RECLAMATION

Managing Water in the West

Flaming Gorge Working Group

August 21, 2014

U.S. Department of the Interior
Bureau of Reclamation

Flaming Gorge Working Group Meeting August 2014

- 2006 Record of Decision Operating Criteria and 2014 Adaptive Management Operating Criteria
- Hydrologic Overview
- Spring and Summer Operations
- Current and Projected Hydrology and Operations

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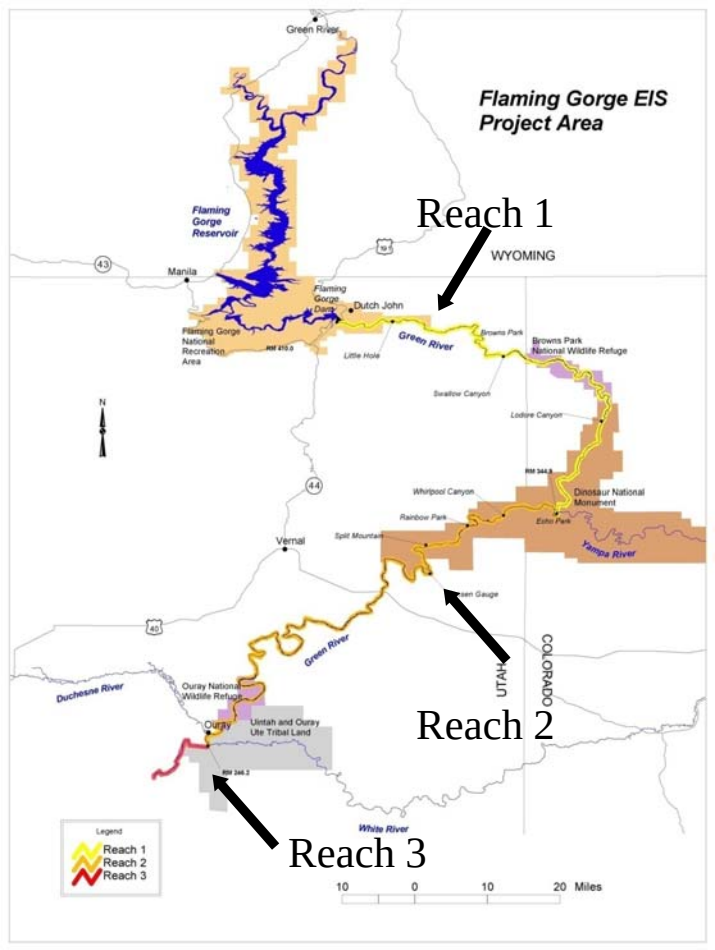
2006 Record of Decision Geographic Scope



- Reach 1
  - Flaming Gorge Dam to Yampa River Confluence
- Reach 2
  - Green River Confluence with Duchesne and White Rivers
- Reach 3
  - Green River Confluence with Colorado River

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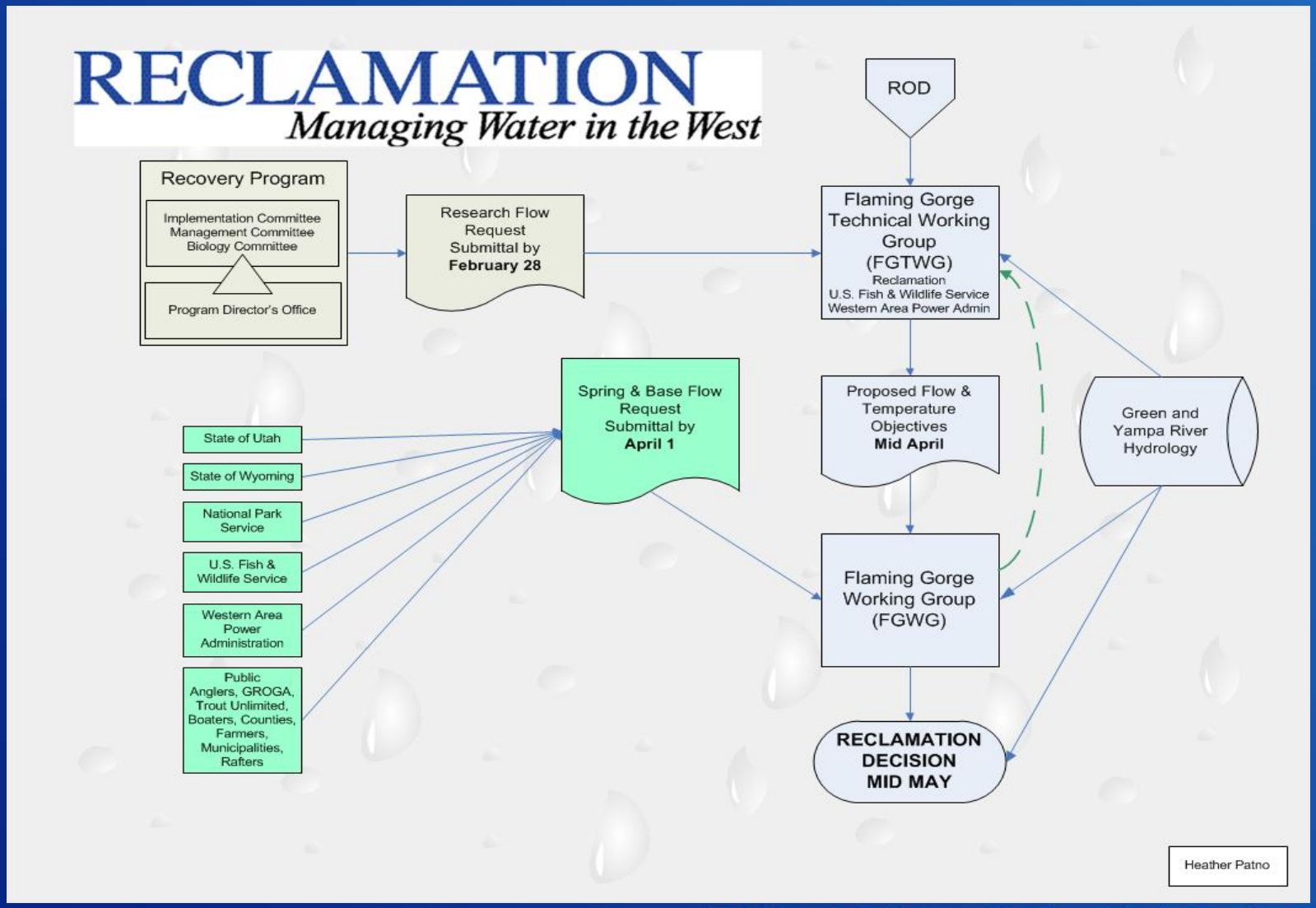
ROD Process



RECLAMATION

2014 Recovery Program LTSP

Upper Colorado River Endangered Fish Recovery Program

Noreen Walsh, Chairman
Implementation Committee

Thomas E. Chart
Program Director

U.S. Fish and Wildlife Service - P.O. Box 25486 - Denver Federal Center - Denver, CO 80225 - (303) 969-7322 - Fax (303) 969-7327

FWS/CRRP
K3a1
Mail Stop 65115

Memorandum

February 26, 2013

To: Larry Walkoviak, Director, Upper Colorado Region, Bureau of Reclamation

Heather Hermansen, Chair, Flaming Gorge Technical Working Group, Bureau of Reclamation

From: Thomas Chart, Director, Upper Colorado River Endangered Fish Recovery Program

Subject: Recovery Program's Research Request for 2013 Green River Spring Flows

The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) supports the Bureau of Reclamation's (Reclamation) operations at Flaming Gorge Dam in 2013 consistent with the 2005 biological opinion (U.S. Fish and Wildlife Service 2005) and 2006 record of decision (ROD; U.S. Department of Interior 2006). As in 2011 and 2012, the primary objective of our request this year is to build on past research (Bestgen et al. 2011) to benefit the razorback sucker population throughout the Green River by timing the river-floodplain connection with the presence of wild-produced razorback sucker larvae.

As was the case last year, this Recovery Program 2013 spring flow request is based on objectives outlined in our *Study Plan to Examine the Effects of Using Larval Sucker Occurrence in the Green River as a Trigger for Flaming Gorge Dam* (LTSP) (Larval Trigger Study Plan Ad Hoc Committee 2012). In the LTSP we describe the range of experimental floodplain connection scenarios we would like to study and how we would evaluate the results of Reclamation's operations to achieve those scenarios. More specifically, our study design matrix (Table 2 in the LTSP) details the range of experimental conditions we would like to assess with recognition that more than one cell of that matrix could be accomplished in a single year. Minimally, to complete the experiment, the

Recovery Program requests three years with flows < 18,600 cfs and three years with flows ≥ 18,600 cfs and with connecting flows in each of these years of at least seven days duration. However, spring peak flow magnitude requests will be driven by hydrologic conditions in the upper Green River Basin; therefore, it may not be possible to complete the experiment in six consecutive years.

In 2012, snowpack accumulation in the Yampa River drainage was categorized as 'dry' and 'moderately dry' in the Upper Green River drainage. The Recovery Program and the Flaming Gorge Technical Work Group (FGTWG) ultimately agreed to focus the 2012 spring flow request on the driest category of experimental conditions outlined in the LTSP. We applaud Reclamation's Flaming Gorge releases last May, which were timed coincident with the presence of larval razorback sucker (first larval detection – May 16, 2012; Bestgen et al. 2012a) and which proved integral in establishing a floodplain connection at Stewart Lake and Old Charley Wash. As per the LTSP, Utah Division of Wildlife Resources (UDWR) crews were able to document larval entrainment and describe physical conditions at that floodplain site (Breen and Skorupski 2012). Similarly, USFWS crews detected larval entrainment into the Old Charley site as well. During the spring and summer months of 2012, USFWS crews also (Webber and Jones 2012) sampled fish and monitored water quality at a variety of other floodplains that still held water from the extensive period of connection in 2011, but that did not connect in 2012. The Recovery Program is poised and properly funded to follow through on specific LTSP field investigations again in 2013 (e.g., Project Nos. 22F, 164 and 165; Scopes of Work available at: http://www.coloradoriverrecovery.org/documents-publications/work-plan-documents/project-scopes-of-work.html); sampling protocols and rationale are discussed further in Bestgen et al. (2012b).

As described in Breen and Skorupski 2012, the magnitude and period of inundation at the Stewart Lake site was limited last spring due to sedimentation in the inlet channel that occurred during the high flows of 2011. During summer 2012, UDWR excavated the inlet channel to restore connection conditions more consistent with those described for this site in the LTSP. Also, personnel from Western Area Power Administration (Western), Argonne National Laboratories (funded by Western), and the Recovery Program surveyed Reach 2 levee breach elevations in Autumn 2012 to better assess connection flows for future LTSP experimentation. We are hopeful the results of those surveys are available to the Recovery Program and the FGTWG this spring.

THE RECOVERY PROGRAM'S SPRING 2013 GREEN RIVER FLOW REQUEST:

Implement the LTSP. The Recovery Program requests that the FGTWG match Recovery Program research needs identified in the LTSP with the best available spring flow forecast information to develop a specific Reach 2 floodplain connection scenario. The Recovery Program Director's office will distribute the pertinent FGTWG recommendation to the Biology and Management Committees and Principal Investigators as quickly as possible.

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2014 US Fish & Wildlife Service

ORIGINAL

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

May 14, 2013

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		732

In Reply Refer To
FWS/R6
ES/UT
08-FA-0180

Memorandum

To: Director, Upper Colorado Region, Bureau of Reclamation
Chair, Flaming Gorge Technical Working Group, Bureau of Reclamation

From: Field Supervisor, Utah Field Office, U.S. Fish and Wildlife Service L. Crist

Subject: 2013 Green River Spring and Base Flows to Assist in Recovery of the Endangered Fishes

This letter describes our recommendations for 2013 spring and base flows in Reach 2 of the Green River for discussion by the Flaming Gorge Technical Working Group (FGTWG) in development of recommendations for Flaming Gorge Dam operations. Our intent is to work with other FGTWG members to ensure consistency with the 2005 biological opinion (BO; U.S. Fish and Wildlife Service 2005) and 2006 record of decision (ROD; U.S. Department of Interior 2006), which recommend flows to protect and assist in recovery of endangered fishes.

The following recommendations are subject to forecasted and real-time May – July hydrologic conditions in the upper Green River drainage, with recognition that trade-offs of spring and base flows should be considered and used to adjust operations as deemed appropriate.

Spring-peak Research Flow

We support the Upper Colorado River Endangered Fish Recovery Program's (Recovery Program) 2013 Spring Flow Request, as explained in their February 26, 2013 letter. The primary objective as presented in their letter is to time Flaming Gorge releases and resultant floodplain connection with the presence of wild produced razorback sucker larvae. The Recovery Program's objective is consistent with the intent of the Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam (Flow Recommendations; Muth et al. 2000), the 2005 BO, and the 2006 ROD, and uses the best available science to guide Flaming Gorge operations and recovery actions in an adaptive management framework. Timing Flaming Gorge r

more likely to survive in Stewart Lake than in the main channel habitats. We base this on continued improvement of selenium levels in Stewart Lake and years of unsuccessful recruitment of the species in main channel habitats that contain non-native predators. Although Stewart Lake selenium levels have not been completely remediated, Stewart Lake offers larval fish better habitat than the main channel because larval fish can grow more quickly and in a predator free environment[4]. While some impacts to endangered fish from selenium exposure may still occur (reduced survival, physiological abnormalities, etc.), these impacts are much less than the likely predation effects in the main channel.

As a result, we believe that entraining larval razorback sucker into Stewart Lake (via Flaming Gorge operations) and harboring them over the summer (via Stewart Lake remediation efforts) offer a net benefit to the species. While there may be some level of incidental take[5] from selenium levels in the lake, this take is covered in the 2005 BO for operation of Flaming Gorge. We would like to compliment Reclamation, the UDWR, and other partners for improving conditions of Stewart Lake and are confident complete remediation will occur in the near future.

Base Flow Request

Because of projected drier than average year conditions, we believe that base flow augmentation is a very important consideration for 2013. Base flows are important for a variety of ecological reasons, such as increased resource and habitat availability. We propose the following approach to base flow operations in 2013, which mirrors our recommended approach in 2010 and 2012. The 2010 and 2012 proposals relied on the most up-to-date research available. Biological data collected those years indicated that numbers of Colorado pikeminnow continue to improve.

Our understanding is that Reclamation will identify a Reach 1 base flow target commensurate with the April - July hydrologic condition in accordance with the ROD and the BO. The Reach 1 target will create a flow condition in Reach 2 that falls within the appropriate base flow range when coupled with projected Yampa River base flows (Muth et al. 2000). For reasons mentioned below, we request that Reclamation does not operate under a classification drier than the official base flow classification and also releases higher flows than the scheduled base flow target through September 30, 2012. We understand that Reclamation may need to release less than the base flow target through the remainder of the base flow period (October to March) to balance annual operations.

Specifically, we request that Reclamation augment the Reach 1 calculated base flow target by as much as 40%. For example, if Reclamation determines that a release of 1,100 cfs is necessary to comply with the ROD and BO, then we request that up to 1,540 cfs be released through Sept 30, 2012. This augmentation is in accordance with the

[4] UDWR is operating a weir to prevent large bodied fish from entering Stewart Lake in 2013
[5] As defined under the Endangered Species Act

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Hydrologic Overview

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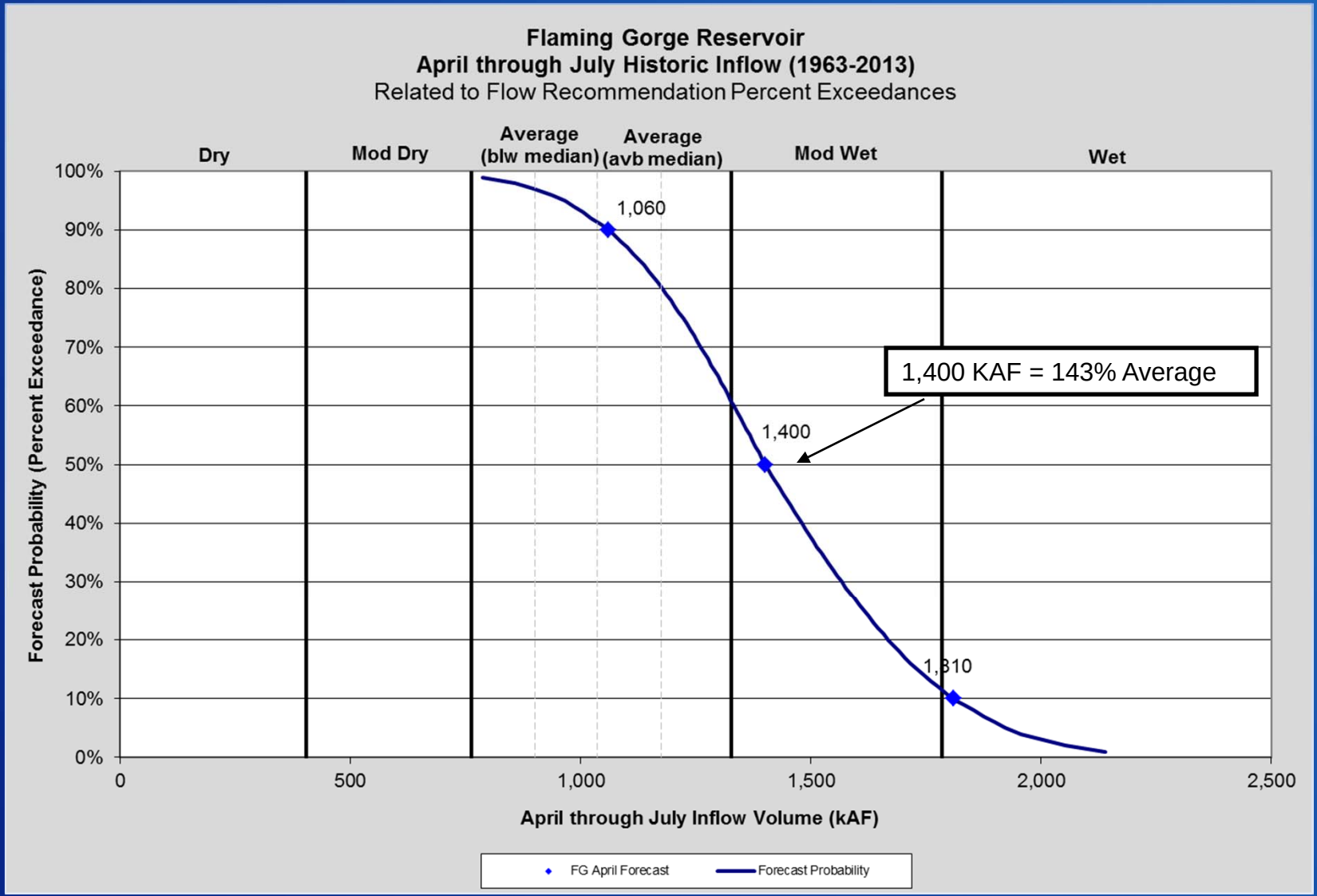
FG FGWG April Forecast



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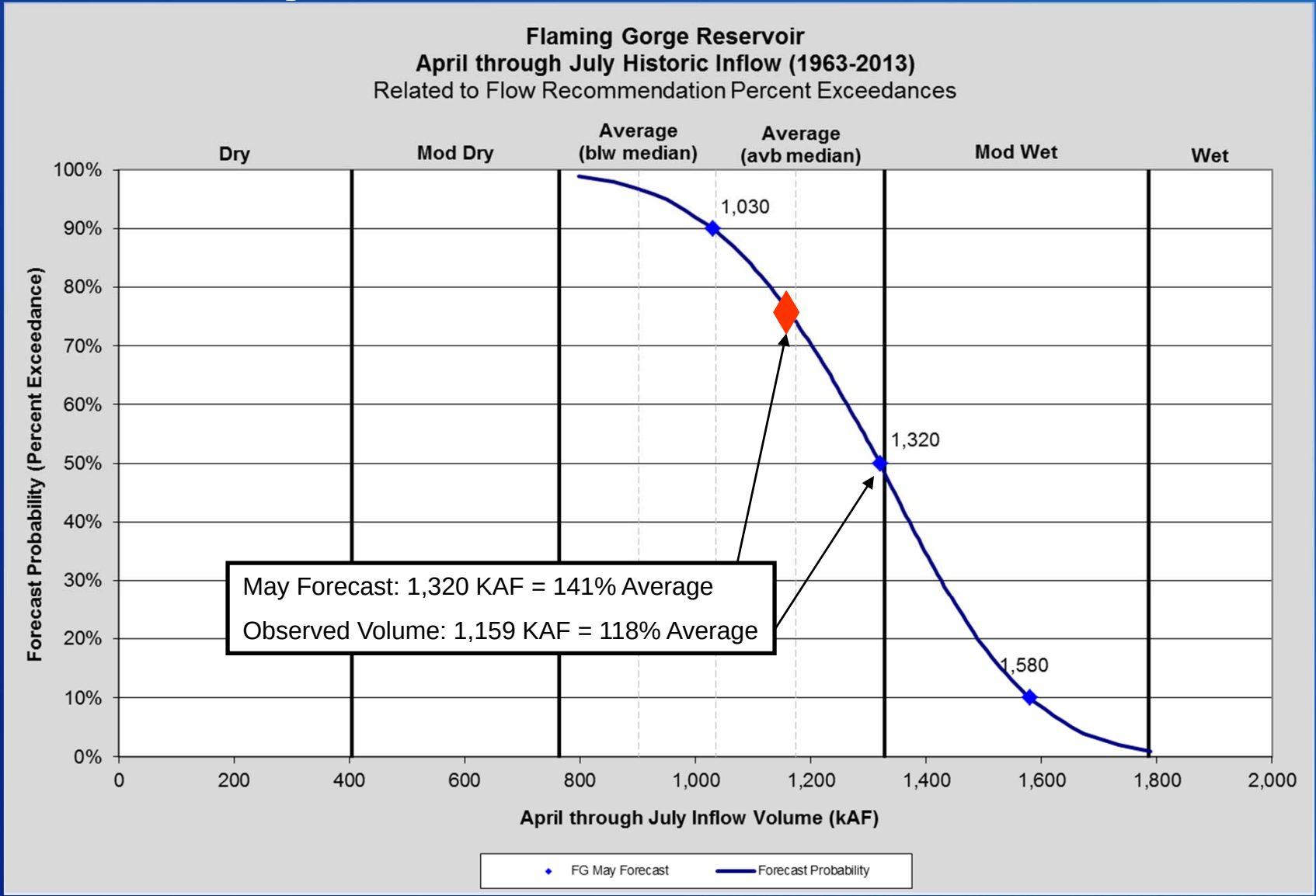
FG May and Observed Classifications



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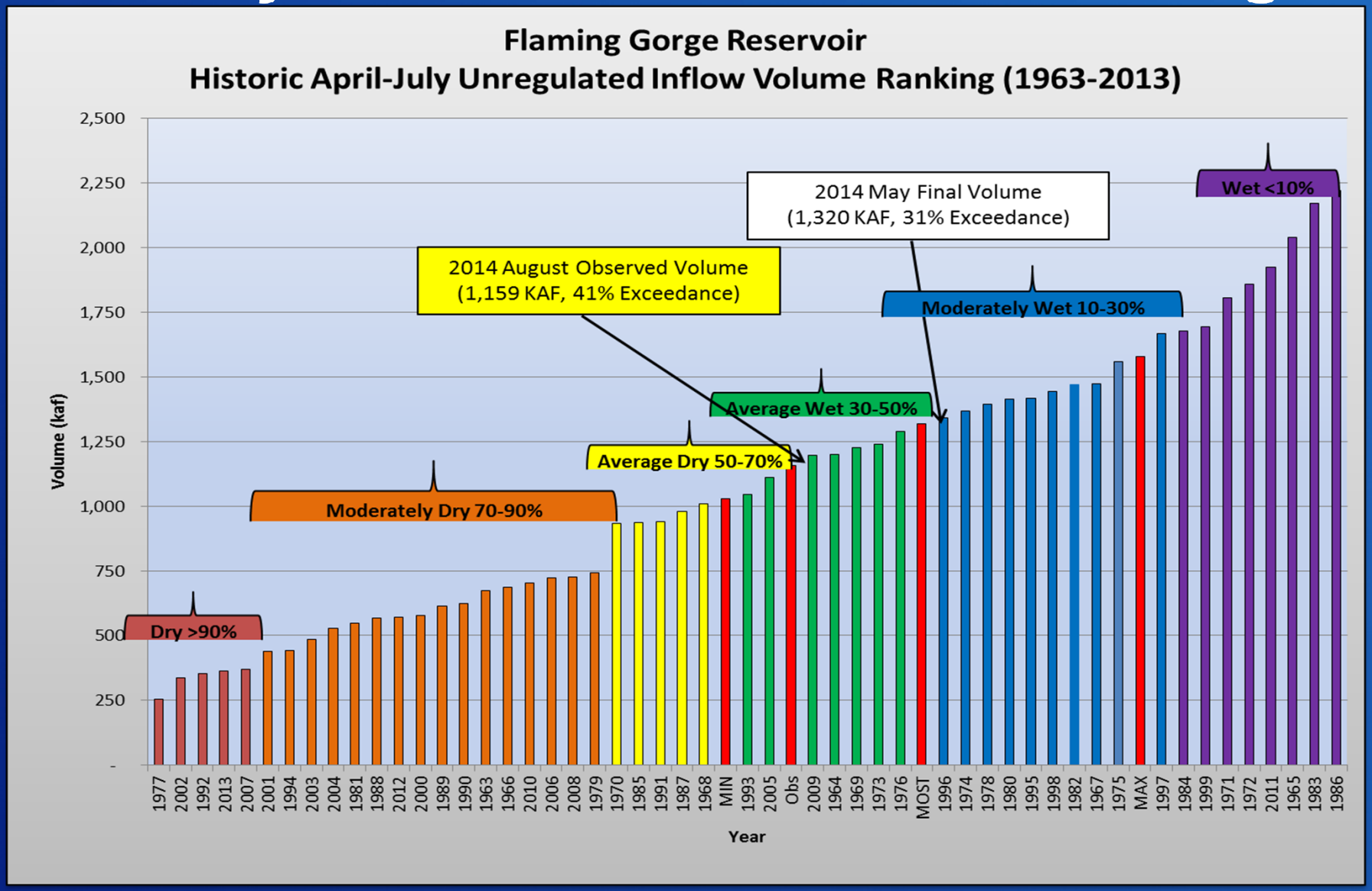
FG May and Observed Historic Ranking



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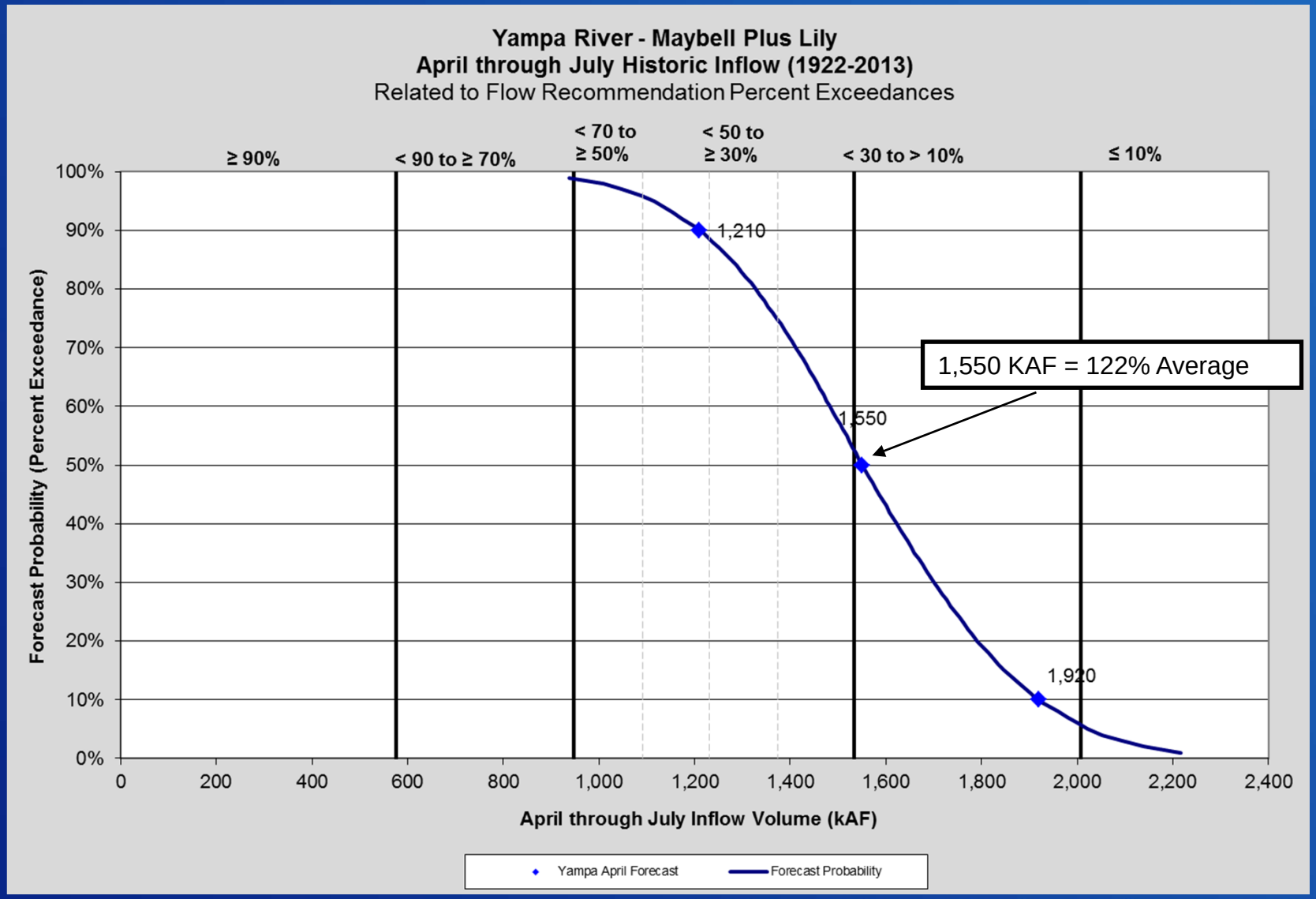
Yampa FGWG April Forecast



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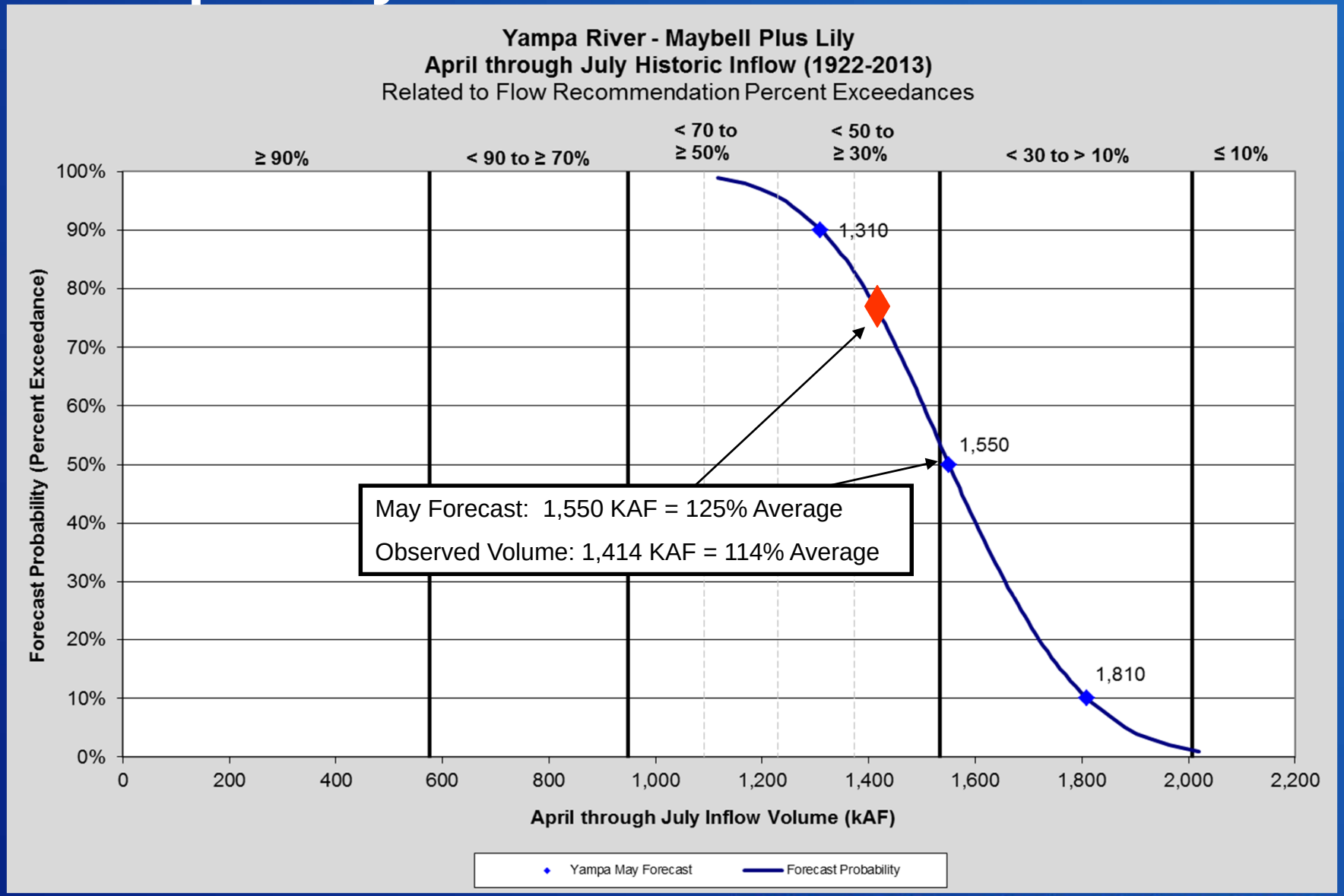
Yampa May and Observed Classifications



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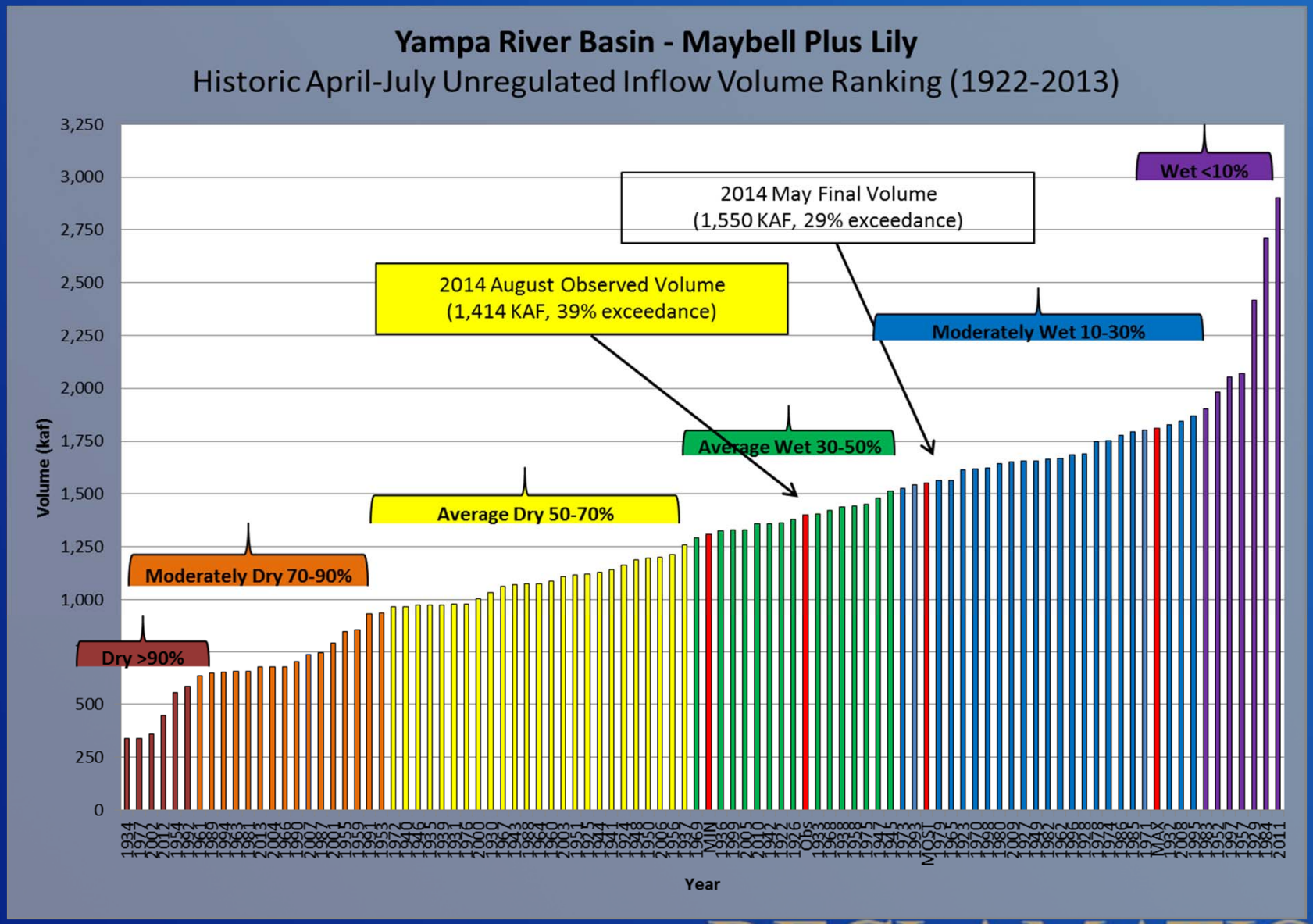
Yampa May and Observed Historic Ranking



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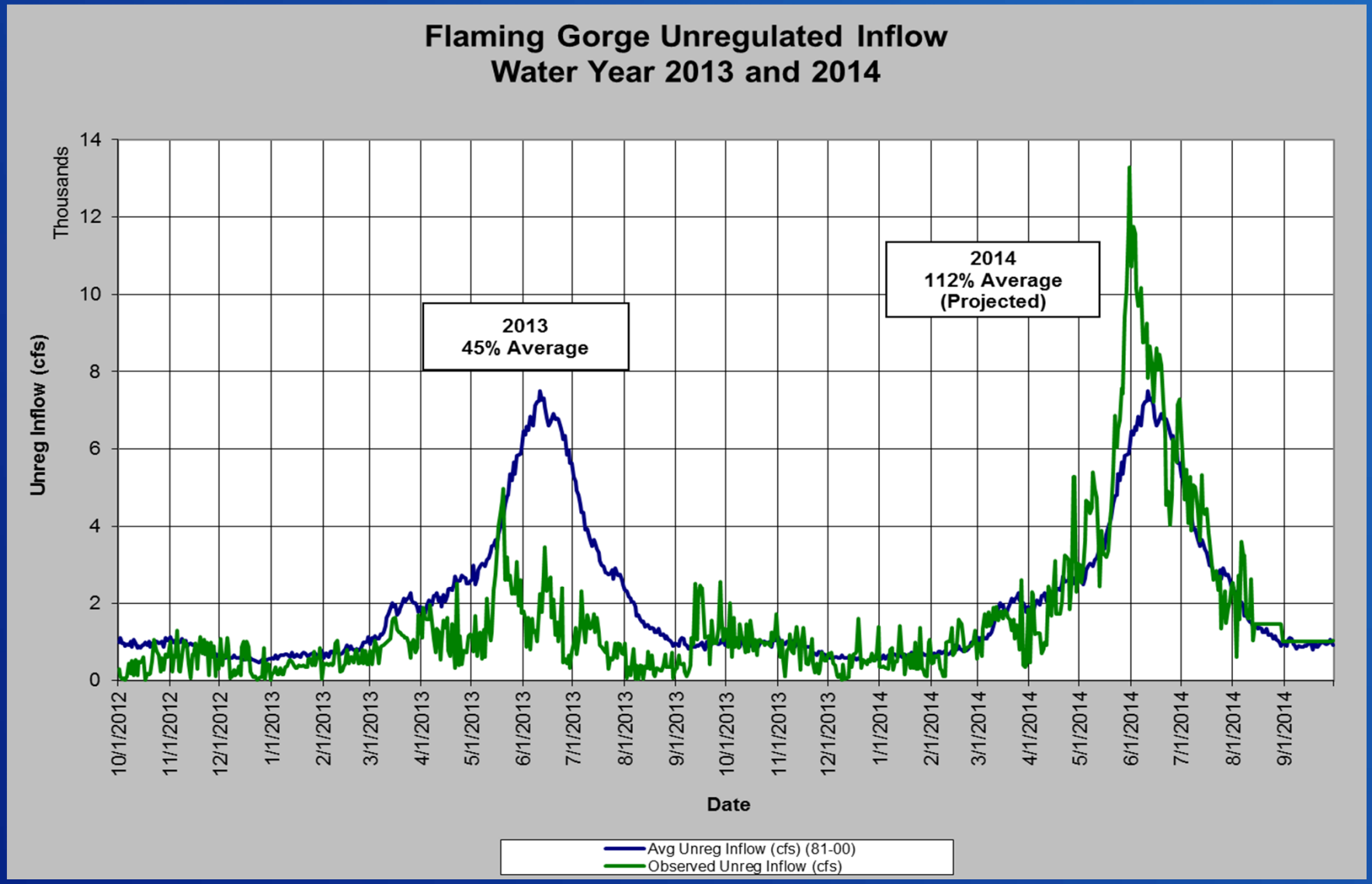
Observed (Projected) Unregulated Inflow



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Spring Operations

(Larval Trigger Study Plan)

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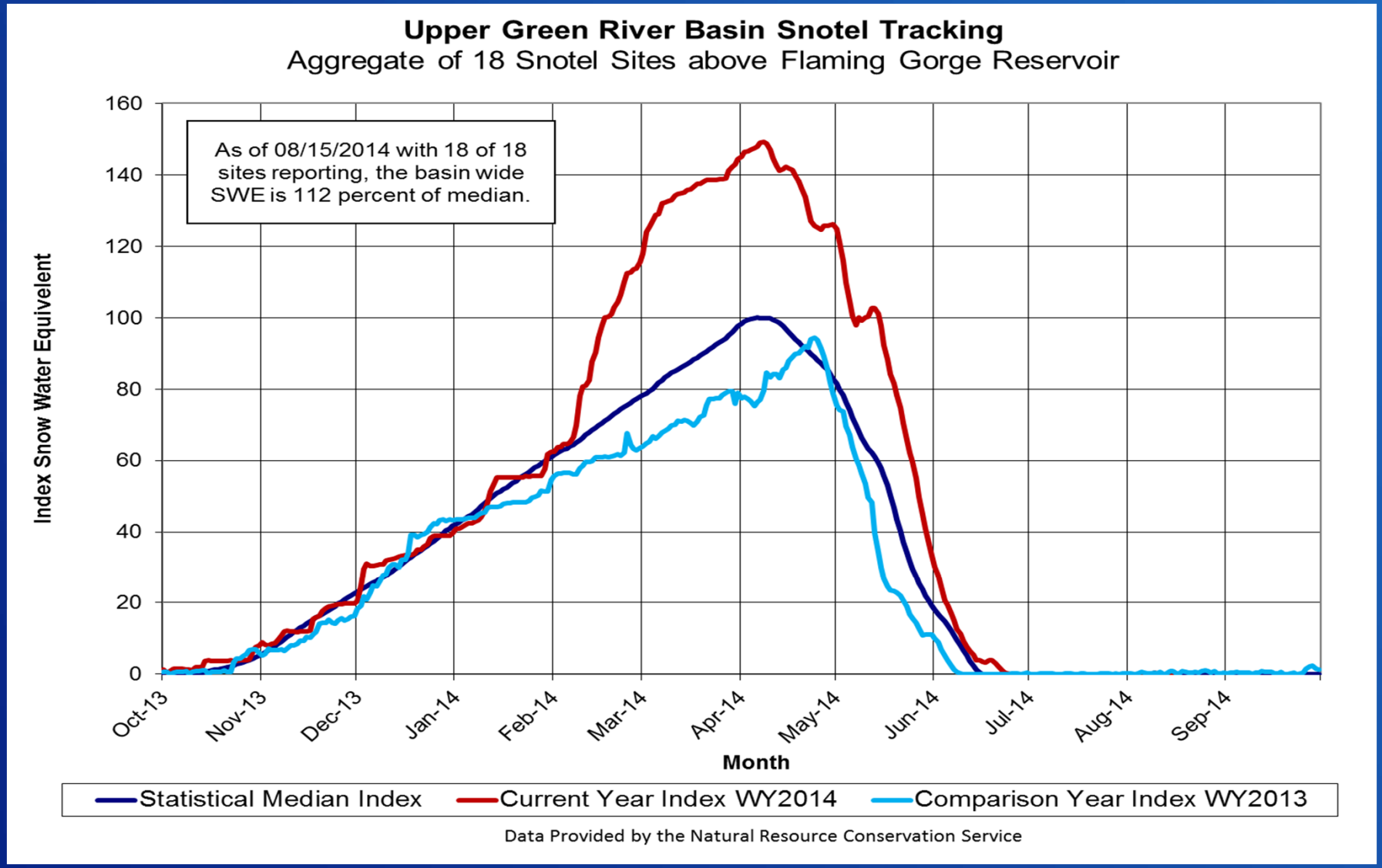
Flaming Gorge 2014 SWE



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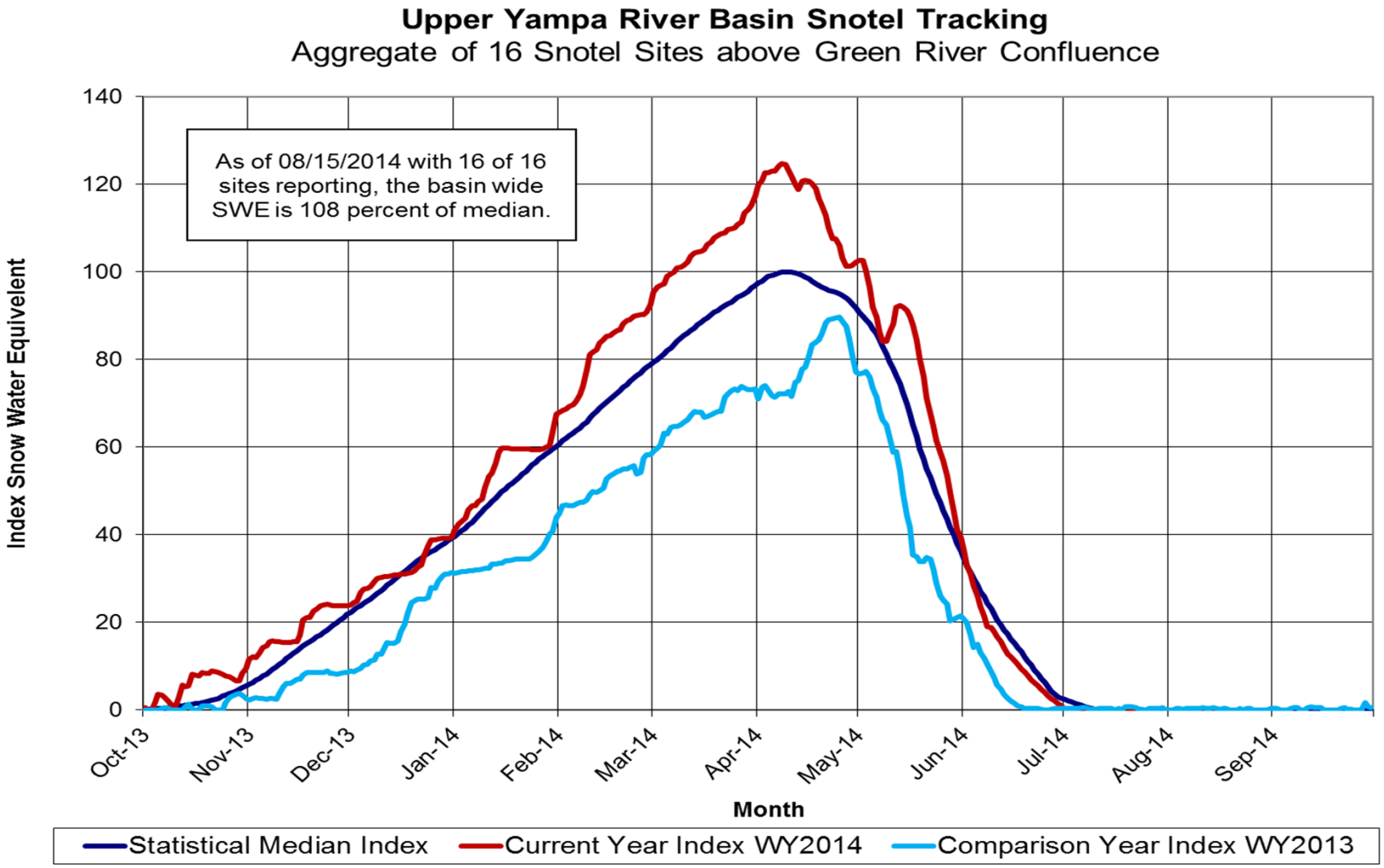
Yampa 2014 SWE



Data Provided by the Natural Resource Conservation Service

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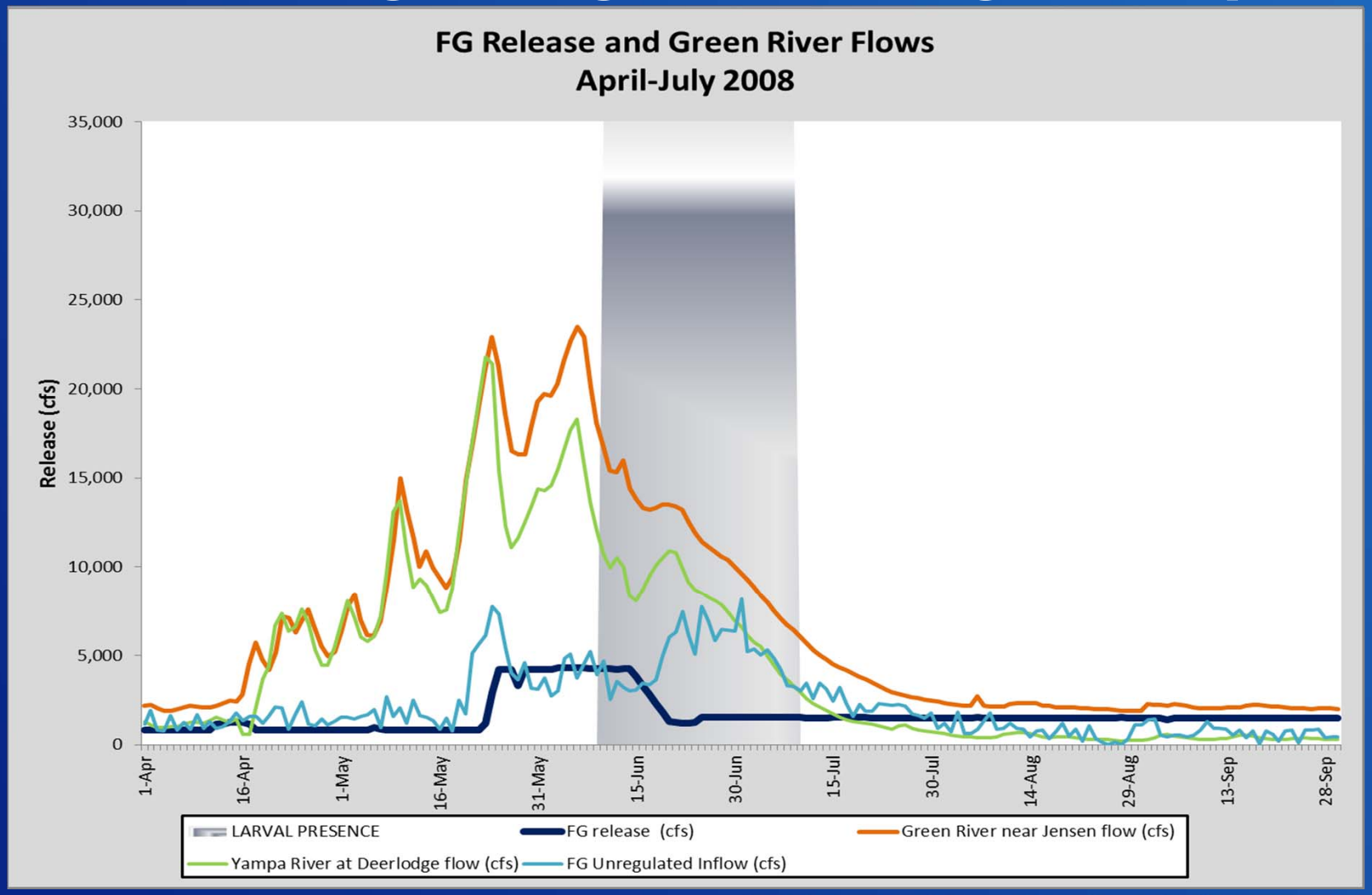

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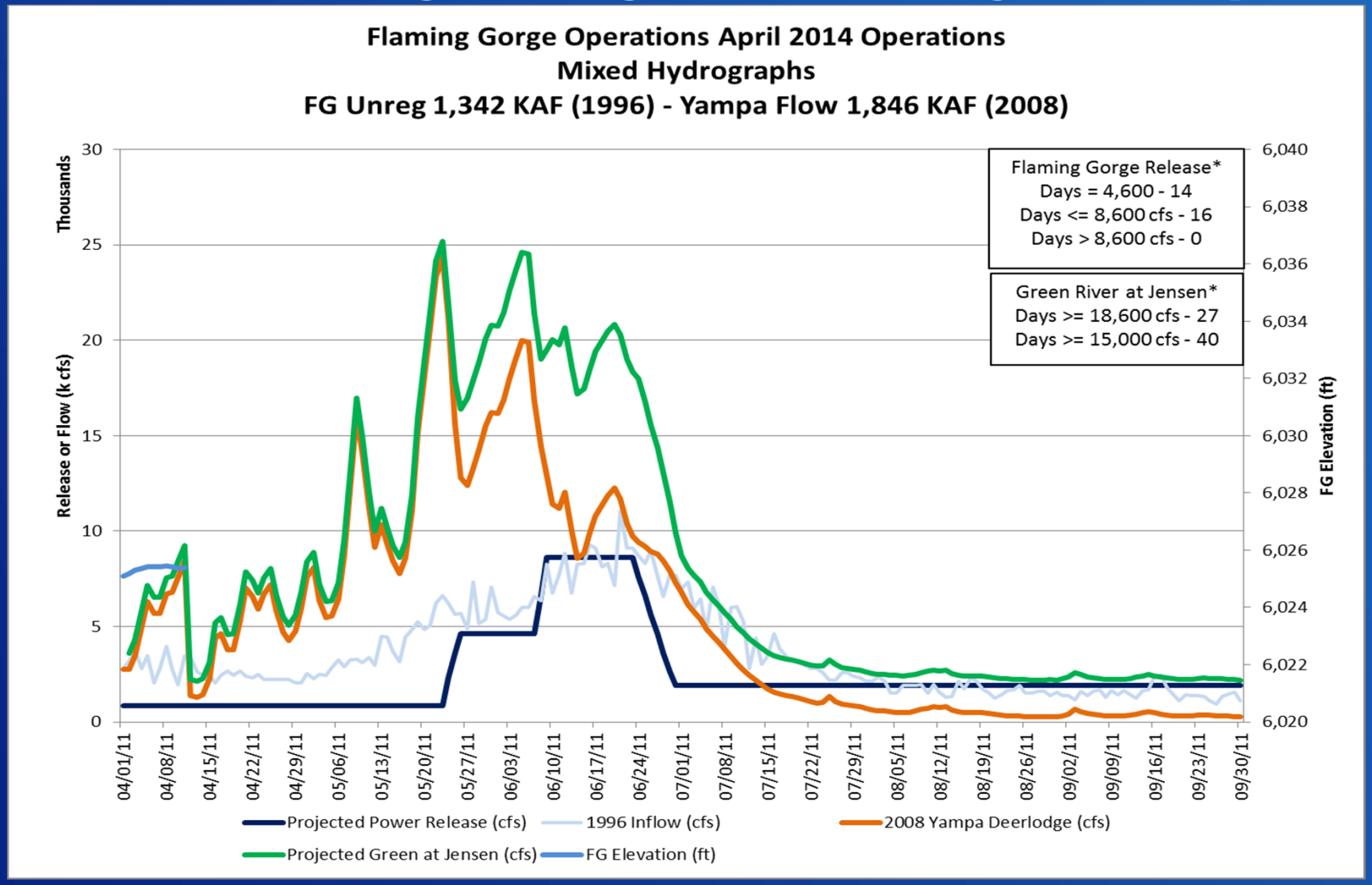

*This is a projection based on historic hydrographs. Actual days of flows in 2014 are unknown.

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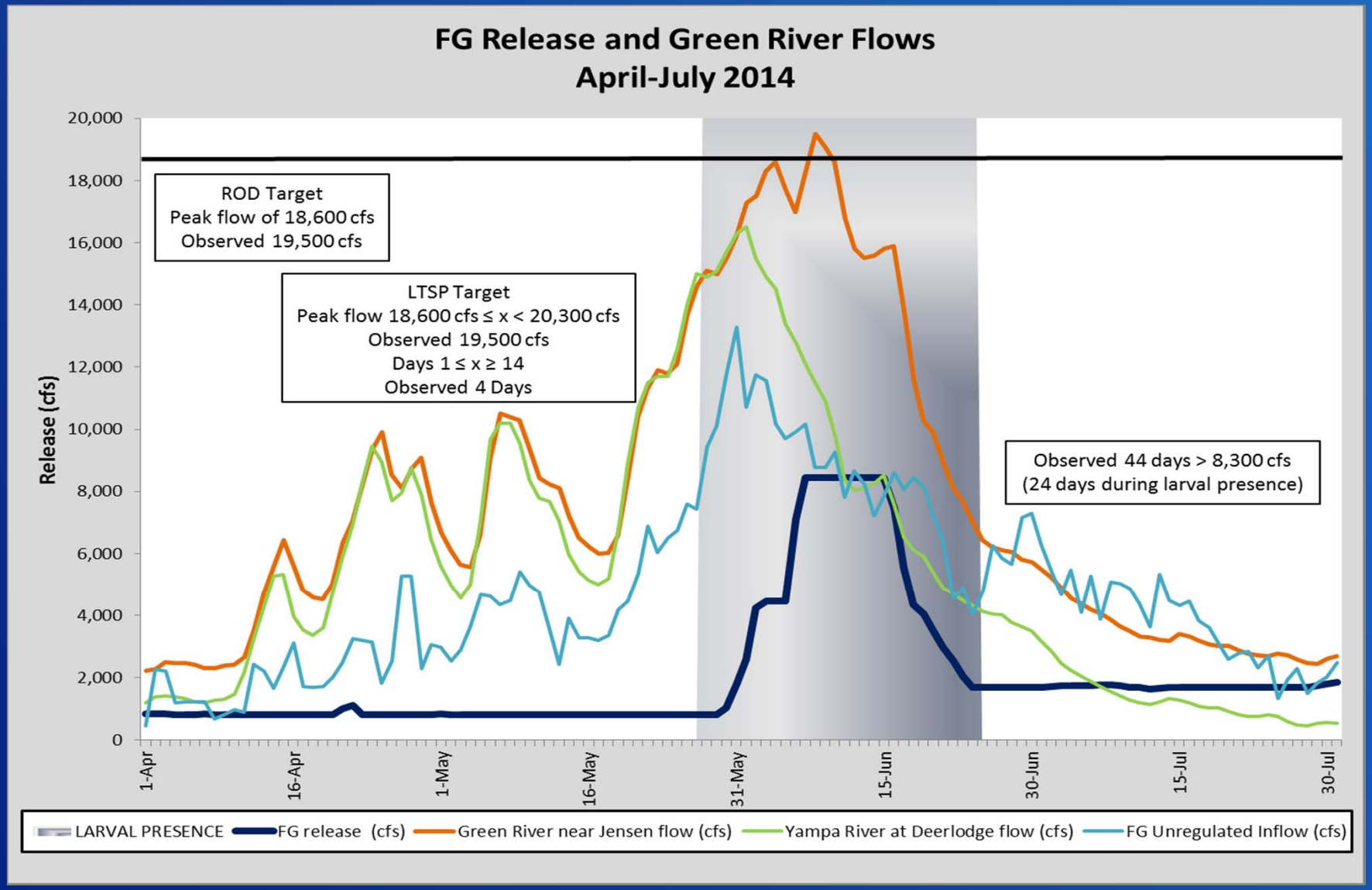
Flaming Gorge Spring Operations



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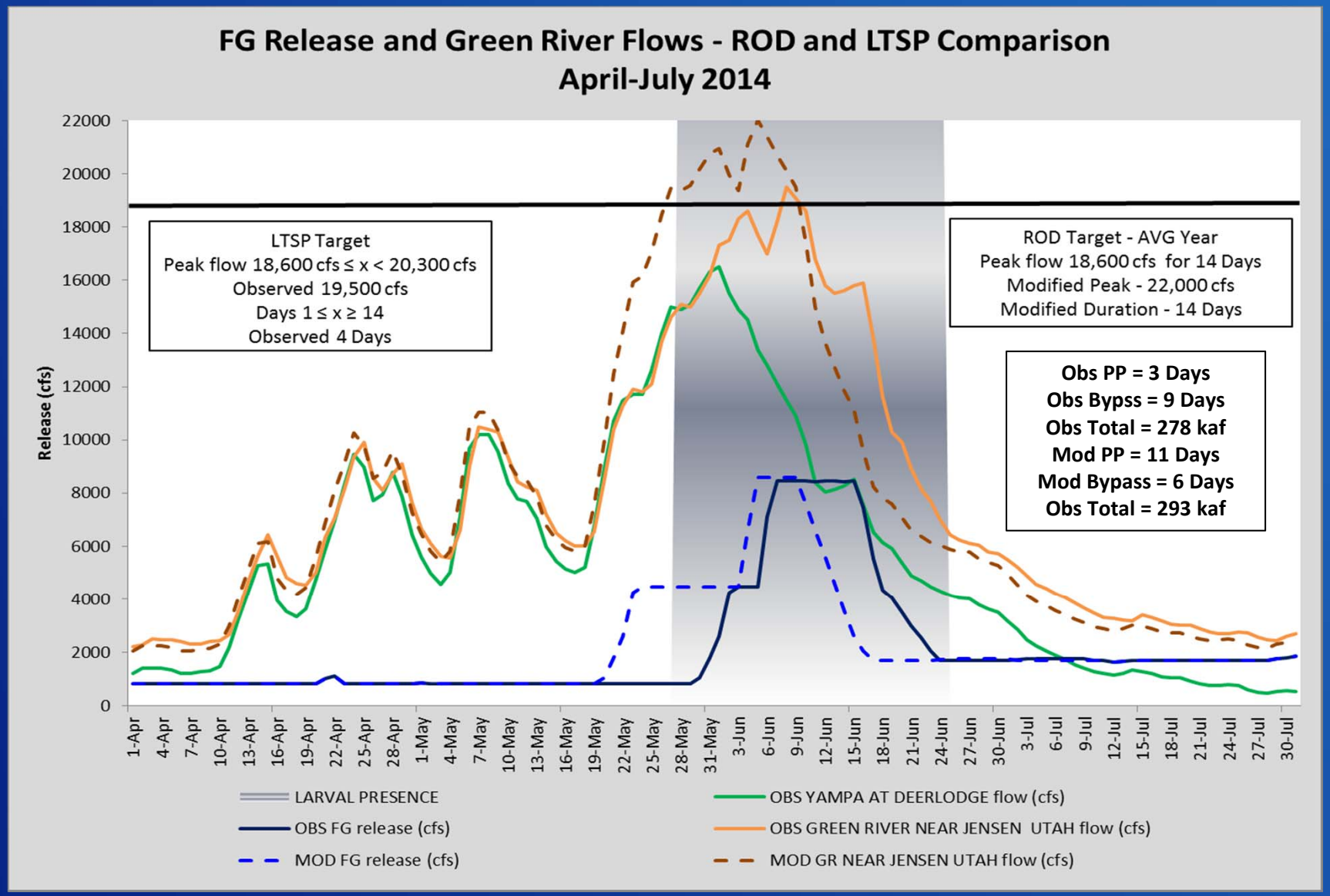
Flaming Gorge Spring Operations



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Current and Projected Hydrology and Operations

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Current Conditions

Live Capacity	3.752	MAF
Capacity on 8/19/13	3.289	MAF
Available Space	.463	MAF
Percentage of Full	88	%

Reservoir Elev. (Min Power)	5908.00	feet
Elevation on 8/19/13	6028.45	feet
Elevation above (Min)	120.45	feet

Average Inflow	1,470	cfs
Average Release	2,000	cfs

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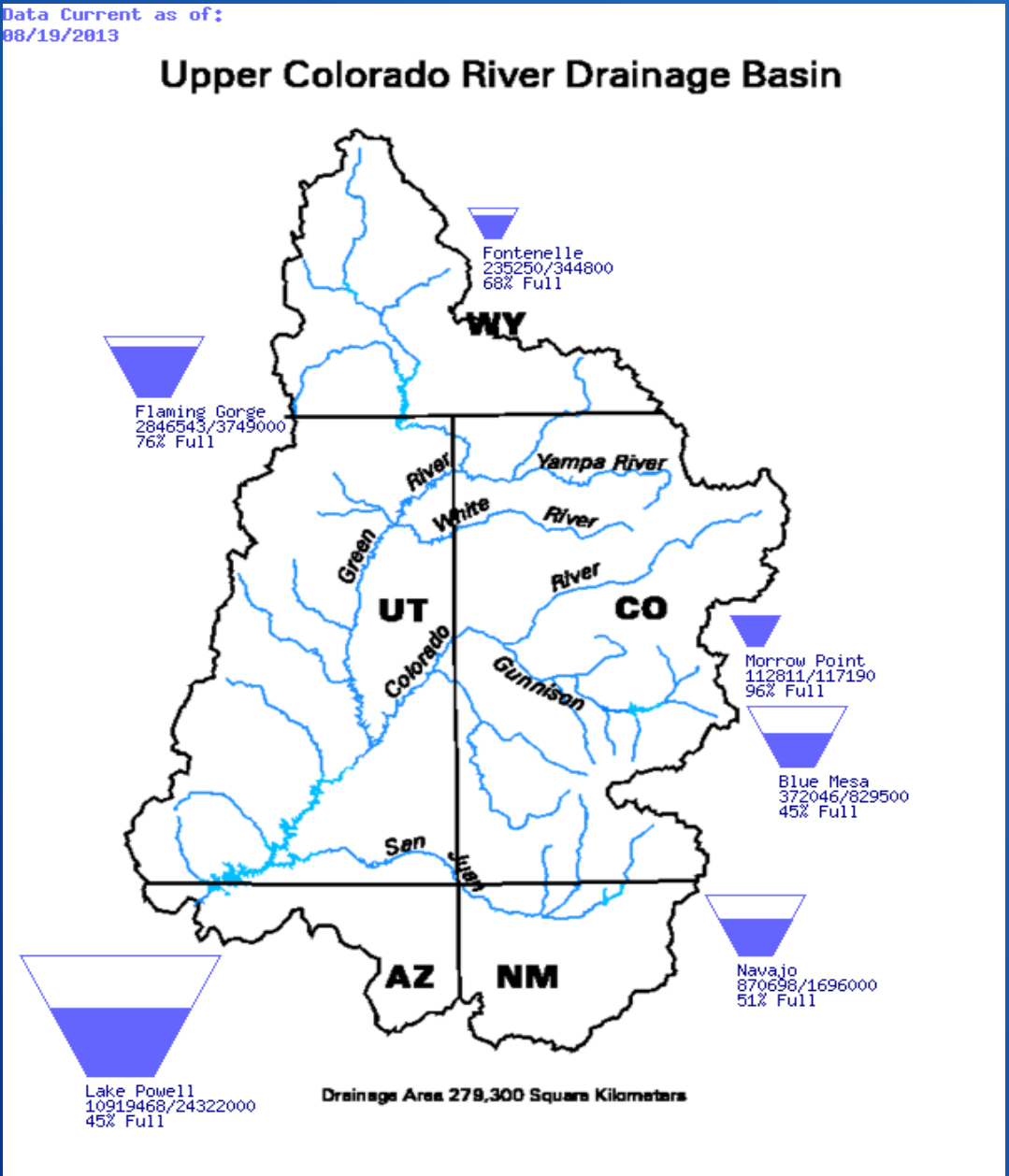
CRSP System Storage 2013

Observed April-July Inflow Percent of Average Volume

- Fontenelle – 44%
- Flaming Gorge – 37%
- Blue Mesa – 51%
- Navajo – 36%
- Glen Canyon – 36%



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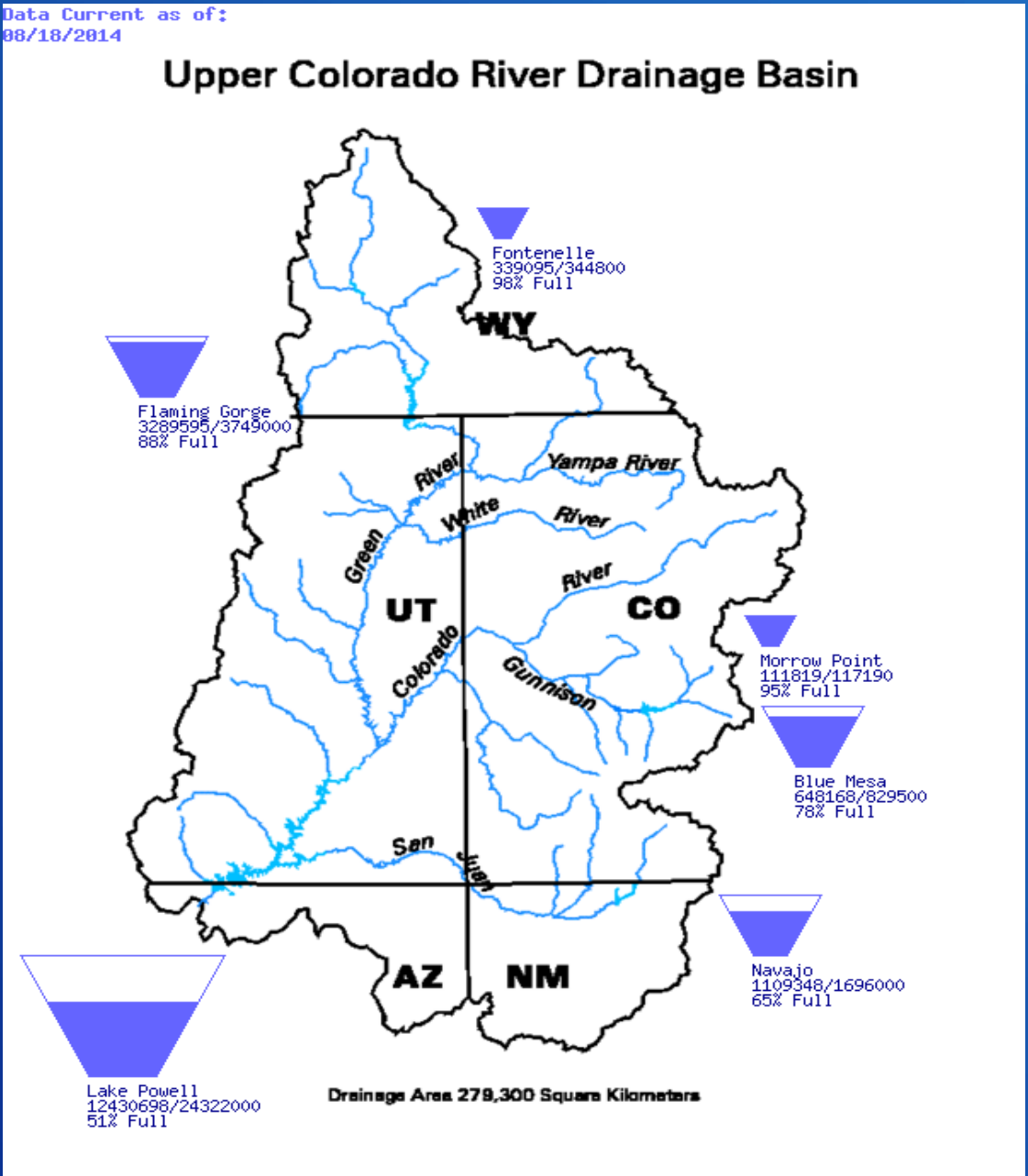
CRSP System Storage 2014

Observed April-July Inflow Percent of Average Volume

- Fontenelle – 141%
- Flaming Gorge – 118%
- Blue Mesa – 126%
- Navajo – 58%
- Glen Canyon – 97%



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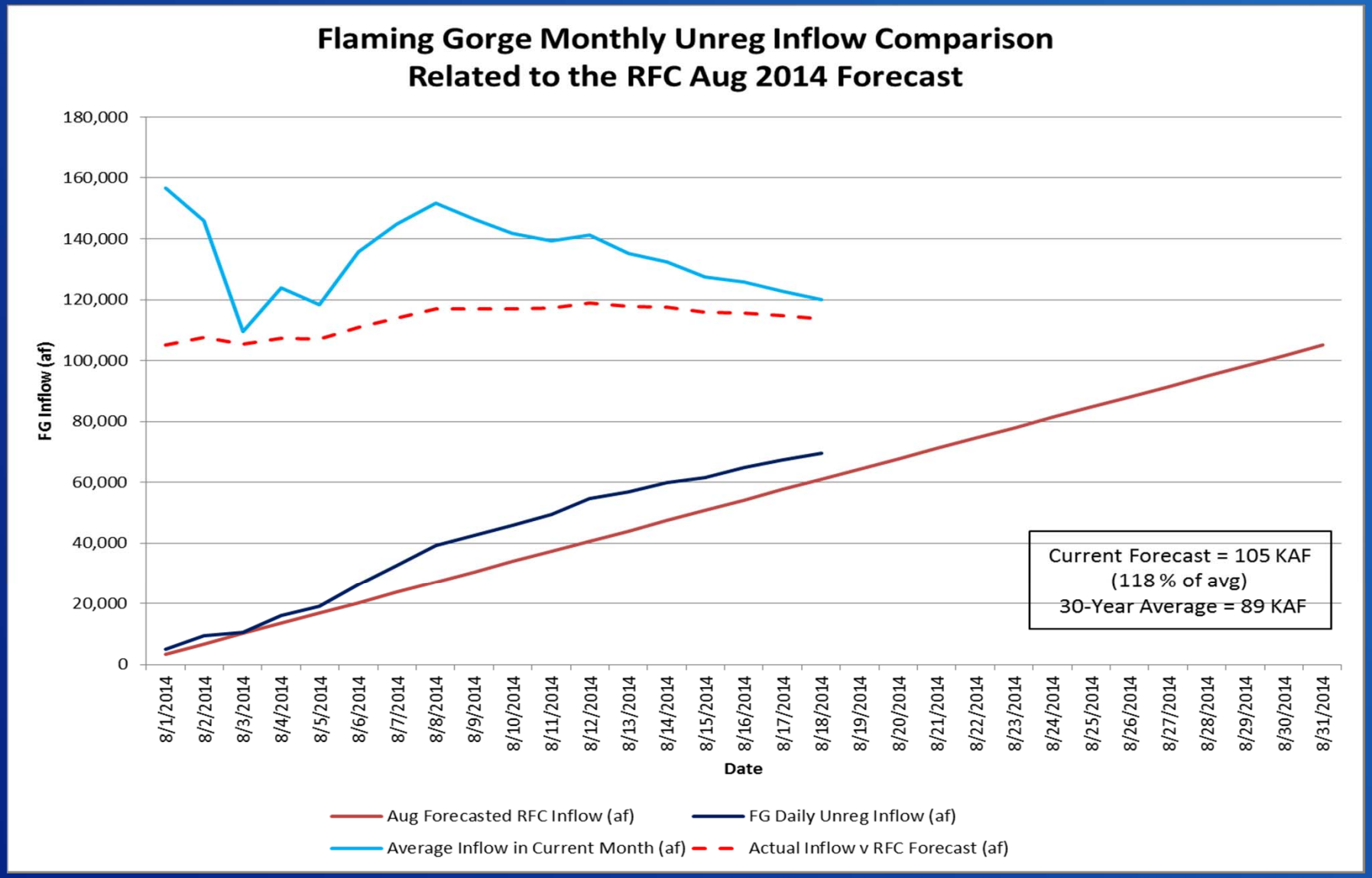
August Unregulated Inflow



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Base Flow Flexibility

- Beginning about June-August and continuing through November
  - Variation of ±40% around the annual mean base flow
- December through February
  - Variation of ±25% around the annual mean base flow
- Consecutive daily change limited to 3%
- Hydropower generation at Flaming Gorge limited to produce no more than 0.1 meter daily stage change at Jensen, Utah

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Flow Recommendation Flexibility

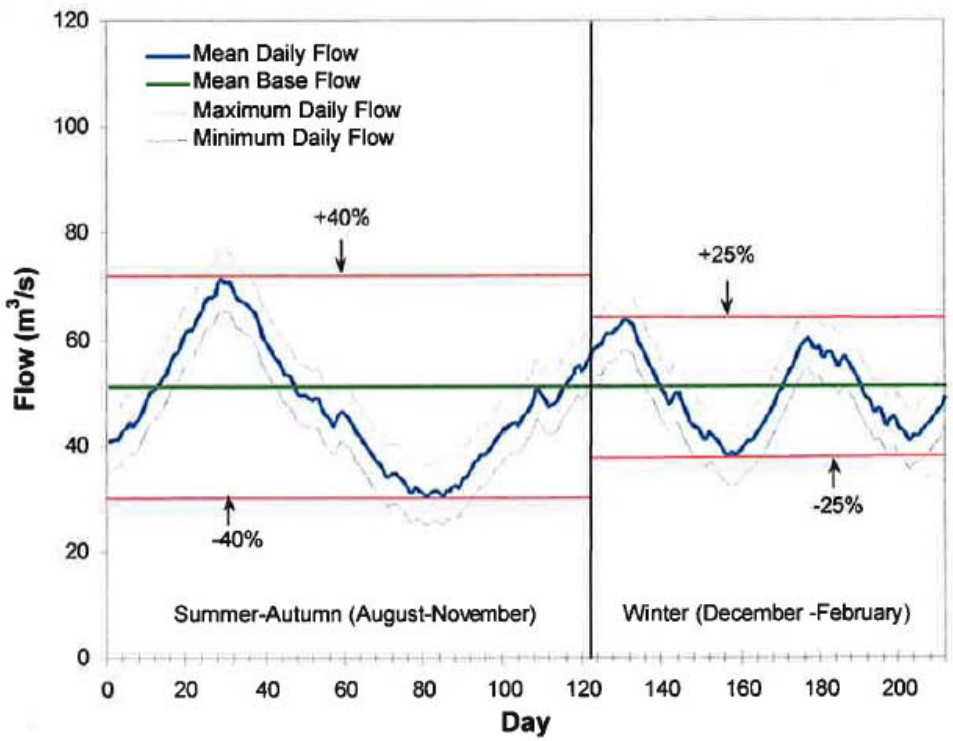

Figure 5.2.—Representation of recommendations for flow variability during the summer through winter base flow period in Reach 2. (In summer and autumn, mean daily flow should be within 40% of the mean annual base flow; in winter, mean daily flow should be within 25% of the mean annual base flow. The rate of change in mean daily flow should be 3% or less between consecutive days. Fluctuation between maximum and minimum daily flows should produce no more than a 0.1-m change in stage at the USGS stream gage near Jensen, Utah.)

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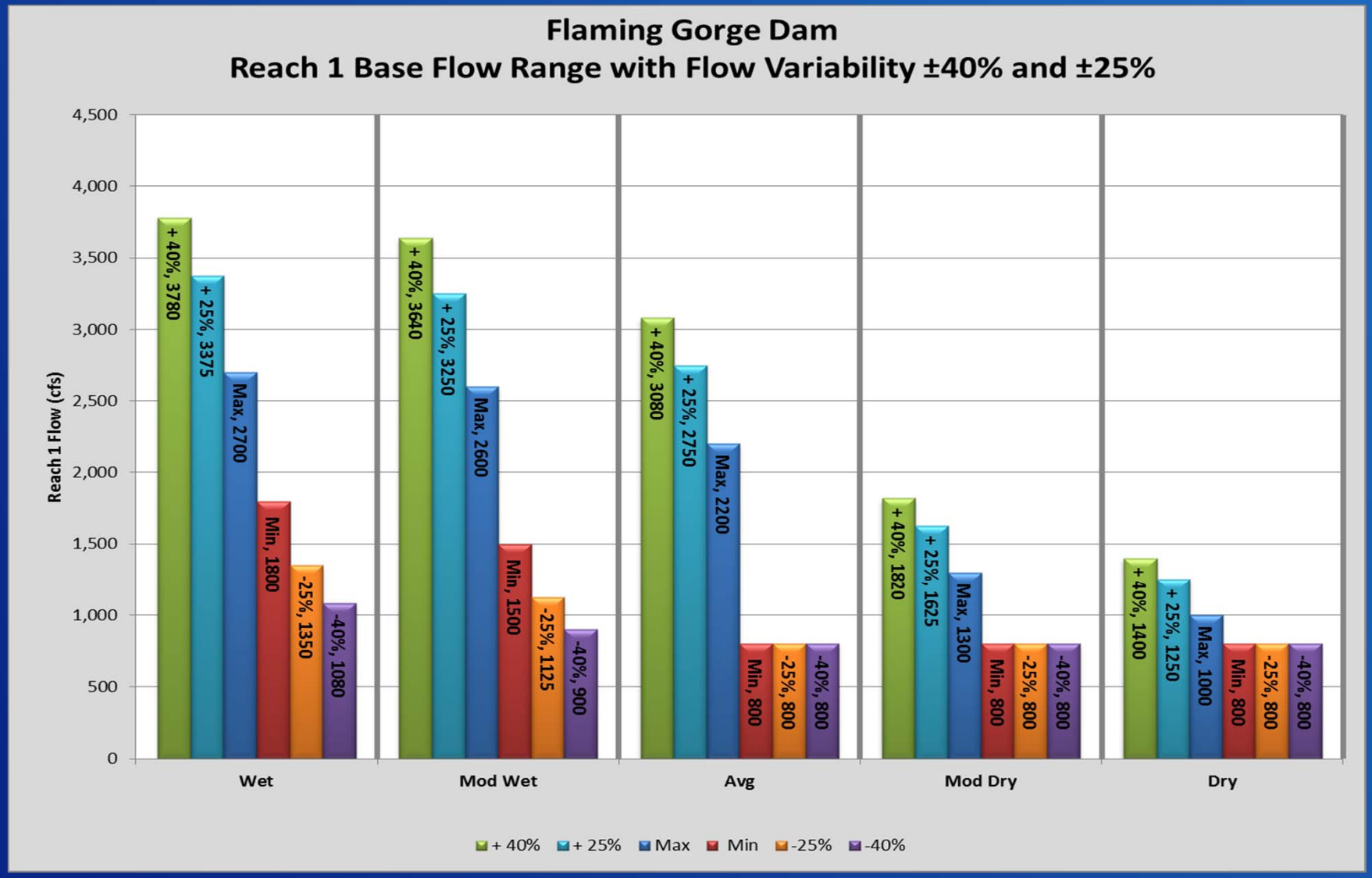
Base Flow Ranges



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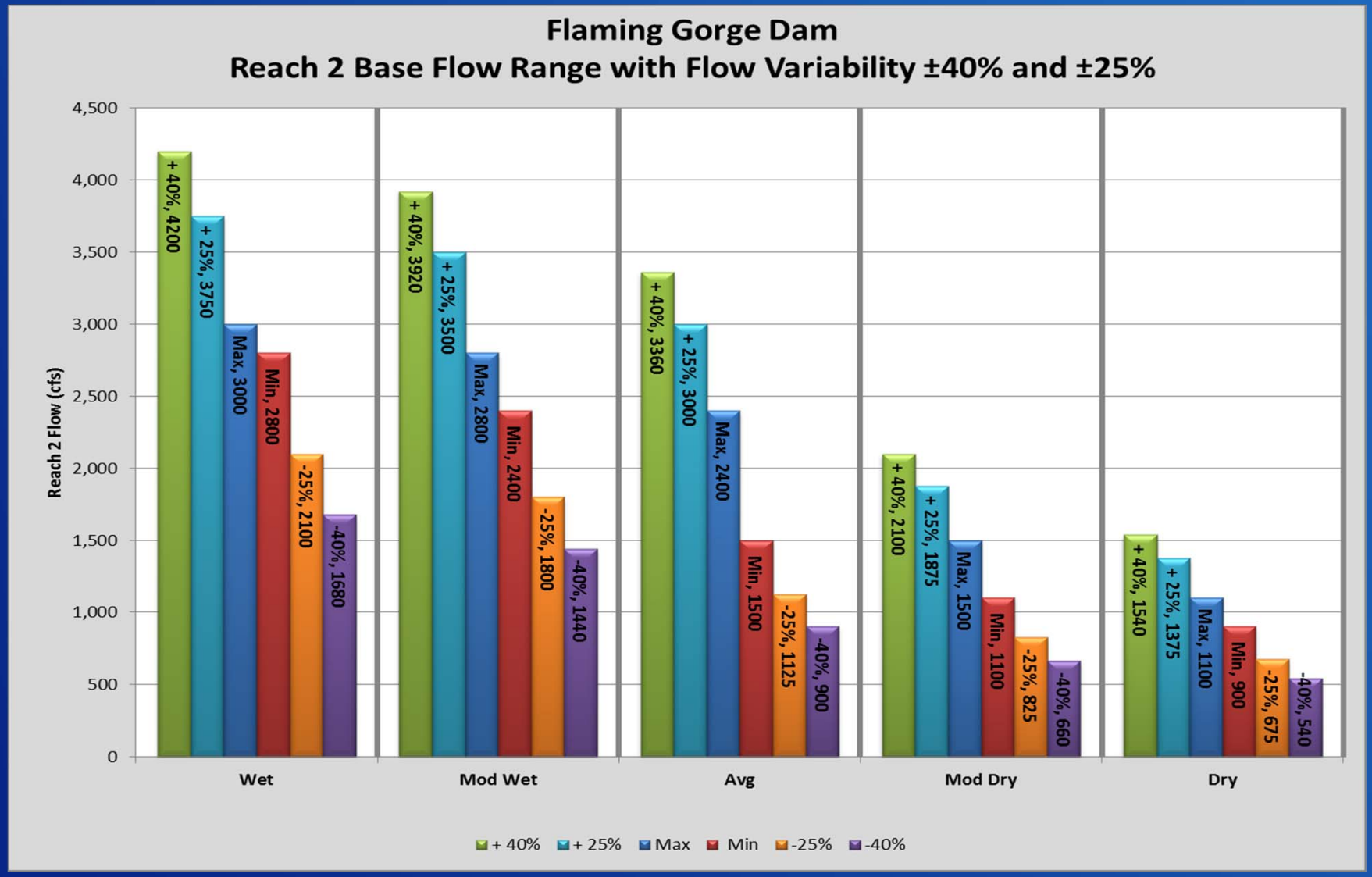
Base Flow Ranges



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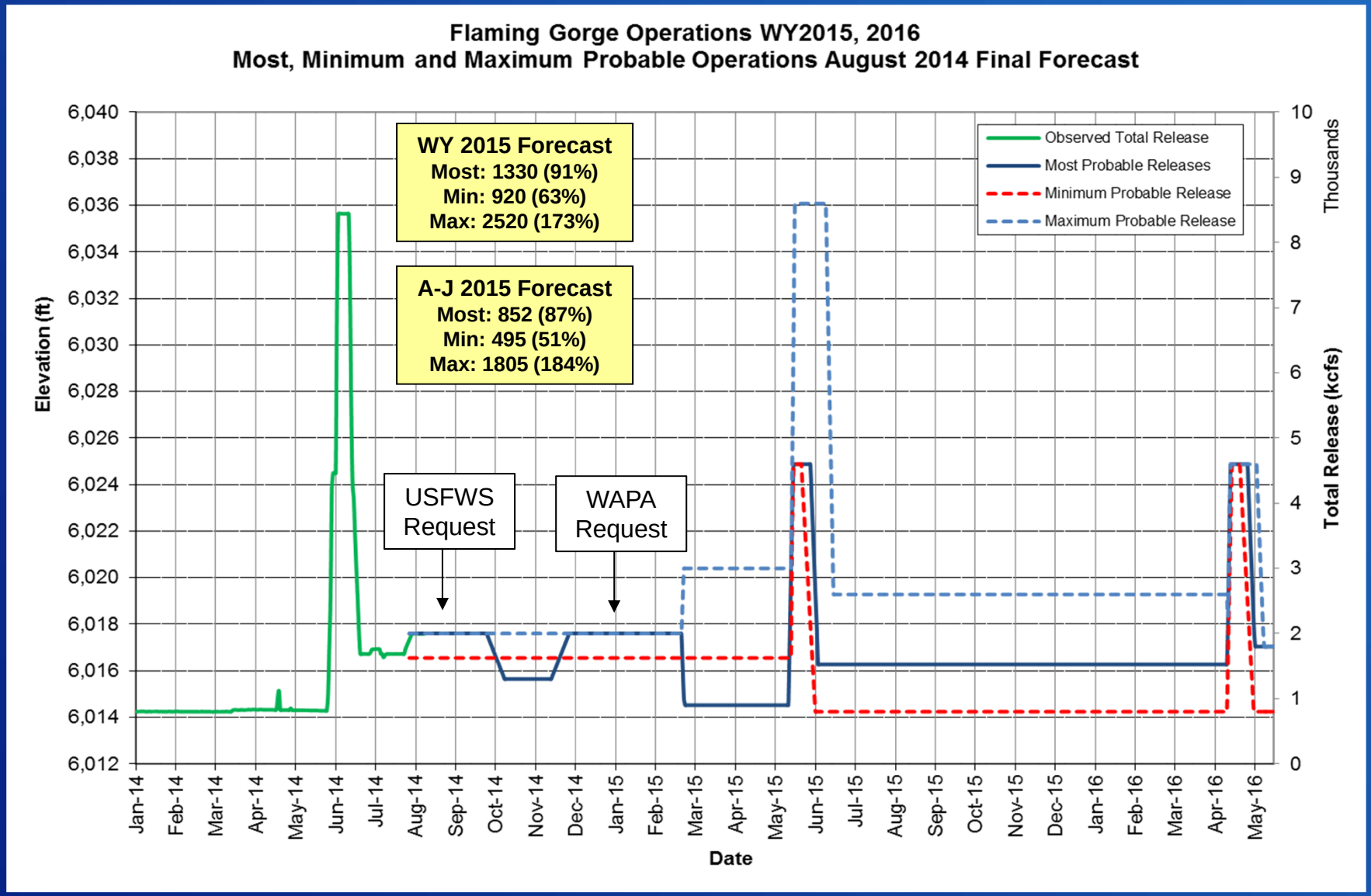
Release Scenarios



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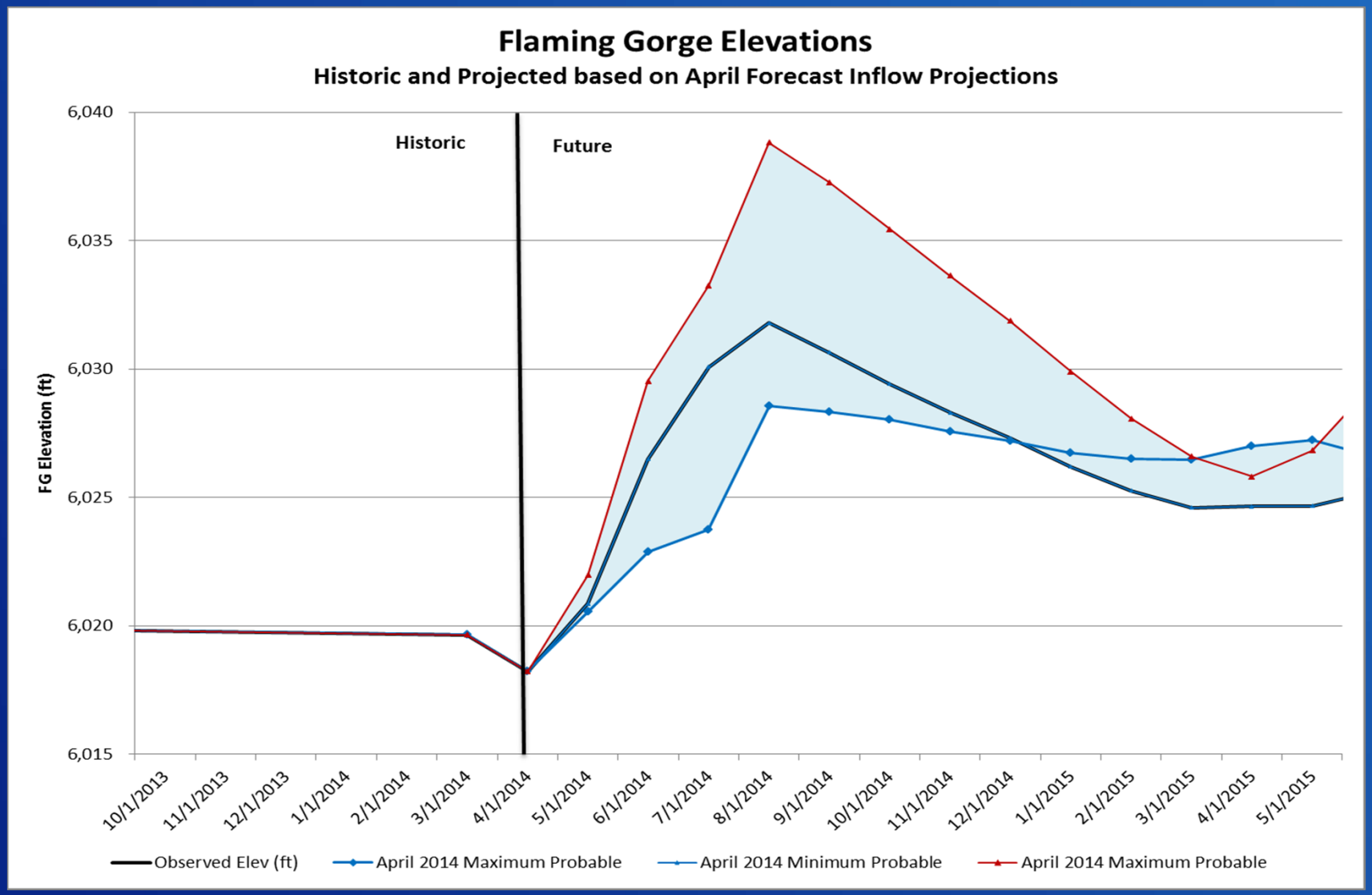
FGWG April Projected Elevations



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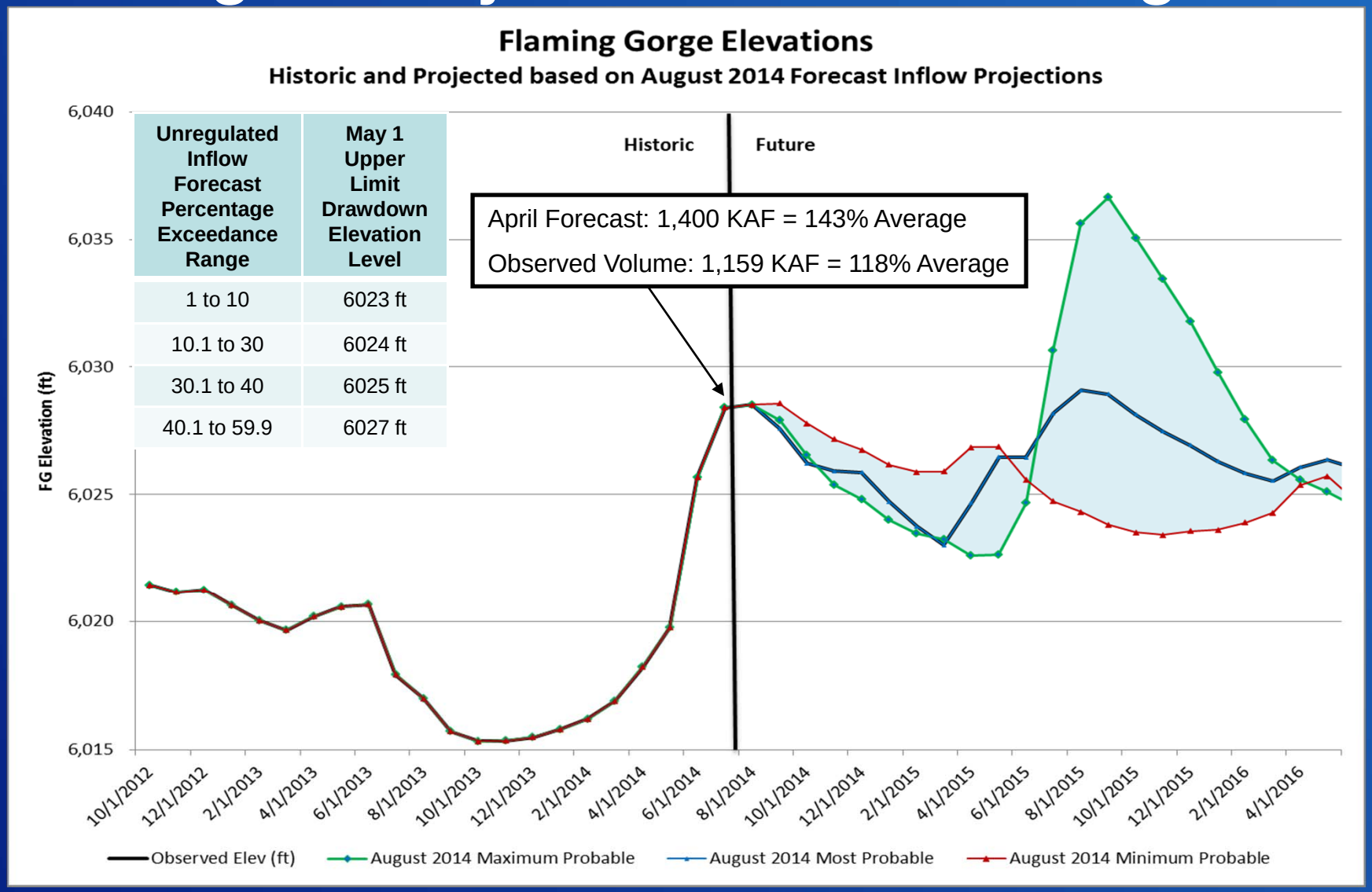
August Projected Elevation Ranges



Unregulated Inflow Forecast Percentage Exceedance Range	May 1 Upper Limit Drawdown Elevation Level
1 to 10	6023 ft
10.1 to 30	6024 ft
30.1 to 40	6025 ft
40.1 to 59.9	6027 ft

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August 2014

- Questions?

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