RECLAMATION

Managing Water in the West

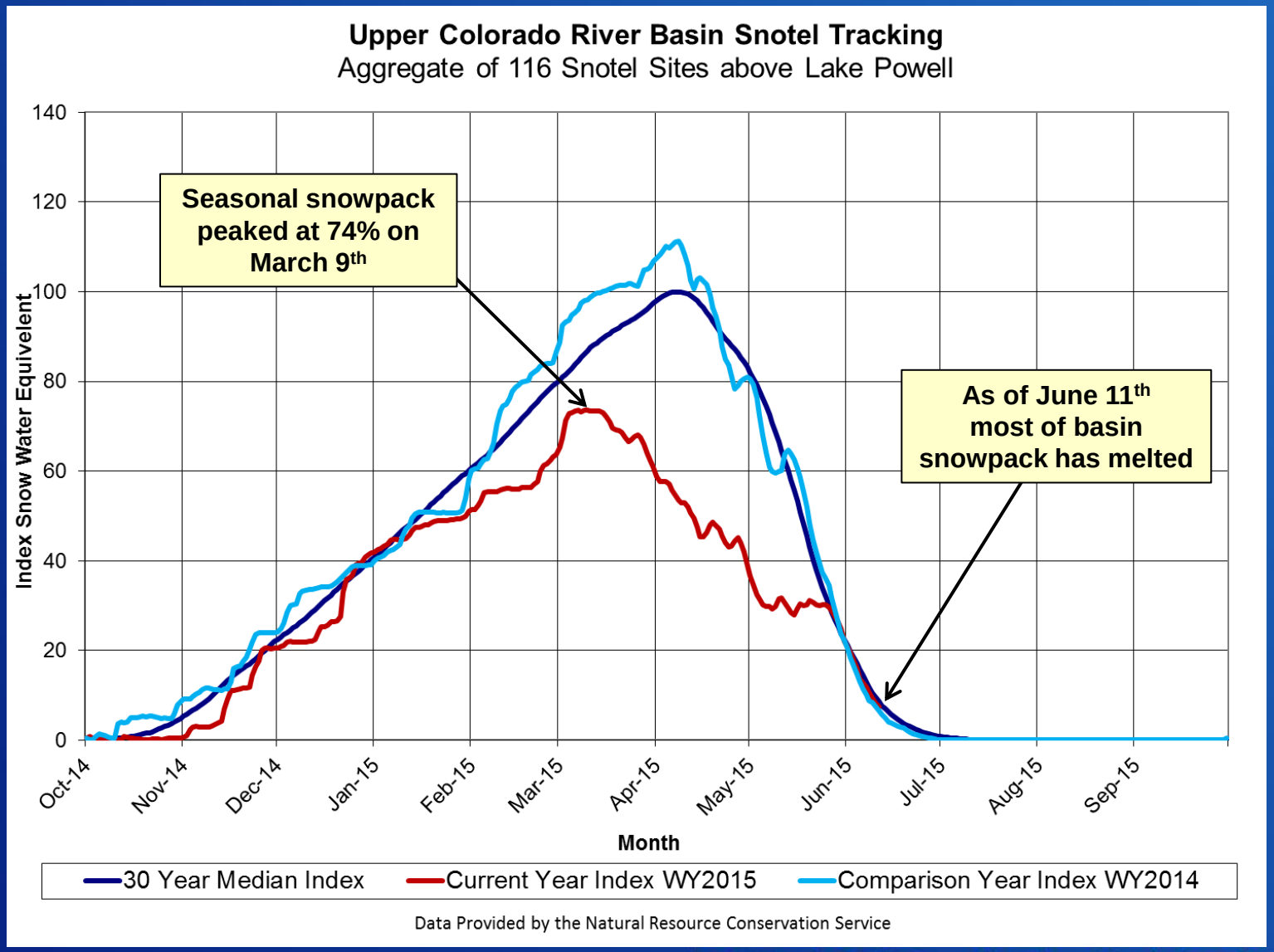
Basin Hydrology, Operations and 2016 Hydrograph

Glen Canyon Technical Work Group

June 11, 2015

U.S. Department of the Interior
Bureau of Reclamation

Snow Conditions



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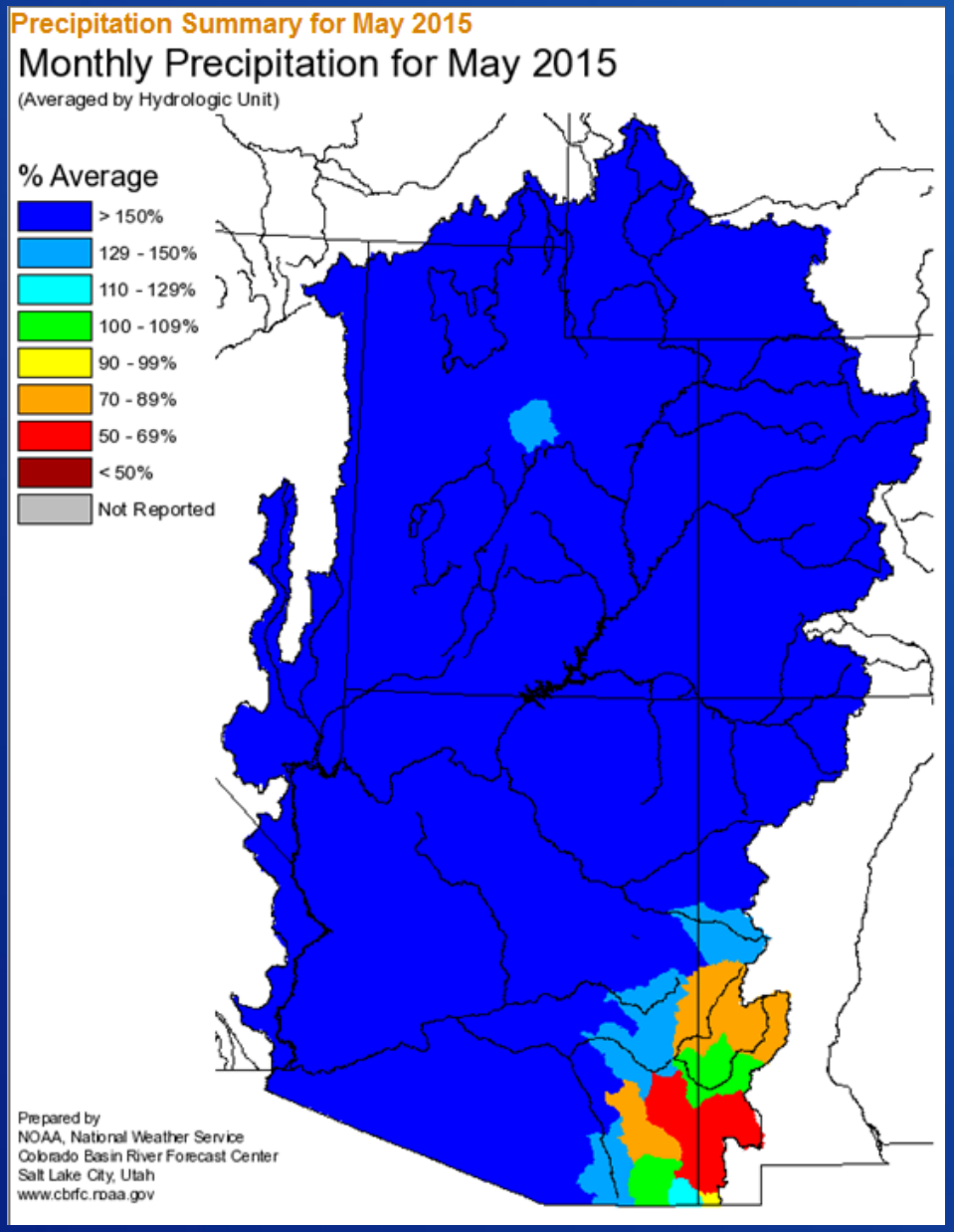

May was very wet!

- Slowed snowmelt
- Some additional snow accumulation
- Widespread rainfall throughout the basin

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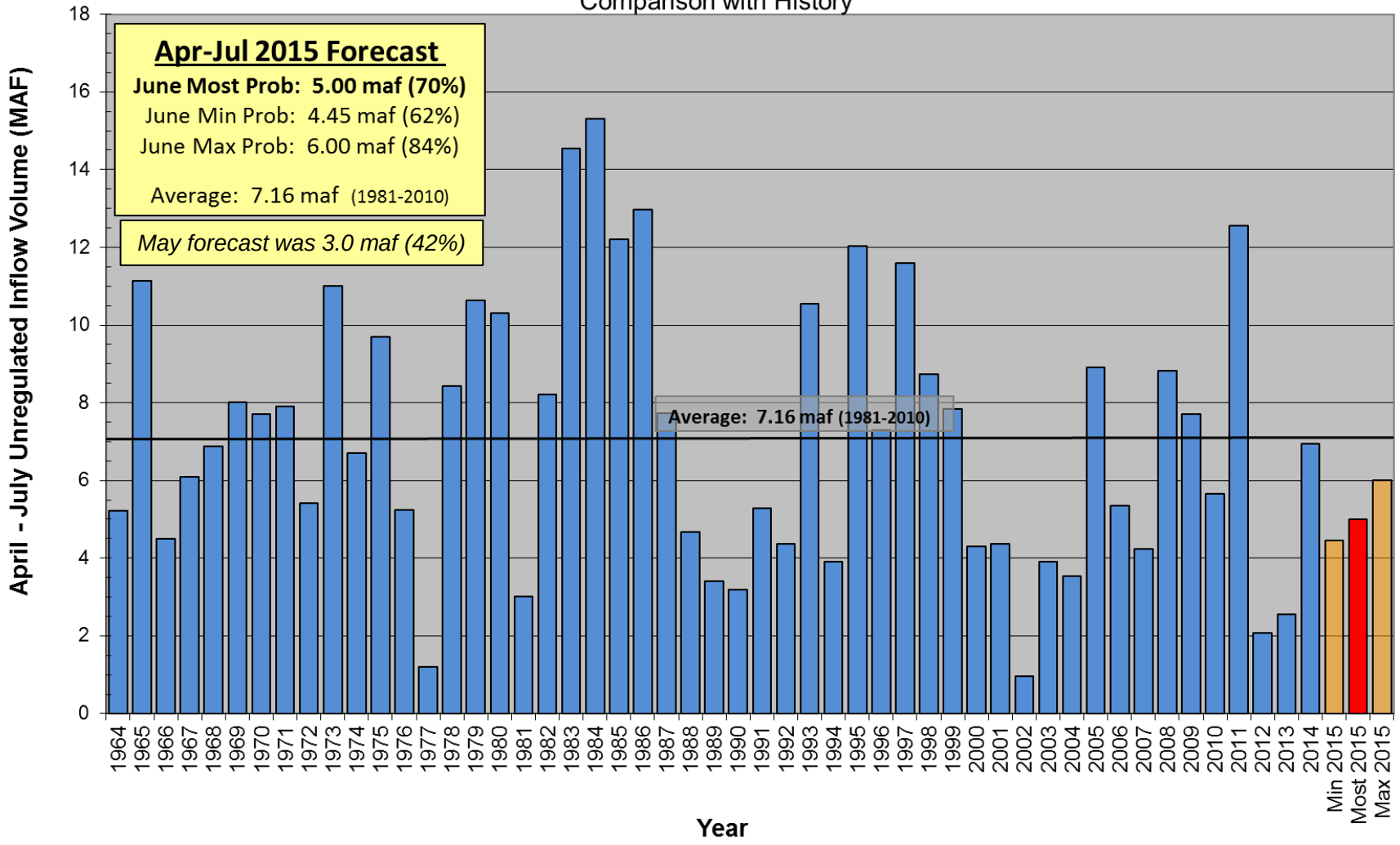
Lake Powell Unregulated Inflow

April - July 2015 Forecast

Issued June 3

Comparison with History



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Lake Powell 2015 Operating Tier
Upper Elevation Balancing

- Tier was set in August 2014
- April Adjustment to Balancing
- Goal: balance contents of Lake Powell and Lake Mead by end of water year
  - release 8.23 maf - 9.0 maf
  - Currently projecting 9.0 maf release

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
3,636 - 3,666 (2008-2026)	**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	15.5 - 19.3 (2008-2026)
3,575	**Mid-Elevation Release Tier** Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	9.5
3,525	**Lower Elevation Balancing Tier** Balance contents with a min/max release of 7.0 and 9.5 maf	5.9
3,490		4.0
3,370		0

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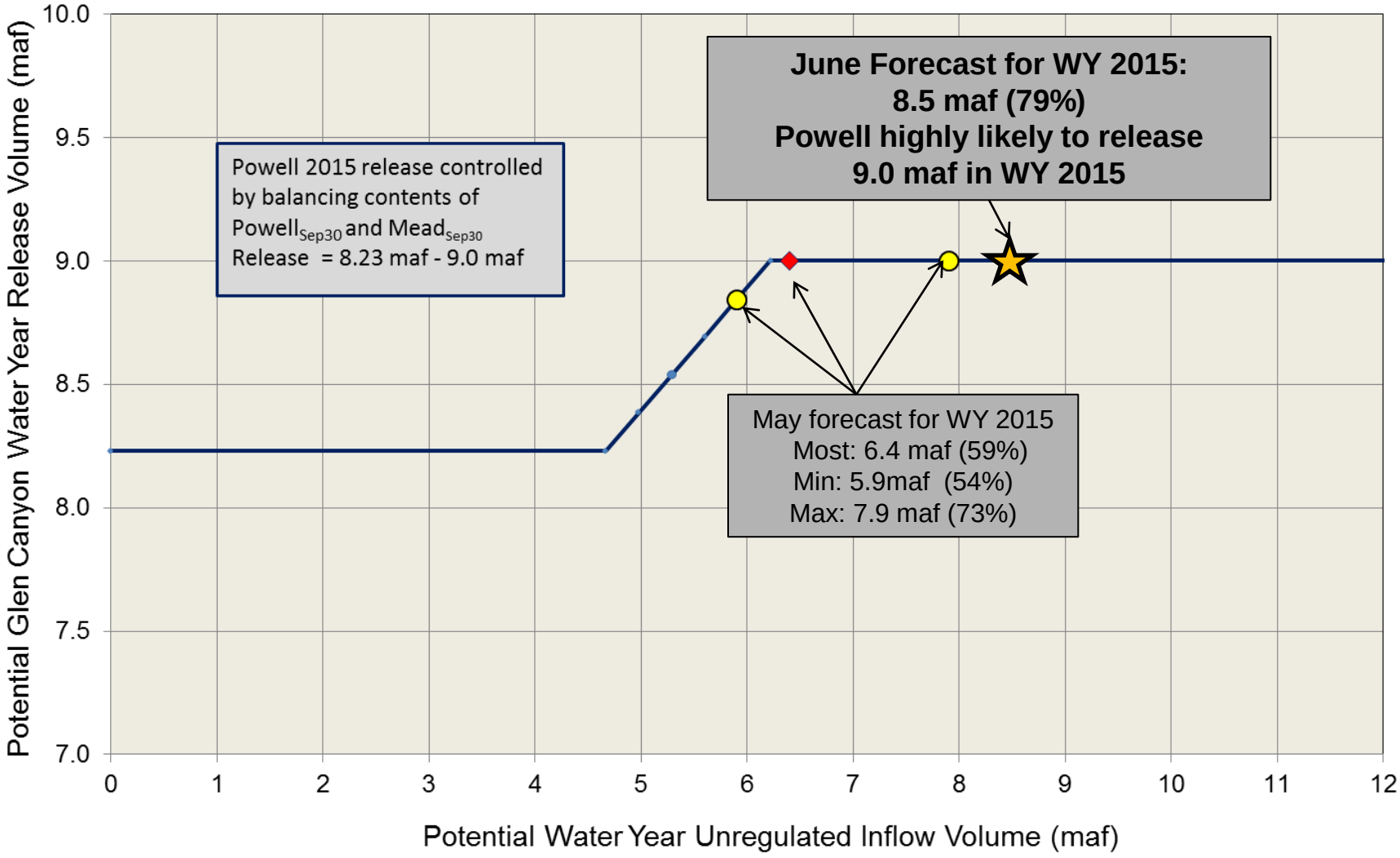
Potential Lake Powell Release Scenarios

Water Year 2015 Release Volume as a Function of Unregulated Inflow Volume
based on May 2015 24-Month Study Conditions



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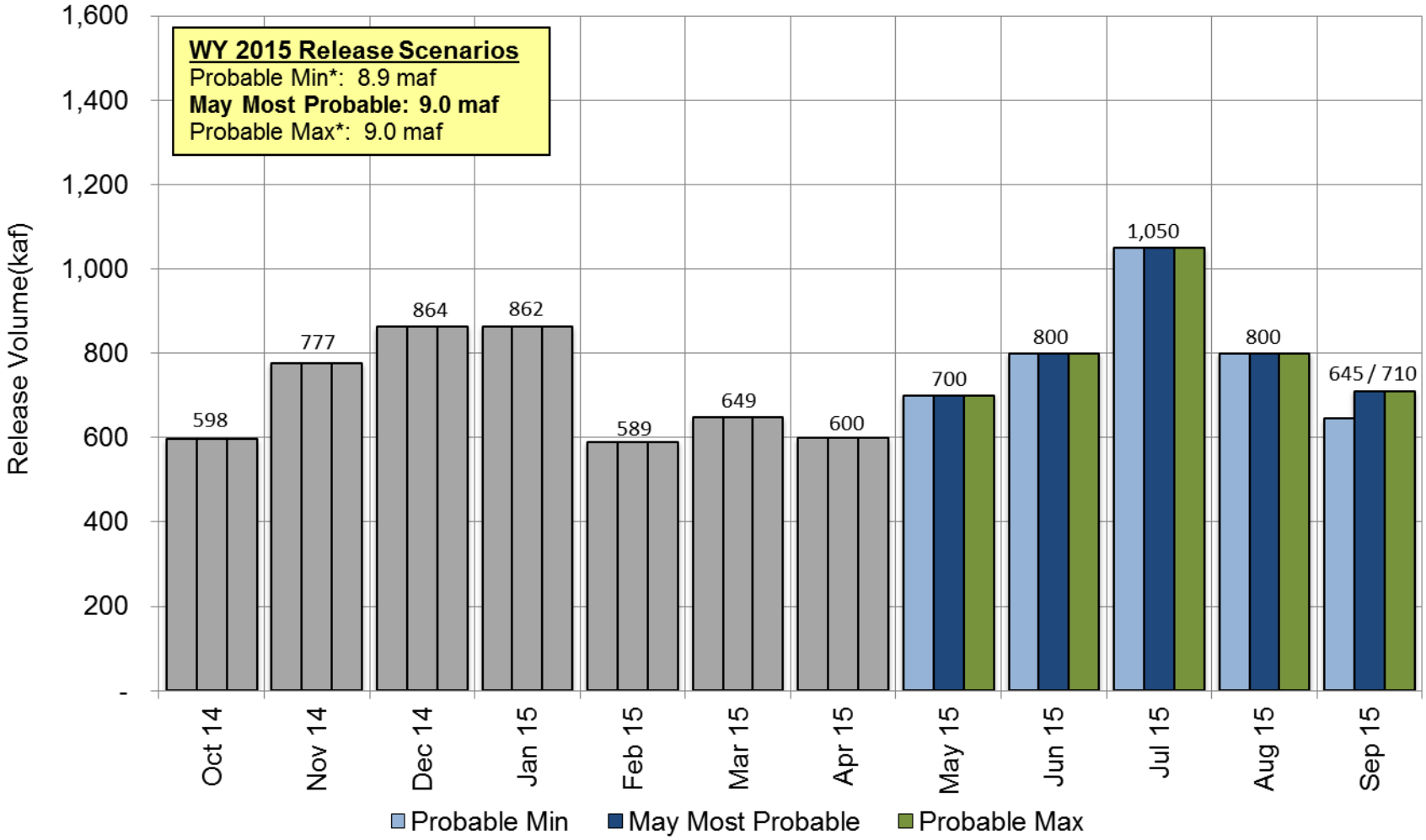
Projected Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2015

Updated May 2015



** Probable Min and Max annual release volume is based on April Min and Max inflow forecasts*

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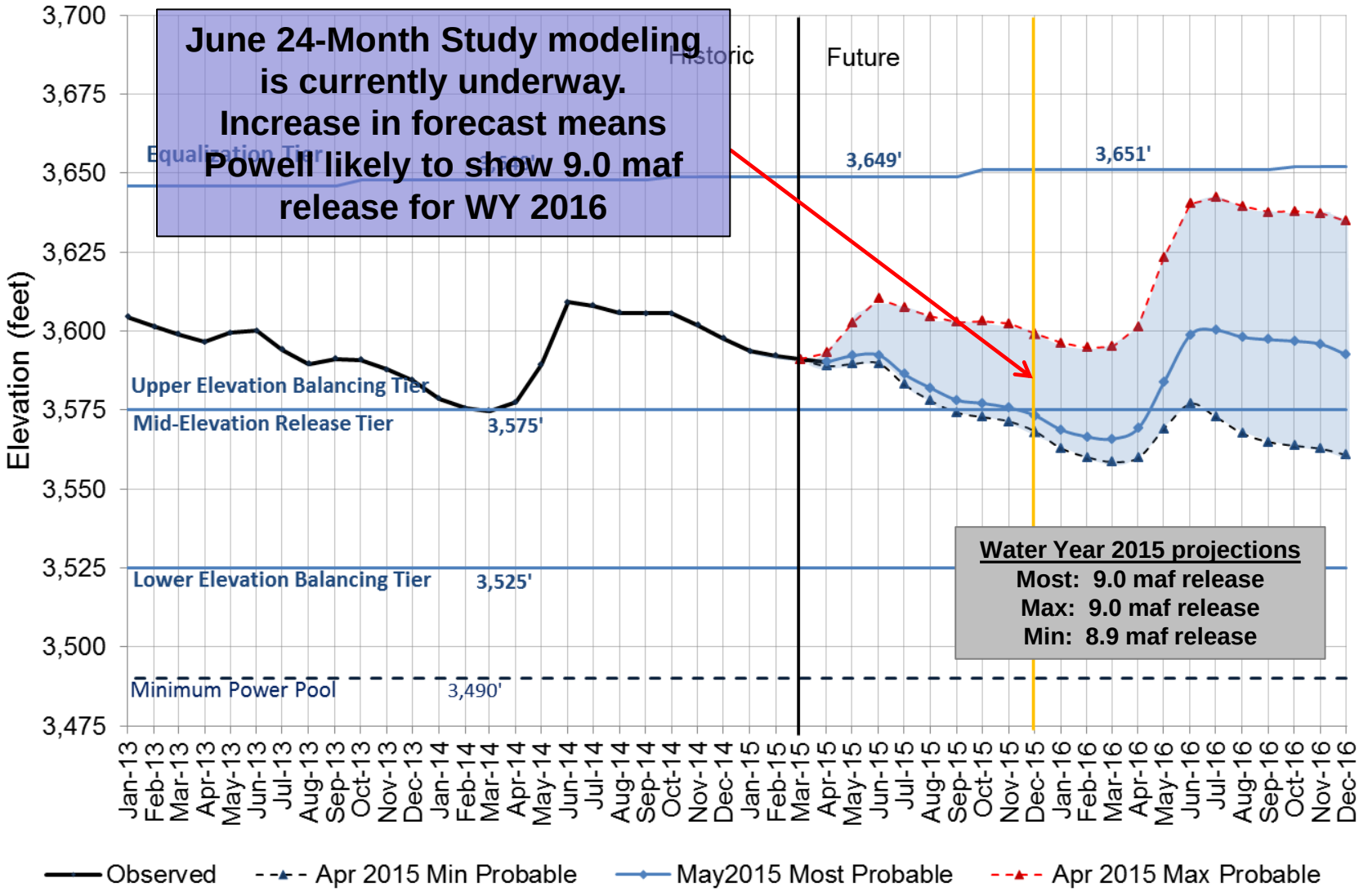
Lake Powell End of Month Elevations

Historic and projected based on May and April 2015 modeling



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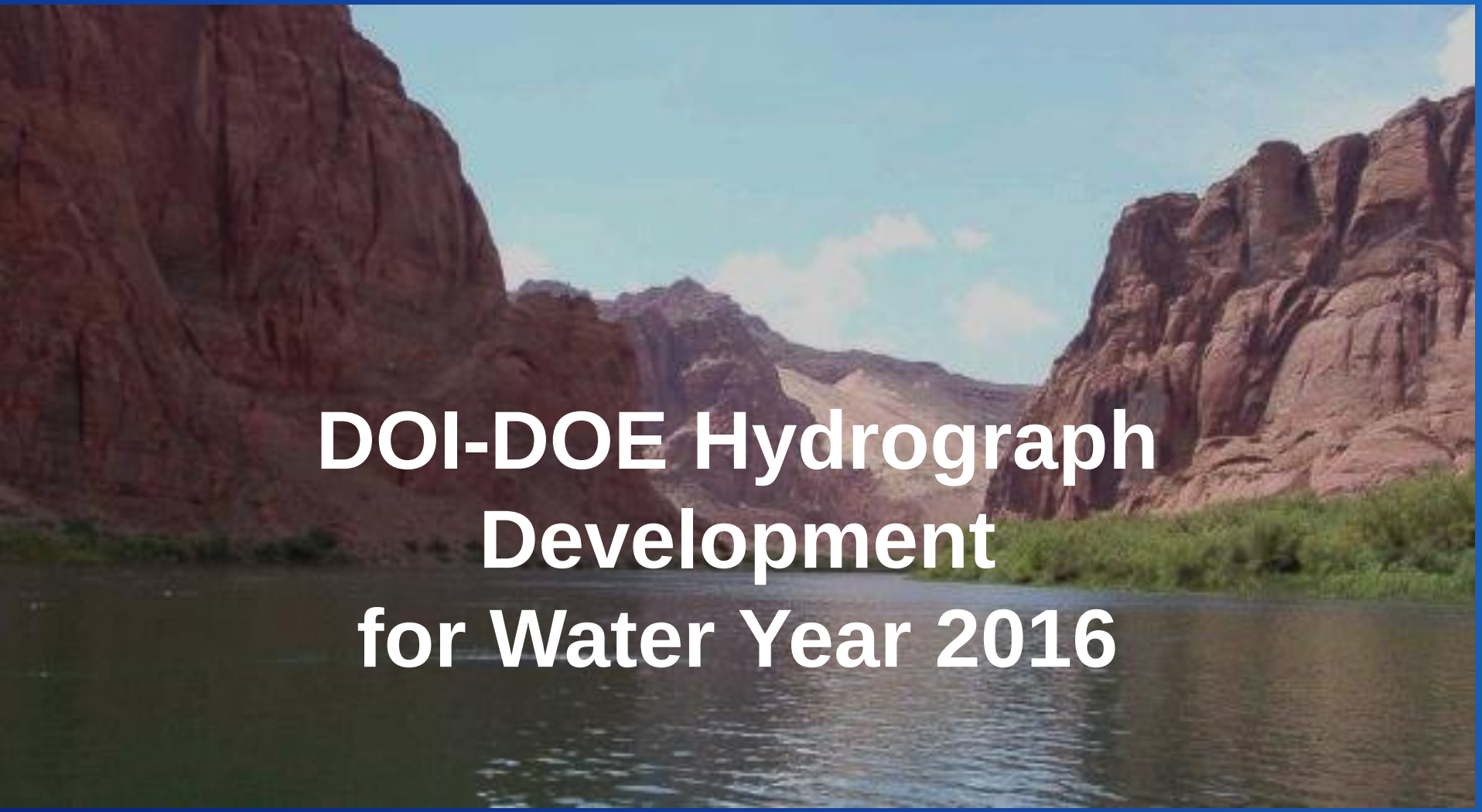

DOI-DOE Hydrograph Development for Water Year 2016

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2016 Projected Annual Release

(Based on April and May 2015 modeling,
June modeling is currently underway)

- **Min probable**: 7.48 maf release

  (Mid-Elevation Release Tier – release is set for entire year)

- **Most probable**: 7.48 maf release *(9.0 maf likely in June 24-Month Study)*

  (Upper Elevation Balancing Tier
  with projected April adjustment to Balancing 8.23-9.0 maf release)

- **Max probable**: 9.0 maf release

  (Upper Elevation Balancing Tier
  with projected April adjustment to Balancing 8.23-9.0 maf release)

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2016 Hydrograph
Current Proposal

Annual Release Volume	June	August	September
less than 9.0 maf	600 kaf - 650 kaf	800 kaf	600 kaf
9.0 maf – less than 9.5 maf	800 kaf	900 kaf	700 kaf
9.5 maf – less than 10 maf	900 kaf	900 kaf	700 kaf
10 maf and greater	900 kaf or more	900 kaf or more	800 kaf or more

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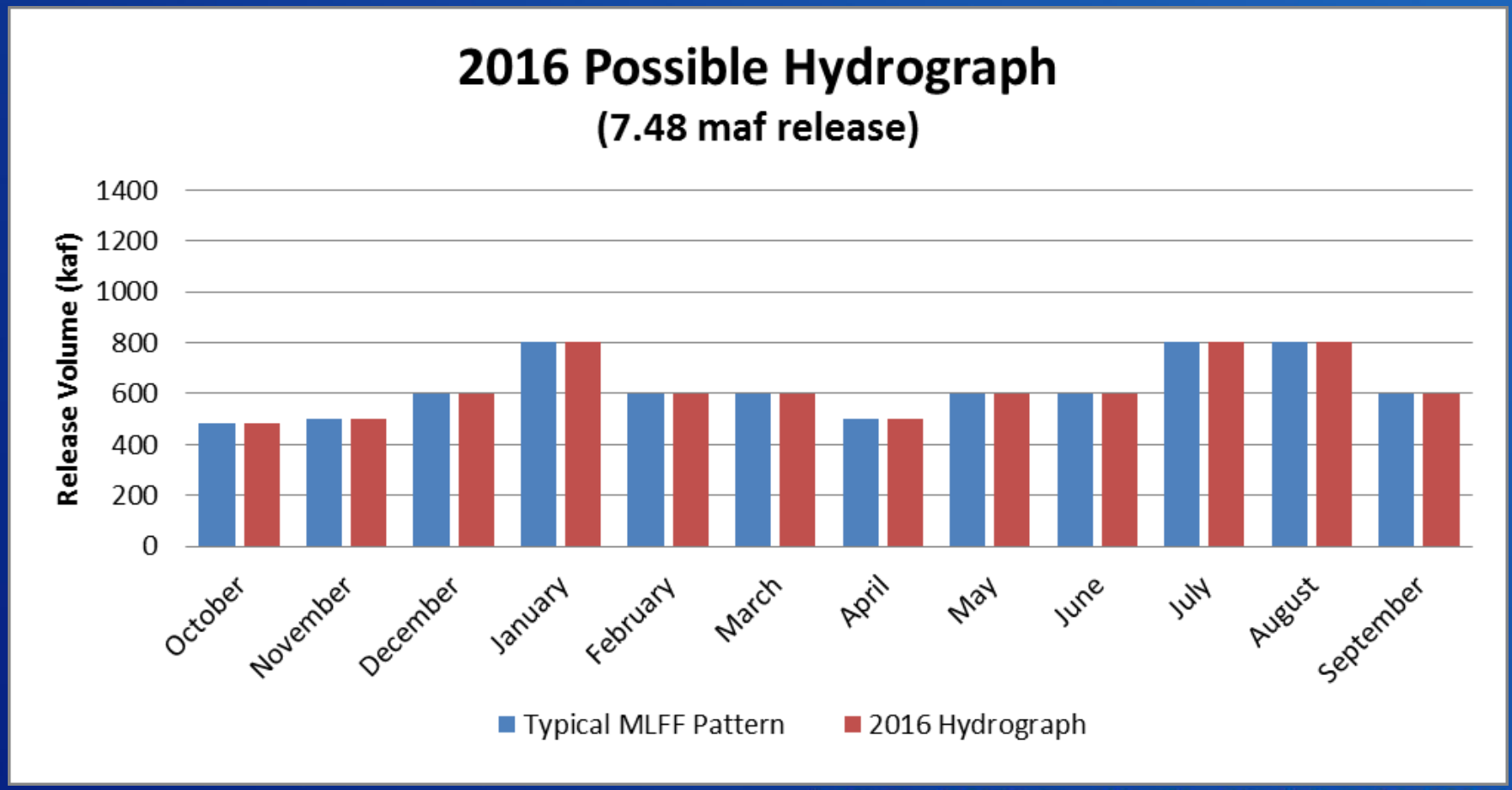
2016 Proposed Hydrograph
7.48 maf release

Release is already low in June, Aug and Sep, no difference



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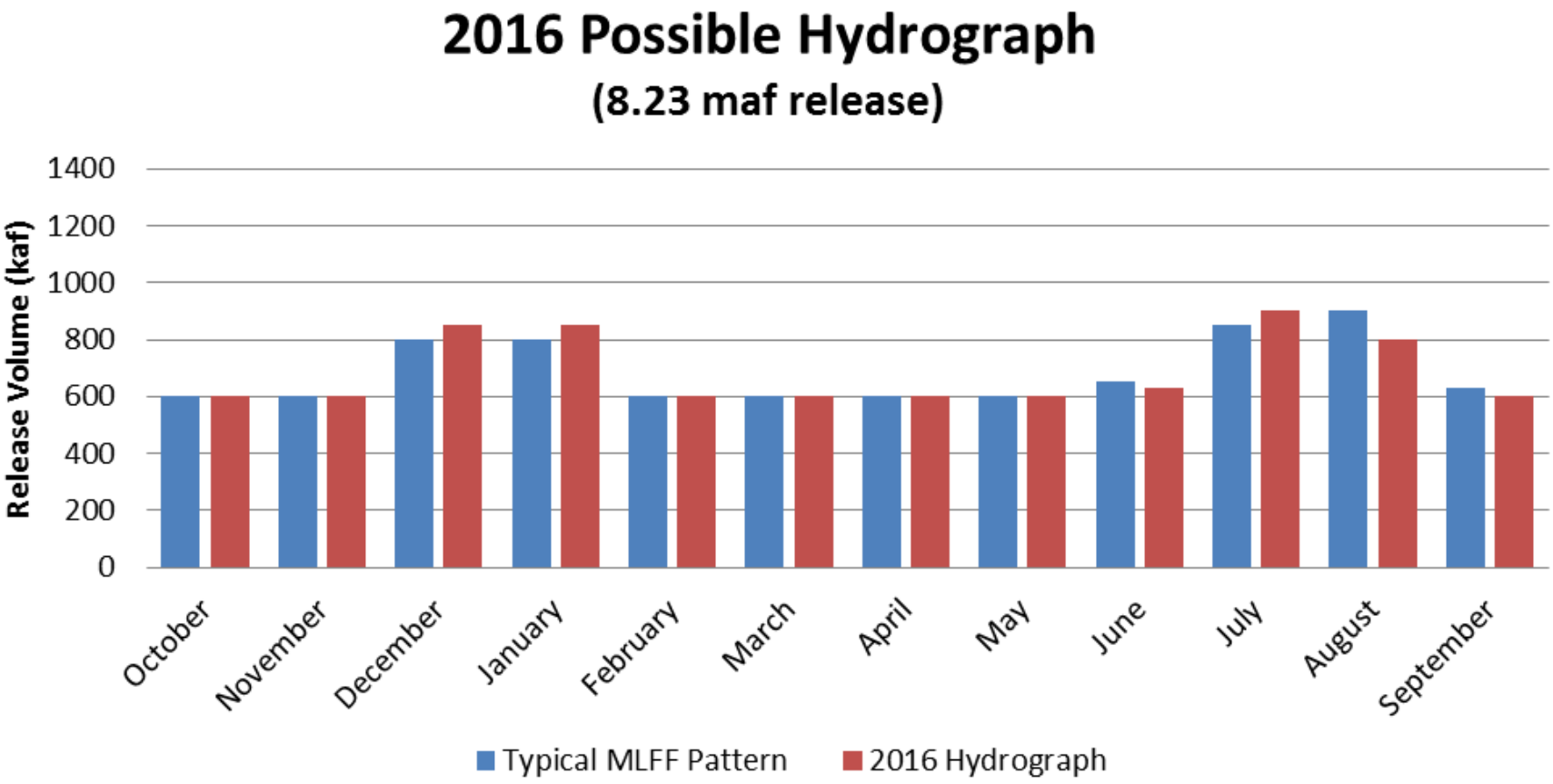
2016 Proposed Hydrograph
8.23 maf release



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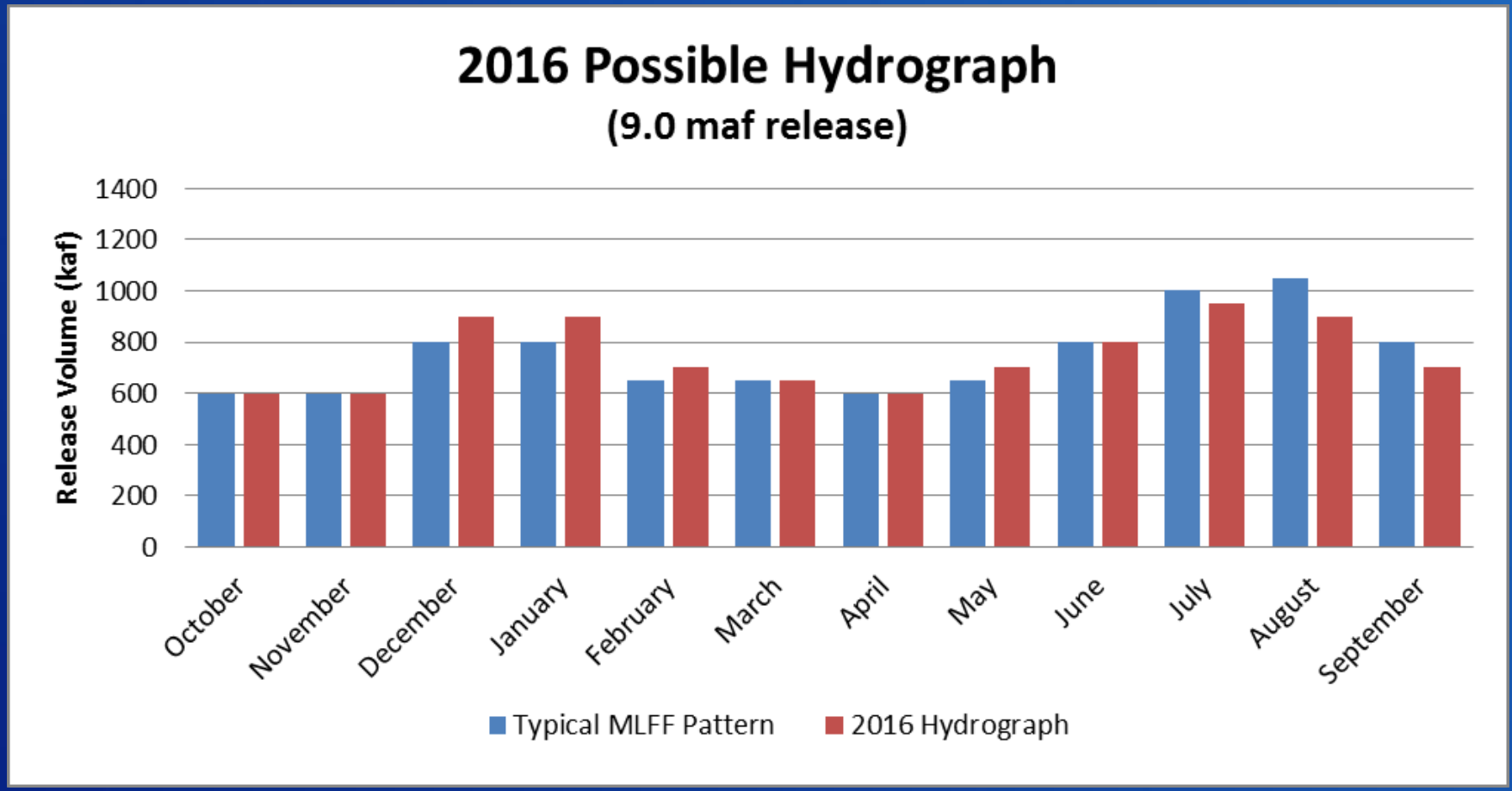
2016 Proposed Hydrograph
9.0 maf release



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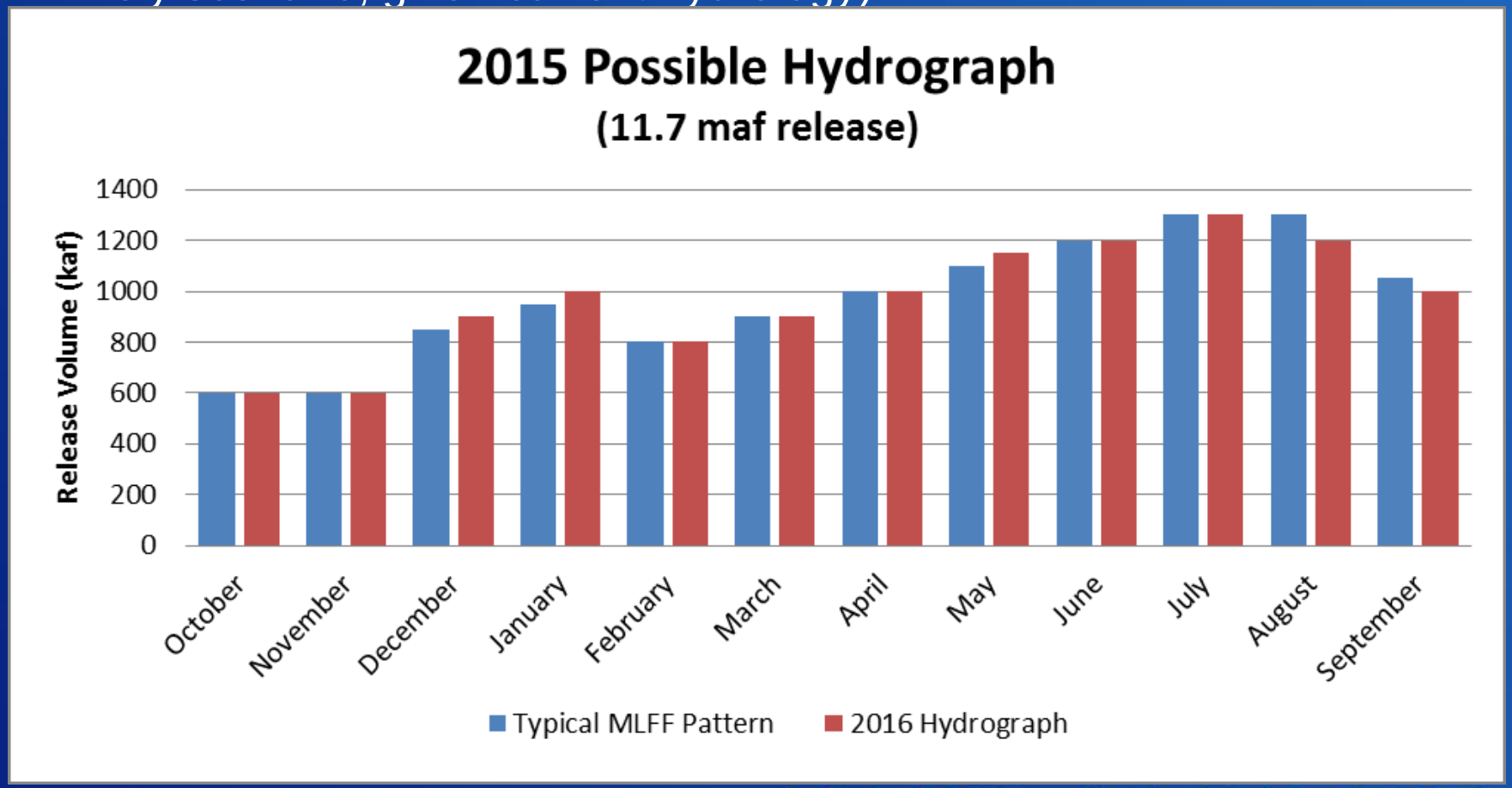
2016 Proposed Hydrograph
11.7 maf release

- Lots of water to move: limited flexibility, minimal difference (not a likely scenario, given current hydrology)



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Screening Tool Analysis

Typical 9.0 MLFF

Month	Monthly Volume (kaf)	Total Sediment Transport (MT)	Total Hydropower Value (1000$)	Temp at RM61 (deg C)
Oct	600	14,614	15,858	11.4
Nov	600	15,869	15,343	10.6
Dec	800	41,620	20,972	10.0
Jan	800	41,620	19,536	9.9
Feb	650	25,345	15,906	10.3
Mar	650	19,397	15,459	10.8
Apr	600	15,869	13,209	11.3
May	650	19,397	14,825	11.8
Jun	800	45,598	19,428	12.1
Jul	1000	113,929	30,588	12.1
Aug	1050	136,707	32,491	11.9
Sep	800	45,598	22,360	11.8
Total	9000	535,564	235,977	
	Annual	535,564		
	Jul-Nov	326,718		
	Aug-Sep	182,305		

Modified 9.0 year Proposal

Month	Monthly Volume (kaf)	Total Sediment Transport (MT)	Total Hydropower Value (1000$)	Temp at RM61 (deg C)
Oct	600	14,614	15,858	11.4
Nov	600	15,869	15,343	10.6
Dec	900	77,431	23,762	10.0
Jan	900	77,431	22,102	9.9
Feb	700	33,365	17,096	10.3
Mar	650	19,397	15,459	10.8
Apr	600	15,869	13,209	11.3
May	700	25,355	15,871	11.7
Jun	800	45,598	19,428	12.1
Jul	950	94,279	29,197	12.2
Aug	900	77,431	28,169	12.1
Sep	700	27,671	19,715	12.0
Total	9000	524,310	235,210	
			-767	hydropower diff
	Annual	524,310	-11,254	sed diff (annual
	Jul-Nov	229,864	-96,854	sed diff (Jul-Nov)
	Aug-Sep	105,102	-77,203	sed diff (Aug - Sep)

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2016 Hydrograph Next Steps

- Continue to coordinate with TWG and AMWG member agencies
- TWG present to AMWG August 26-7 with motion for approval to recommend to Secretary

Questions?

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