

# RECLAMATION

*Managing Water in the West*

## **2014 Colorado River Annual Operating Plan**

**Colorado River Management Work Group  
Second Consultation  
July 30, 2013**



U.S. Department of the Interior  
Bureau of Reclamation

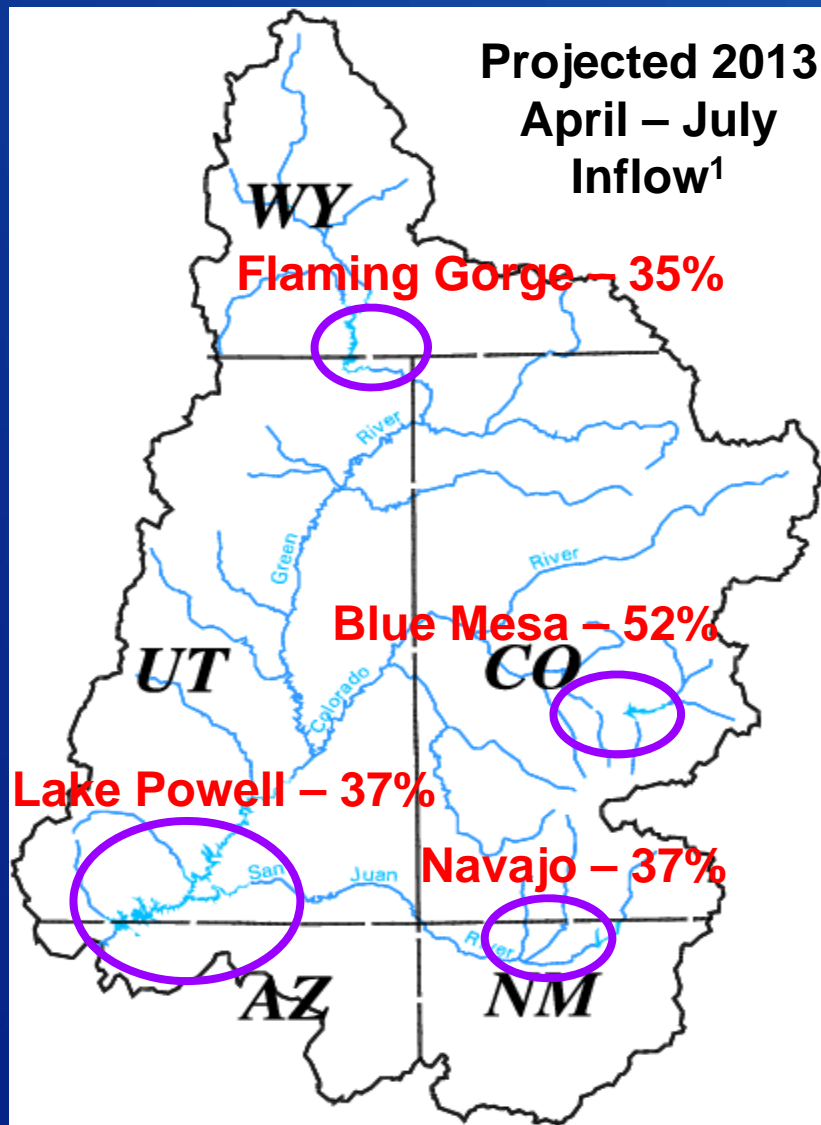
# 2014 Colorado River AOP Second Consultation Meeting

- Welcome and Introductions – *Steve Hvinden / Dave Trueman*
- Upper Basin Hydrology and Operations – *Katrina Grantz*
- Lower Basin Hydrology and Operations – *Dan Bunk*
- Report on Progress in Implementing the California Colorado River Water Use Plan – *Tanya Trujillo*
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- Review of Draft 2014 AOP – CRMWG
- Conclusion, Wrap-up, Future Meeting Date
  - Final Consultation at McCarran Airport, Thursday, September 5, 2013

# Upper Colorado River Basin Hydrology and Operations

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# CBRFC Unregulated Inflow Forecasts dated July 1, 2013 (July Official)

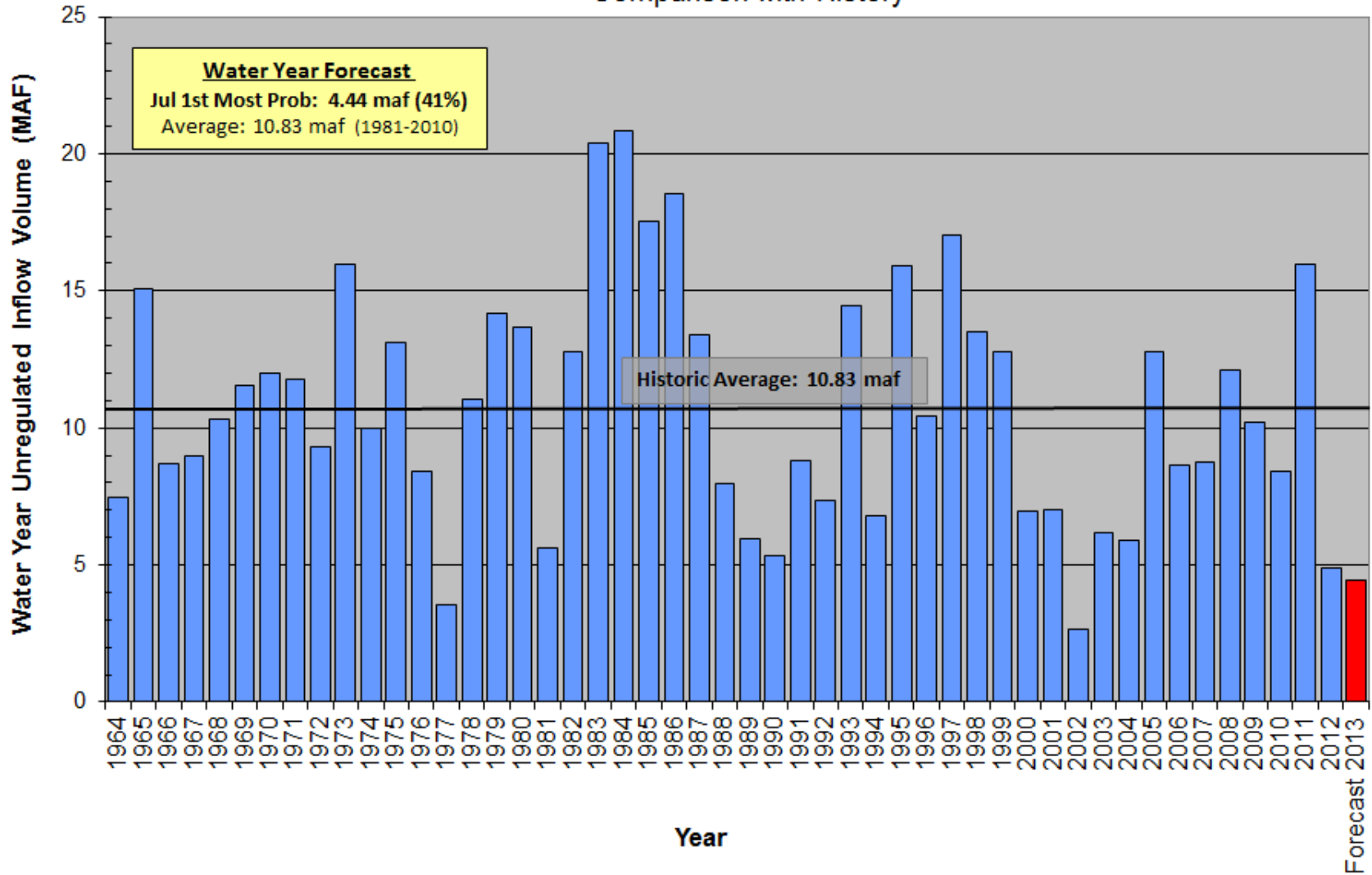


## Lake Powell Apr-Jul Unreg Inflow

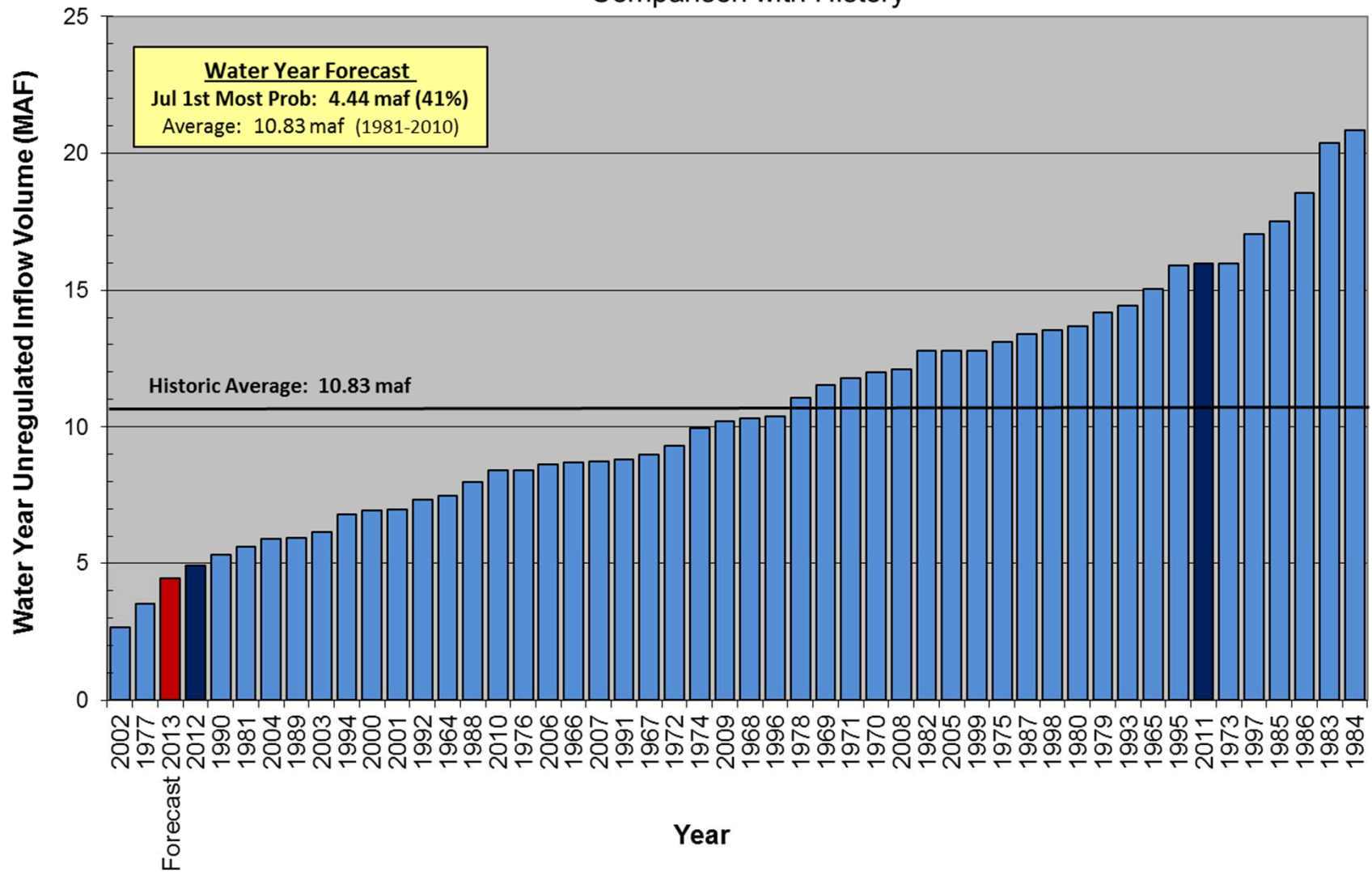
Period in 2013	Inflow (KAF)	Percent of Average <sup>1</sup>
April (observed)	355	34
May (observed)	1122	48
June (observed)	939	35
July (forecasted)	250	23
April – July	2670	37
Water Year	4435	41

<sup>1</sup> Percentages and percent of average based on period of record from 1981-2010.

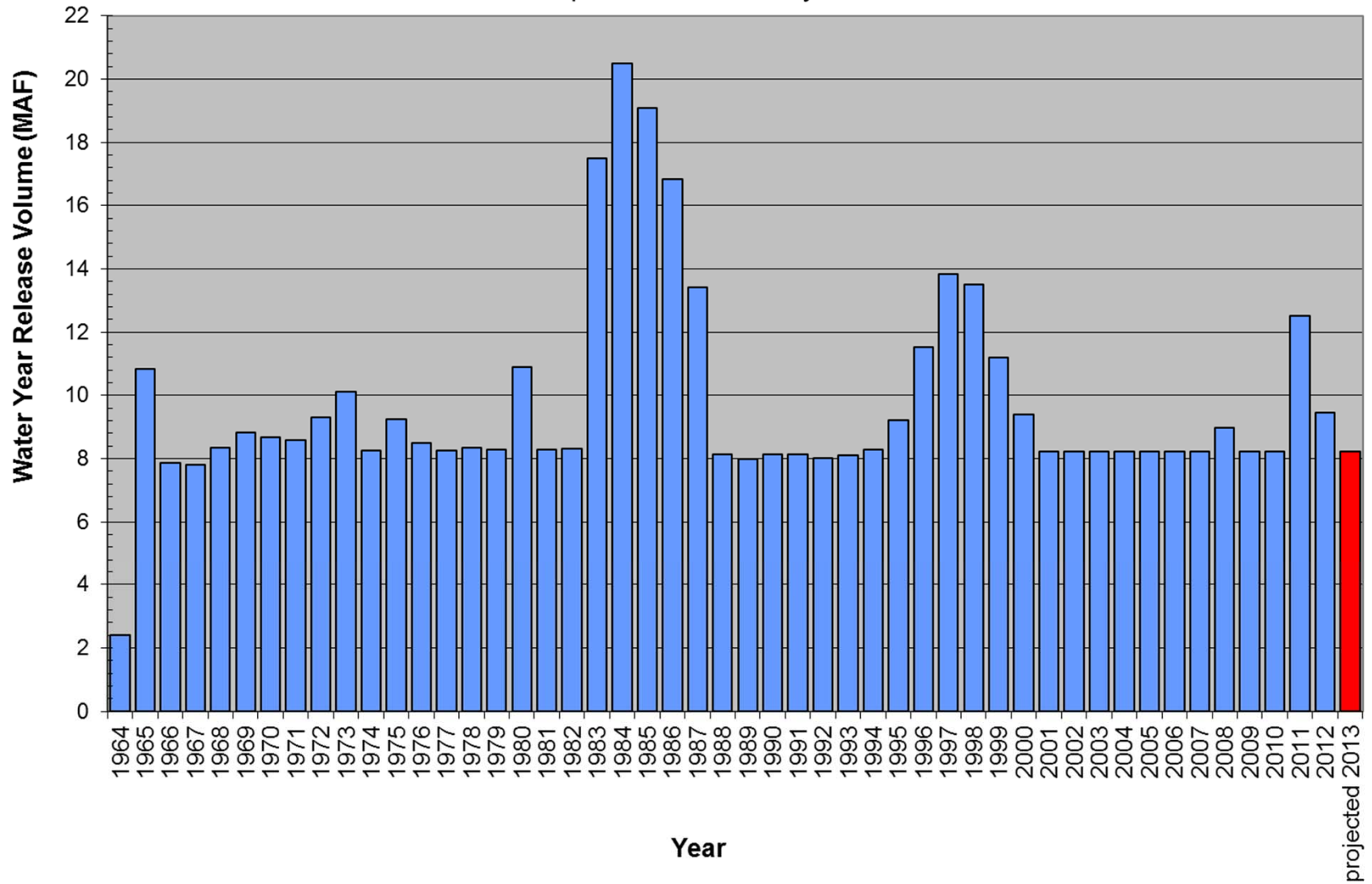
## Lake Powell Unregulated Inflow Water Year 2013 Forecast (Jul 1) Comparison with History



## Lake Powell Unregulated Inflow Water Year 2013 Forecast (July 1) Comparison with History



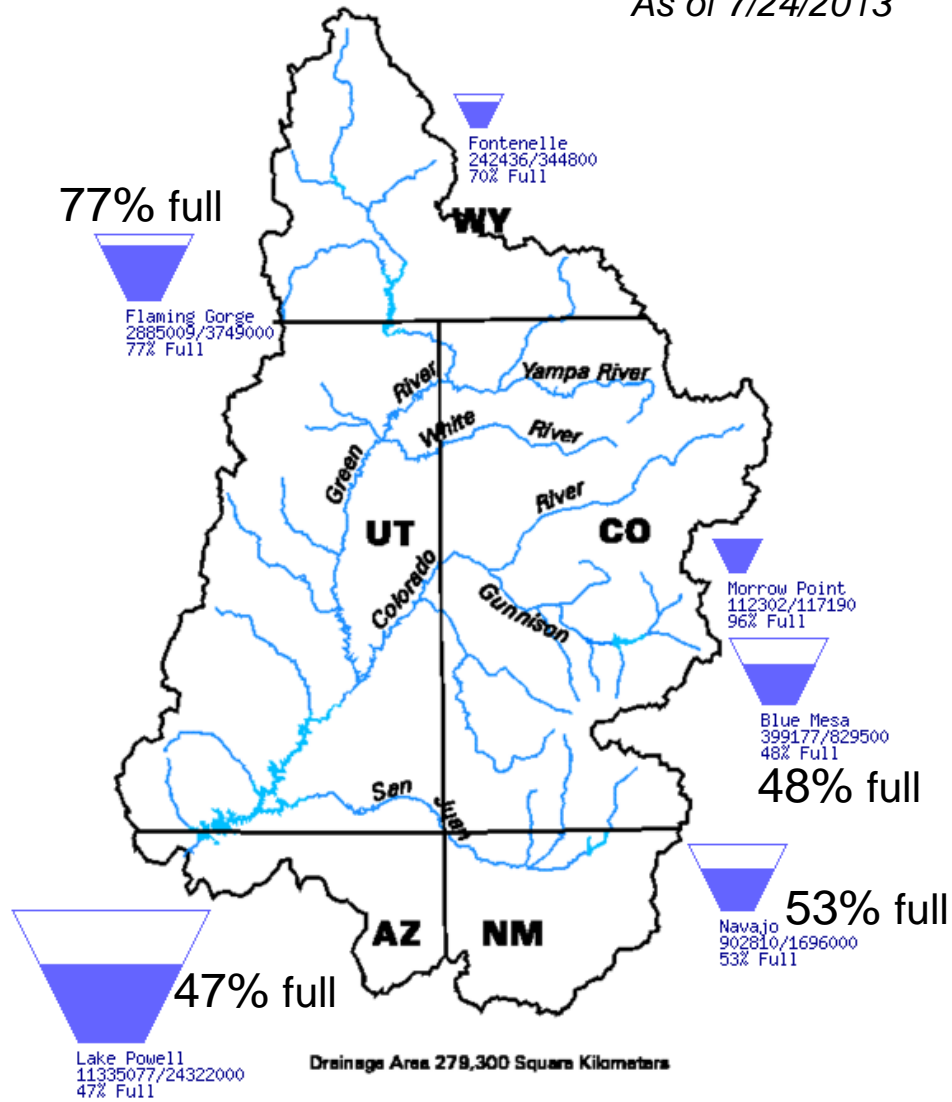
## Lake Powell Release Water Year 2013 Projected Comparison with History



Data Current as of:  
07/24/2013

## Upper Colorado River Drainage Basin

As of 7/24/2013



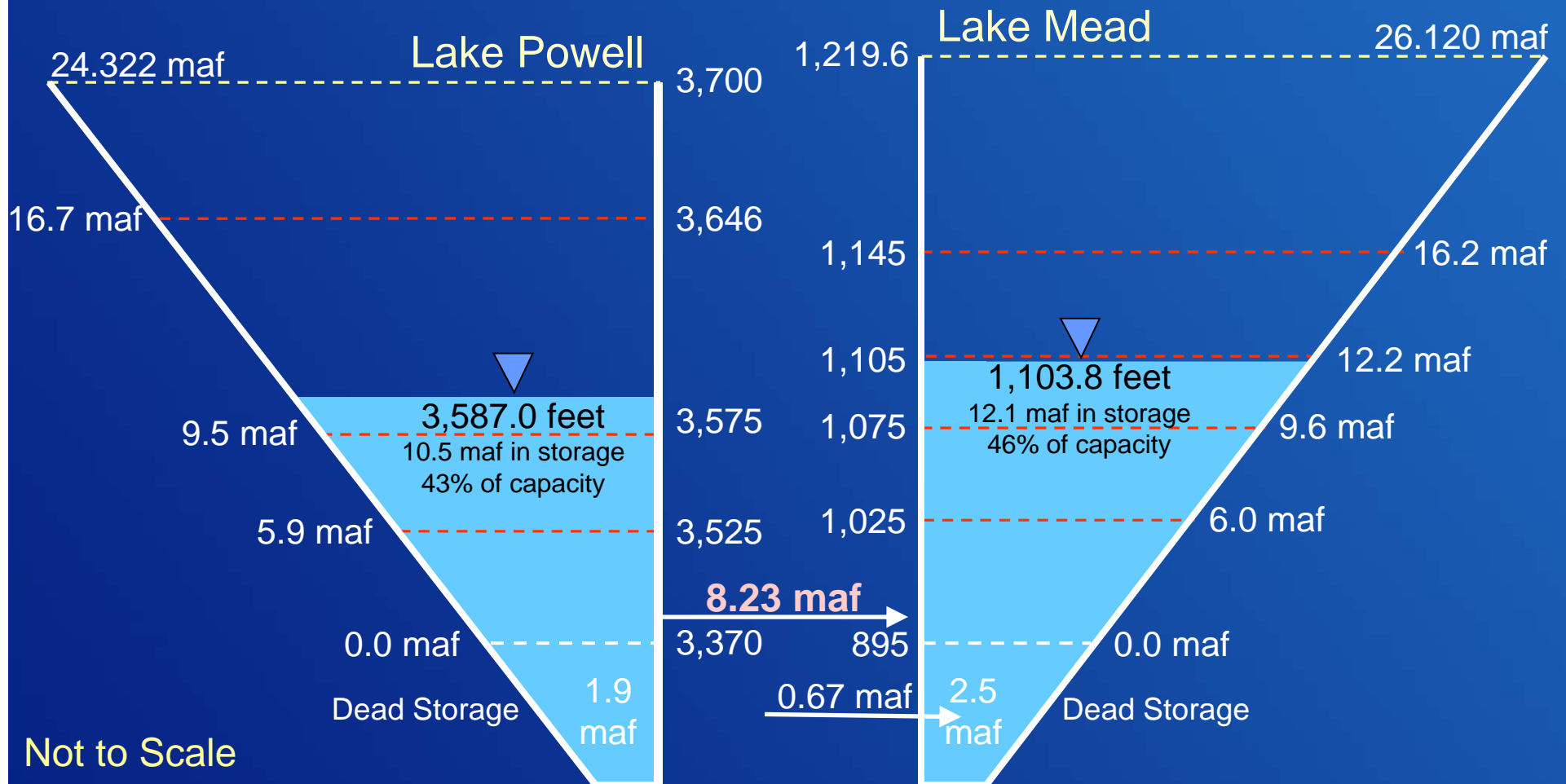
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# Water Year 2013 Projections

## July 2013 24-Month Study Most Probable Inflow Scenario

Projected Unregulated Inflow into Powell<sup>1</sup> = 4.44 maf (41% of average)



Not to Scale

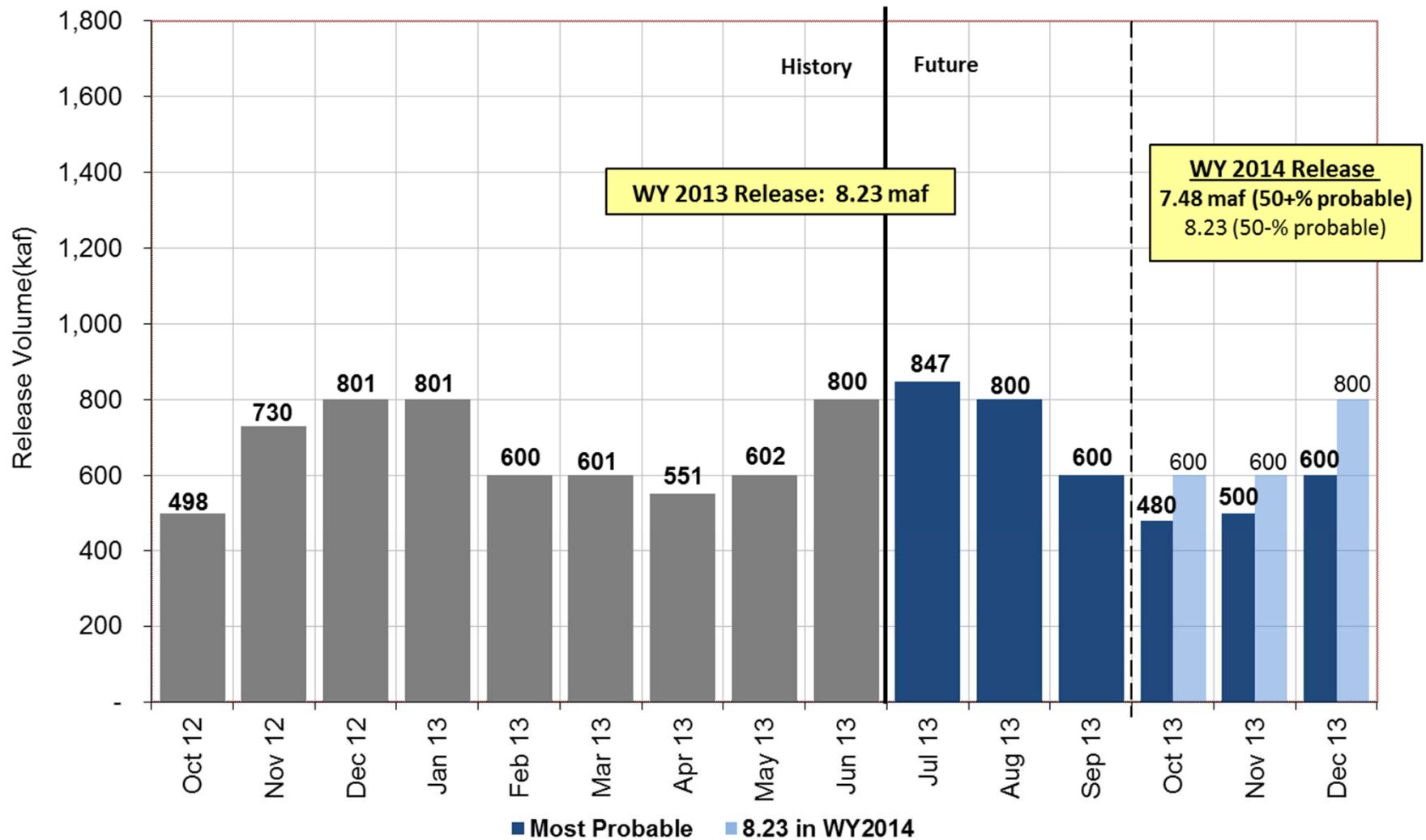
<sup>1</sup> WY 2013 unregulated inflow volume is based on the CBRFC forecast dated 7/1/13. Percent of average inflow is based on the 30-year period of record from 1981-2010.

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# Lake Powell Monthly Release Volume Distribution

July 2013 24-Month Study

Water Year 2013

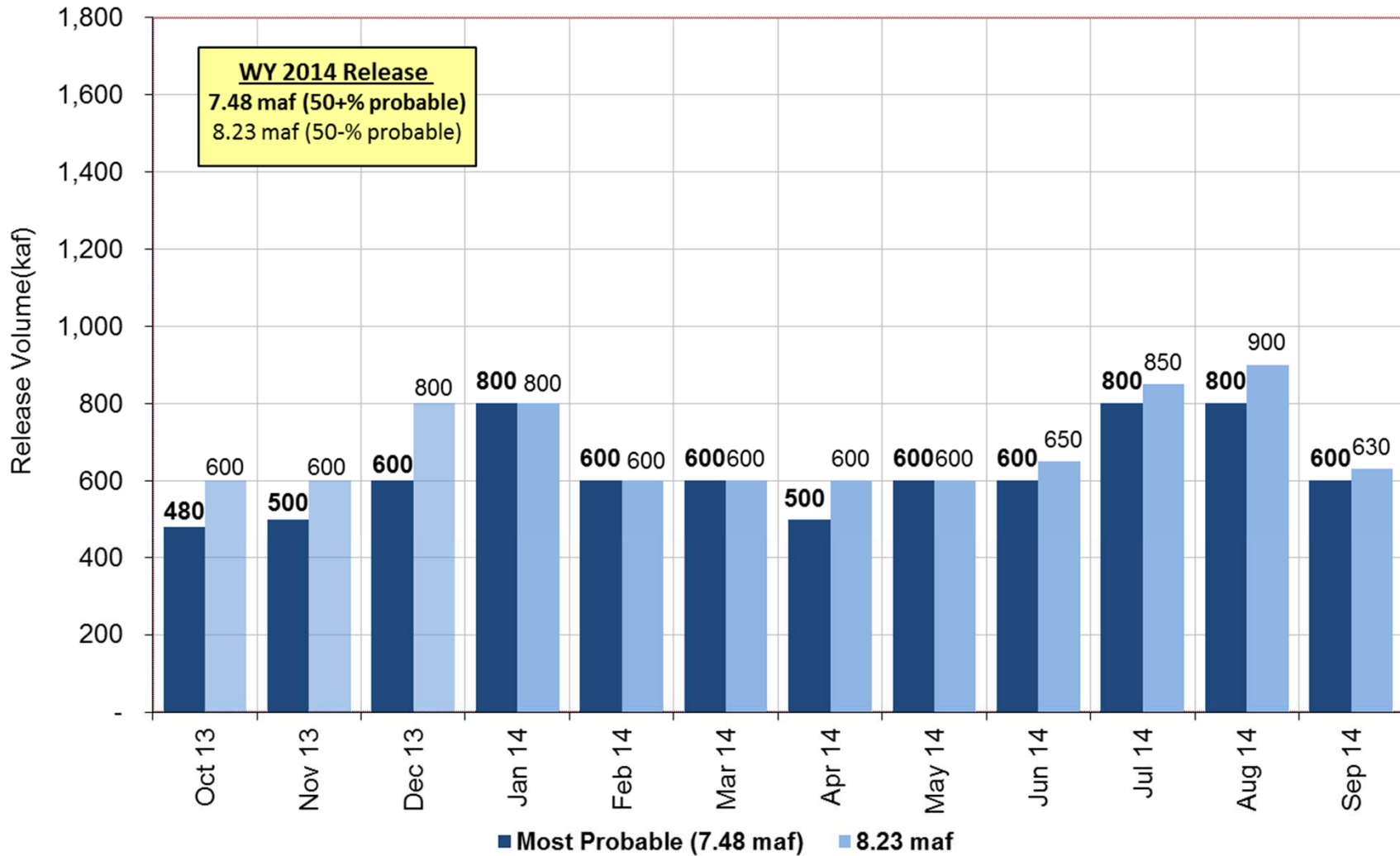


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# Projected Lake Powell Monthly Release Volume Distribution

July 2013 24-Month Study

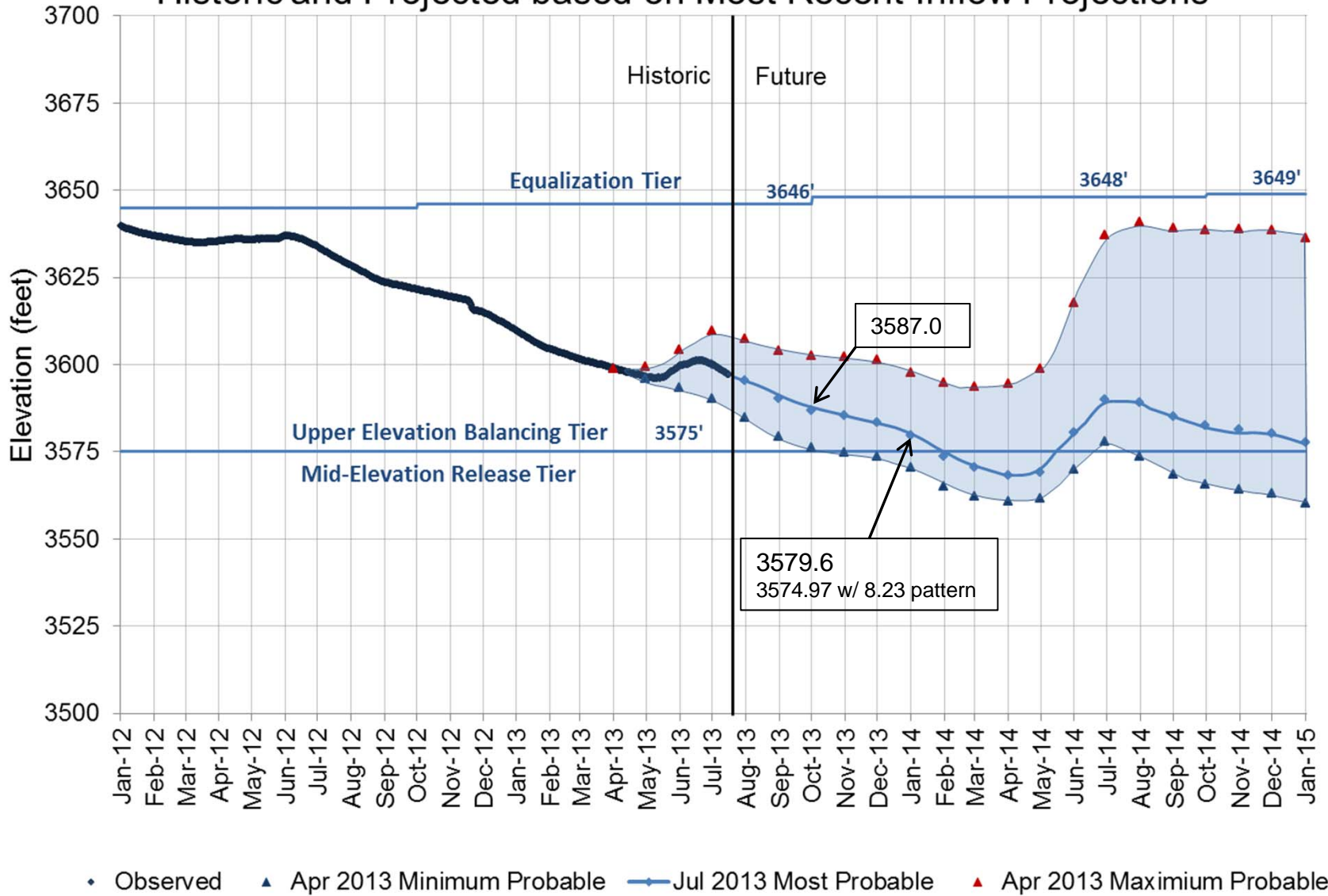
Water Year 2014



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# Lake Powell Elevations

## Historic and Projected based on Most Recent Inflow Projections



## 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	14,700	18,000	17,900	17,900	15,300
Capacity (kaf/month)	1310	1380	1290	1290	920	1090	1110	980	1070	1110	1110	910
Max (kaf) <sup>1</sup>	--	--	--	--	--	--	--	--	--	847	800	600
Most (kaf) <sup>2</sup>	494	730	801	801	600	600	551	602	800	847	800	600
Min (kaf) <sup>1</sup>	--	--	--	--	--	--	--	--	--	847	800	600

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

2 Based on July 2013 Most probable 24-Month Study

(updated 7-25-2013)

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# 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)	14,800	17,800 <sup>3</sup>	17,800	17,800	12,800	14,300 17,800	17,800	14,300 17,800	17,800	17,900	17,900	14,600
Capacity (kaf/month)	910	1060	1100	1100	710	1000	1040	990	1080	1100	1100	890
Max (kaf) <sup>1</sup>	600	600	800	800	600	600	600	600	650	850	900	630
Most (kaf) <sup>2</sup>	480	500	600	800	600	600	500	600	600	800	800	600
Min (kaf) <sup>1</sup>	480	500	600	800	600	600	500	600	600	800	800	600

(updated 7-25-2013)

- 1 Based on Apr 2013 Min/Max probable 24-Month Study
- 2 Based on July 2013 Most probable 24-month Study
- 3 Total release during a HFE = Capacity +15,000 cfs of bypass  
( e.g., Nov 2013 Total Possible Release = ~32,800 cfs)

# 2013 Annual Operating Plan (retrospective)

## Lake Powell Unregulated Inflow WY2013

Scenario	2013 AOP WY 2013  Developed Aug 2012	Current Most Probable WY 2013  Developed July 2013
Minimum Probable	5.00 maf (46 %) <sup>1</sup>	4.44 maf (41 %)  <i>Mid-month: 4.43 maf (40%)</i>
Most Probable	8.85 maf (82 %)	
Maximum Probable	16.00 maf (148 %)	

<sup>1</sup> Percentages and percent of average based on period of record from 1981-2010.

# Lake Powell Unregulated Inflow Projections

Based on forecast issued July 1, 2013

Scenario	WY 2013 Developed July 2013	WY 2014 Developed July 2013	Historic Average (1981-2010)
Current Most Probable	4.44 maf (41 %) <sup>1</sup>	8.21 maf (76 %)	10.83 maf (100 %)

<sup>1</sup> Percentages and percent of average based on period of record from 1981-2010.

Note: The 2014 AOP will developed using the WY2014 forecast issued in August 2013

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# Lower Colorado River Basin

## Hydrology and Operations

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# Colorado River Basin Storage (as of July 28, 2013)

Current Storage	Percent Full	MAF	Elevation (Feet)
Lake Powell	46%	11.26	3,594.8
Lake Mead	47%	12.24	1,105.6
Total System Storage*	51%	30.37	NA

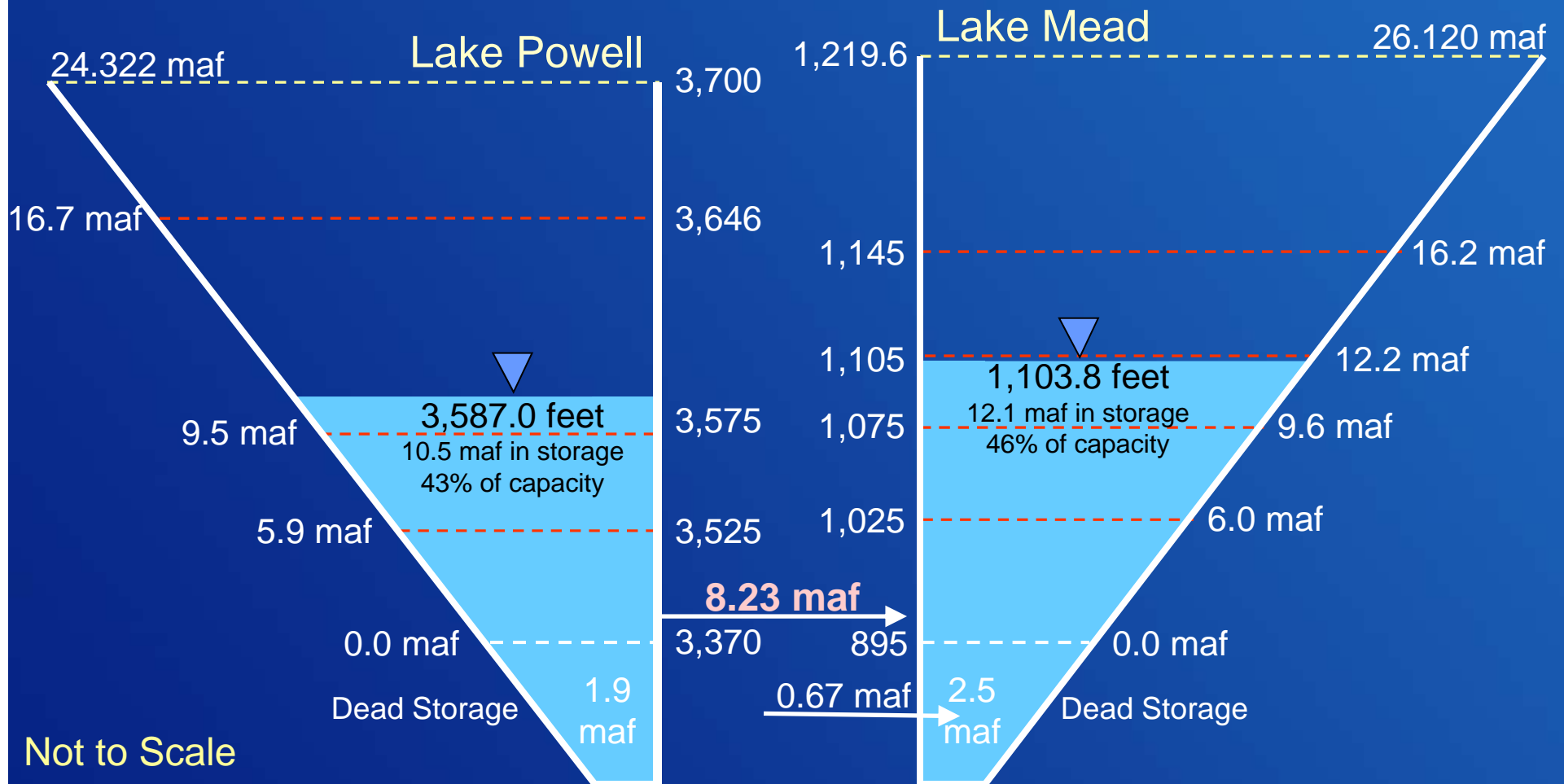
\*Total system storage was 35.38 maf or 59% this time last year

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# Water Year 2013 Projections

## July 2013 24-Month Study Most Probable Inflow Scenario

Projected Unregulated Inflow into Powell<sup>1</sup> = 4.44 maf (41% of average)



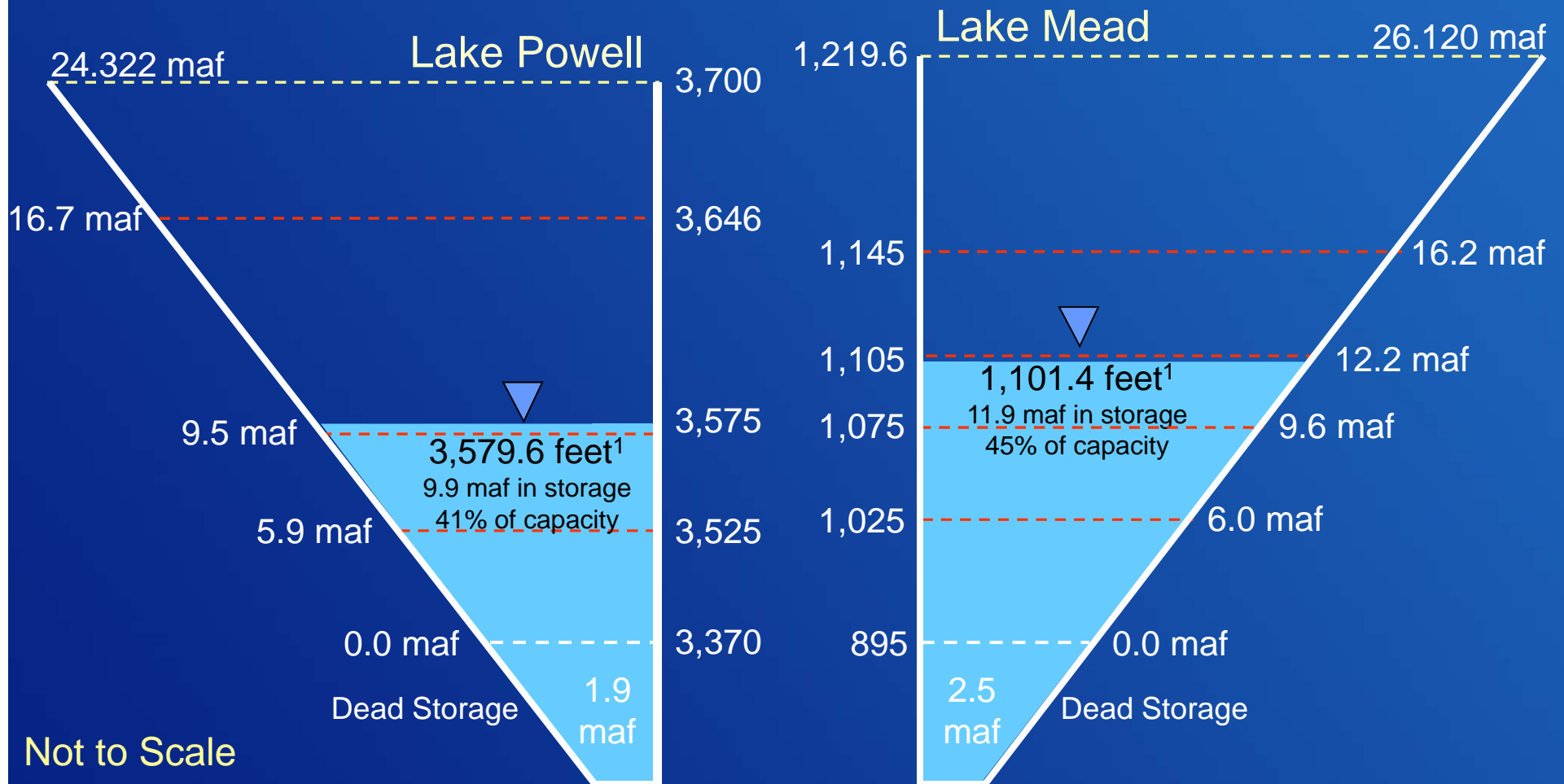
Not to Scale

<sup>1</sup> WY 2013 unregulated inflow volume is based on the CBRFC forecast dated 7/1/13. Percent of average inflow is based on the 30-year period of record from 1981-2010.

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# End of Calendar Year 2013 Projections

## July 2013 24-Month Study Most Probable Inflow Scenario



Not to Scale

<sup>1</sup> Based on a 7.48 maf release pattern from Lake Powell in Water Year 2014.

# Lake Powell & Lake Mead Operational Table

## Projected Operational Tiers for 2014 based on the July 2013 24-Month Study

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) <sup>1</sup>	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) <sup>1</sup>
3,700	<b>Equalization Tier</b> Equalize, avoid spills or release 8.23 maf	24.3	1,220	<b>Flood Control Surplus or Quantified Surplus Condition</b> Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	<b>Upper Elevation Balancing Tier<sup>3</sup></b> Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	15.5 - 19.3 (2008-2026)	1,200 (approx.) <sup>2</sup>	<b>Domestic Surplus or ICS Surplus Condition</b> Deliver > 7.5 maf	22.9 (approx.) <sup>2</sup>
			1,145	<b>Normal or ICS Surplus Condition</b> Deliver ≥ 7.5 maf	15.9
3,575		9.5	1,105		11.9
3,525	<b>Mid-Elevation Release Tier</b> Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	5.9	1,075	<b>Shortage Condition</b> Deliver 7.167 <sup>4</sup> maf	9.4
			1,050	<b>Shortage Condition</b> Deliver 7.083 <sup>5</sup> maf	7.5
3,490	<b>Lower Elevation Balancing Tier</b> Balance contents with a min/max release of 7.0 and 9.5 maf	4.0	1,025	<b>Shortage Condition</b> Deliver 7.0 <sup>6</sup> maf Further measures may be undertaken <sup>7</sup>	5.8
3,370			0		895

Diagram not to scale

<sup>1</sup> Acronym for million acre-feet

<sup>2</sup> 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.

<sup>3</sup> Subject to April adjustments which may result in a release according to the Equalization Tier

<sup>4</sup> Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

<sup>5</sup> Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada

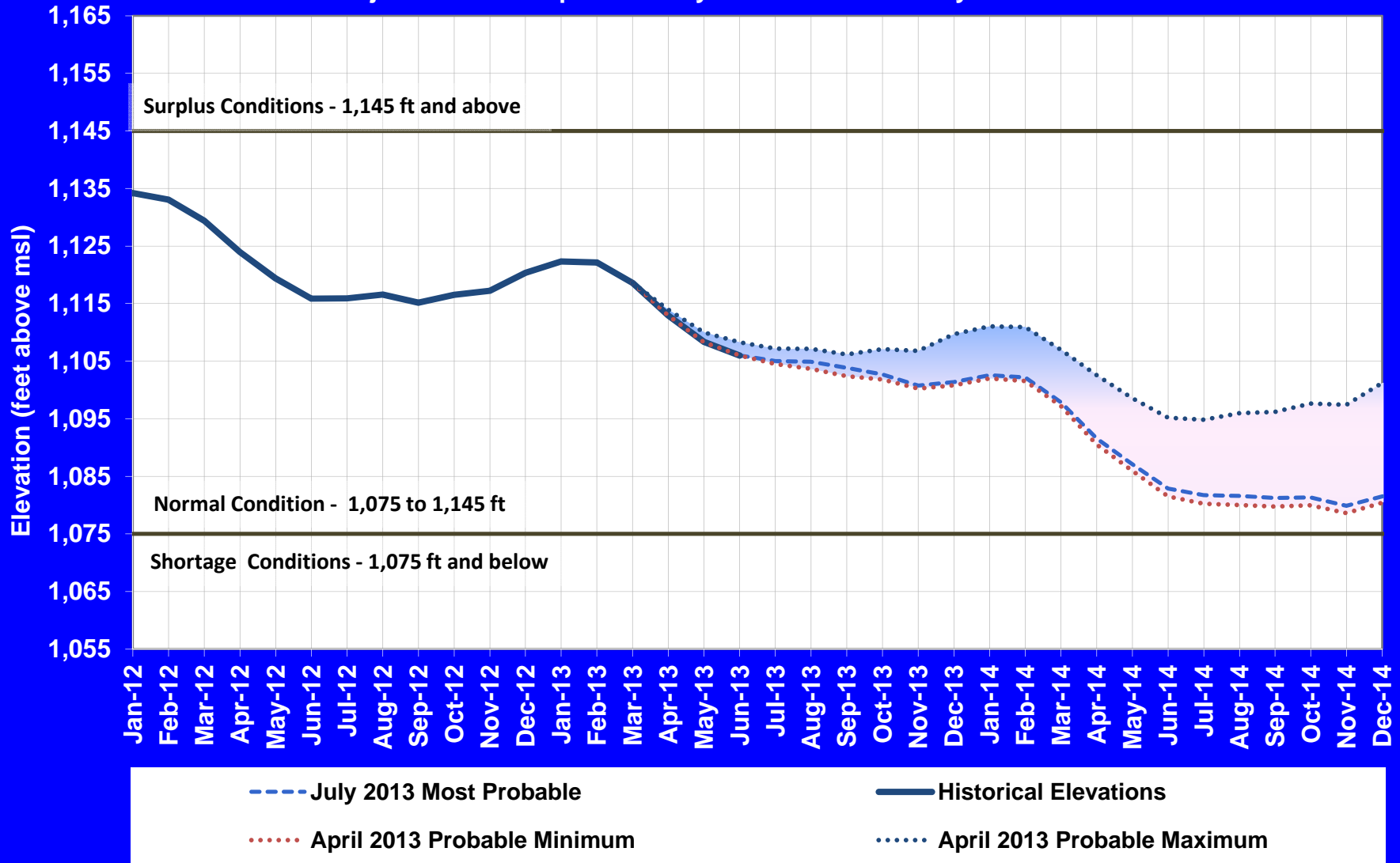
<sup>6</sup> Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

<sup>7</sup> 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.

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## Lake Mead End of Month Elevations

Projections from April and July 2013 24-Month Study Inflow Scenarios



# Lower Basin Side Inflows – WY/CY 2013<sup>1,2</sup>

## Intervening Flow from Glen Canyon to Hoover Dam

	Month in WY/CY2013	5-Year Average Intervening Flow (KAF)	Observed Intervening Flow (KAF)	Observed Intervening Flow (% of Average)	Difference From 5-Year Average (KAF)
H I S T O R Y	October 2012	54	54	98%	-1
	November 2012	44	60	136%	+16
	December 2012	99	50	50%	-49
	January 2013	81	56	69%	-25
	February 2013	94	68	73%	-26
	March 2013	77	69	89%	-8
	April 2013	80	37	46%	-43
	May 2013	64	28	44%	-36
	June 2013	33	2	6%	-31
F U T U R E	July 2013	55			
	August 2013	109			
	September 2013	81			
	October 2013	54			
	November 2013	44			
	December 2013	99			
	<b>WY 2013 Totals</b>	<b>870</b>	<b>668</b>	<b>77%</b>	<b>-203</b>
	<b>CY 2013 Totals</b>	<b>870</b>	<b>702</b>	<b>81%</b>	<b>-168</b>

<sup>1</sup> Values were computed with the LC's gain-loss model for the most recent 24-month study.

<sup>2</sup> Percents of average are based on the 5-year mean from 2008-2012.

# YAO Operations Update

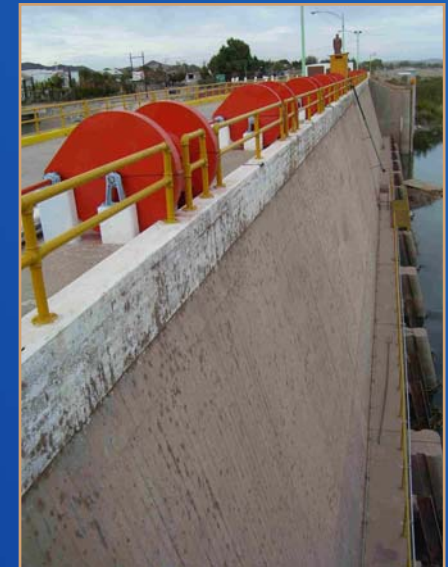
- Brock Reservoir and Senator Wash  
2013 YTD accumulated storage<sup>1</sup>

–Brock 90,050 AF

–Senator Wash 46,310 AF

- Excess Flows to Mexico

2013 YTD total<sup>2</sup> 29,340 AF



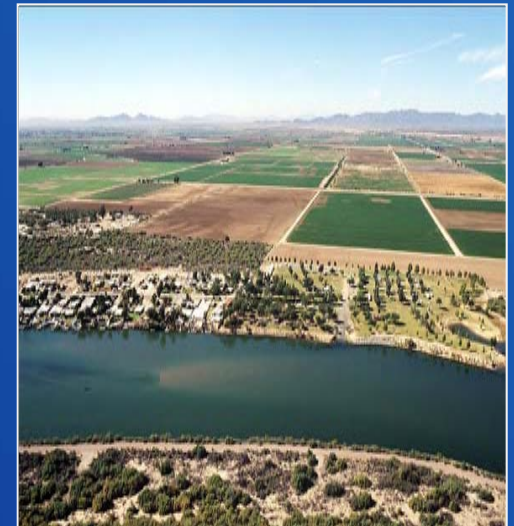
<sup>1</sup> Provisional year-to-date totals through July 25, 2013

<sup>2</sup> Provisional year-to-date total through July 28, 2013



# YAO Operations Update

- Pumped drainage return flows from the Wellton-Mohawk Irrigation and Drainage District
  - Flow at station 0+00 on the Main Outlet Drain from January through June 2013 was 56,575 AF at 2,633 ppm
- Provisional drainage Flows to the Colorado River
  - From the South Gila Drainage Wells January through June 2013 was 17,403 AF at 1,727 ppm
  - From the Yuma Mesa Conduit January through June 2013 was 6,155 AF at 1,870 ppm



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An aerial photograph of a large concrete dam and its reservoir. The dam is a curved structure with several spillways. The reservoir is a deep blue-green color, surrounded by rugged, brown mountains. The sky is clear and blue. The text is overlaid in white on the image.

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