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Managing Water in the West

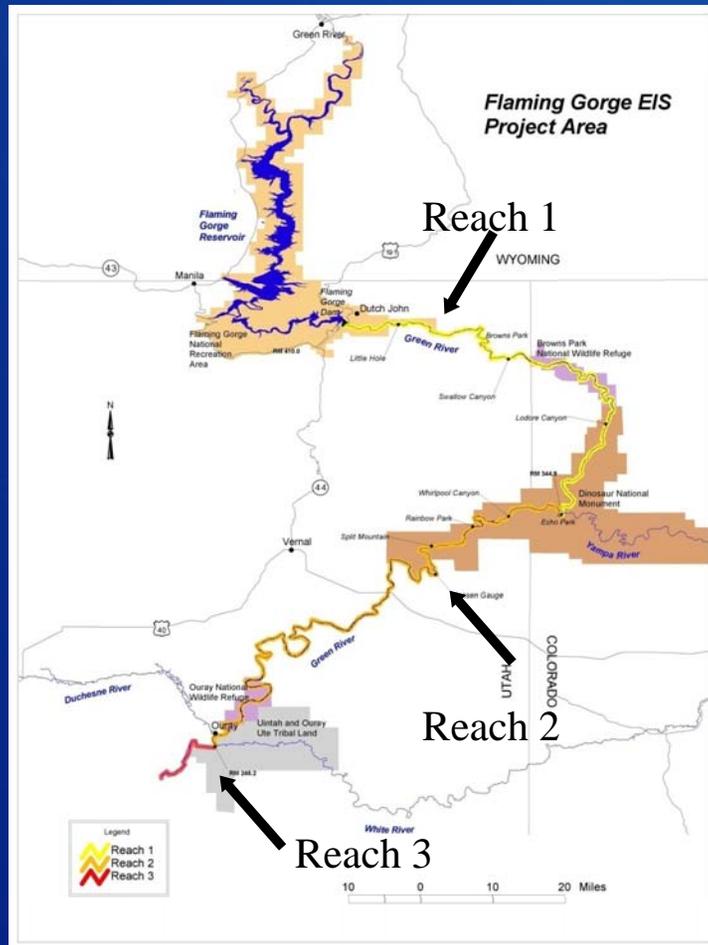
Flaming Gorge Technical Working Group

Flow and Temperature
Recommendations
Spring 2012



U.S. Department of the Interior
Bureau of Reclamation

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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Percentage Exceedances and Hydrologic Classifications

**Hydrologic
Classification**

Percentage Exceedance Range

Wet

<10

Moderately Wet

30 to 10

Average

70 to 30

Moderately Dry

90 to 70

Dry

>90

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Recovery Program Research Request

Stephen D. Guertin, Chairman
Implementation Committee



**Upper Colorado River
Endangered Fish
Recovery Program**

Thomas E. Chart, Director
Recovery Program

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FWS/CRRP
K3a1
Mail Stop 65115

MAR 26 2012

Memorandum

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
Tom Chart

Subject: Recovery Program's Research Request for 2012 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 2012 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, 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 floodplain connection with the presence of wild-produced razorback sucker larvae. A secondary objective is to achieve a target flow at the Stirrup floodplain site as part of a specific project conducted by the Utah Division of Wildlife Resources (UDWR) to continue investigations of recruitment behavior of juvenile razorback sucker stocked from 2007-2009 and bonytail stocked in 2011.

At a Recovery Program Management Committee meeting in Cheyenne, Wyoming on August 11, 2011, Reclamation's Beverly Heffernan asked that the Recovery Program clarify if and how the larval trigger would factor into future flow requests. In response to those questions, the Recovery Program has developed the attached: *Study Plan to Examine the Effects of Using Larval Sucker Occurrence in the Green River as a Trigger for Flaming Gorge Dam (LTSP)*. 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

Colorado River Energy Distributors Association • Colorado Water Congress • National Park Service • State of Colorado
State of Utah • State of Wyoming • The Nature Conservancy • U.S. Bureau of Reclamation • U.S. Fish and Wildlife Service
Utah Water Users Association • Western Area Power Administration • Western Resource Advocates • Wyoming Water Association

- Primary Objective - LTSP
- Secondary Objective - Stirrup Floodplain
 - Razorback Emigration from the Stirrup Floodplain
 - Five consecutive days of flows $\geq 15,000$ cfs in Reach 2

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Recovery Program Research Request

- Time Reach 1 flows with the initial appearance of larval suckers
- Design Matrix
 - Three years of flows < 18,600 cfs
 - Three years of flows > 18,600 cfs
 - Connecting flows of at least seven days duration

**STUDY PLAN TO EXAMINE THE EFFECTS OF USING
LARVAL RAZORBACK SUCKER OCCURRENCE IN THE GREEN
RIVER AS A TRIGGER FOR FLAMING GORGE DAM PEAK RELEASES**

Prepared by the Larval Trigger Study Plan Ad Hoc Committee

Kirk LaGory, Argonne National Laboratory
Tom Chart, Upper Colorado River Endangered Fish Recovery Program
Kevin Bestgen, Colorado State University, Larval Fish Laboratory
Jerry Wilhite, Western Area Power Administration
Shane Capron, Western Area Power Administration
David Speas, Bureau of Reclamation
Heather Hermansen, Bureau of Reclamation
Kevin McAbee, U.S. Fish and Wildlife Service
Jana Mohrman, U.S. Fish and Wildlife Service
Melissa Trammell, National Park Service
Brandon Albrecht, Environmental Group Representative

Coordinated by

The Upper Colorado River Endangered Fish Recovery Program

Final Report

March 2012

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Average Hydrologic Category

(May 1 inflow forecast 795 – 1,349 KAF)

Reach	Magnitude (cfs)	Duration
Reach 1	$\geq 4,600$ cfs	That necessary to achieve duration target in Reach 2
Reach 2	$\geq 18,600$ cfs in 50% of average years	Two weeks (i.e. 14 days) in 25% of all average years
	$\geq 8,300$ cfs in 50% of average years	One week in 50% of average years

- ***FGTWG recommendation:***

- Attempt to meet Recovery Program request to time Reach 1 flows with the initial appearance of larval suckers and meet 8,300 cfs in Reach 2
- Attempt to meet Recovery Program request to achieve 15,000 cfs in reach 2 for a minimum of 5 days
- Downramp at 500 cfs/day following peak flows

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Moderately Dry Hydrologic Category

(May 1 inflow forecast 431 – 795 KAF)

Reach	Magnitude (cfs)	Duration
Reach 1	$\geq 4,600$ cfs	That necessary to achieve duration target in Reach 2
Reach 2	$\geq 8,300$ cfs	One week

- ***FGTWG recommendation:***
- Attempt to meet Recovery Program request to time Reach 1 flows with the initial appearance of larval suckers and meet 8,300 cfs in Reach 2
- Downramp at 350 cfs/day following peak flows

Dry Hydrologic Category

(May 1 inflow forecast < 431 KAF)

Reach	Magnitude (cfs)	Duration
Reach 1	$\geq 4,600$ cfs	That necessary to achieve duration target in Reach 2
Reach 2	$\geq 8,300$ cfs	2 days or more except in extremely dry years (>98% exceedance)

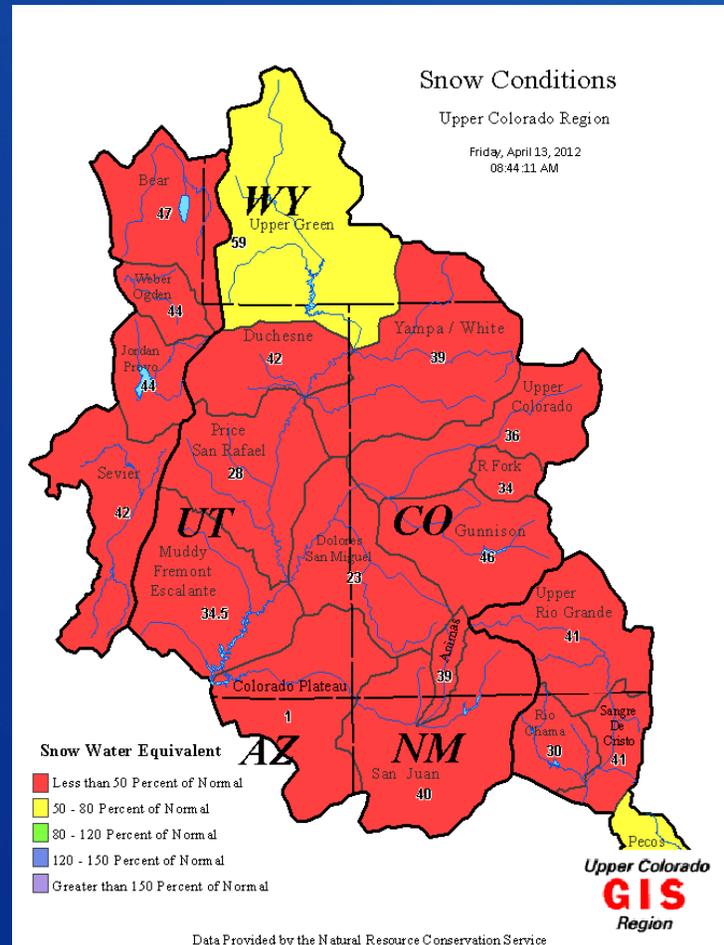
- ***FGTWG recommendation:***
- Attempt to meet Recovery Program request to time Reach 1 flows with the initial appearance of larval suckers and meet 8,300 cfs in Reach 2
- Downramp at 350 cfs/day following peak flows

Current Conditions

Live Capacity	3.752	MAF
<u>Capacity on 4/17/12</u>	<u>3.205</u>	<u>MAF</u>
Available Space	.547	MAF
Percentage of Full	85	%
Reservoir Elev. (Min Power)	5908.00	feet
<u>Elevation on 4/17/12</u>	<u>6026.21</u>	<u>feet</u>
Elevation above (Min)	118.21	feet
Average Inflow	1,750	cfs
Average Release	1,600	cfs

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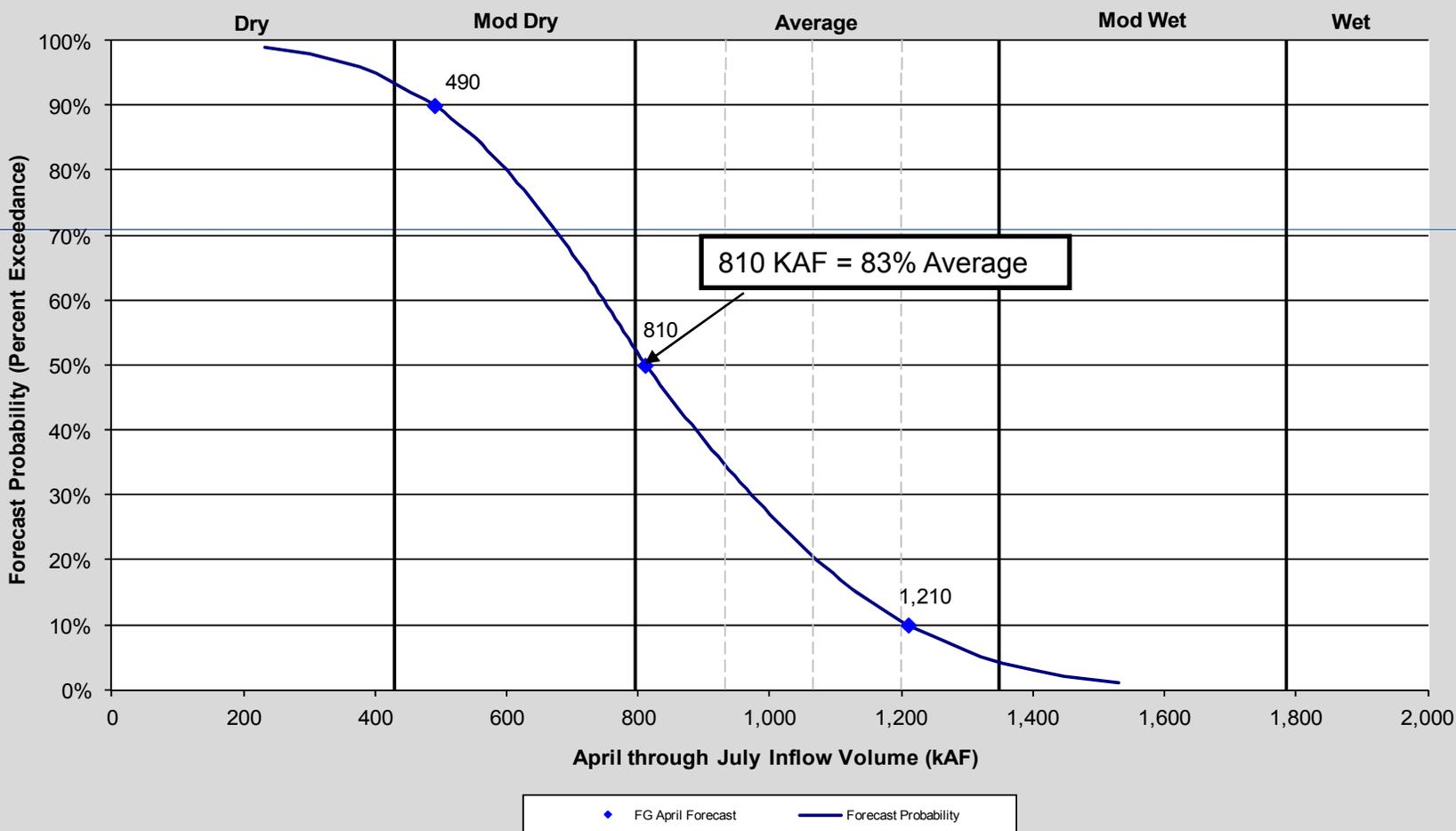
Upper Colorado Basin Snow Conditions



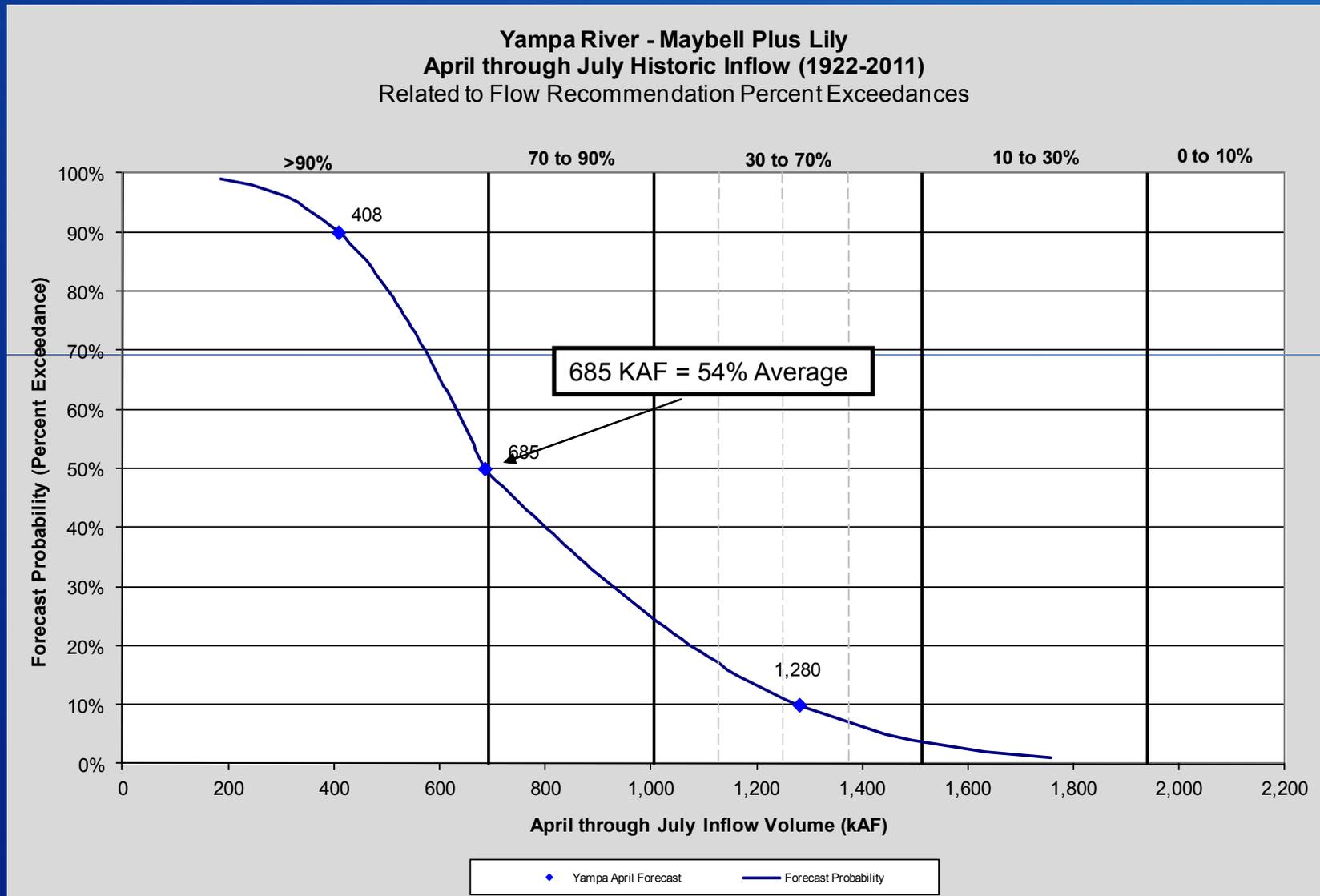
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FG April Final Forecast Classifications

Flaming Gorge Reservoir
April through July Historic Inflow (1963-2011)
Related to Flow Recommendation Percent Exceedances



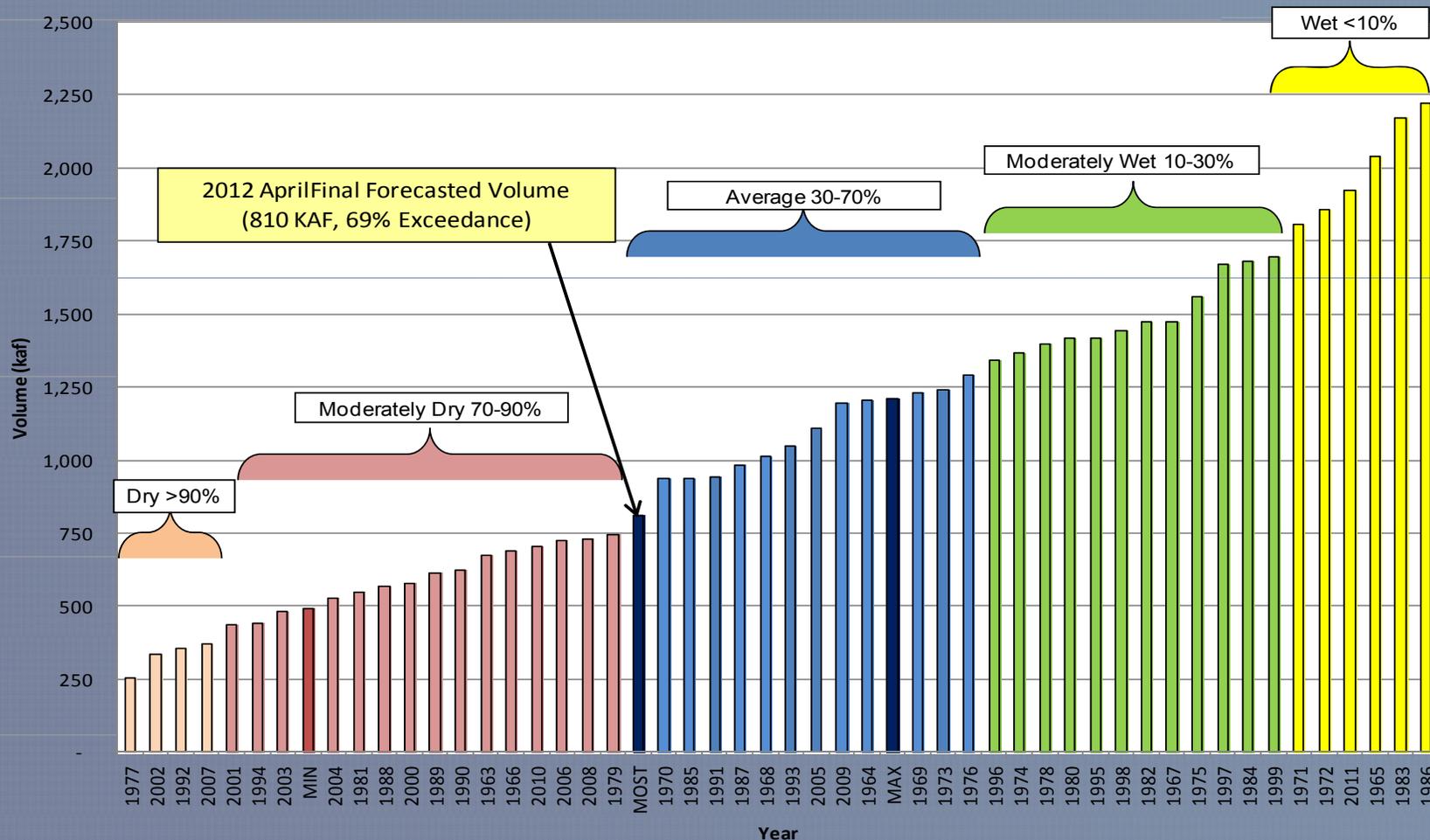
Yampa April Final Forecast Classifications



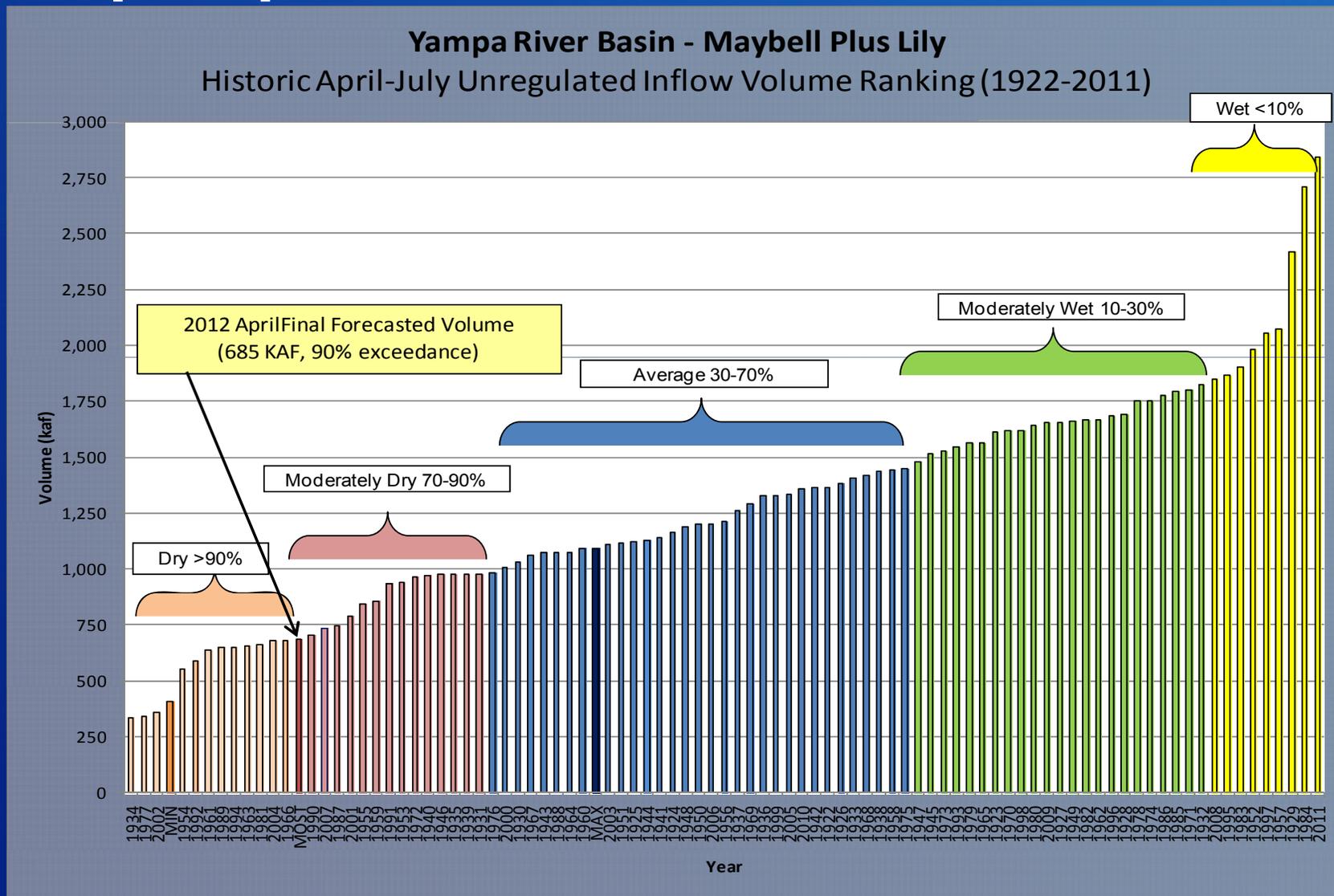
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FG April Final Forecast Historic Ranking

Flaming Gorge Reservoir
 Historic April-July Unregulated Inflow Volume Ranking (1963-2011)

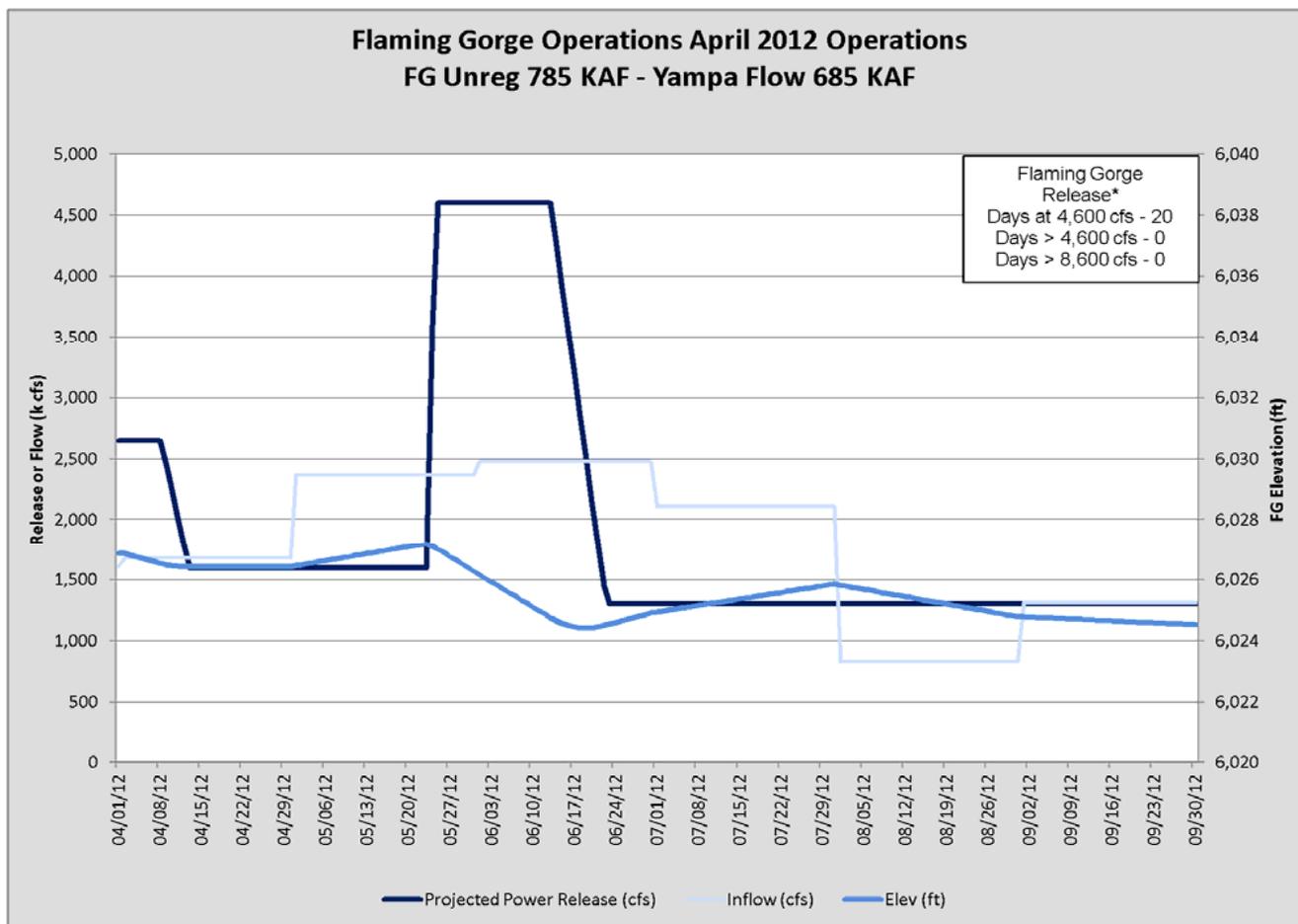


Yampa April Final Forecast Historic Ranking



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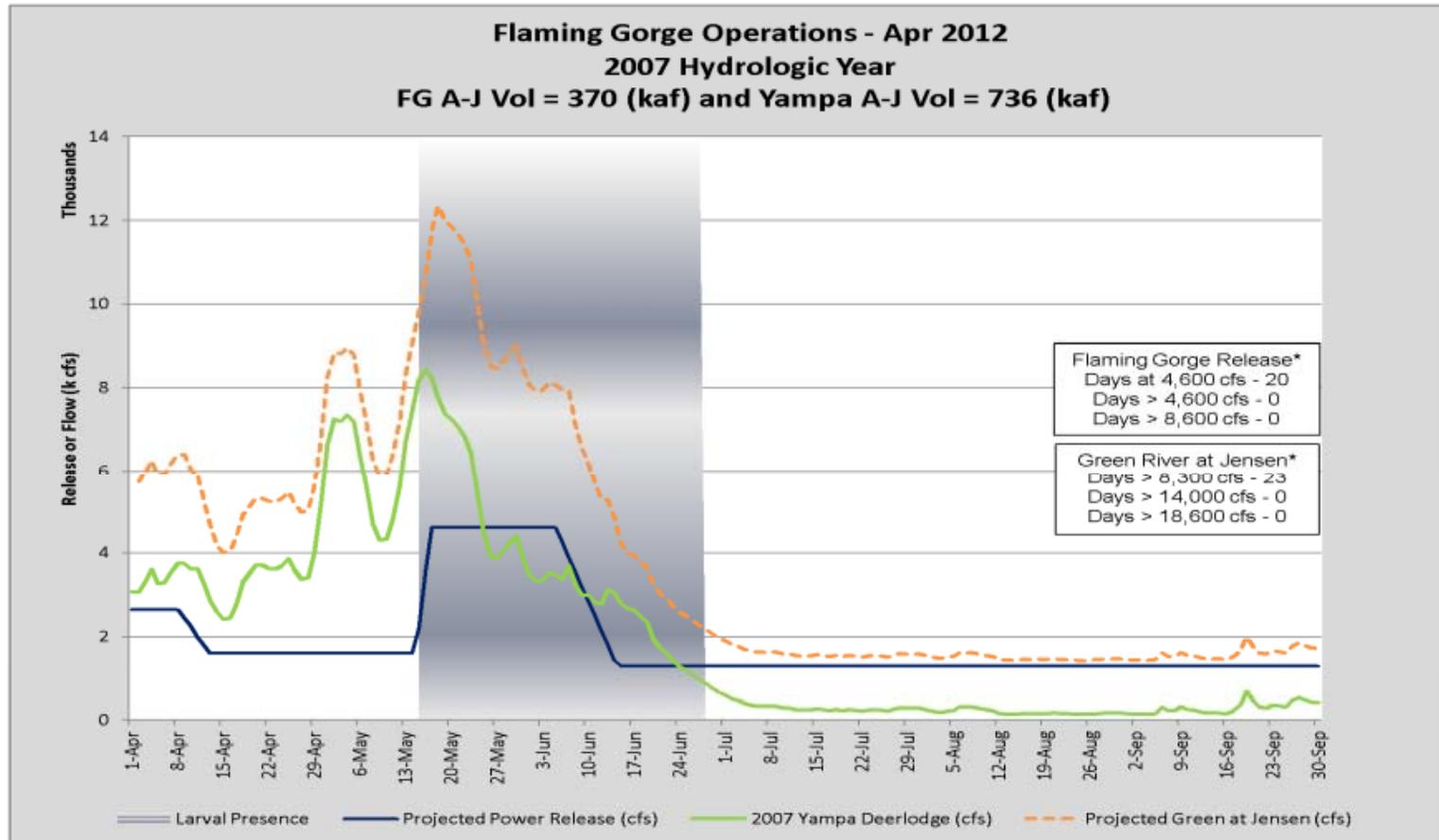
Flaming Gorge Projected Operations



*This is a projection based on historic hydrographs. Actual days of flows in 2012 are unknown.

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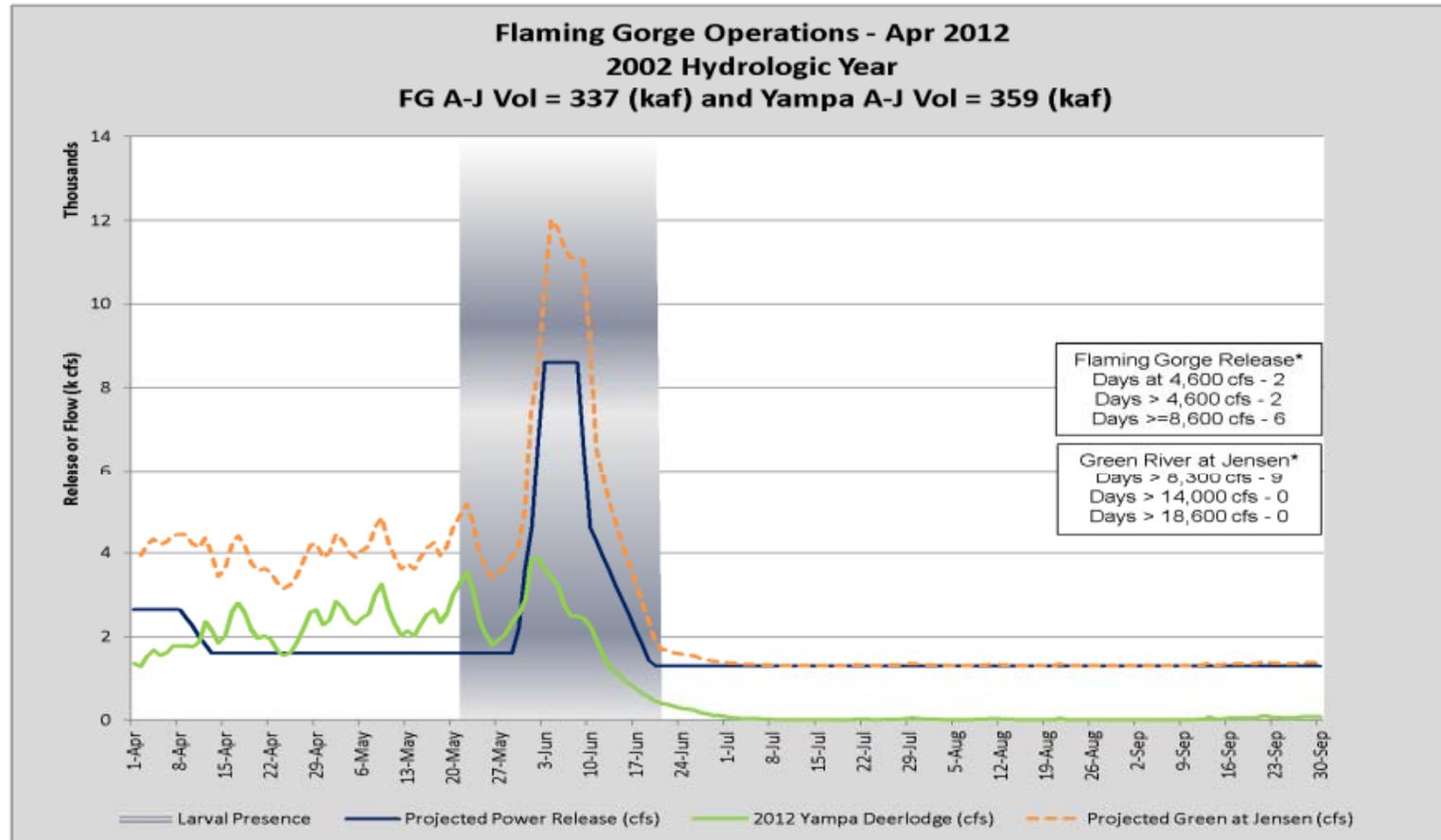
Yampa River and Projected Green River Flows



*This is a projection based on historic hydrographs. Actual days of flows in 2012 are unknown.

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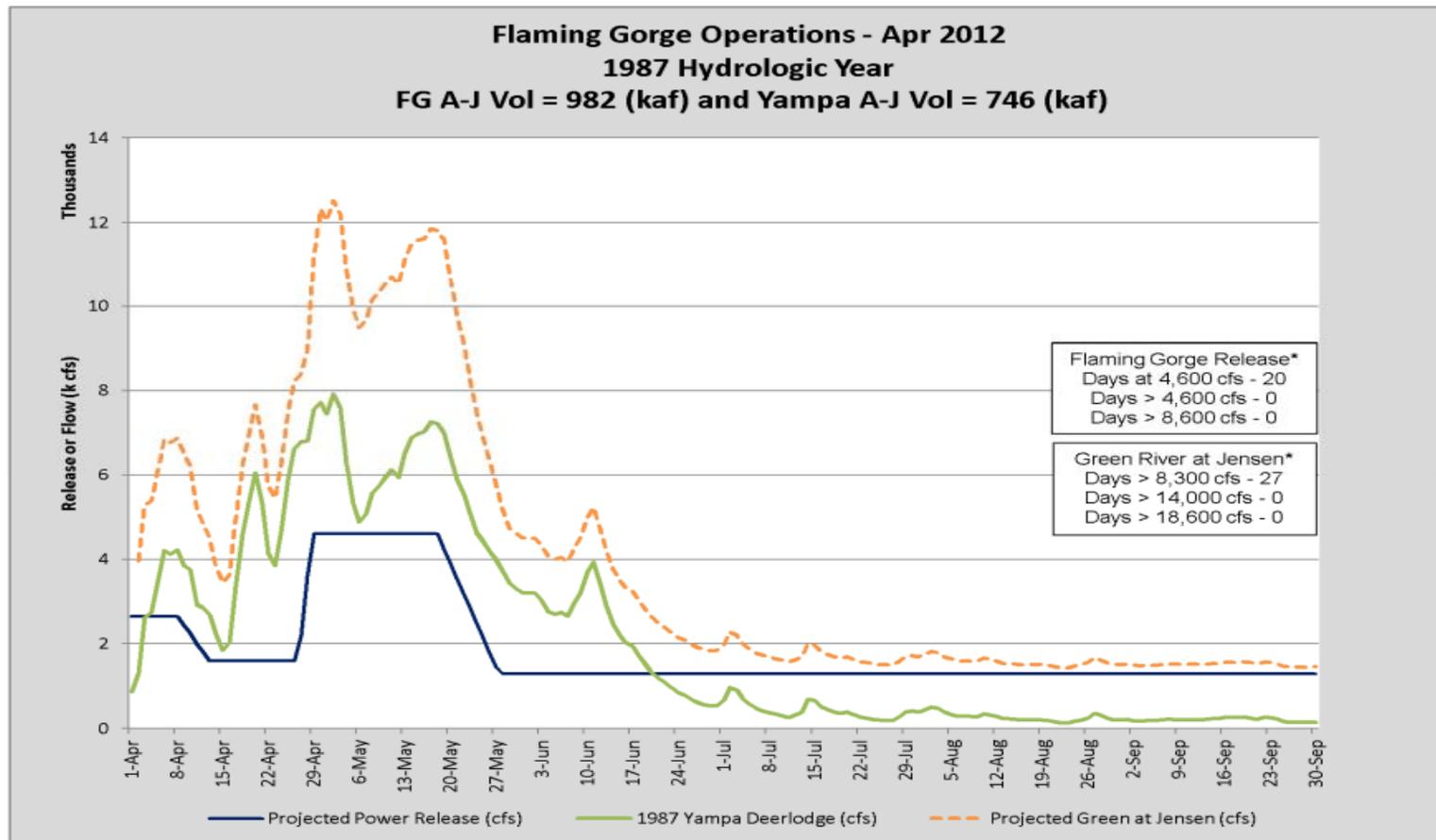
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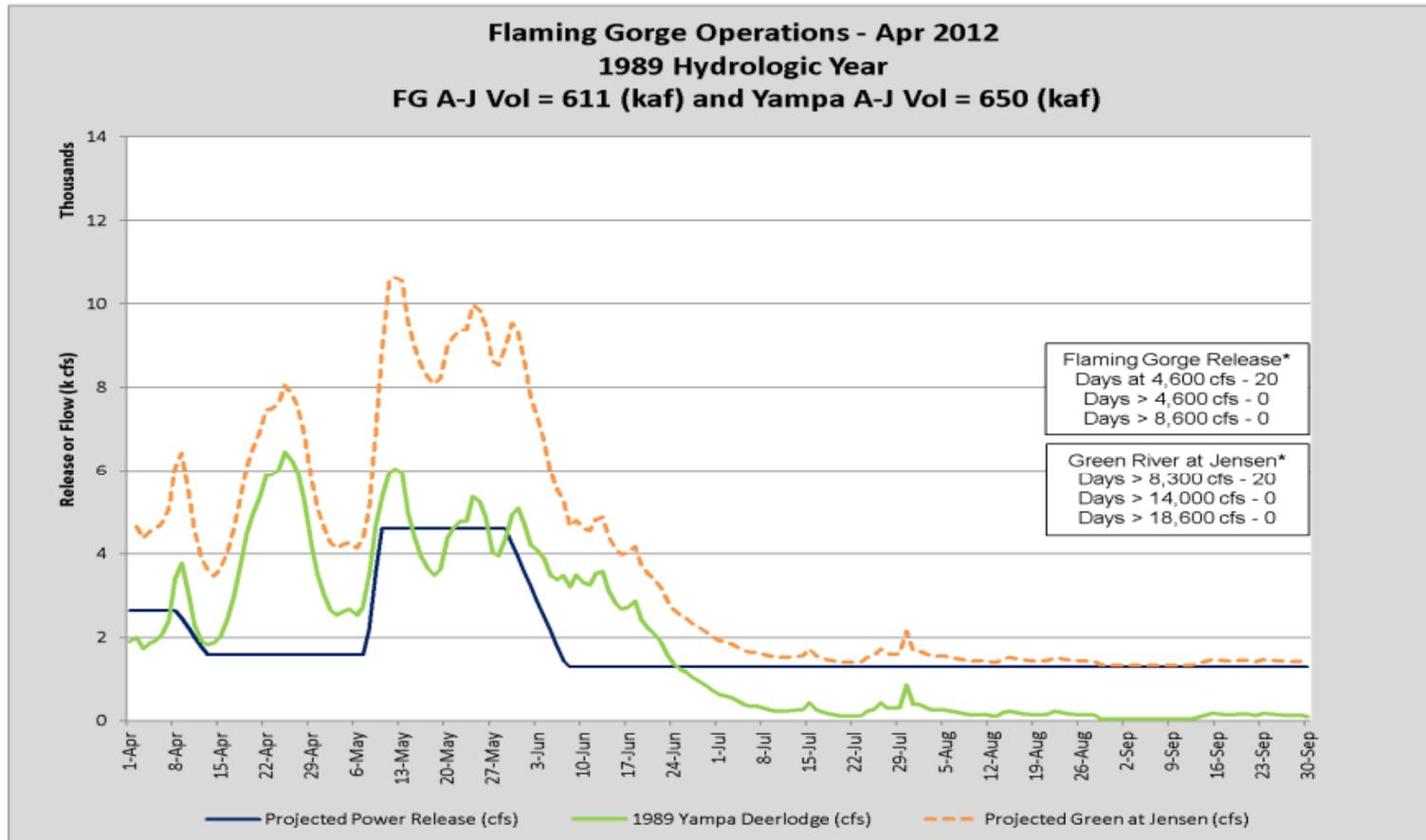
Yampa River and Projected Green River Flows



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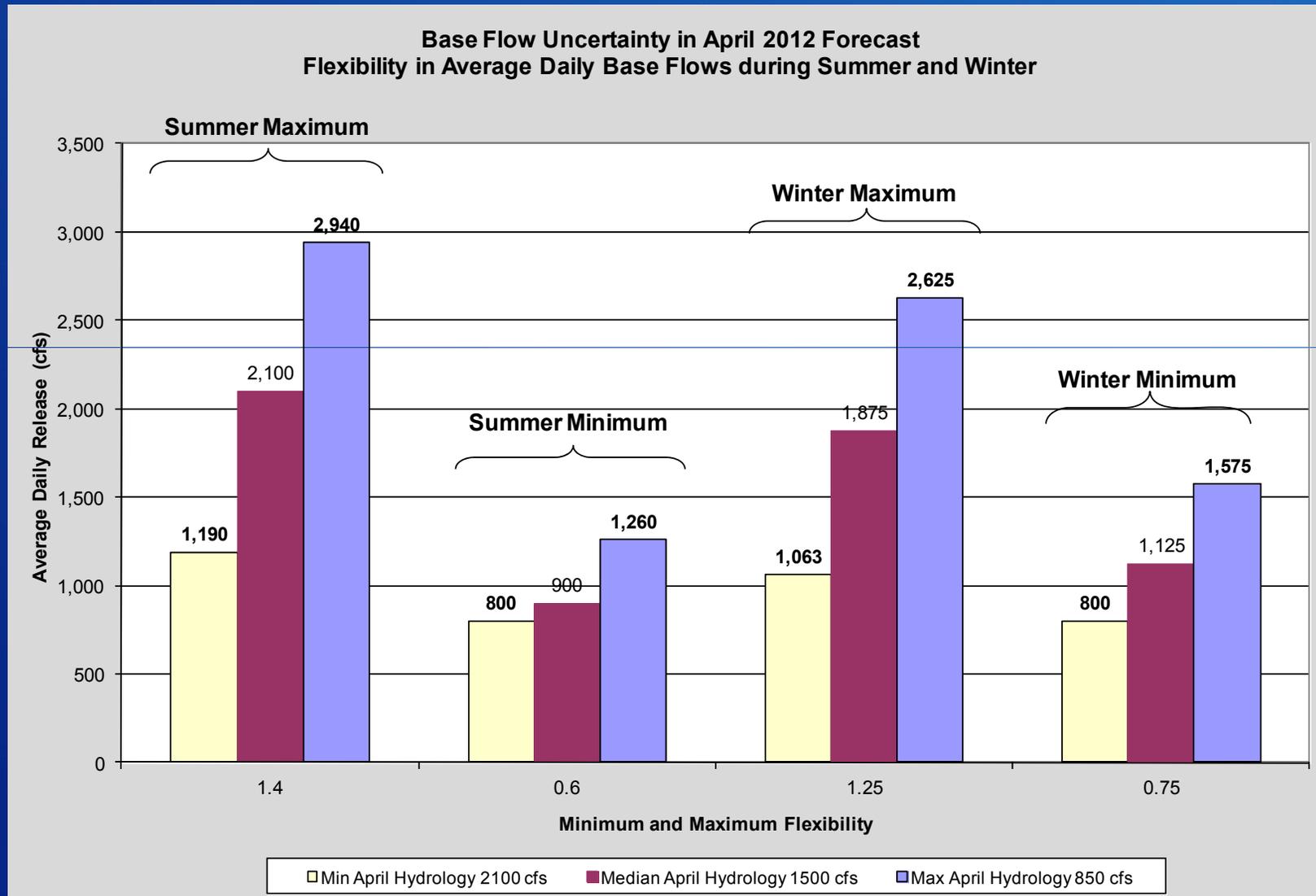
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Yampa River and Projected Green River Flows



*This is a projection based on historic hydrographs. Actual days of flows in 2012 are unknown.

Base Flow Ranges



Flaming Gorge Working Group

April 2012

- Questions?

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- (801) 524-3883



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