Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
February 22-23, 2012

Agenda Item

Basin Hydrology and Operations

Action Requested

✓ Information item only.

Presenter

Rick Clayton, Hydraulic Engineer, Upper Colorado Region, Bureau of Reclamation

Previous Action Taken

N/A

Relevant Science

N/A

Background Information

The presentation is intended to provide pertinent information to AMWG members on current water supply and forecasted hydrologic conditions within the Upper Colorado River Basin. The presentation will focus on projected reservoir conditions and operations at Lake Powell/Glen Canyon Dam for the remainder of water year 2012 and provide a general outlook for 2013.

The presentation will cover the implementation of the *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations of Lake Powell and Lake Mead* and the potential for equalization releases from Lake Powell in water year 2013. Such information is provided to assist the AMWG in developing recommendations to the Secretary on the operation of Glen Canyon Dam for water year 2013.

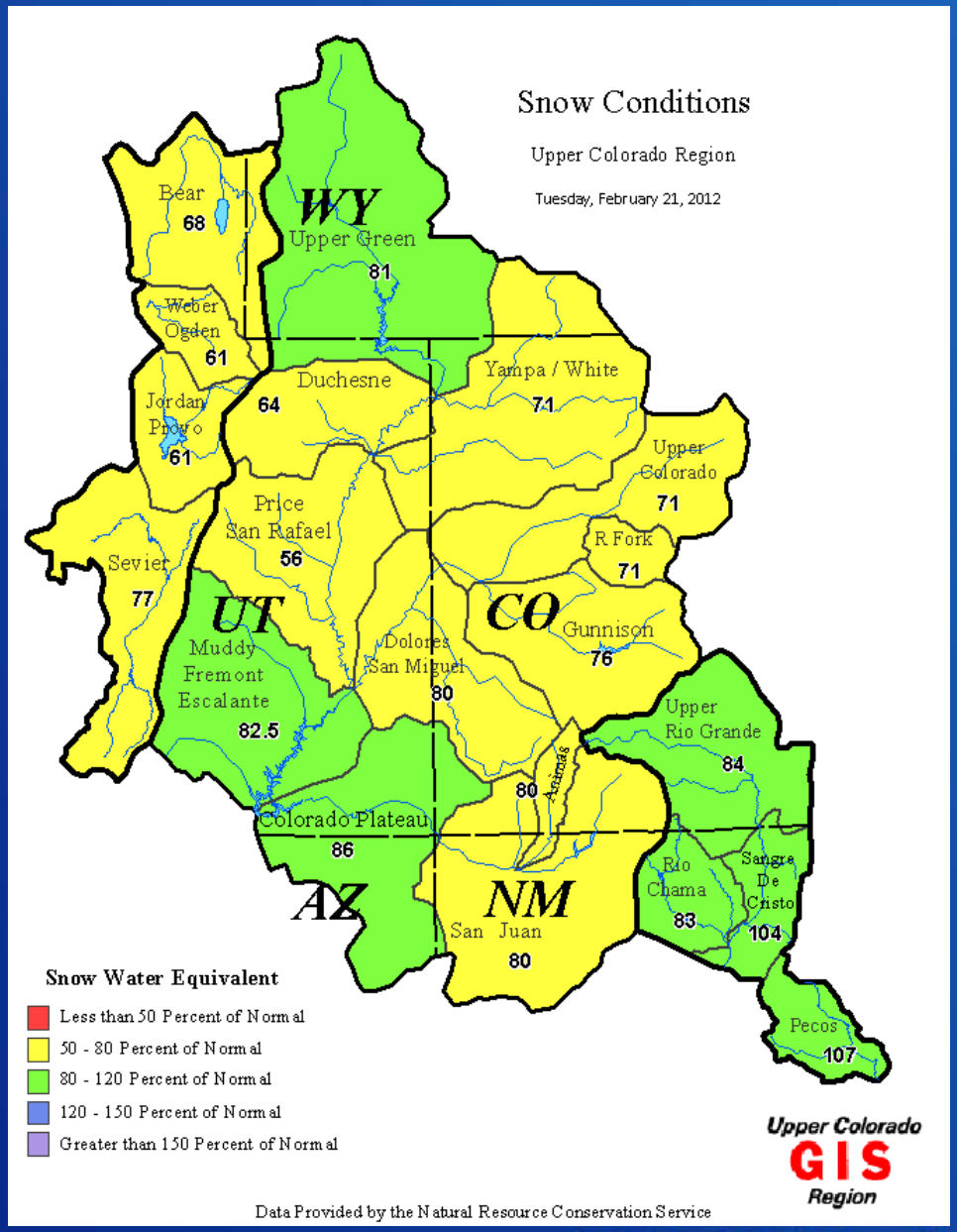
RECLAMATION

Managing Water in the West

Upper Basin Hydrology and Projected Operations 2012

Adaptive Management Work Group
February 22-23, 2012

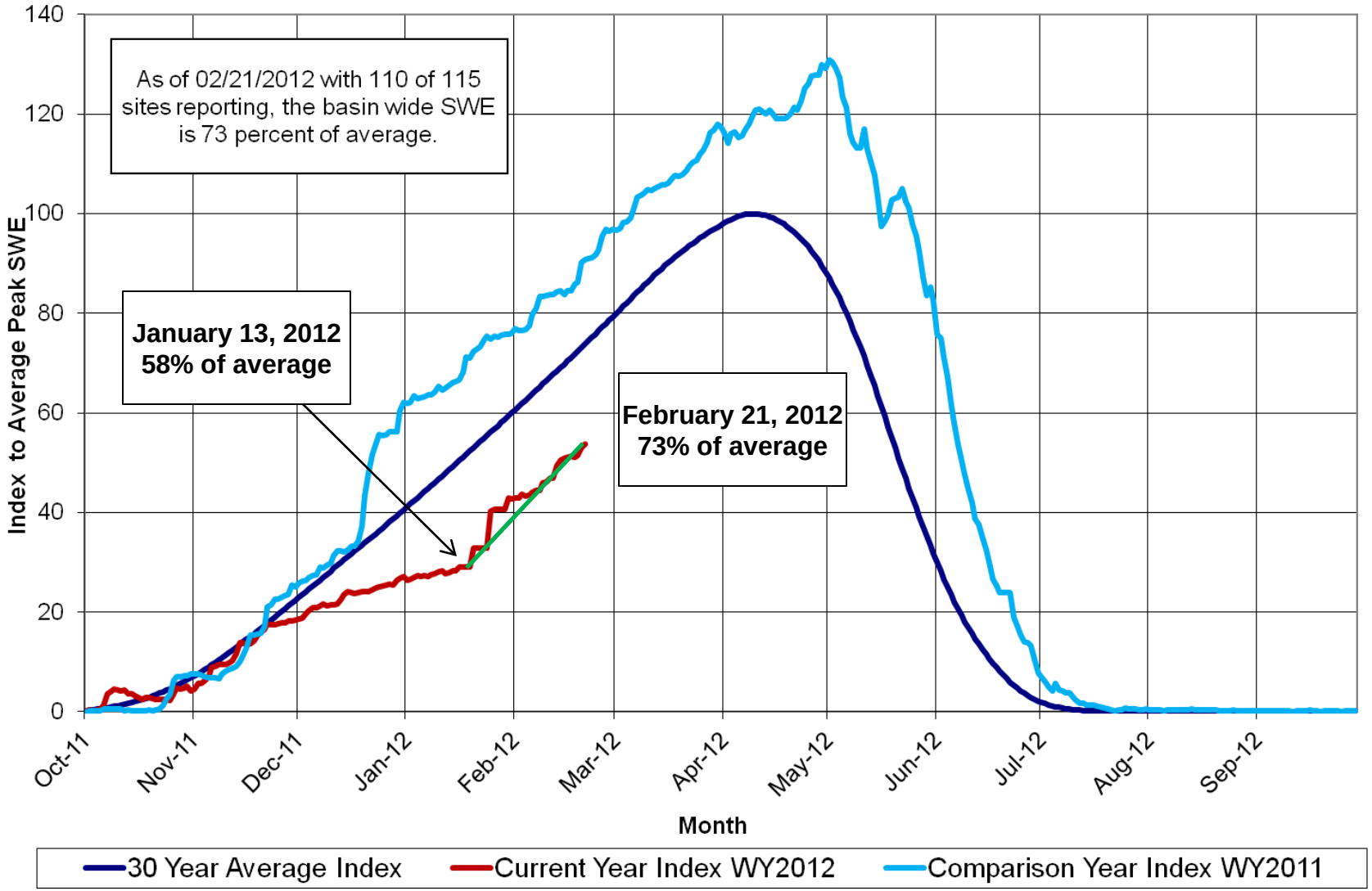
U.S. Department of the Interior
Bureau of Reclamation



RECLAMATION

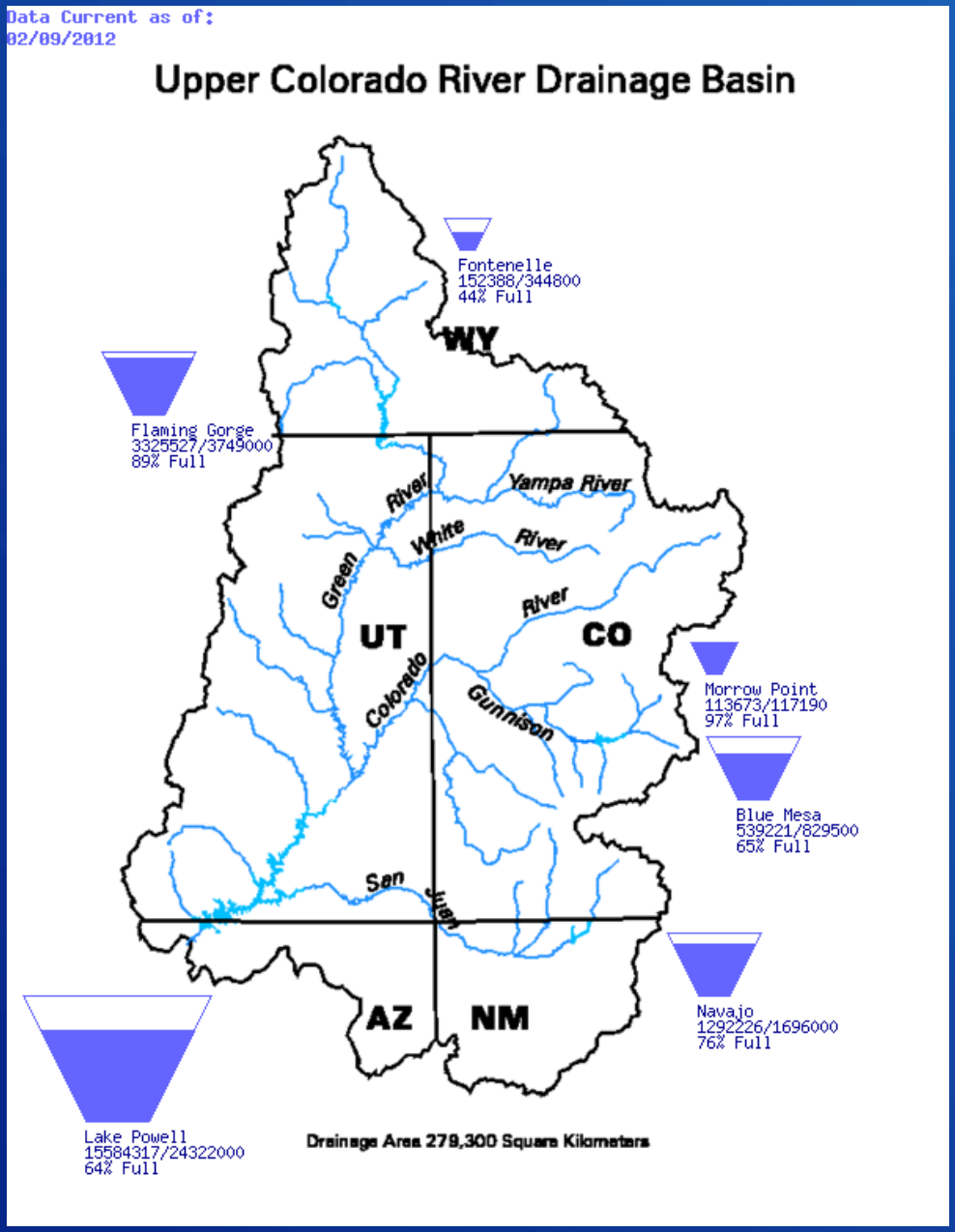
Upper Colorado River Basin Snotel Tracking

Aggregate of 115 Snotel Sites above Lake Powell



Data Provided by the Natural Resource Conservation Service

RECLAMATION



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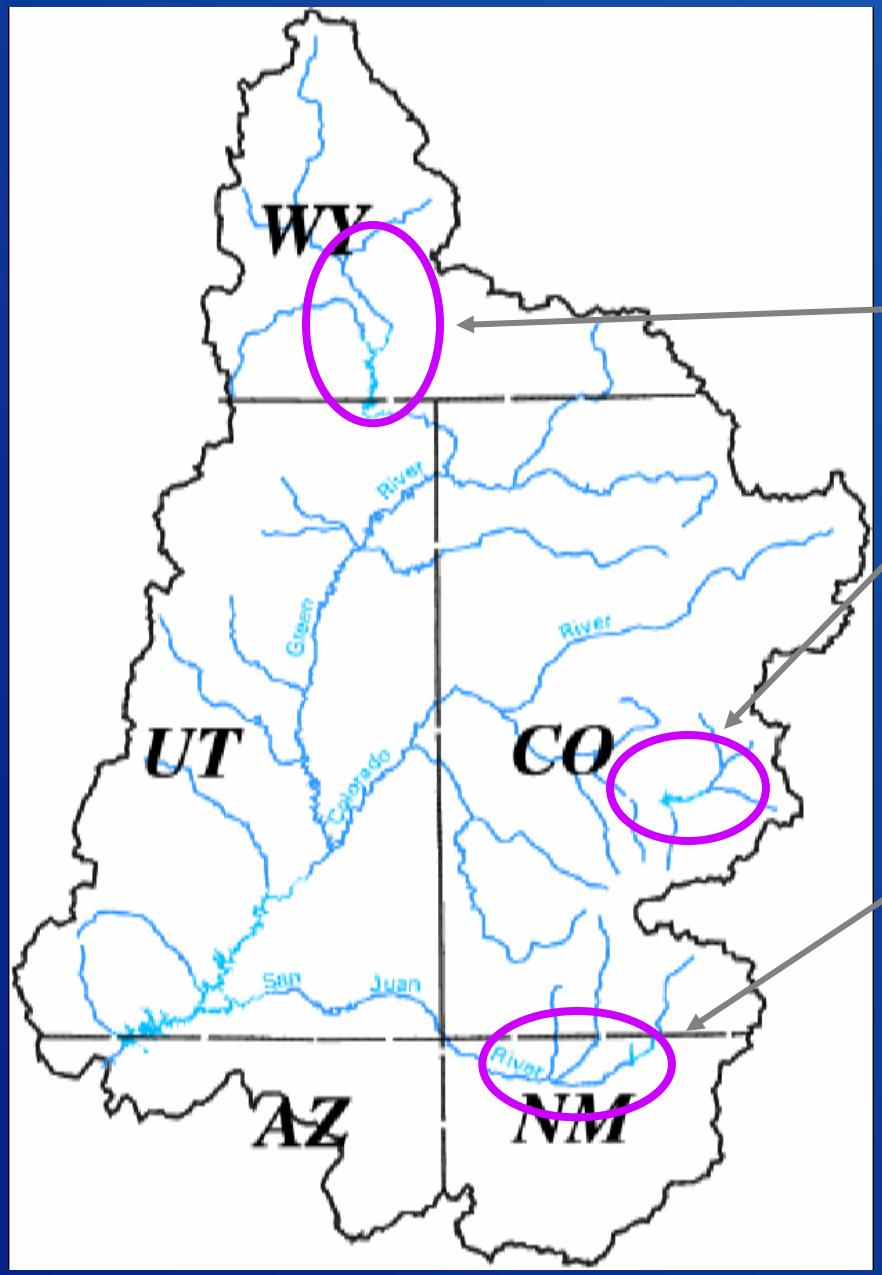


Projected Upper Basin Operations

February 24-Month Study (Most Probable)

Green River at Flaming Gorge Reservoir

Apr-July Unreg Inflow = 880 kaf (90% avg)

Release = 612 kaf

Gunnison River at Crystal Reservoir

Apr-July Unreg Inflow = 555 kaf (67% avg)

Release = 385 kaf

San Juan River at Navajo Reservoir

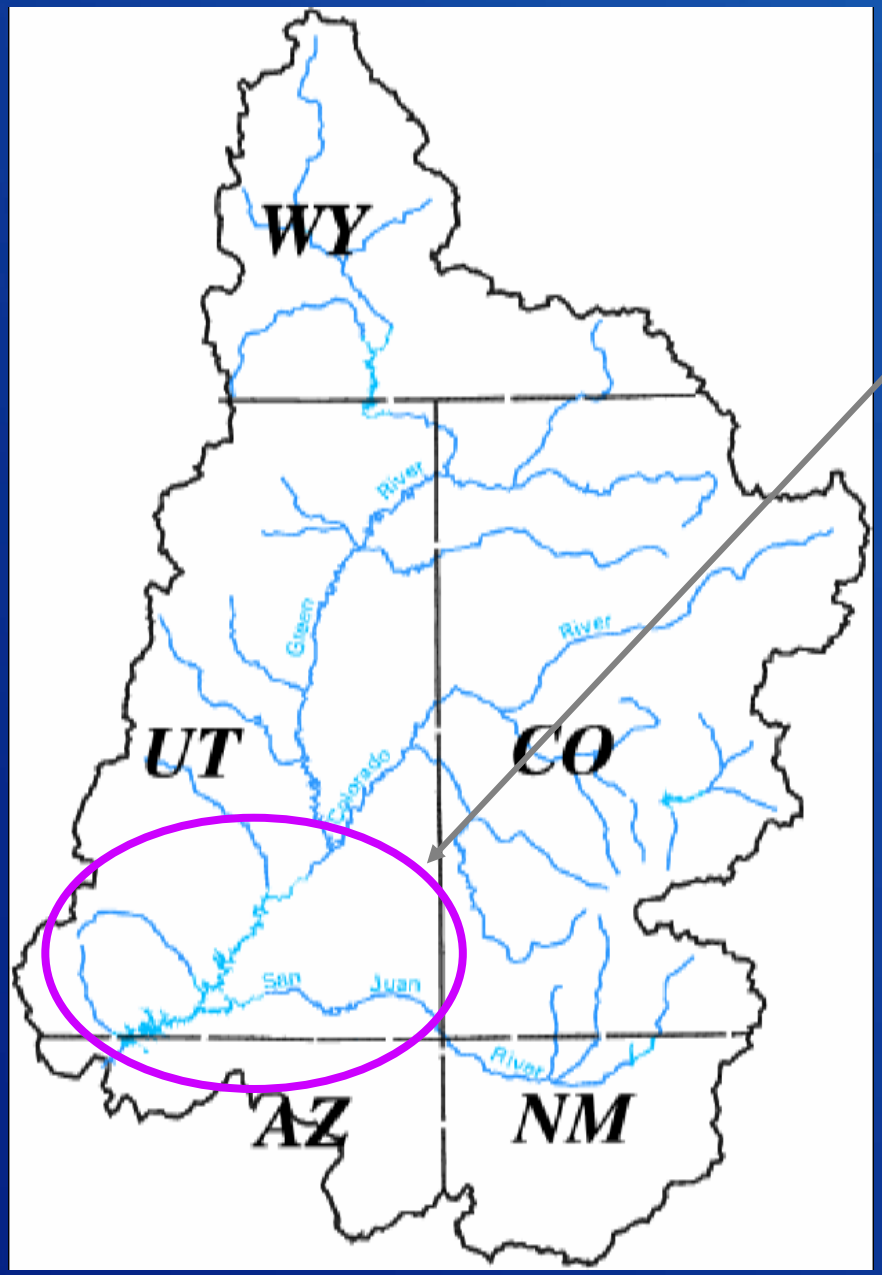
Apr-July Unreg Inflow = 630 kaf (85% avg)

Release = 202 kaf

RECLAMATION

Projected Upper Basin Operations

January 24-Month Study (Most Probable)



Colorado River at Lake Powell

Apr-July *Unreg Inflow = 5.05 maf (71% avg)*
Observed Inflow =4.4 maf
Release = 2.81 maf

RECLAMATION

Lake Powell & Lake Mead
Operational Diagrams and Projected Conditions[1]

Lake Powell

Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf)[1]
3,700	**Equalization Tier** Equalize, avoid spills or release 8.23 maf	24.3
3,646.26 **1/1/12 Projection**		**16.75** **1/1/12 Projection**
	Upper Elevation Balancing Tier[3] Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	
3,575		9.5
	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	
3,525		5.9
	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	
3,490		4.0
3,370		0

Lake Mead

Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf)[1]
1,220	**Flood Control Surplus or Quantified Surplus Condition** Deliver > 7.5 maf	25.9
1,200 (approx.)[2]		22.9 (approx.)[2]
	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	
1,145		15.9
1,134.12 **1/1/12 Projection**	**Normal or ICS Surplus Condition** Deliver ≥ 7.5 maf	**14.78** **1/1/12 Projection**
1,075		9.4
	Shortage Condition Deliver 7.167[4] maf	
1,050		7.5
	Shortage Condition Deliver 7.083[5] maf	
1,025		5.8
	Shortage Condition Deliver 7.0[6] maf Further measures may be undertaken[7]	
1,000		4.3
895		0

Diagram not to scale

[1] Acronym for million acre-feet

[2] This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

[3] Subject to April adjustments which may result in a release according to the Equalization Tier

[4] Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

[5] Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada

[6] Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

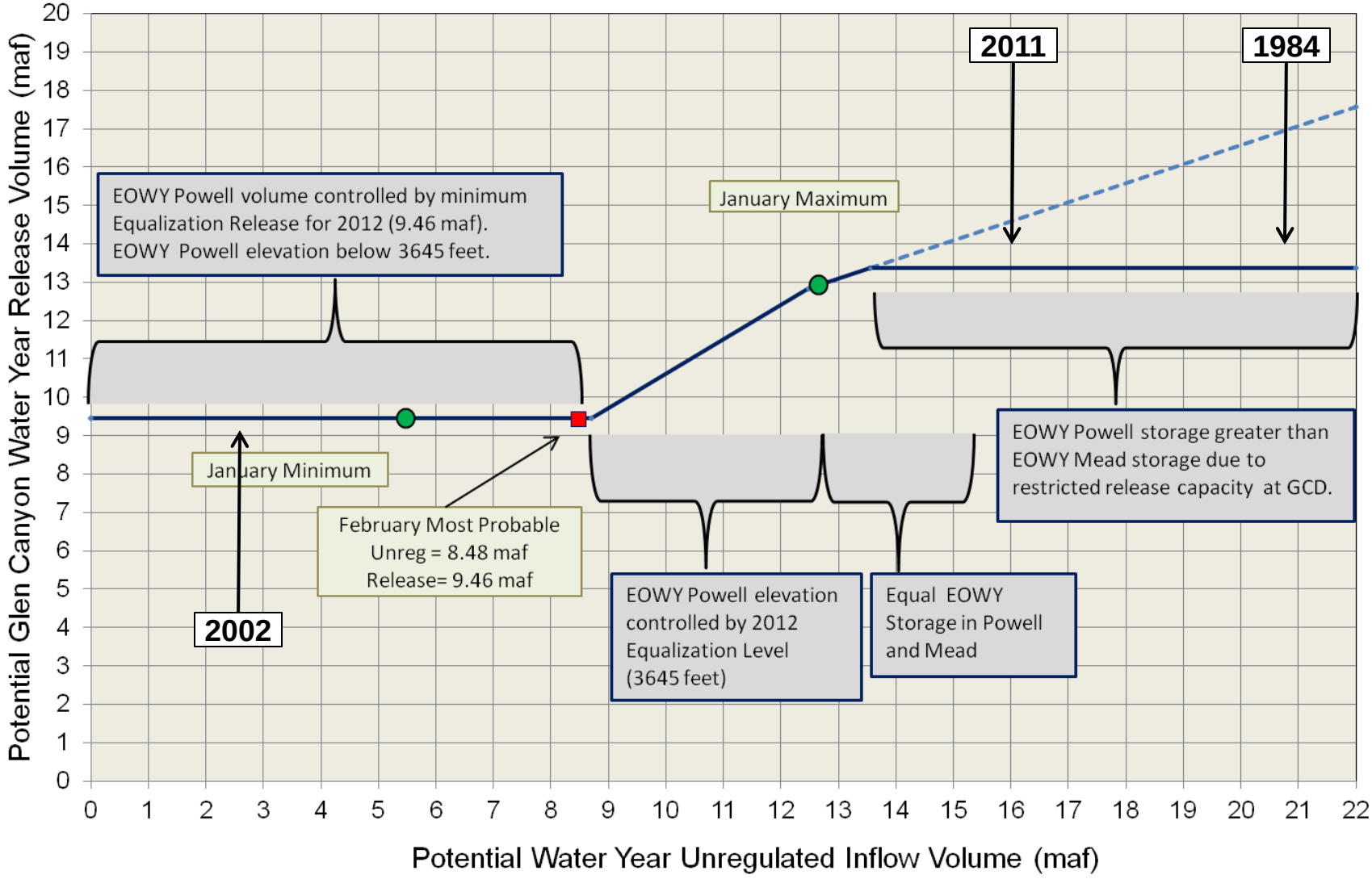
[7] Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

[1] **January 1, 2012 , projections are based on the August 2011 24-Month Study.**

RECLAMATION

Coordinated Operations of Lake Powell and Lake Mead

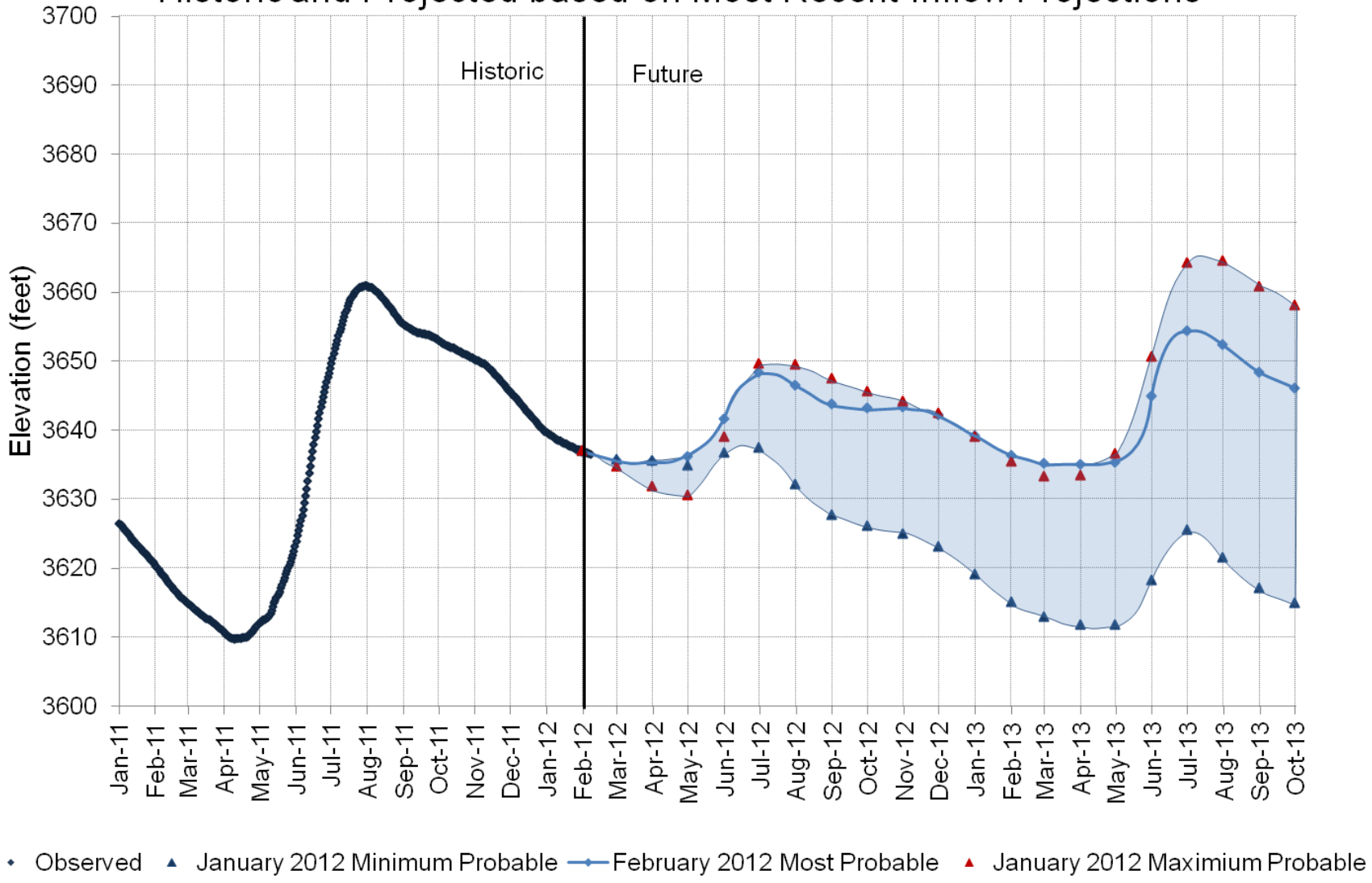
Water Year 2012 ReleaseVolume as a Function of Unregulated Inflow Volume
based on February 24-Month Study Conditions



RECLAMATION

Lake Powell Elevations

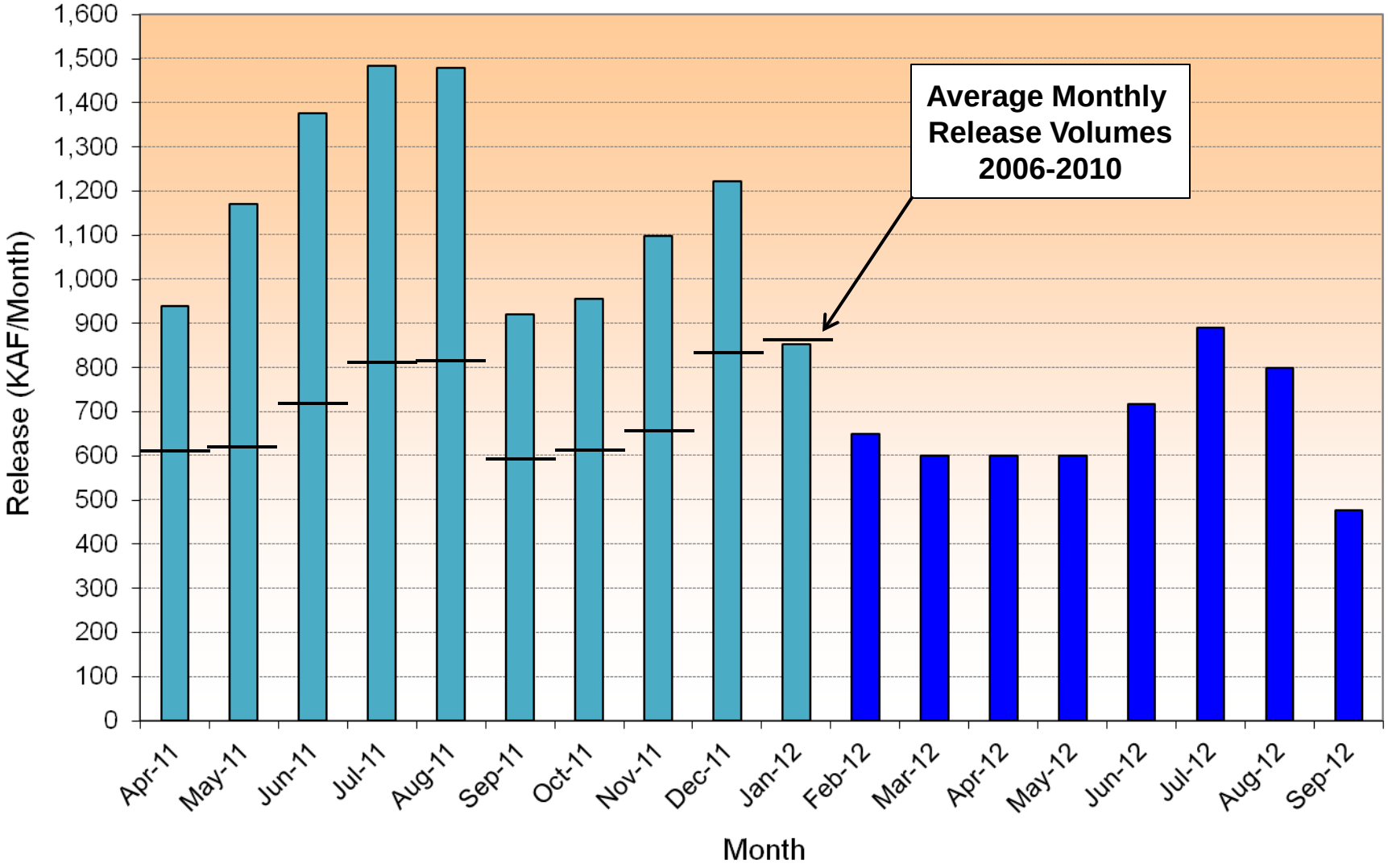
Historic and Projected based on Most Recent Inflow Projections



RECLAMATION

Historic and Proposed WY 2012 Lake Powell Monthly Release Volumes

Estimated based on Most Probable (Median) Inflow Scenario (February-2012)



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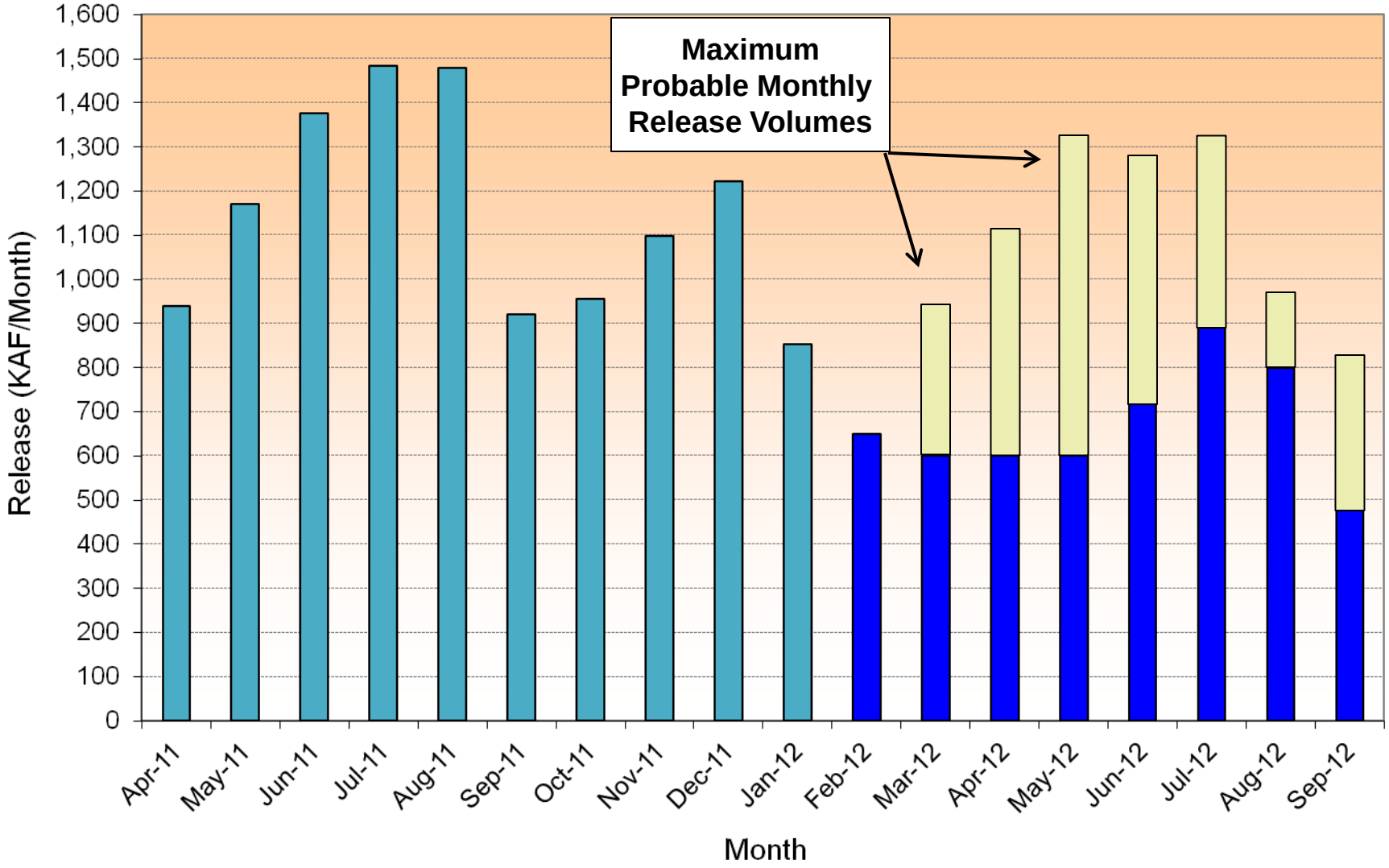
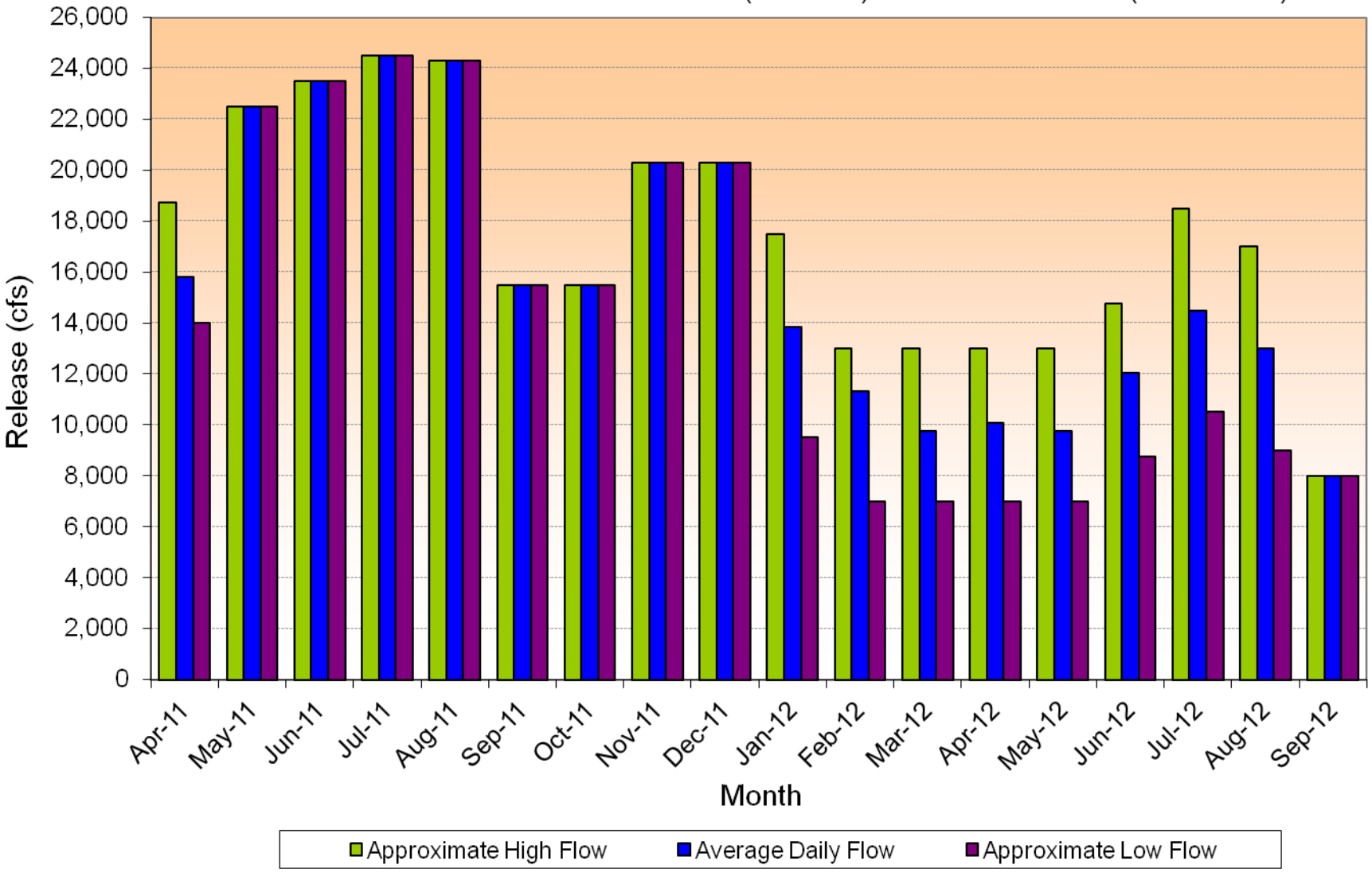


RECLAMATION

Proposed WY2012 Glen Canyon Dam Daily Release Regime

Estimated based on Most Probable (Median) Inflow Scenario (Feb 2012)



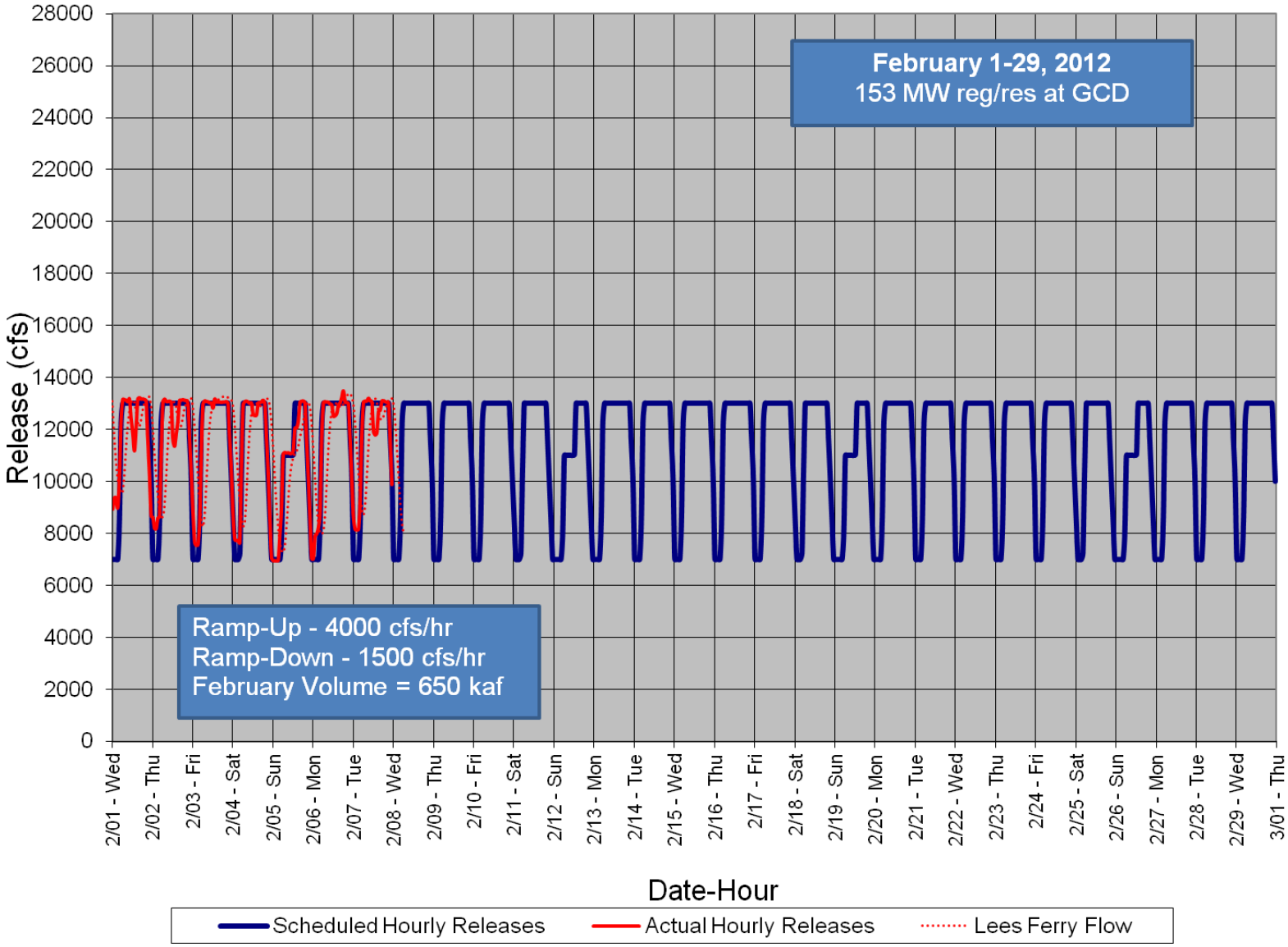
RECLAMATION

Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2012
(updated 2-17-2012)

Unit Number	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sep 2012
1												
2												
3												
4												
5												
6 (3/4 Unit)												
7												
8												
Units Available	5	5.5	5.75	6.75	4.75	4.75 / 6.75	6.75	6.75	6.75	6.75	6.75	4.75
Capacity (cfs)	15,500	20,750	20,750	20,750	14,400	14,200 / 23,800	23,000	23,000	23,000	23,800	23,800	14,800
Capacity (kaf/month)	1030	1099	1223	1130	950	920	1200	1330	1290	1330	1320	970
Max (kaf)	956	1099	1223	852	650	920	1200	1330	1290	1330	974	833
Most (kaf)	956	1099	1223	852	650	600	600	600	717	890	800	476
Min (kaf)	956	1099	1223	852	650	600	600	600	717	890	800	476

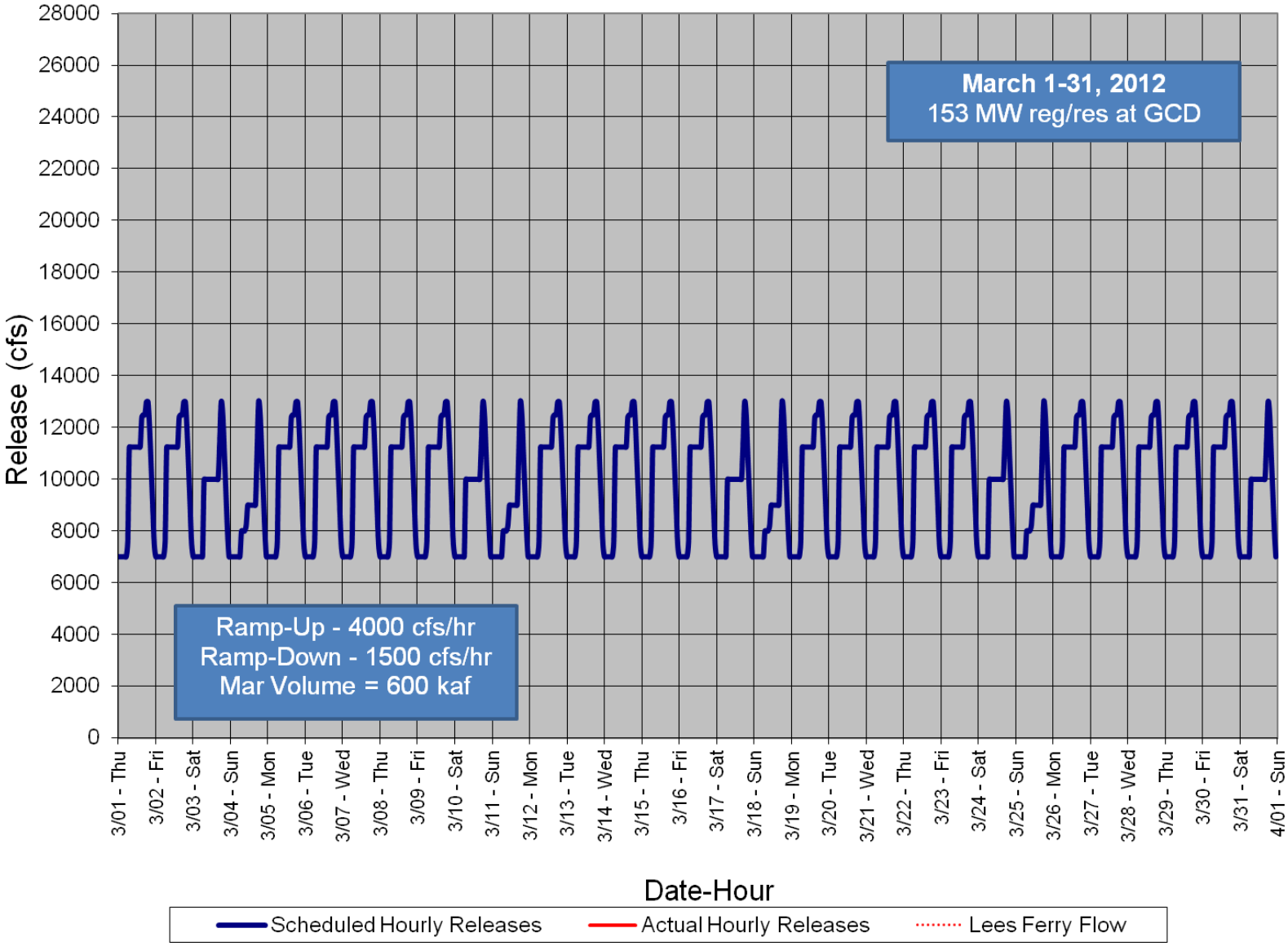
RECLAMATION

Glen Canyon Dam Hourly Release Pattern FEB 2012



RECLAMATION

Glen Canyon Dam Hourly Release Pattern MAR 2012



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1												
2												
3												
4												
5												
6 (3/4 Unit)												
7												
8												
Units Available	5	7	7	7	5	5 / 7	7	7	7	7	7	4
Capacity (cfs)	15,400	22,000	22,000	22,000	14,600	14,600 / 22,000	22,300	22,300	22,300	22,300	22,300	11,300
Capacity (kaf/month)	1110	1310	1360	1360	900	1140	1310	1370	1330	1370	1370	780
Max (kaf)	---	---	---	---	---	---	---	---	---	---	---	---
Most (kaf)	491	600	800	800	600	600	800	840	1065	1200	1079	800
Min (kaf)	---	---	---	---	---	---	---	---	---	---	---	---

RECLAMATION

Questions

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RECLAMATION