

Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
May 8, 2013

Agenda Item

Basin Hydrology and Operations

Action Requested

✓ Information item only.

Presenter

Katrina Grantz, Hydraulic Engineer, Bureau of Reclamation, Upper Colorado Region

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 2013 and provide a general outlook for 2014.

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 projected releases from Lake Powell in water year 2013 as well as the potential Operating Tier for water year 2014. Such information is provided to assist the AMWG in developing recommendations to the Secretary on the operation of Glen Canyon Dam for the remainder of water year 2013 and for water year 2014.

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Managing Water in the West

Colorado River Basin Hydrology and Projected Glen Canyon Dam Operations

AMWG meeting (via webinar)

May 8, 2013



U.S. Department of the Interior
Bureau of Reclamation

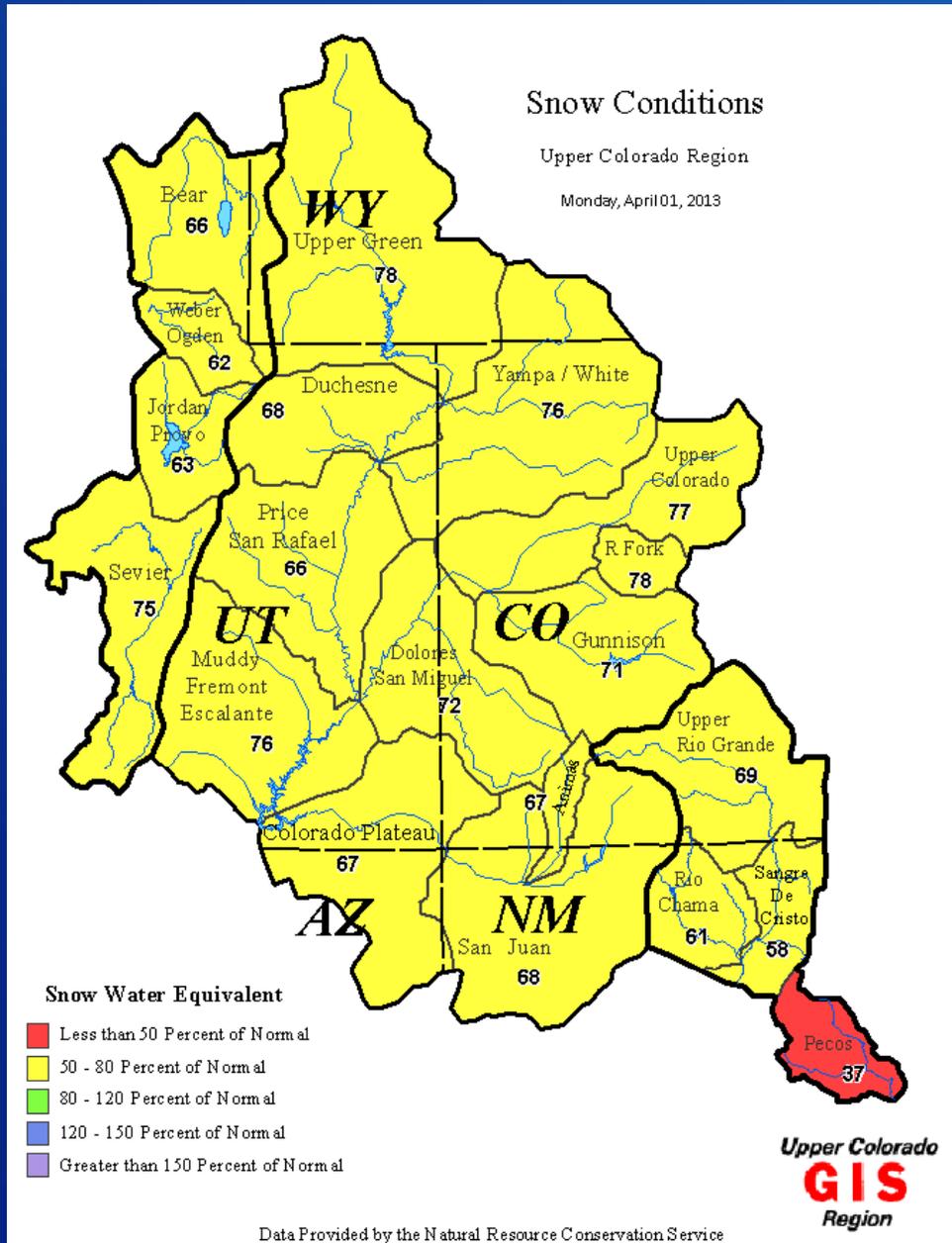
Hydrology and Operations

- Current Hydrology Update
- Projected Glen Canyon Dam Operations
 - Projections for the remainder of WY 2013
 - Outlook for WY 2014

Water Year 2013 Hydrologic Conditions

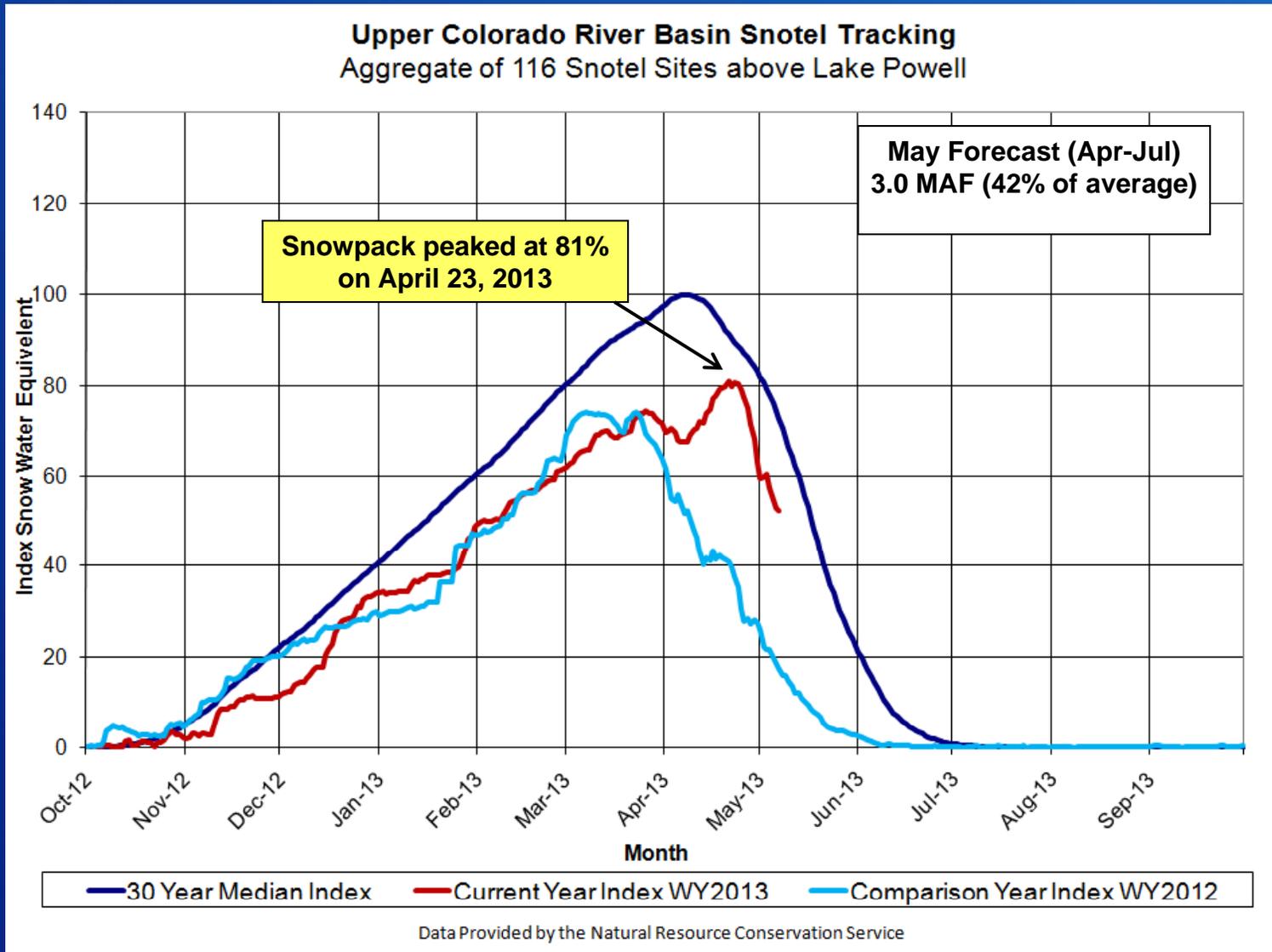
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Upper Colorado Region Snowmap April 1, 2013



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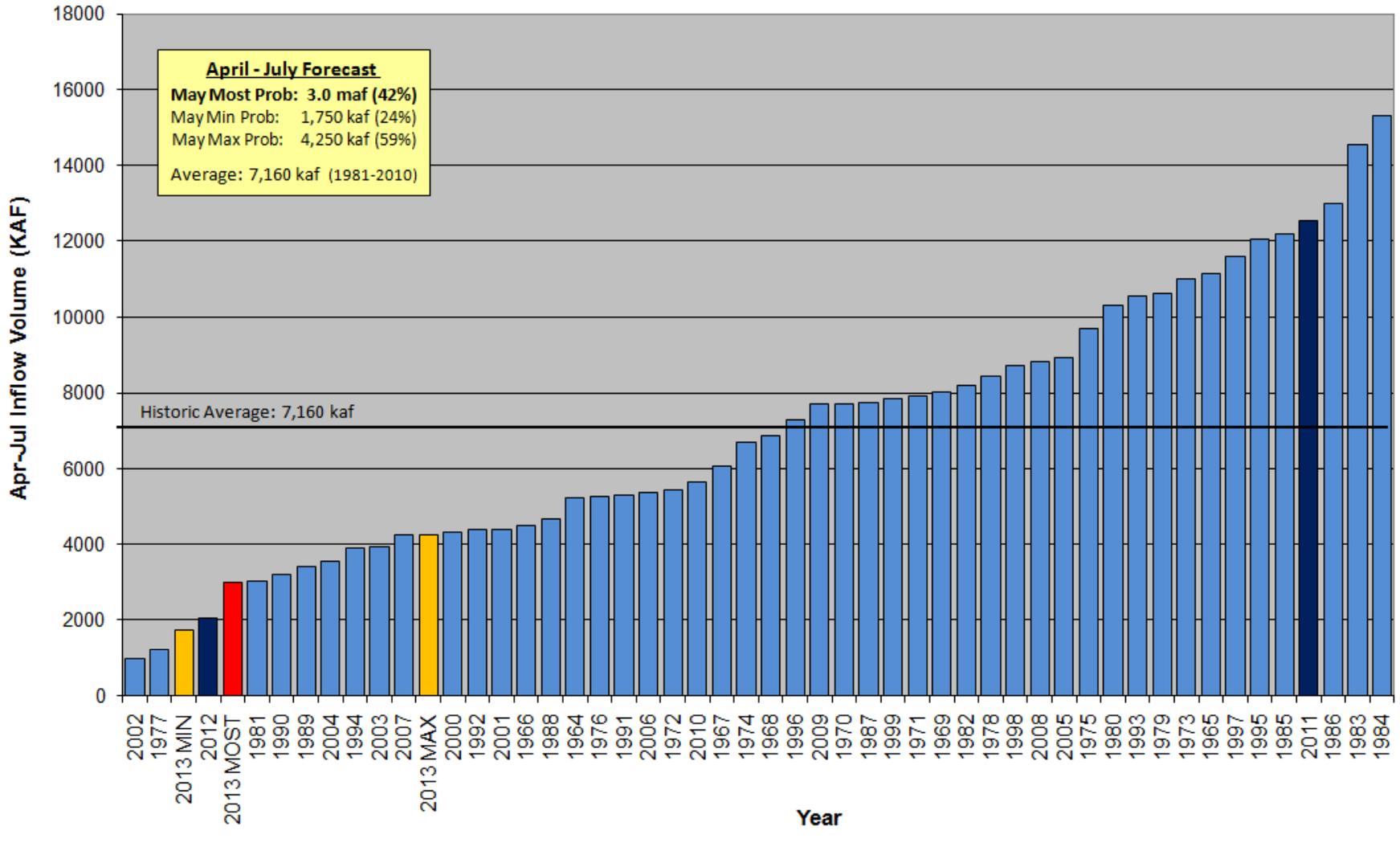
Upper Colorado Basin Snowpack



Powell Unregulated Inflow

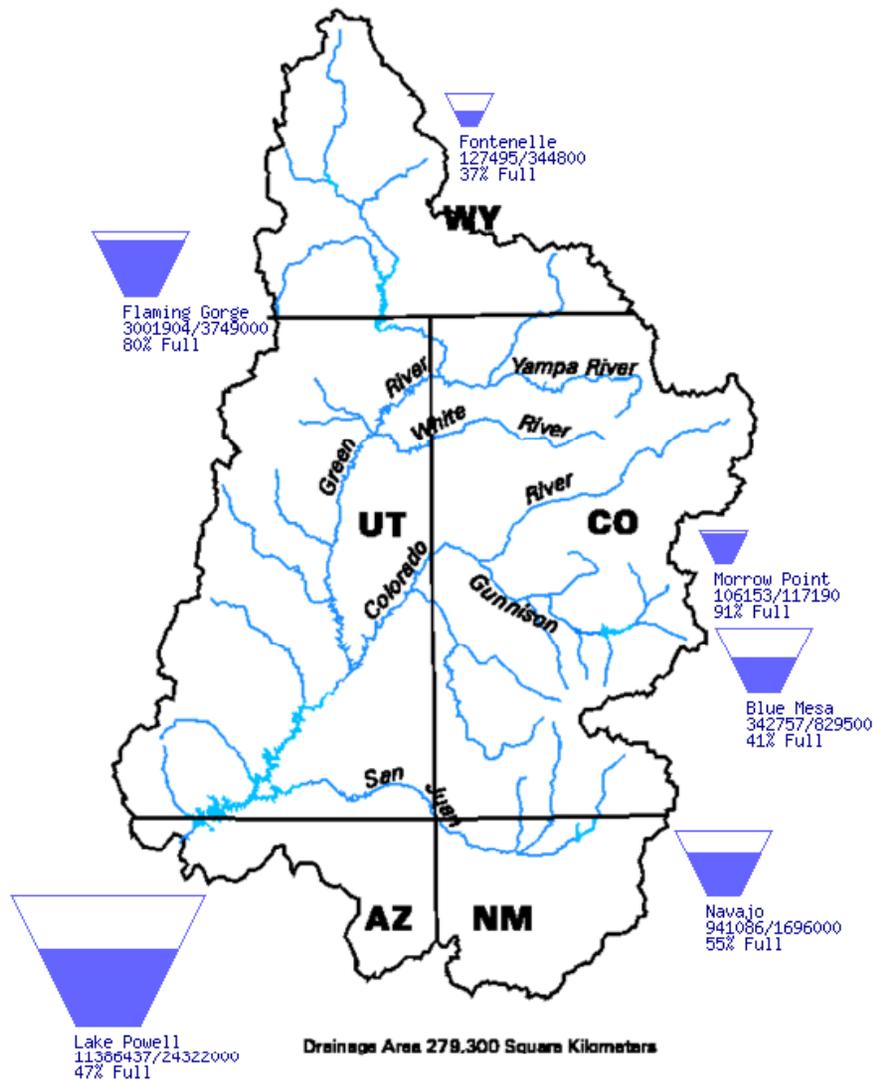
Apr-Jul 2013 Forecast (issued May 2)

Comparison with History



Data Current as of:
05/06/2013

Upper Colorado River Drainage Basin



Reservoir Storage Conditions 5/6/2013

(% of Capacity)
(% of average A-J forecast)

Powell – 47 % full
Apr-Jul Forecast – 42 %

Flaming Gorge – 80 % full
Apr-Jul Forecast – 49 %

Blue Mesa – 41 % full
Apr-Jul Forecast – 50 %

Navajo – 55 % full
Apr-Jul Forecast – 44 %

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Projected Operations for the Remainder of WY 2013

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NOTE: Modeling is currently underway using the May forecast. The projections presented here are based on the April most probable forecast (and 24-Month Study results)

Powell forecast increased slightly from April to May

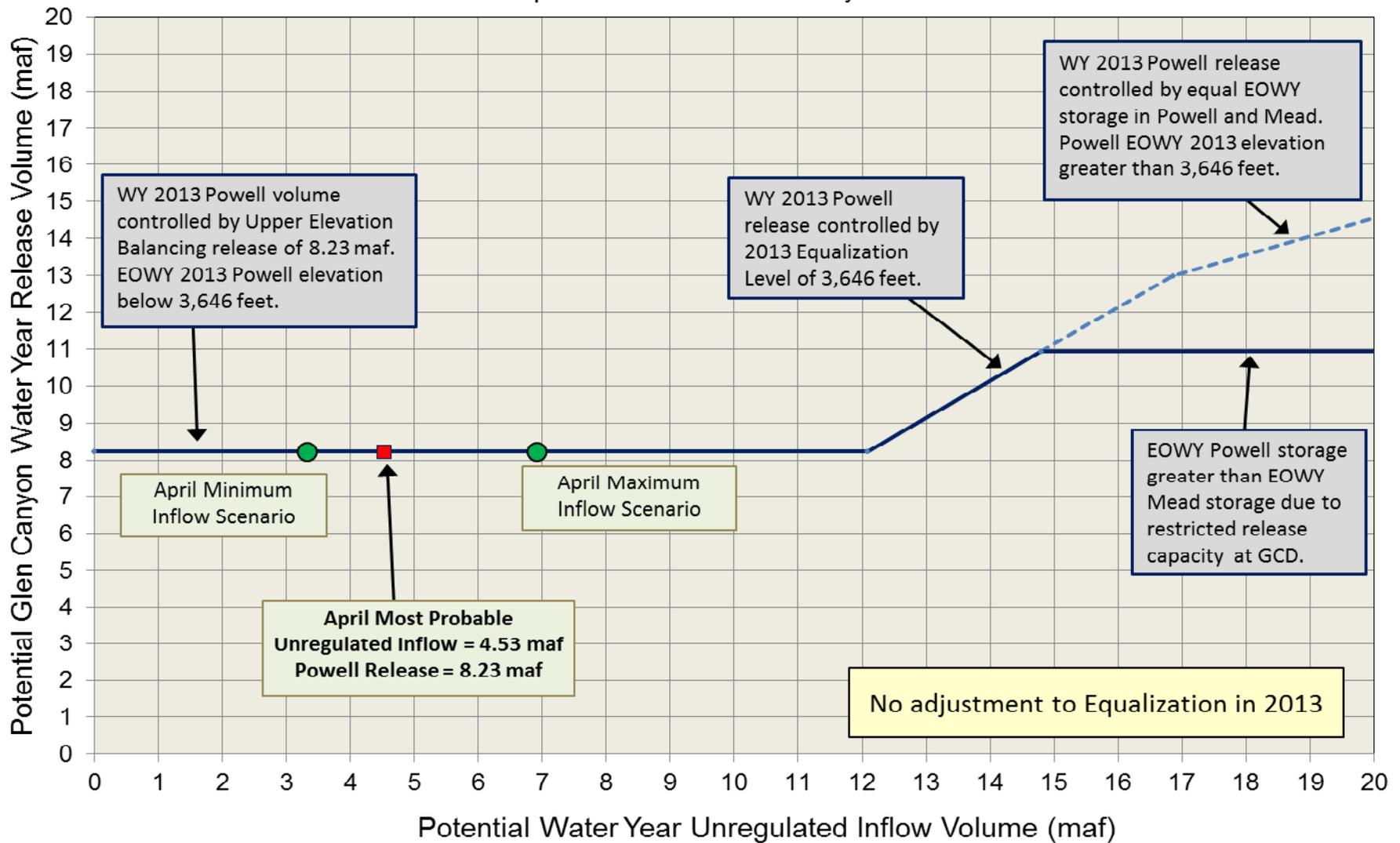
38% → 42%

2.7 MAF → 3.0 MAF

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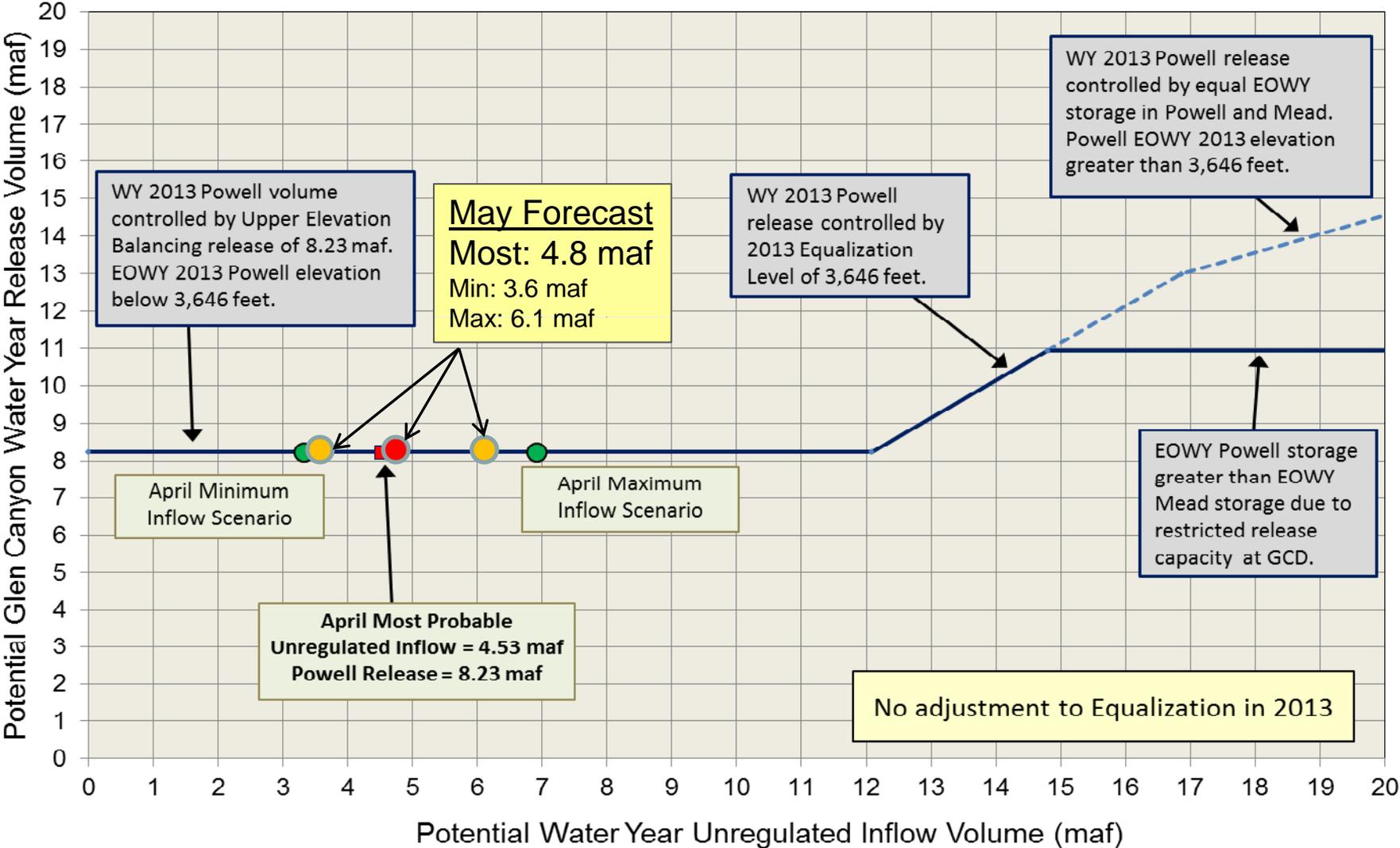
Coordinated Operations of Lake Powell and Lake Mead

Water Year 2013 Release Volume as a Function of Unregulated Inflow Volume
based on April 2013 24-Month Study Conditions



Coordinated Operations of Lake Powell and Lake Mead

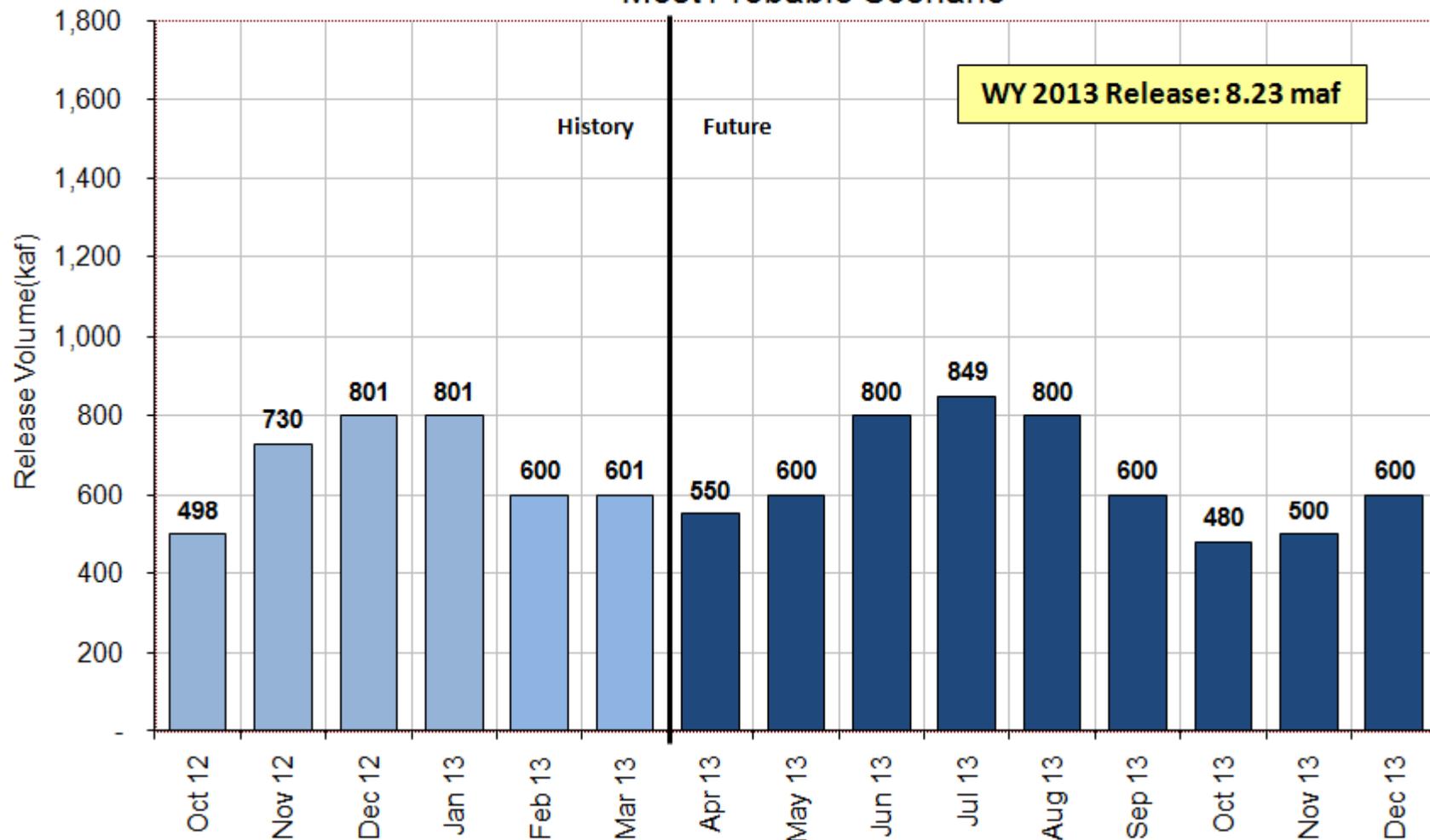
Water Year 2013 Release Volume as a Function of Unregulated Inflow Volume
based on April 2013 24-Month Study Conditions



Lake Powell Monthly Release Volume Distribution

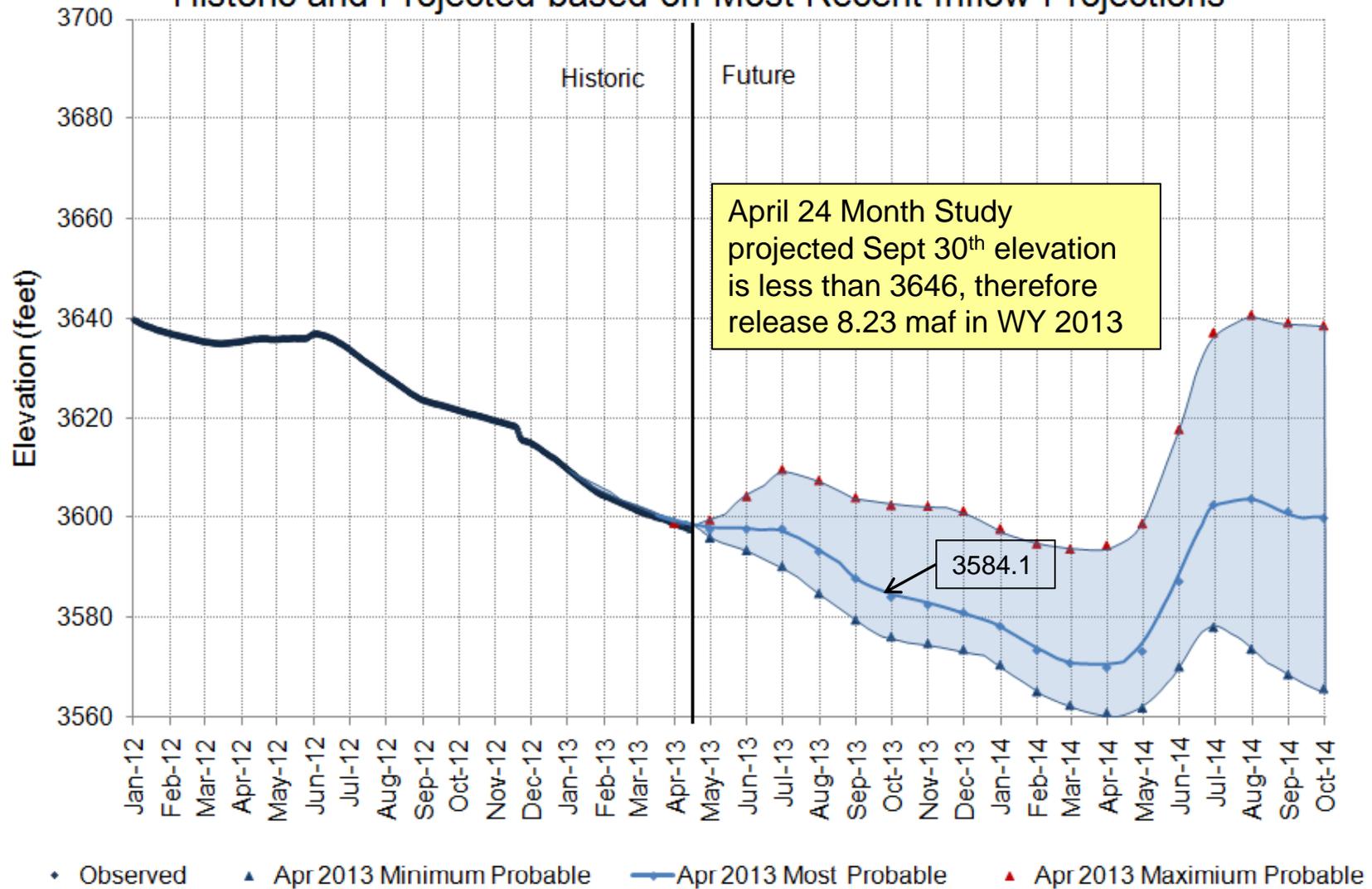
April 2013 24-Month Study

Most Probable Scenario

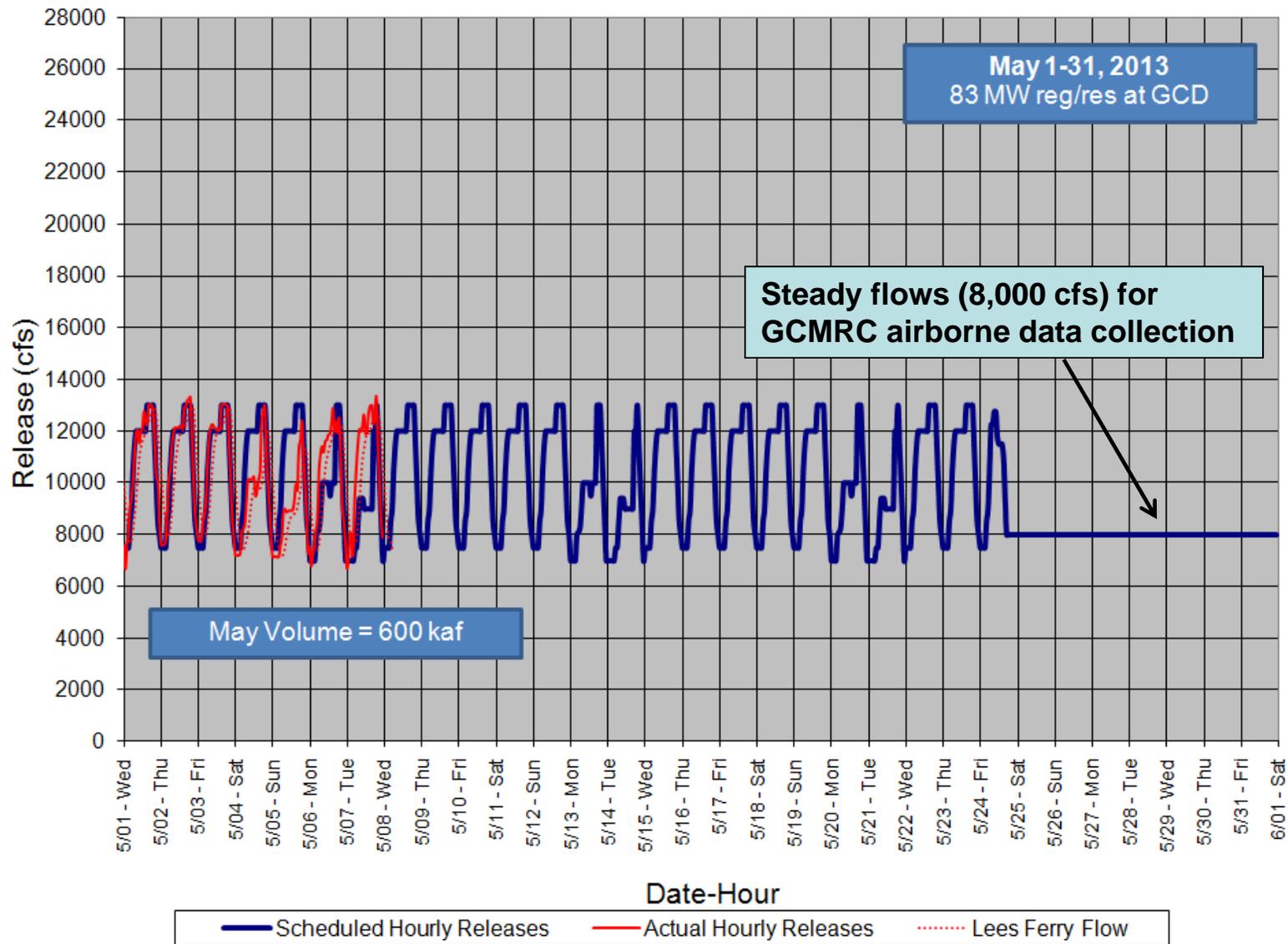


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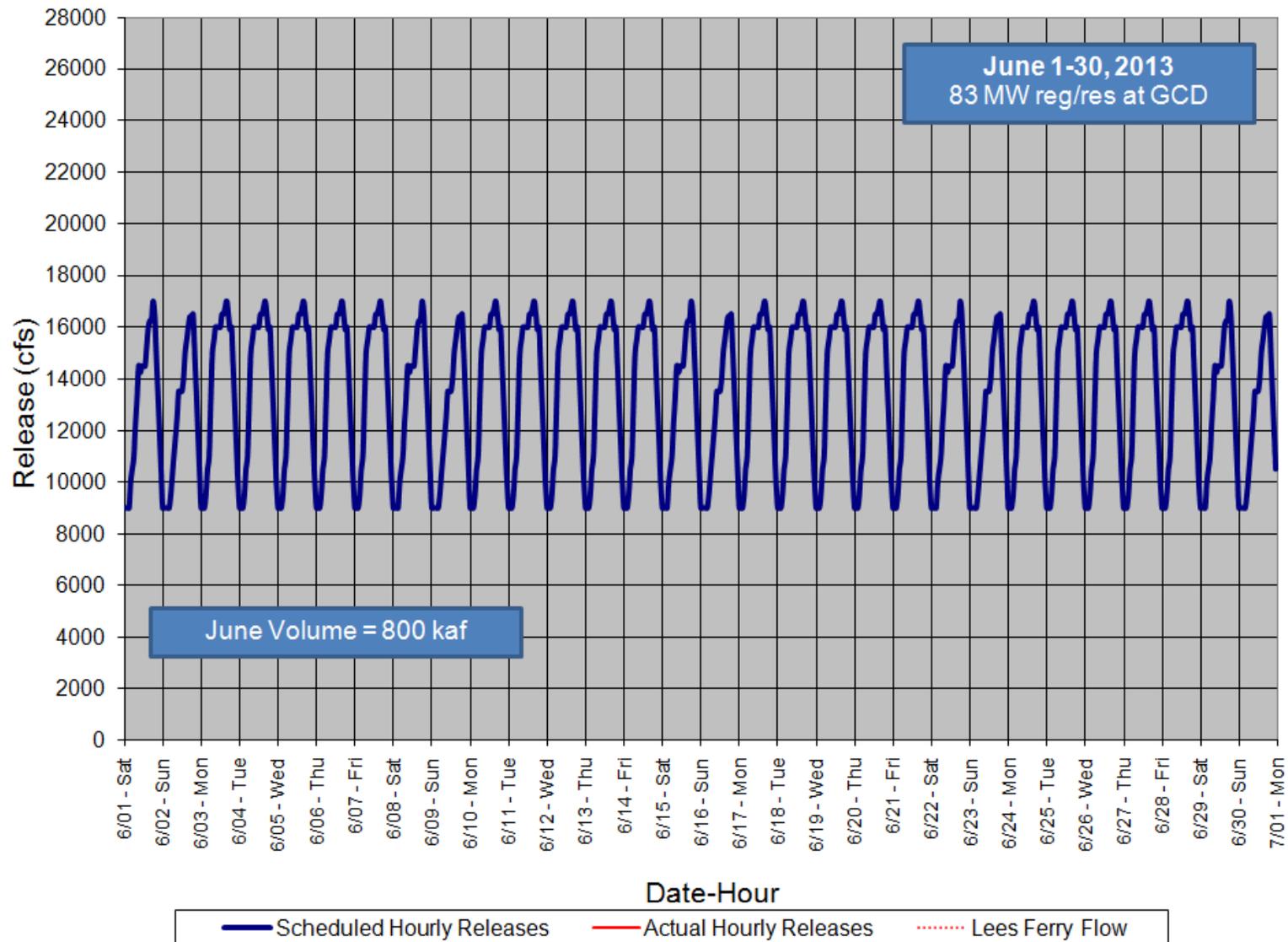
Lake Powell Elevations Historic and Projected based on Most Recent Inflow Projections



Glen Canyon Dam Hourly Release Pattern MAY 2013



Glen Canyon Dam Hourly Release Pattern JUNE 2013



Outlook to WY2014

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Water Year 2014 Projections: April 2013 24-Month Study

April 2013 24-Month Study EXHIBIT run

Timestep	Day	Powell Inflow .Unregulated 1,000 acre-feet	Powell Outflow 1,000 acre-feet	Powell .Pool Elevation ft	Mead Pool Ele ft	Powell 1,000 acre-feet
10/31/12	Wed	190.13	498.06	3,619.46	1,116.50	
11/30/12	Fri	245.78	729.98	3,615.10	1,117.24	
12/31/12	Mon	201.21	800.95	3,609.82	1,120.36	
1/31/13	Thu	168.36	800.84	3,604.42	1,122.32	
2/28/13	Thu	262.29	599.80	3,601.47	1,122.14	
3/31/13	Sun	362.27	601.20	3,598.96	1,118.59	
4/30/13	Tue	500.00	550.00	3,597.54	1,113.35	
5/31/13	Fri	800.00	600.00	3,597.65	1,109.07	
6/30/13	Sun	1,000.00	800.00	3,597.67	1,107.03	
7/31/13	Wed	400.00	849.18	3,593.22	1,105.77	
8/31/13	Sat	200.00	800.00	3,587.82	1,105.28	
9/30/13	Mon	200.00	600.00	3,584.13	1,104.18	
10/31/13	Thu	338.07	600.00	3,581.28	1,104.96	
11/30/13	Sat	392.51	600.00	3,576.61	1,104.50	
12/31/13	Tue	362.53	800.00	3,573.66	1,107.60	
1/31/14	Fri	361.18	800.00	3,568.70	1,108.90	
2/28/14	Fri	392.99	600.00	3,566.09	1,108.61	
3/31/14	Mon	665.38	600.00	3,565.17	1,104.51	
4/30/14	Wed	1,055.51	600.00	3,567.35	1,099.46	
5/31/14	Sat	2,342.99	600.00	3,581.80	1,095.16	
6/30/14	Mon	2,666.05	650.00	3,596.95	1,091.65	
7/31/14	Thu	1,090.84	850.00	3,597.71	1,091.12	
8/31/14	Sun	499.88	900.00	3,594.07	1,092.12	
9/30/14	Tue	408.21	630.00	3,592.50	1,092.19	

Powell.Outflow -- Volume: 8.23000 [1,000,000 acre-feet]

With an 8.23maf release pattern for WY2014, January 1, 2014 projected elevations in April were:

Powell: 3573.66 (i.e, below 3575 ft)
Mead: 1107.60 (i.e, above 1025 ft)

Therefore, Powell's projected operating tier in April was the Mid-Elevation Release Tier with a 7.48 maf annual release.

Water Year 2014 Projections: April 2013 24-Month Study

April 2013 24-Month Study OFFICIAL run

Timestep	Day	Powell Inflow .Unregulated 1,000 acre-feet	Powell Outflow 1,000 acre-feet	Powell .Pool Elevation ft	Mead Pool Ele ft	Powell 1,000 a
10/31/12	Wed	190.13	498.06	3,619.46	1,116.50	
11/30/12	Fri	245.78	729.98	3,615.10	1,117.24	
12/31/12	Mon	201.21	800.95	3,609.82	1,120.36	
1/31/13	Thu	168.36	800.84	3,604.42	1,122.32	
2/28/13	Thu	262.29	599.80	3,601.47	1,122.14	
3/31/13	Sun	362.27	601.20	3,598.96	1,118.59	
4/30/13	Tue	500.00	550.00	3,597.54	1,113.35	
5/31/13	Fri	800.00	600.00	3,597.65	1,109.07	
6/30/13	Sun	1,000.00	800.00	3,597.67	1,107.03	
7/31/13	Wed	400.00	849.18	3,593.22	1,105.77	
8/31/13	Sat	200.00	800.00	3,587.82	1,105.28	
9/30/13	Mon	200.00	600.00	3,584.13	1,104.18	
10/31/13	Thu	338.07	480.00	3,582.56	1,103.72	
11/30/13	Sat	392.51	500.00	3,580.99	1,102.29	
12/31/13	Tue	362.53	600.00	3,578.29	1,103.29	
1/31/14	Fri	361.18	800.00	3,573.47	1,104.62	
2/28/14	Fri	392.99	600.00	3,570.93	1,104.34	
3/31/14	Mon	665.38	600.00	3,570.03	1,100.16	
4/30/14	Wed	1,055.51	500.00	3,573.26	1,093.96	
5/31/14	Sat	2,342.99	600.00	3,587.24	1,089.61	
6/30/14	Mon	2,666.05	600.00	3,602.44	1,085.48	
7/31/14	Thu	1,090.84	800.00	3,603.63	1,084.40	
8/31/14	Sun	499.88	800.00	3,601.05	1,084.34	
9/30/14	Tue	408.21	600.00	3,599.81	1,084.10	

Powell.Outflow -- Volume: 7.48000 [1,000,000 acre-feet]

With an 7.48 maf release pattern for WY2014, January 1, 2014 projected elevations in April were:

Powell: 3578.29
Mead: 1103.29

**** Note that the actual operating tier will not be determined until the August 2013 24-Month Study.**

April's probability of a 7.48 maf release is ~65%.

In April model run, needed ~130kaf more projected inflow to be in 8.23 maf release scenario.

RECLAMATION

Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2013

Unit Number	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Sep 2013
1												
2												
3												
4												
5												
6												
7												
8												
Units Available	5	8 7	7	7	5	5 6	6	5	6	6	6	5
Capacity (cfs)	19,500	25,200 21,700	21,800	21,600	14,800	14,900 18,600	18,600	15,200	18,600	18,600	18,600	11,400
Capacity (kaf/month)	1310	1380	1290	1290	920	1090	1110	1030	1110	1140	1140	880
Max (kaf) ¹	--	--	--	--	--	--	550	600	800	849	800	600
Most (kaf) ¹	494	730	801	801	600	601	550	600	800	849	800	600
Min (kaf) ¹	--	--	--	--	--	--	550	600	800	849	800	600

¹ Based on Apr 2013 Min/Most/Max probable 24-Month Study

(updated 4-15-2013)

Glen Canyon Power Plant Provisional Unit Outage Schedule for Water Year 2014

Unit Number	Oct 2013	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014
1												
2												
3												
4												
5												
6												
7												
8												
Units Available	5	6	6	6	4	5 / 6	6	5 / 6	6	6	6	5
Capacity (cfs)	15,000	18,400 ²	18,400	18,400	11,700	14,900 / 18,400	18,400	14,900 / 18,400	18,400	18,500	18,500	15,100
Capacity (kaf/month)	1060	1100	1140	1140	740	1040	1080	1030	1120	1140	1140	910
Max (kaf) ¹	600	600	800	800	600	600	600	600	650	850	900	630
Most (kaf) ¹	480	500	600	800	600	600	500	600	600	800	800	600
Min (kaf) ¹	480	500	600	800	600	600	500	600	600	800	800	600

¹ Based on Apr 2013 Min/Most/Max probable 24-Month Study

² Total release during a HFE = Capacity +15,000 cfs of bypass (e.g., Nov 2013 Total Possible Release = ~33,400 cfs)

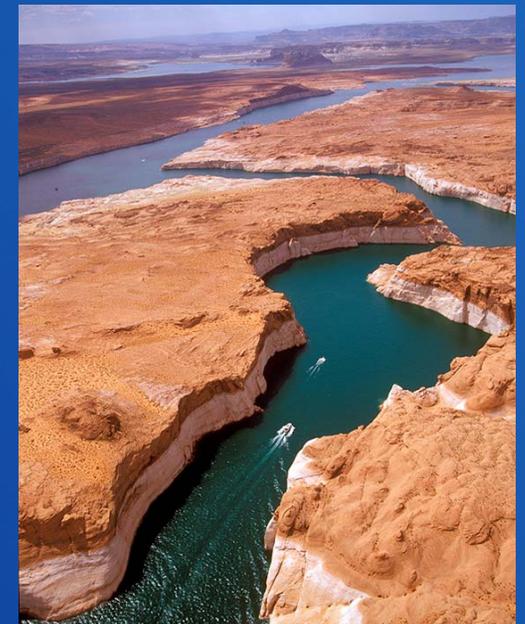
(updated 4-15-2013)

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Questions ?

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