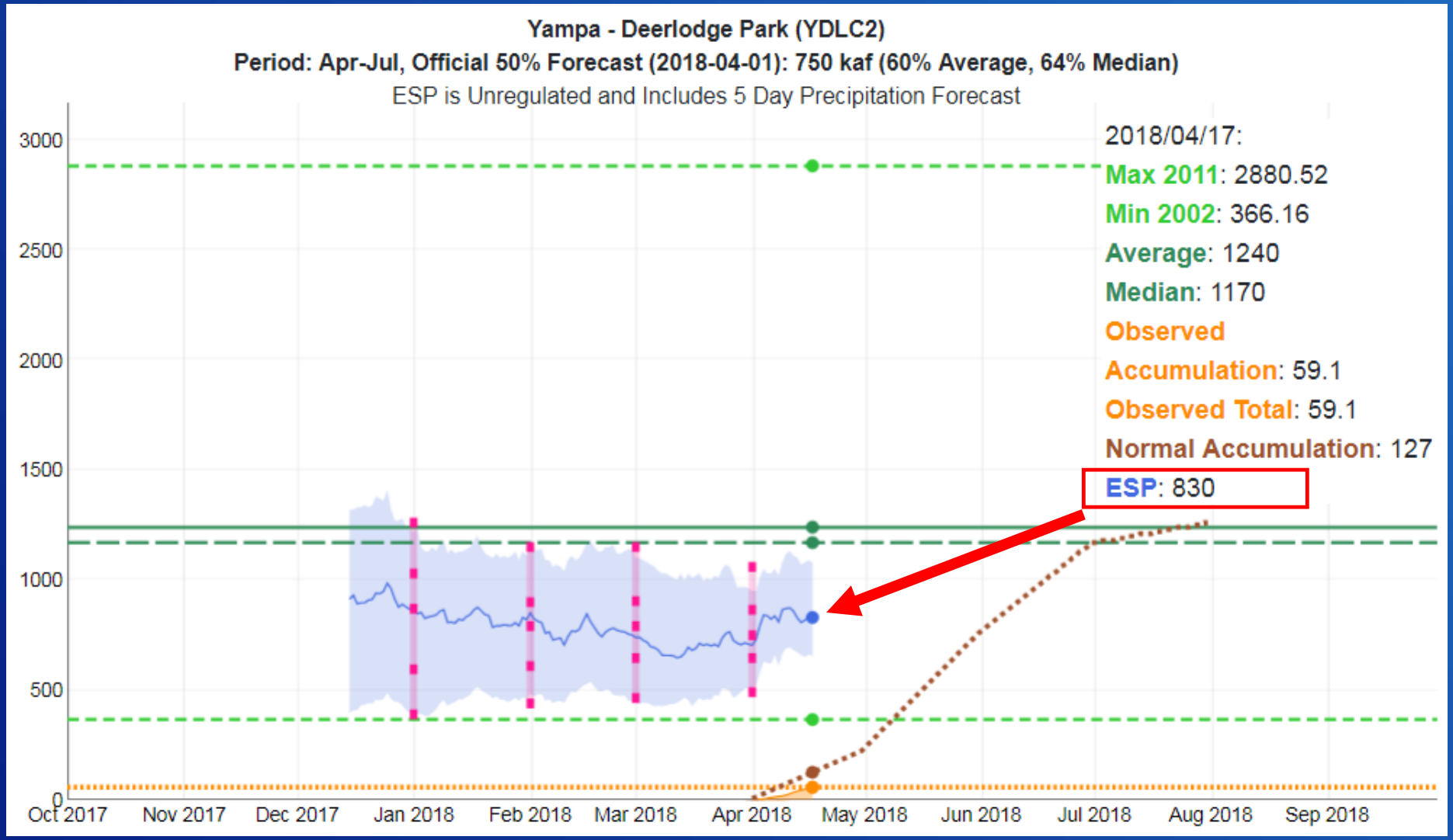
Yampa at Deerlodge Forecast



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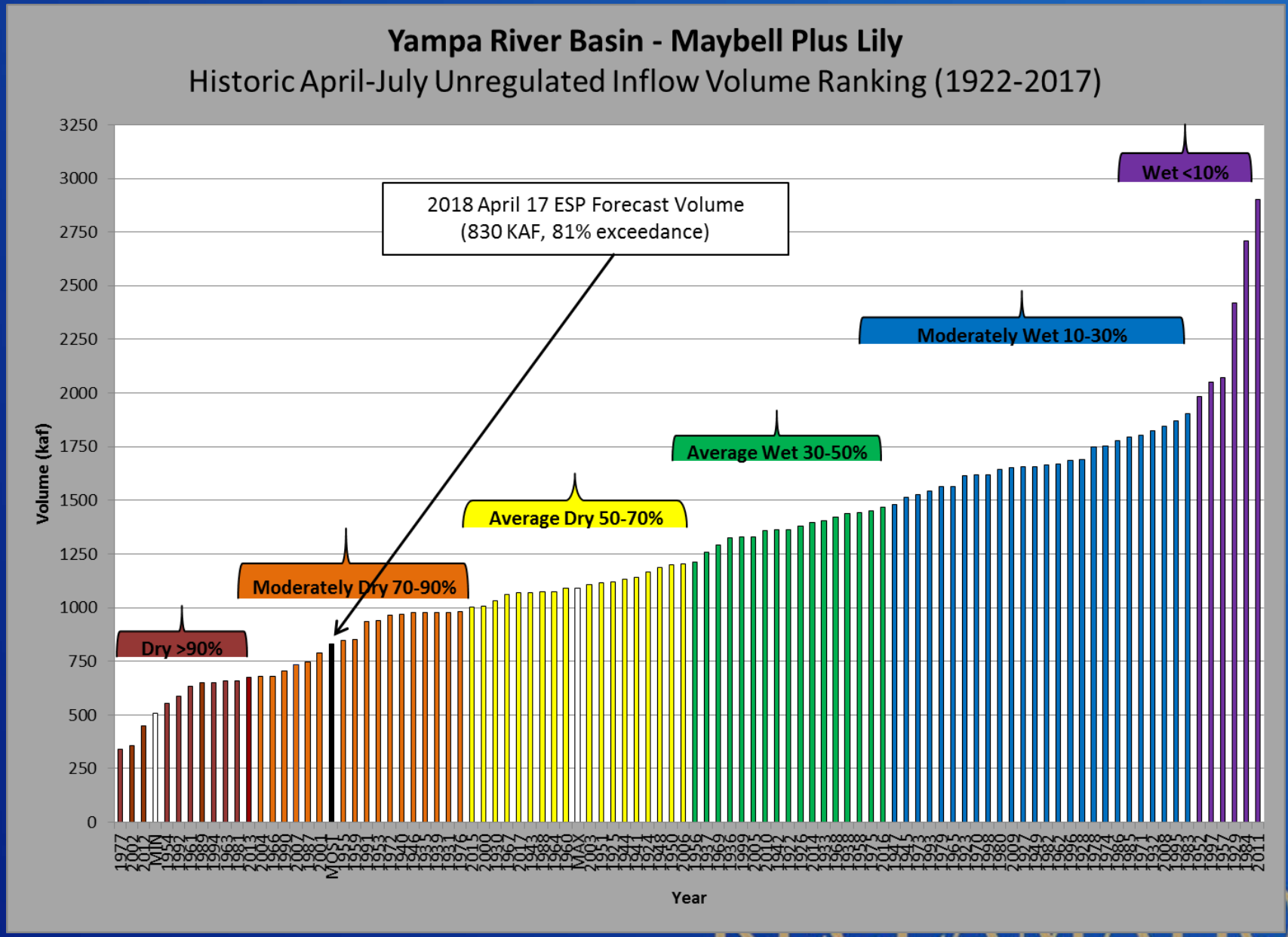

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Approximate period	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1	Aug 15 to Mar 1

Larval Trigger Study Plan Peak Flows

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 ≤ x < 7	7 ≤ x < 14	x ≥14
8,300 ≤ x < 14,000 cfs	Stewart Lake (f), Above Brennan (f), Old Charley Wash (s)[d]	Dry	Moderately dry	Moderately dry and average (below median)
14,000 ≤ x < 18,600 cfs	Same as previous plus Escalante Ranch (f), Bonanza Bridge (f), Johnson Bottom[e] (s), Stirrup (s), Leota 7 (s)	Average (below median)	Average (below median)	Average (below median)
18,600 ≤ x < 20,300 cfs	Same as previous	Average (above median)	Average (above median)	Average (above median)
20,300 ≤ 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 ≥ 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) Exceedance percentages and peak flow recommendations for each hydrologic condition as described in Muth et al. 2000. 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.

(d) Access to the Old Charley Wash floodplain has been denied since 2012.

(e) In 2015, Johnson Bottom was re-contoured and canals were cleaned; this wetland can now entrain larvae when flows are <14,000cfs.

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Colorado Pikeminnow base flows

Table 10. Comparison of base flow levels in Muth et al. (2000) and those proposed in this report for the middle and lower Green River, Utah. The higher upper ends of flow ranges in Muth et al. (2000) for the lower Green River reflect uncertainty about tributary inputs, while proposed targets represent preferred ranges.

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

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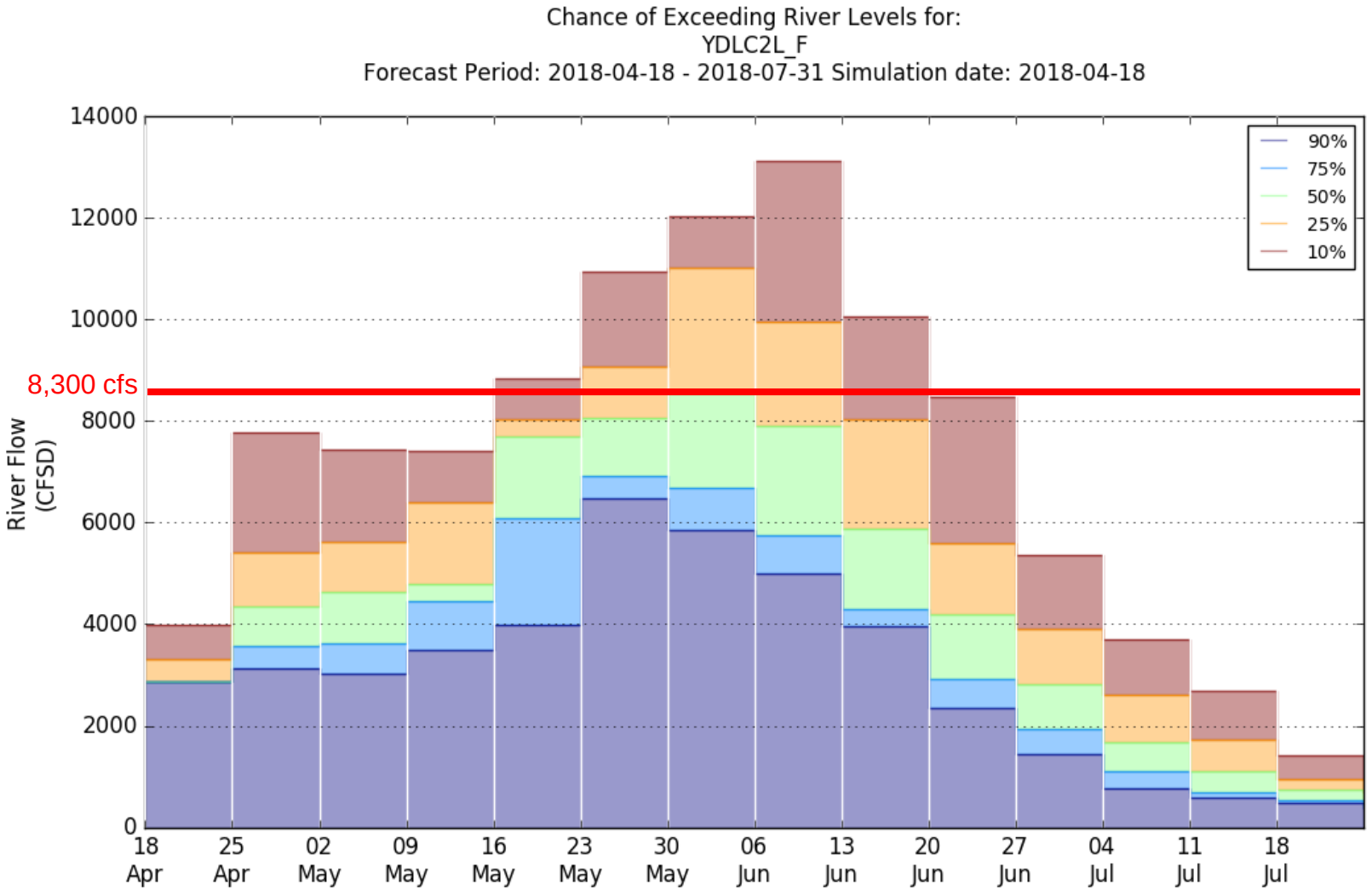
Yampa Peak



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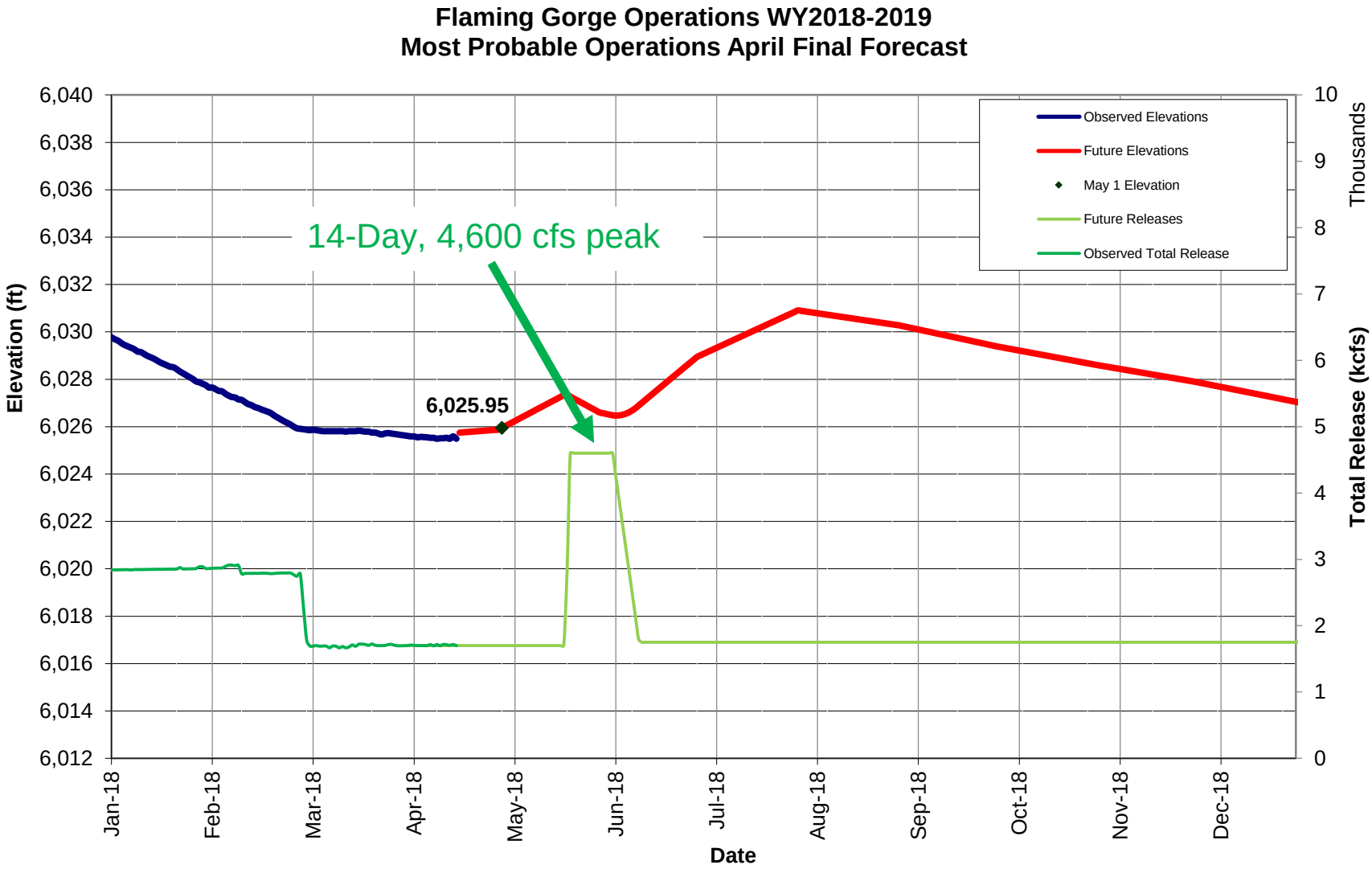
Current and Future Operations - 2018



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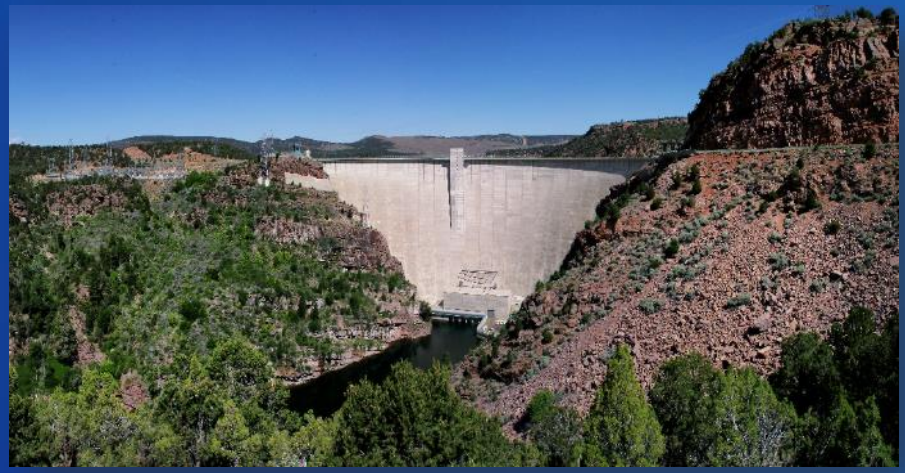

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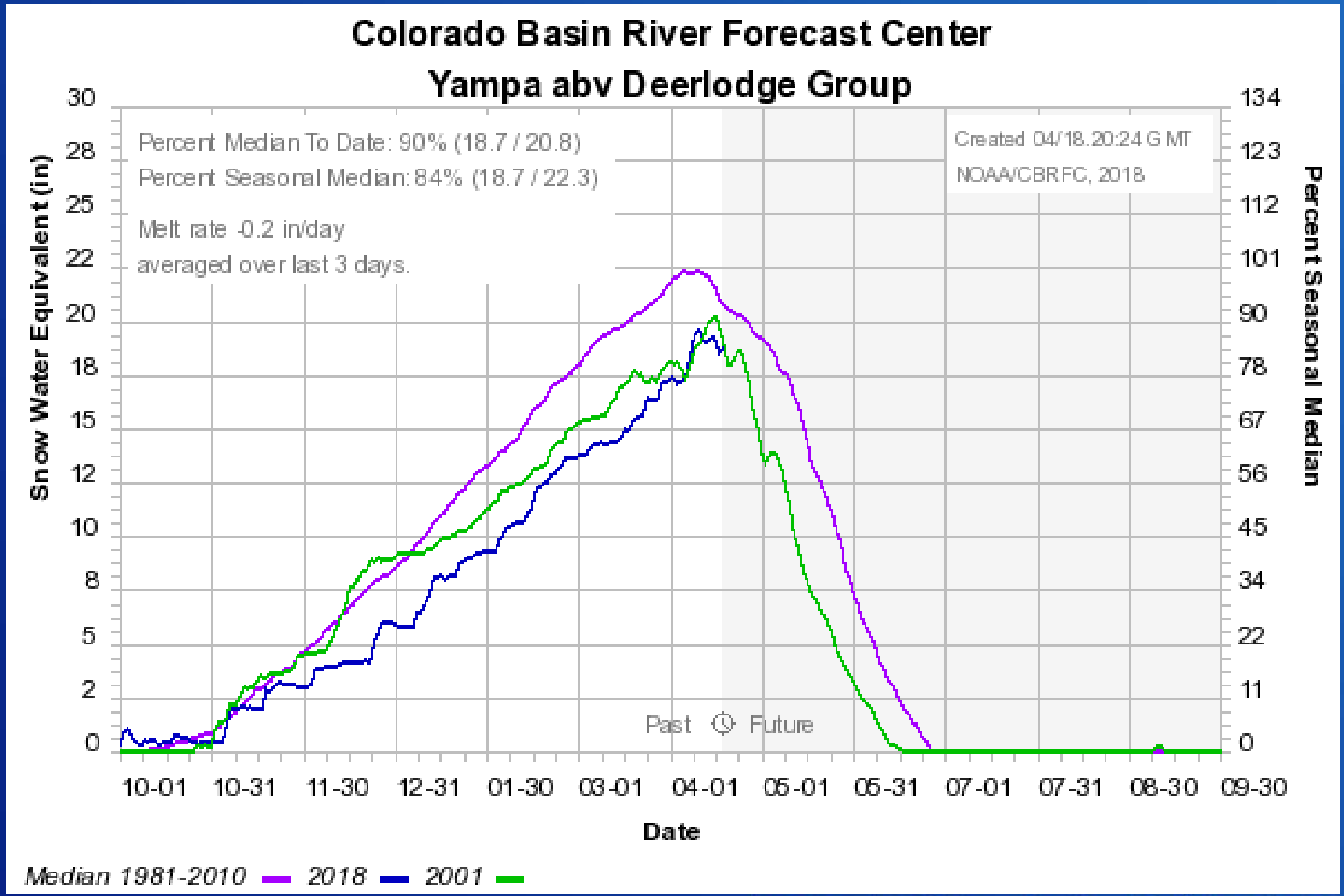
Analogous Years



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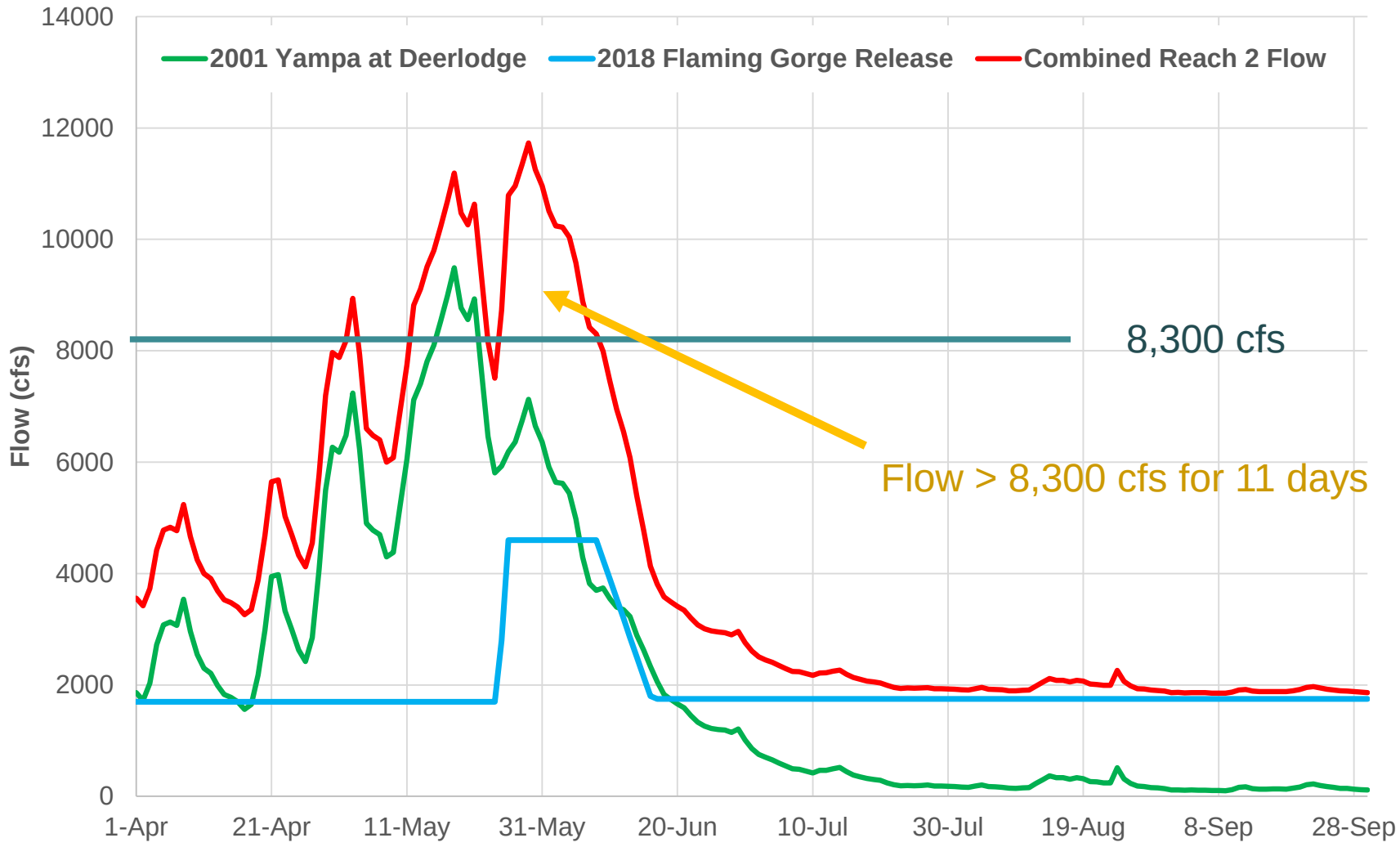
2018 Operations with 2001 Yampa Hydrology



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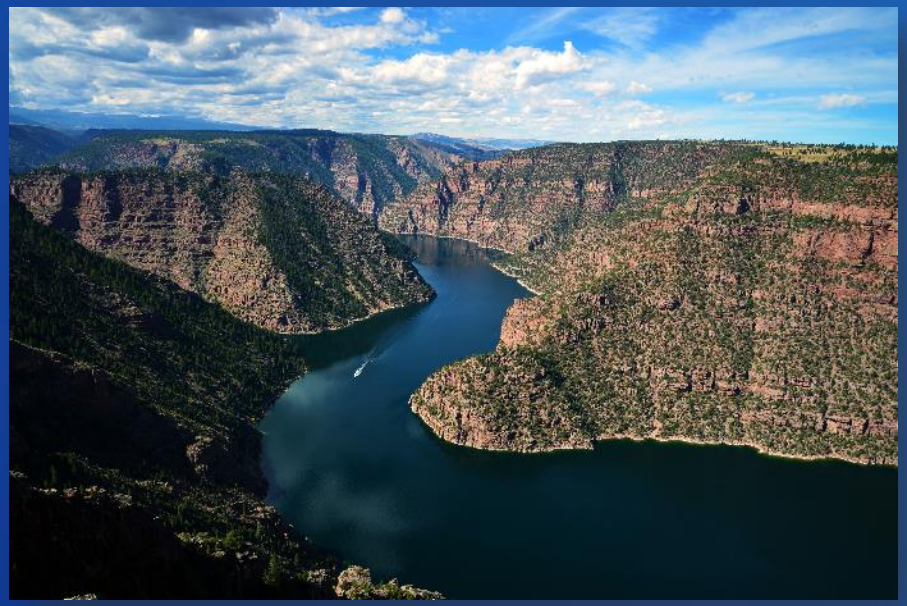

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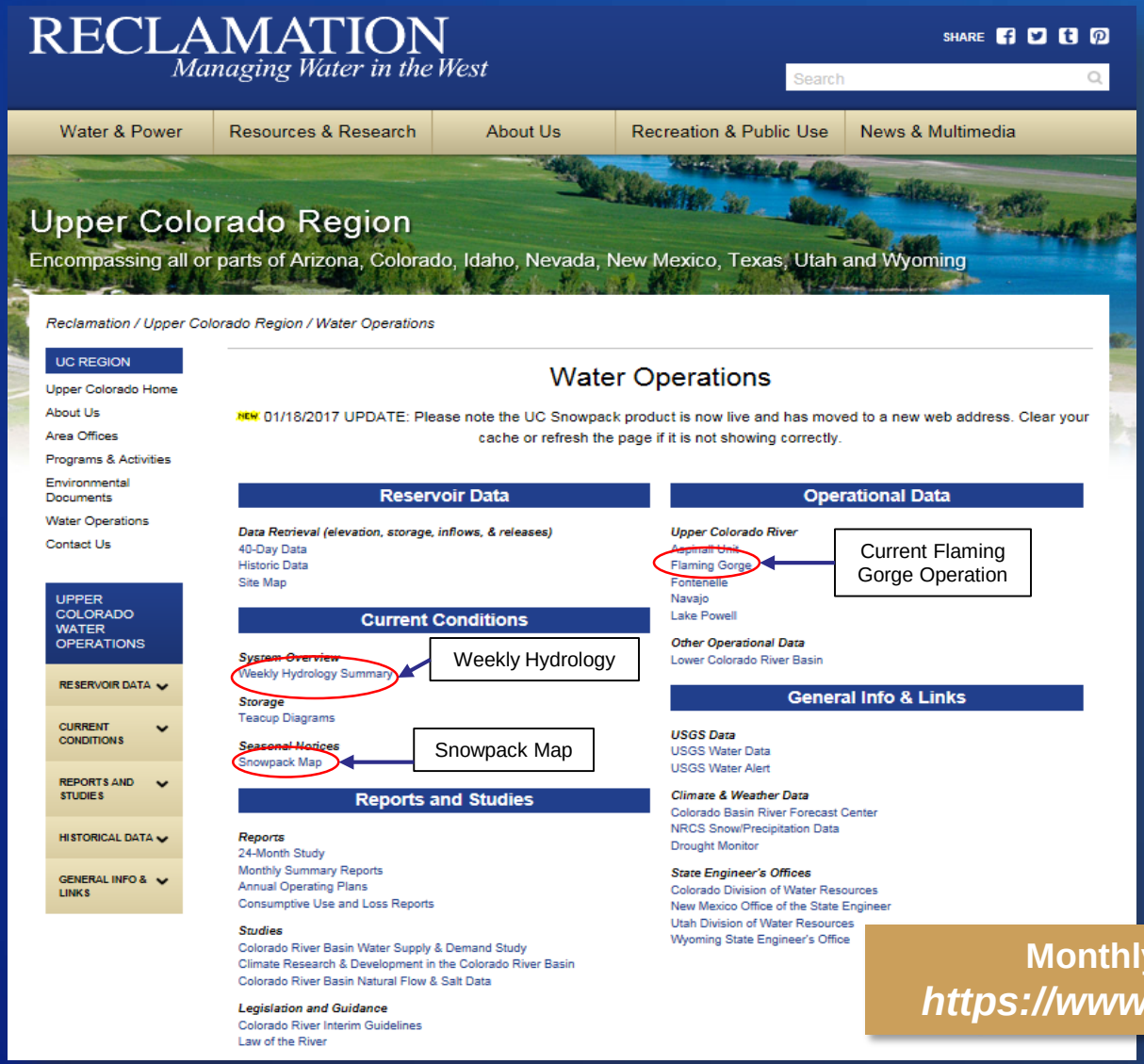
Updates

- **Fishery assessment (electro fishing)**
  - **April 23 – April 24**
  - **Flows to be reduced from 1,750 cfs to 1,600**
  - **Directive and notification to be sent out this week**

- **Baseflow request**
  - **Flow request of 1,750 cfs subject to continued FGTWG discussions**

Ongoing Updates



Upper Colorado Region
Water Operations Group

ResourceMgr@usbr.gov

Monthly, weekly and daily updates:
https://www.usbr.gov/uc/water/index.html

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Questions?

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