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Managing Water in the West

Colorado River Basin: System Status Update

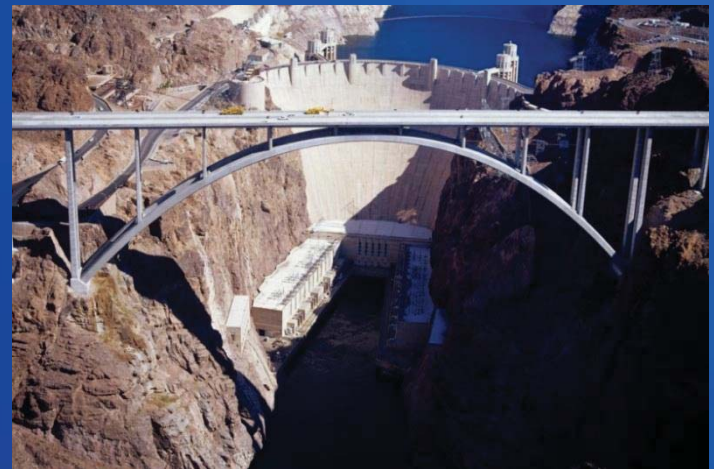
**Colorado River Citizens Forum in Yuma, AZ
September 11, 2013**



U.S. Department of the Interior
Bureau of Reclamation

Colorado River Basin: System Status Update

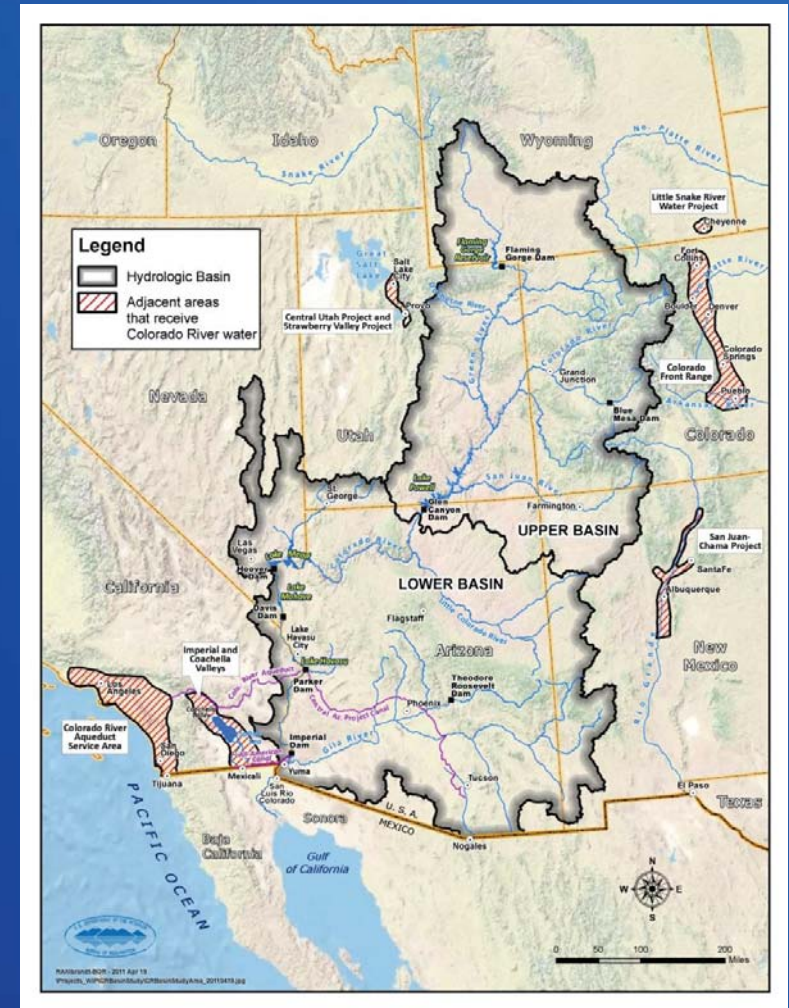
- Overview of the Colorado River Basin
- State of the System
- Projected System Conditions
- Colorado River Basin Water Supply and Demand Study
- Questions



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Overview of the Colorado River Basin

- 16.5 million acre-feet (maf) allocated annually
 - 7.5 maf each to Upper and Lower Basins
 - 1.5 maf to Republic of Mexico
- 13 to 14.5 maf of consumptive use on average annually
- Operations and water deliveries governed by the “Law of the River”
- 60 maf of storage
- 14.9 maf average annual inflow in Upper Basin over the past 100 years
- 1.3 maf average annual inflow in Lower Basin
- Inflows are highly variable year-to-year



Map of Colorado River Upper and Lower Basins

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State of the System

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Colorado River Basin Storage (as of September 10, 2013)

Current Storage	Percent Full	MAF	Elevation (Feet)
Lake Powell	44%	10.8	3,589
Lake Mead	47%	12.3	1,106
Total System Storage*	50%	29.8	NA

*Total system storage was 34.5 maf or 58% this time last year

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Colorado River Drought

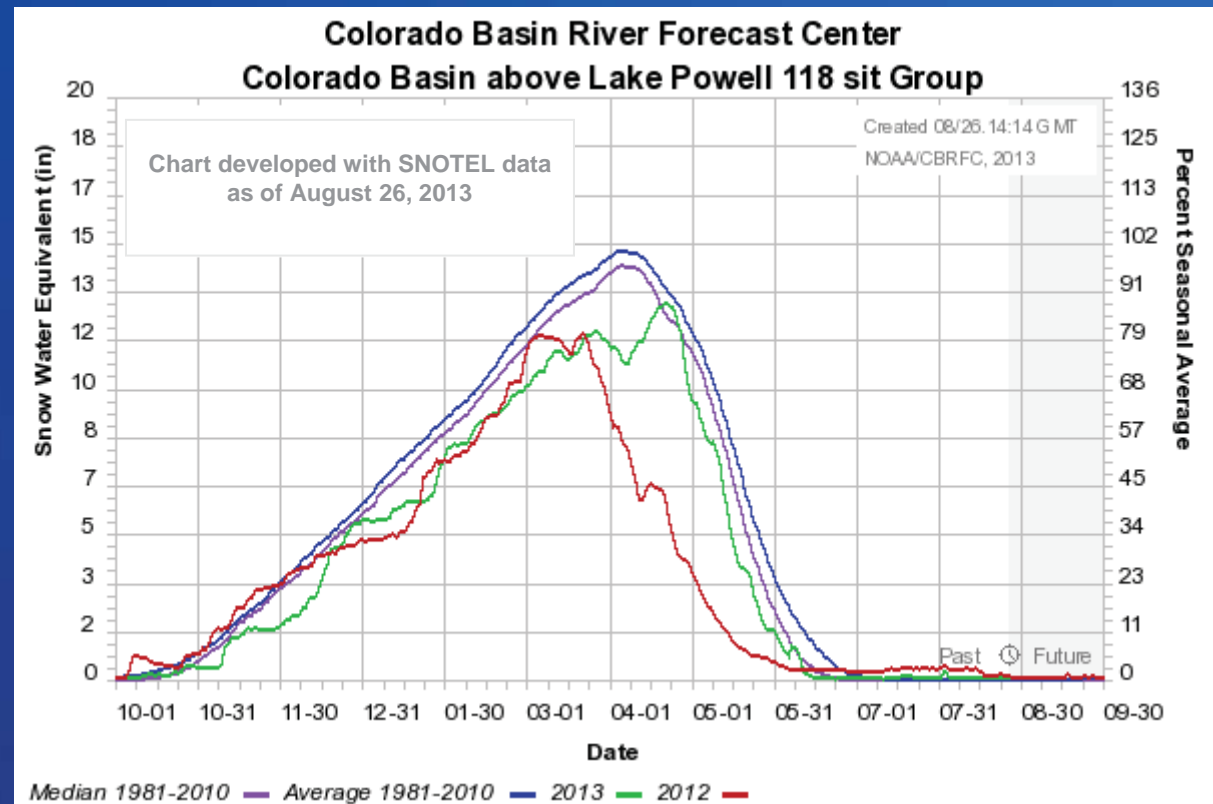
- Inflow into Powell has been below average 11 of the past 14 years (2000-2013)
- The period from 2000-2013 was the driest 14-year period in over 100 years of historical record
- Tree-ring reconstructions show more severe droughts have occurred over the past 1200 years (e.g., drought in the mid 1100s)
- Not unusual to have a few years of above average inflow during longer-term droughts (e.g., the 1950s)

Water Year 2013 Snowpack and Precipitation as of September 9, 2013

Colorado River
Basin above
Lake Powell

Water Year 2013
Precipitation
(year-to-date)
83%

Snowpack peaked
at 81% of average
on April 21



Source: CBRFC

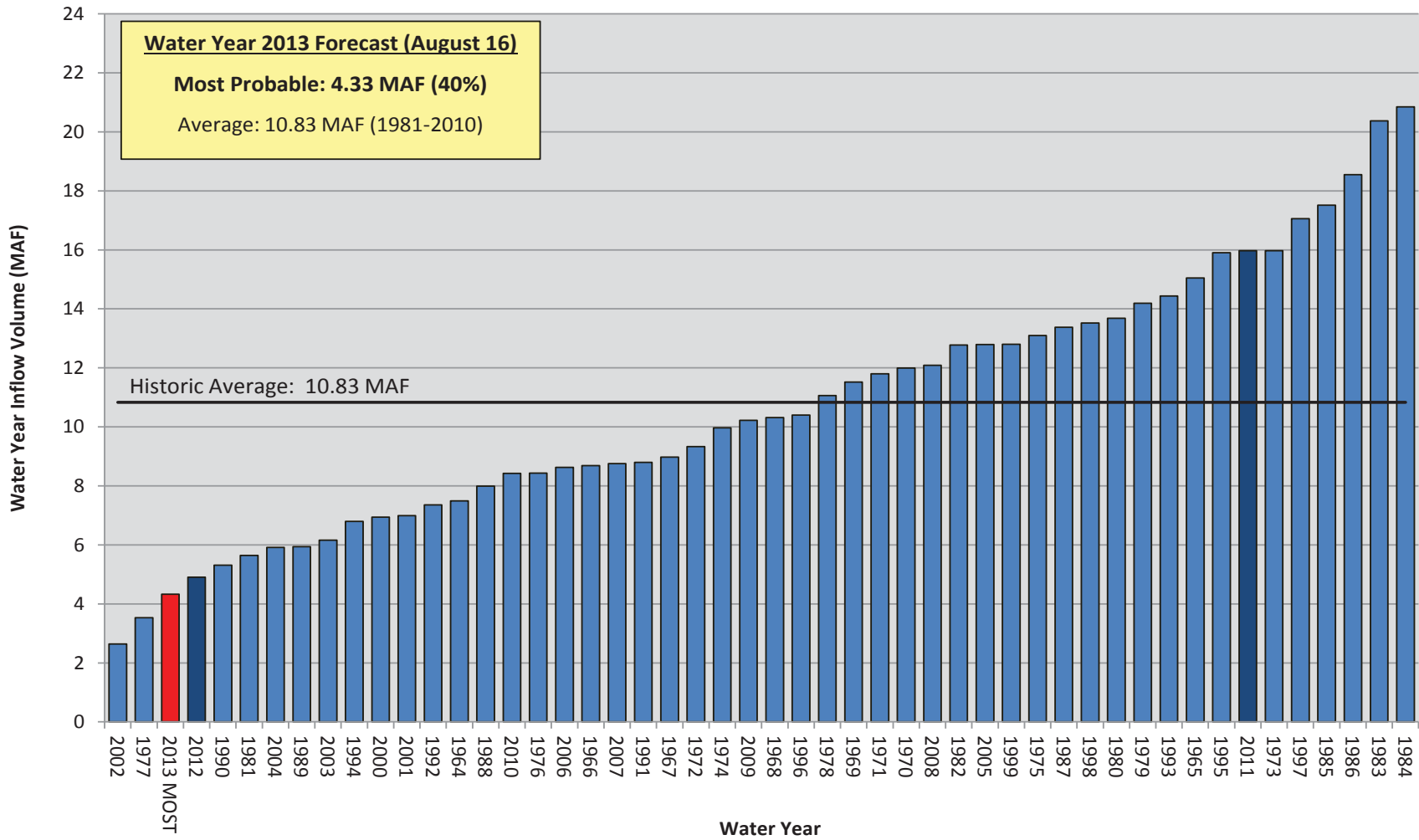
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Unregulated Inflow into Lake Powell

Water Year 2013 Forecast

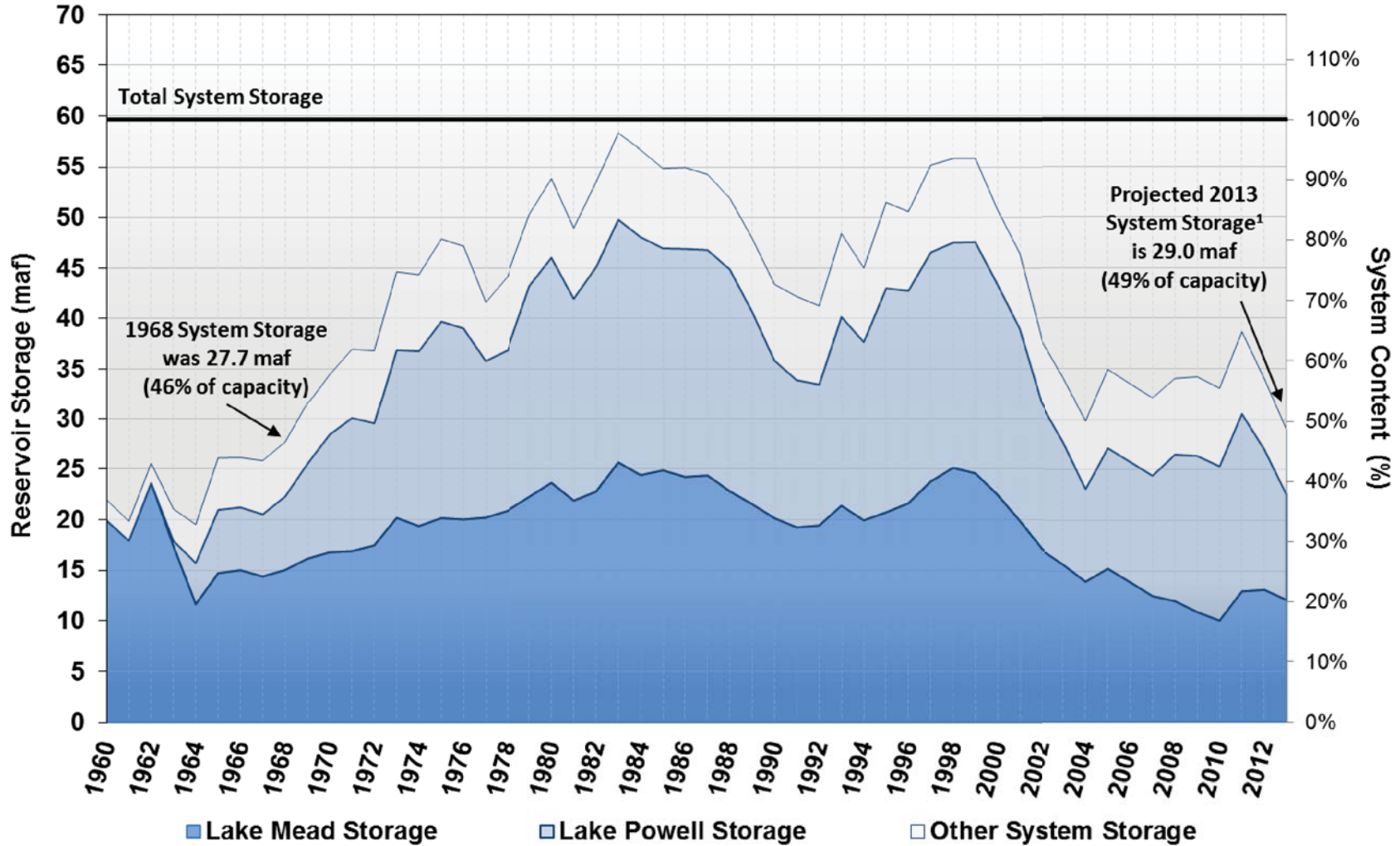
(as of August 1)

Comparison with History



System Storage - End of Water Year Total Volumes

Water Years 1960 - 2013



¹ End of water year 2013 reservoir conditions are based on projections in the August 2013 24-Month Study.

Projected System Conditions

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Annual Operating Plan (AOP)

- A report on the current year's operations and the upcoming year's projected operations
 - published by December of the current calendar year
- Three consultations held annually
 - May, July, and September
- Under the 2007 Interim Guidelines:
 - August projections are used as the basis for decision for Lake Powell and Lake Mead *annual* operations for the coming year
 - April projections are also important due to potential adjustments to Lake Powell's annual operation at the higher reservoir levels
- Draft 2014 AOP currently available at:
 - http://www.usbr.gov/lc/region/g4000/AOP2014/AOP14_draft.pdf
- Current status and projected monthly operation available at:
 - <http://www.usbr.gov/lc/region/g4000/24mo.pdf>

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Lake Powell & Lake Mead Operational Table

Operational Tier Determinations for Water Year/Calendar Year 2014

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	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	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	Upper Elevation Balancing Tier³ 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.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	22.9 (approx.) ²
3,575			1,145		
	3,573.69	9.5	1,105	1,103.08 Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	11.9
	1/1/14 Projection¹		1,075	1/1/14 Projection Shortage Condition Deliver 7.167 ⁴ maf	9.4
3,525	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	5.9	1,050	Shortage Condition Deliver 7.083 ⁵ maf	7.5
3,490	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	4.0	1,025		5.8
3,370			0	1,000	Shortage Condition Deliver 7.0 ⁶ maf Further measures may be undertaken ⁷
			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

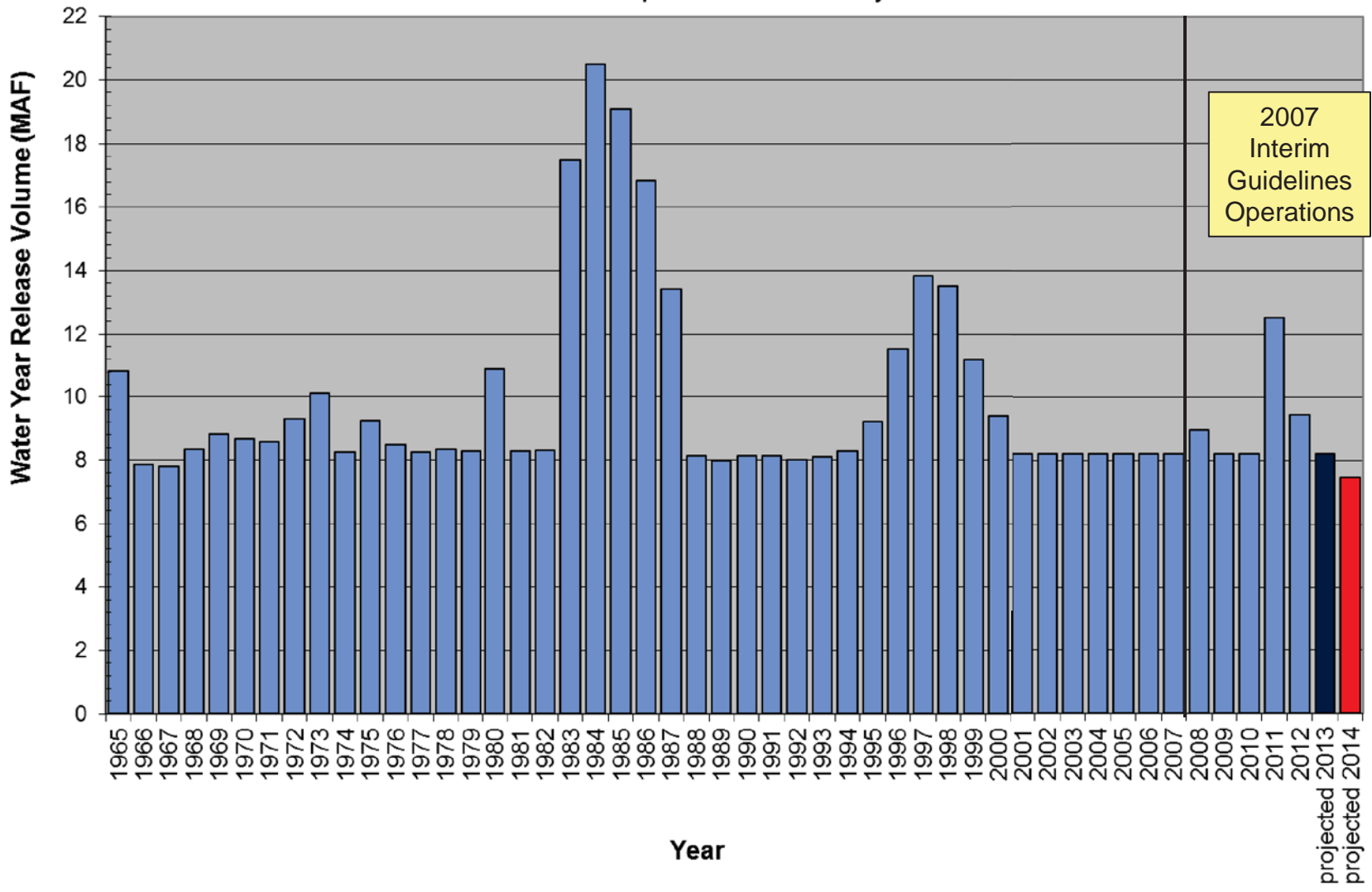
⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

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.

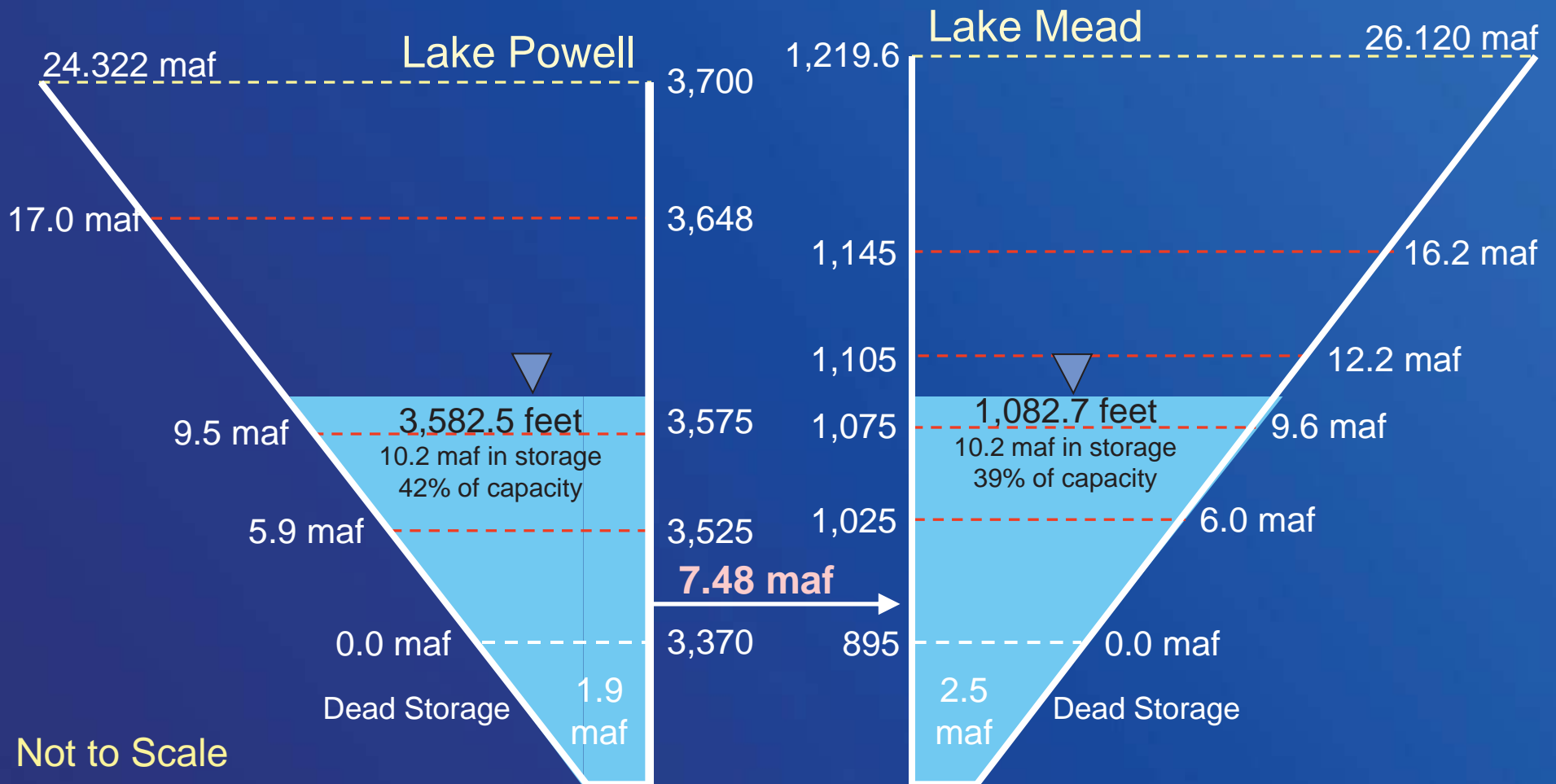
Lake Powell Release Water Year 2013 and 2014 Projected Comparison with History



End of Water Year 2014 Projections

August 2013 24-Month Study Most Probable Inflow Scenario¹

Based on a 7.48 maf release pattern from Lake Powell in Water Year 2014



Not to Scale

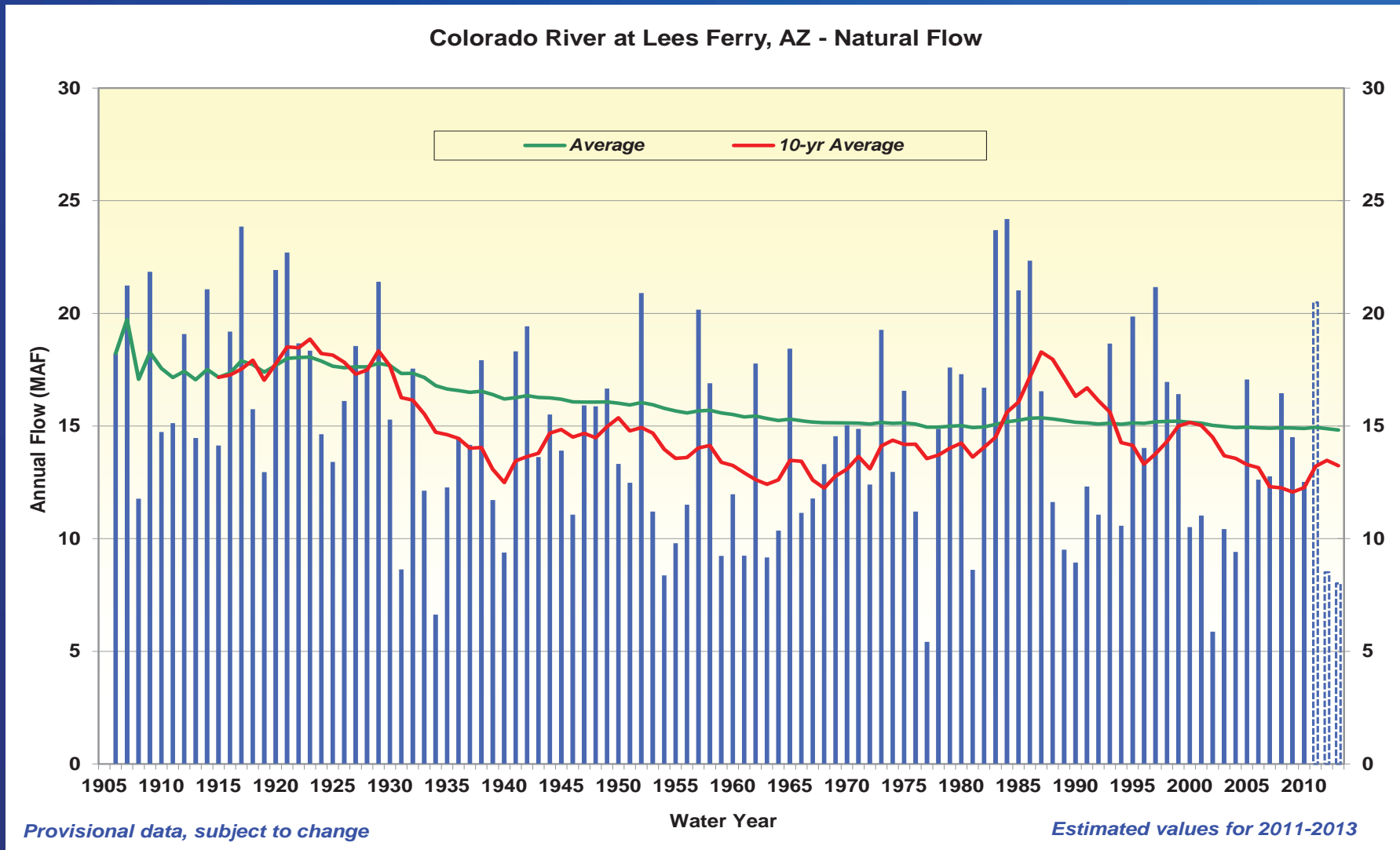
¹ WY 2014 unregulated inflow into Lake Powell is based on the CBRFC outlook dated 8/1/13.



Natural Flow

Colorado River at Lees Ferry Gaging Station, Arizona

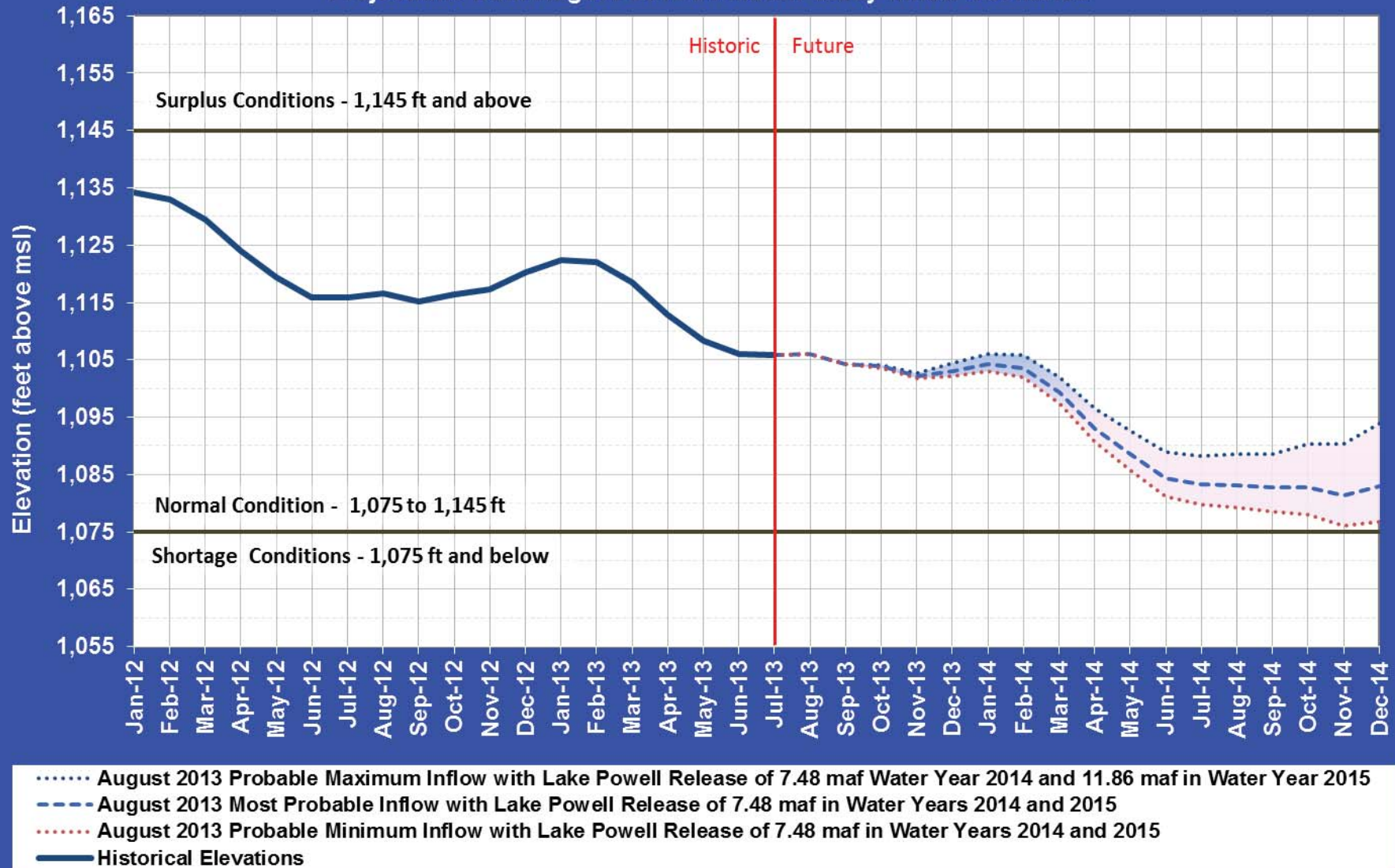
Water Year 1906 to 2013



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Lake Mead End of Month Elevations

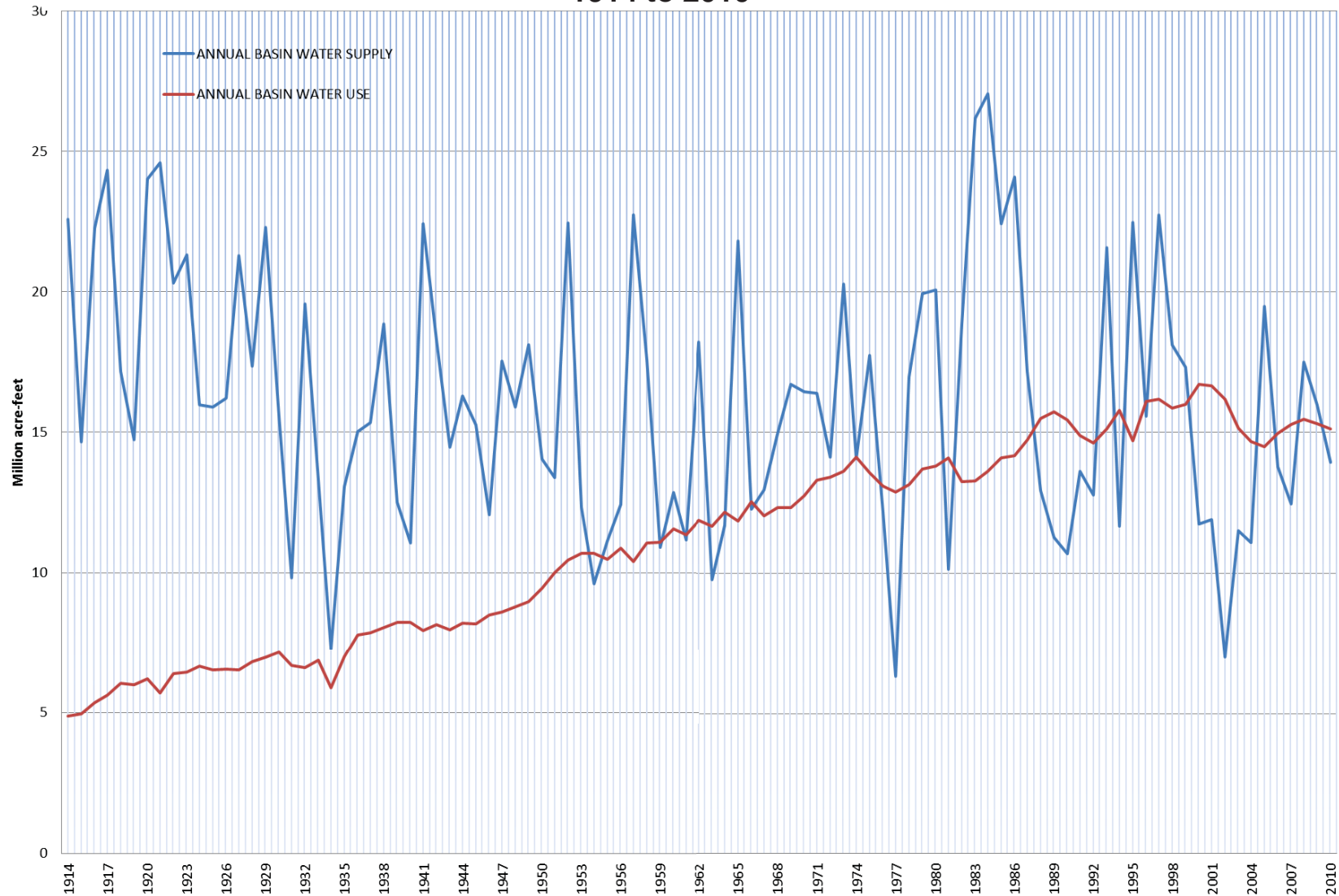
Projections from August 2013 24-Month Study Inflow Scenarios



Colorado River Basin Water Supply and Demand Study

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Historical Annual Colorado River Basin Supply & Use 1914 to 2010



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Colorado River Basin Water Supply and Demand Study

- Study Objective
 - Assess future water supply and demand imbalances over the next 50 years
 - Develop and evaluate opportunities for resolving imbalances
- Study conducted by Reclamation and the Basin States, in collaboration with stakeholders throughout the Basin
- Began in January 2010 and completed in December 2012
- A planning study – does not result in any decisions, but will provide the technical foundation for future activities

Cost-Share Partners

Arizona Department of Water Resources

(California) Six Agency Committee

Colorado Water Conservation Board

New Mexico Interstate Stream Commission

Southern Nevada Water Authority

Utah Division of Water Resources

Wyoming State Engineer's Office

Reclamation's Upper and Lower Colorado Regions

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Final Study Reports

The final Study is a collection of reports available at:
<http://www.usbr.gov/lc/region/programs/crbstudy/report1.html>

Executive Summary

Study Report

Technical Report A – Scenario Development

Technical Report B – Water Supply Assessment

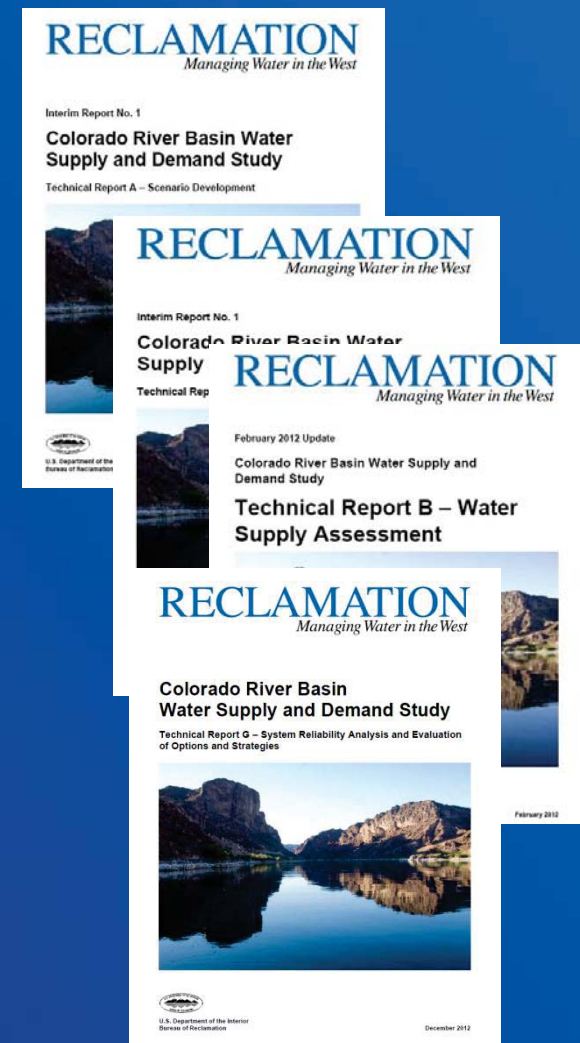
Technical Report C – Water Demand Assessment

Technical Report D – System Reliability Metrics

Technical Report E – Approach to Develop and Evaluate Opportunities to Balance Supply

Technical Report F – Development of Options and Strategies

Technical Report G – System Reliability Analysis and Evaluation of Options and Strategies



An aerial photograph of a large dam and reservoir. The dam is a curved concrete structure in the foreground. The reservoir is a deep blue color, surrounded by rugged, brown mountains. The sky is clear and blue.

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For further information:

www.usbr.gov/lc/riverops.html
BCOOWaterOps@usbr.gov

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