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WATER EFFICIENCY ACTION NETWORK  
FOR THE COLORADO BASIN STATES

# **WATER EFFICIENCY AND THE COLORADO BASIN: CLOSING THE GAP**

WSI Panel, Oct. 10, 2014

# Panelists

- Pam Adams, U.S. Bureau of Reclamation
- John Currier, Colorado River District
- Colby Pellegrino, Southern Nevada Water Authority
- Ed Osann, Natural Resources Defense Council
- Moderator Cindy Dyballa, Network coordinator, Sligo Creek Resources



WATER EFFICIENCY ACTION NETWORK  
FOR THE COLORADO BASIN STATES

“All this is the music of the waters”  
John Wesley Powell, 1895





# Topics

- Current state of the river
- Current water efficiency efforts, including Basin study conservation work group
- Approaches to increasing water efficiency to meet Basin water demands



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FOR THE COLORADO BASIN STATES

# Closing the Gap



Photo: John Locher/AP 2014

# Closing the Gap

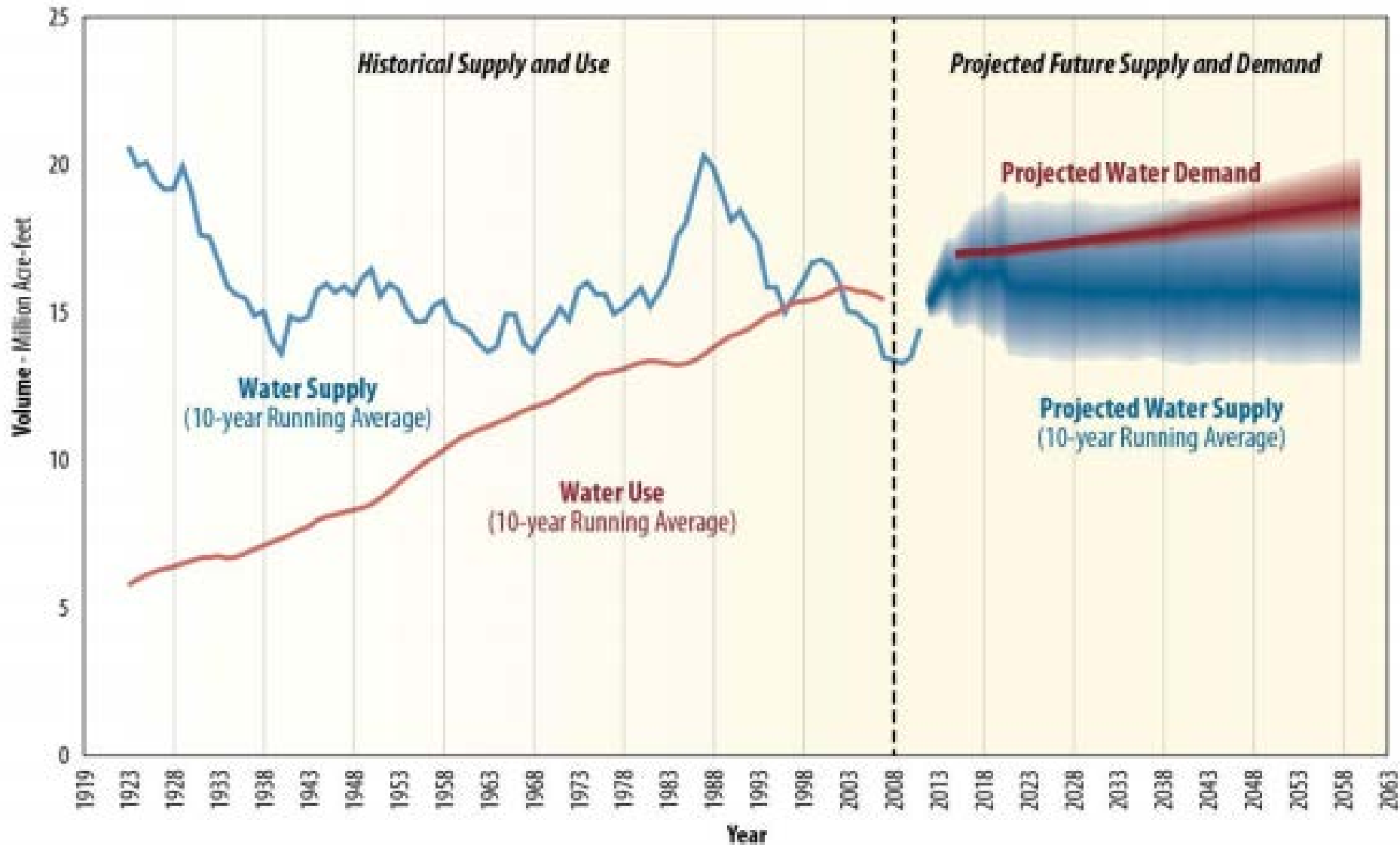
- Not enough water is available in the Basin, now and in future
- Network believes water efficiency is the quickest and least cost of a package of solutions
- Collaboration can achieve results to advance water efficiency
- Join us! More info at <http://www.wean-crb.org>

# Colorado River basin



WATER EFFICIENCY ACTION NETWORK  
FOR THE COLORADO BASIN STATES

# Colorado River Supply and Demand Imbalances







# WATER EFFICIENCY ACTION NETWORK FOR THE COLORADO BASIN STATES



**[www.wean-crb.org](http://www.wean-crb.org)**

# RECLAMATION

*Managing Water in the West*

## Colorado River Basin:

- **Current and Projected System Conditions**
- ***Moving Forward* after the Water Supply & Demand Study**

**WaterSmart Innovations 2014**

**Las Vegas, NV**

**October 10, 2014**

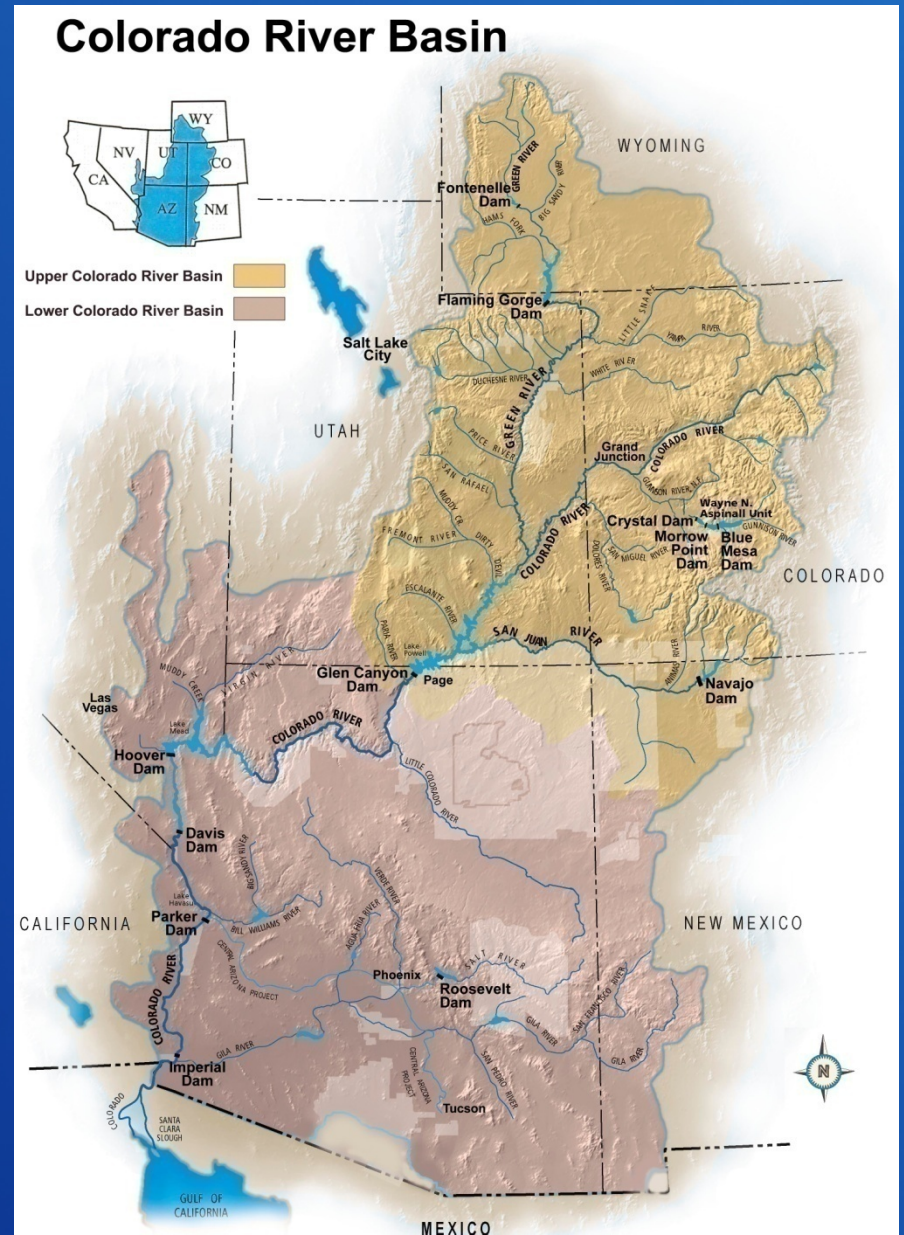


U.S. Department of the Interior  
Bureau of Reclamation



# Colorado River Basin Hydrology

- 16.5 million acre-feet (maf) allocated annually
- 13 to 14.5 maf of consumptive use annually
- 14.9 maf average annual “natural” inflow into Lake Powell over past 105 years; 16.4 maf average over entire River
- Inflows are highly variable year-to-year
- 60 maf of storage

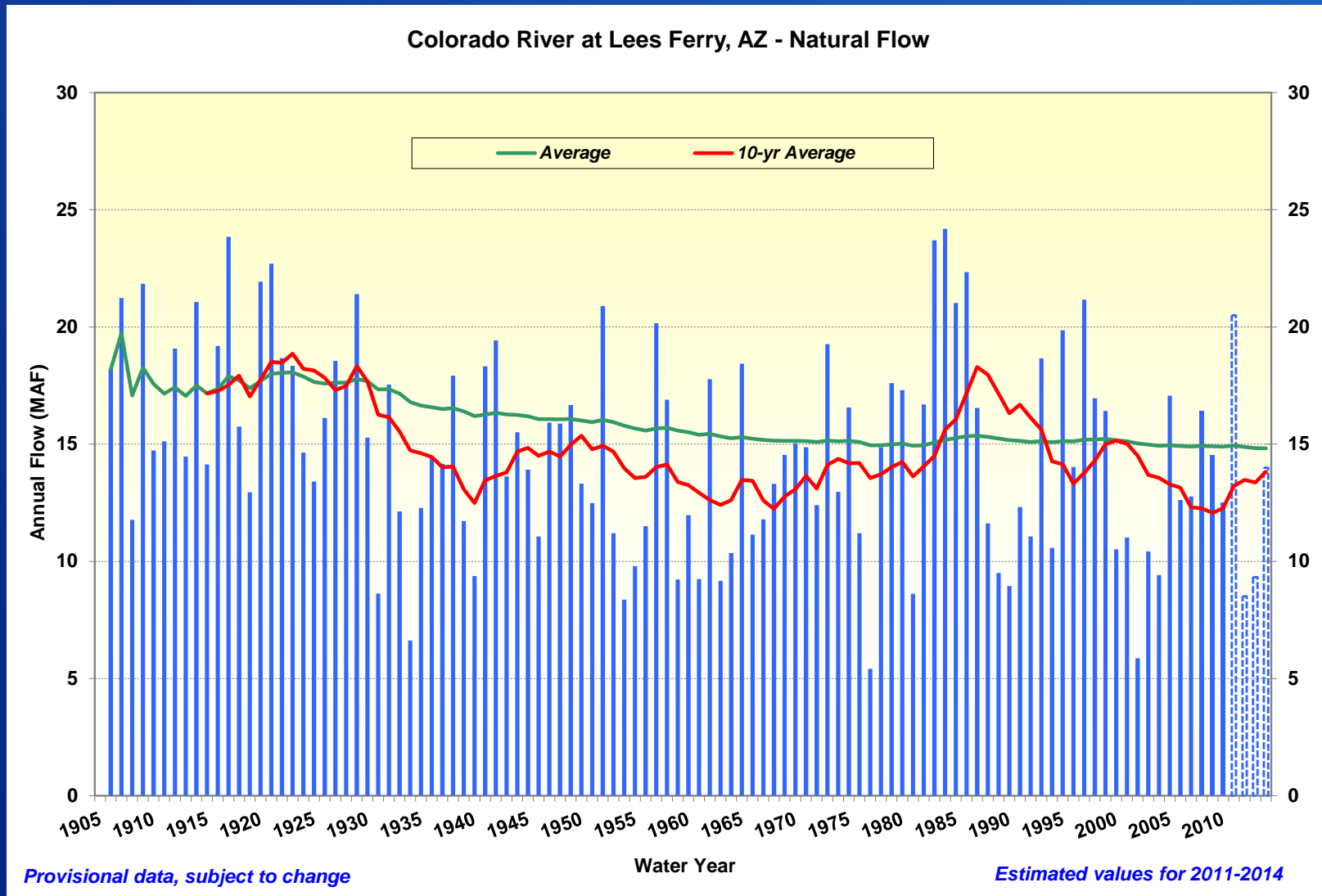


# RECLAMATION

# Natural Flow

## Colorado River at Lees Ferry Gaging Station, Arizona

### Water Year 1906 to 2014



# RECLAMATION

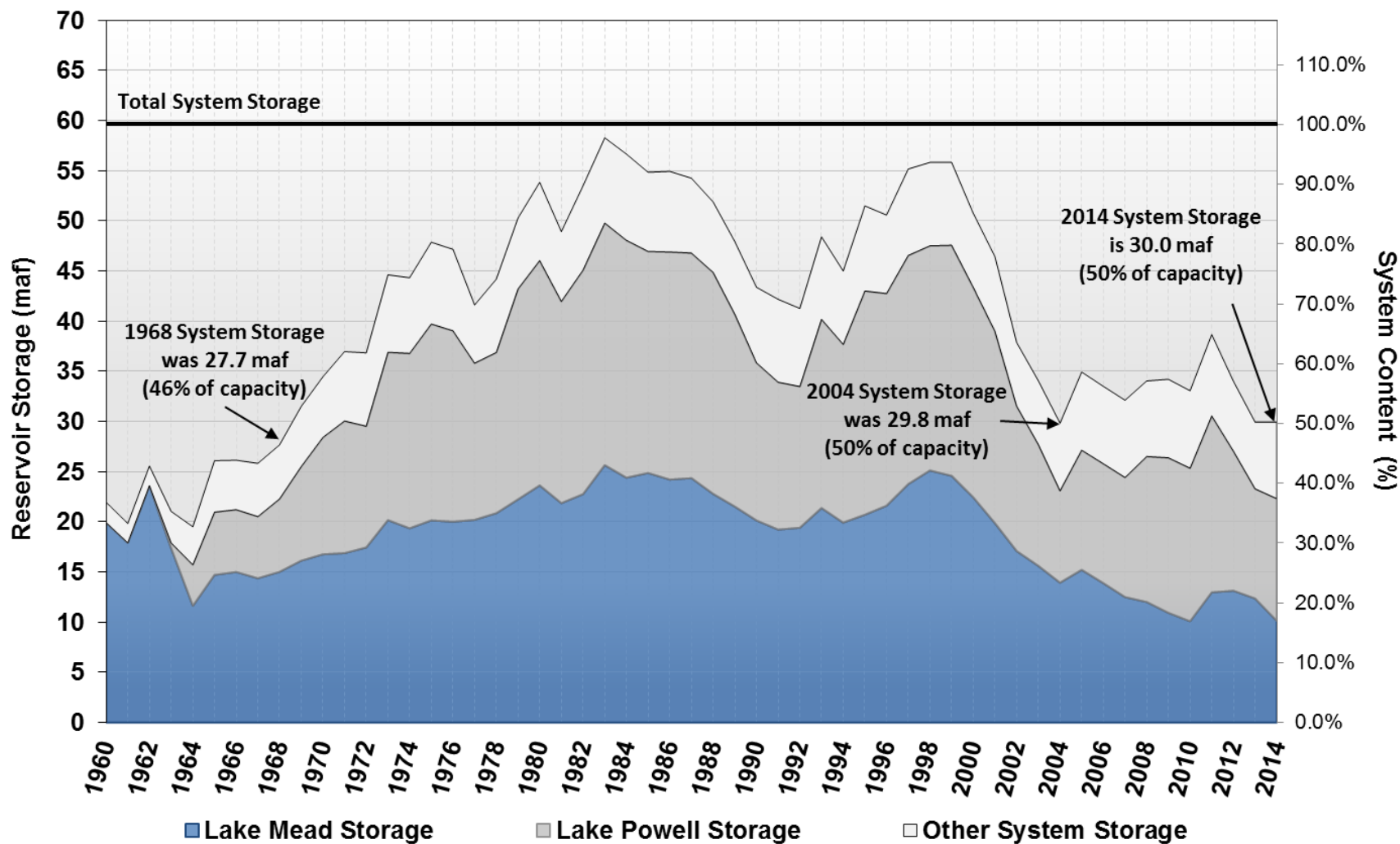
# Colorado River Drought

- Inflow into Lake Powell has been below average 12 of the past 15 years (2000-2014)
- The period from 2000-2014 was the driest 15-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)
- However, based on the paleo-record, less than five 15-year periods were drier than the current period from 2000-2014



# System Storage - End of Water Year Total Volumes

Water Years 1960 - 2014

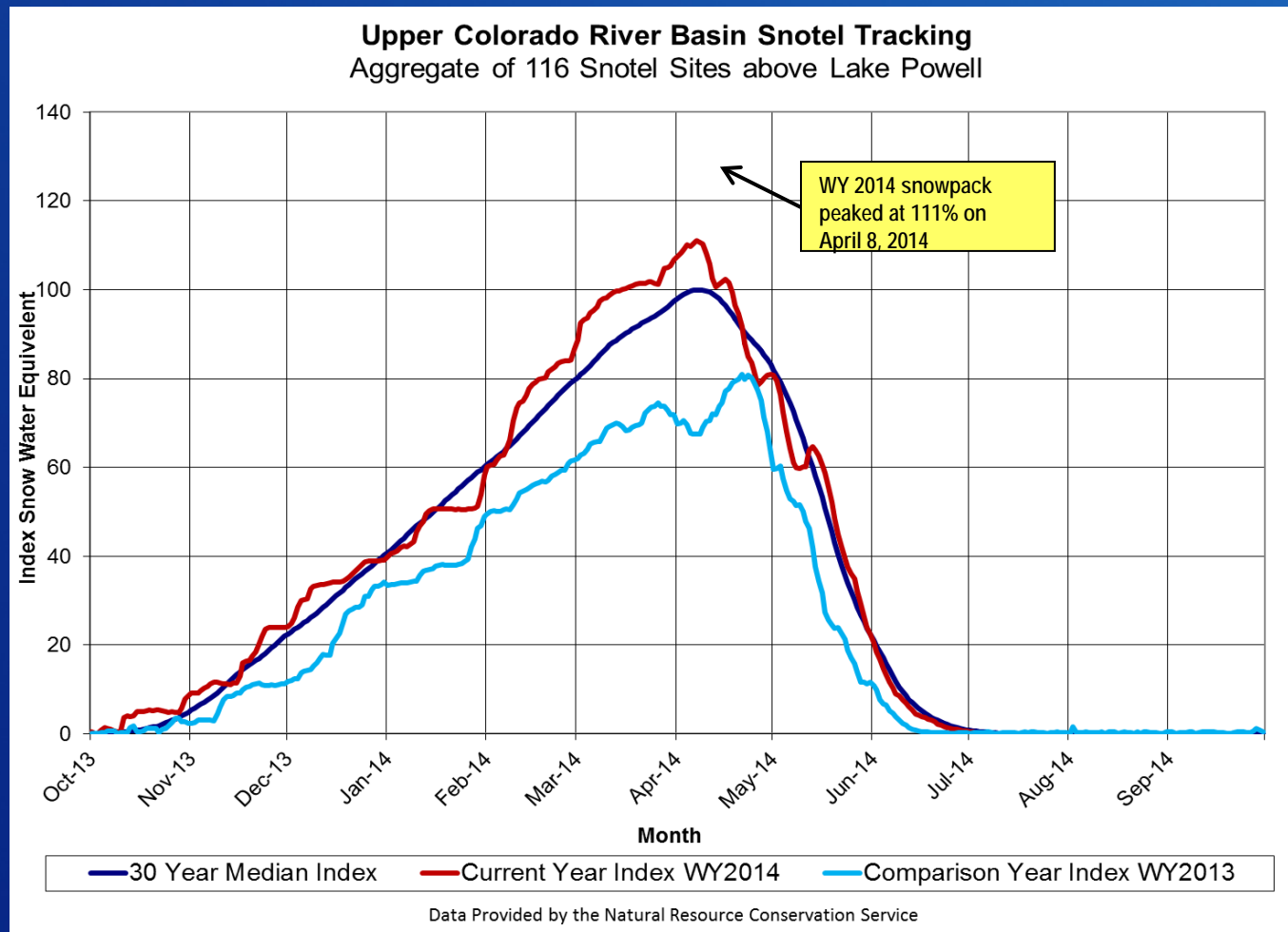


# RECLAMATION

# Colorado River Basin above Lake Powell

Water Year 2014

Precipitation: 106% of average      Runoff: 96% of average

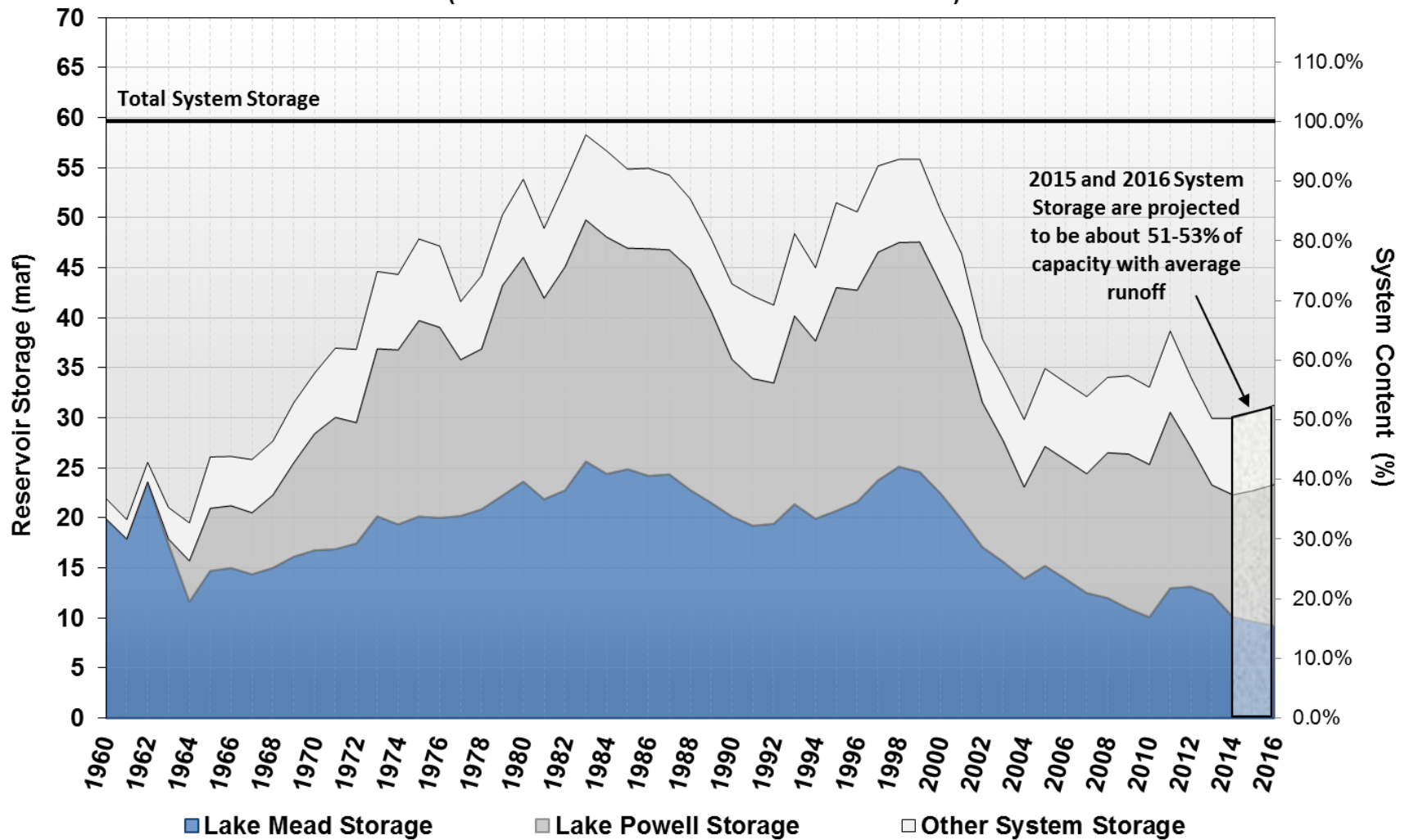


# RECLAMATION

# System Storage - End of Water Year Total Volumes

Water Years 1960 - 2016

(Water Years 2015 and 2016 are estimated<sup>1</sup>)



<sup>1</sup> 2015 and 2016 system storage are based on 24-Month Study model projections.

# Colorado River Basin Water Supply and Demand Study

- Completed in 2012 and conducted by Reclamation and the Basin States, in collaboration with stakeholders throughout the Basin
- Objective was to assess potential future imbalances and options to address those imbalances
- Found that a range of imbalances is plausible; the long-term median is about 3.2 MAF by 2060

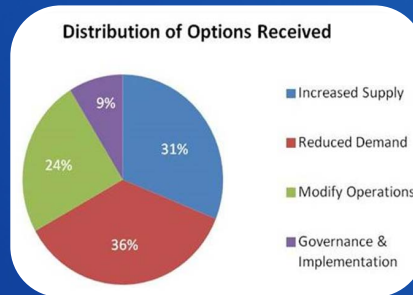


# RECLAMATION



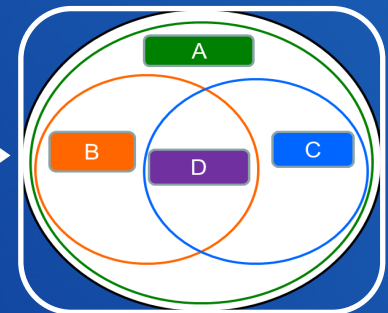
# Recap of the Colorado River Basin Water Supply and Demand Study

- Over 150 options were submitted that represented a wide range of ideas
- Representative options were grouped to form portfolios that represented different strategies
- Each portfolio performed well in reducing resource vulnerability – tradeoffs explored
- There are no silver bullets; a wide range of solutions are needed



**Representative Options (40)**

- M&I Conservation
- Reuse
- Ag Conservation
- Water Transfers
- Water Banking
- Etc.

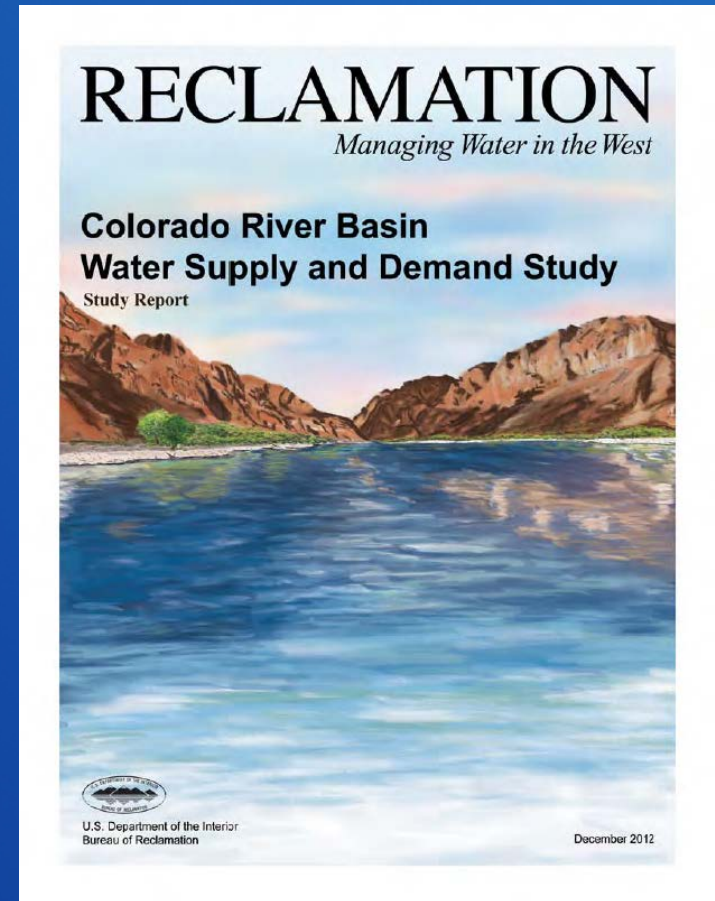


RECLAMATION



# Study Summary

- The system is vulnerable if we do nothing
- Doing something greatly reduces that vulnerability and makes the system more resilient but does not eliminate vulnerability
- In the near term, all portfolios show that conservation, transfers, and reuse are cost-effective ways to reduce vulnerability
- In the longer term, more tradeoffs emerge to achieve an acceptable level of risk in terms of options, cost, resources, and other implications.

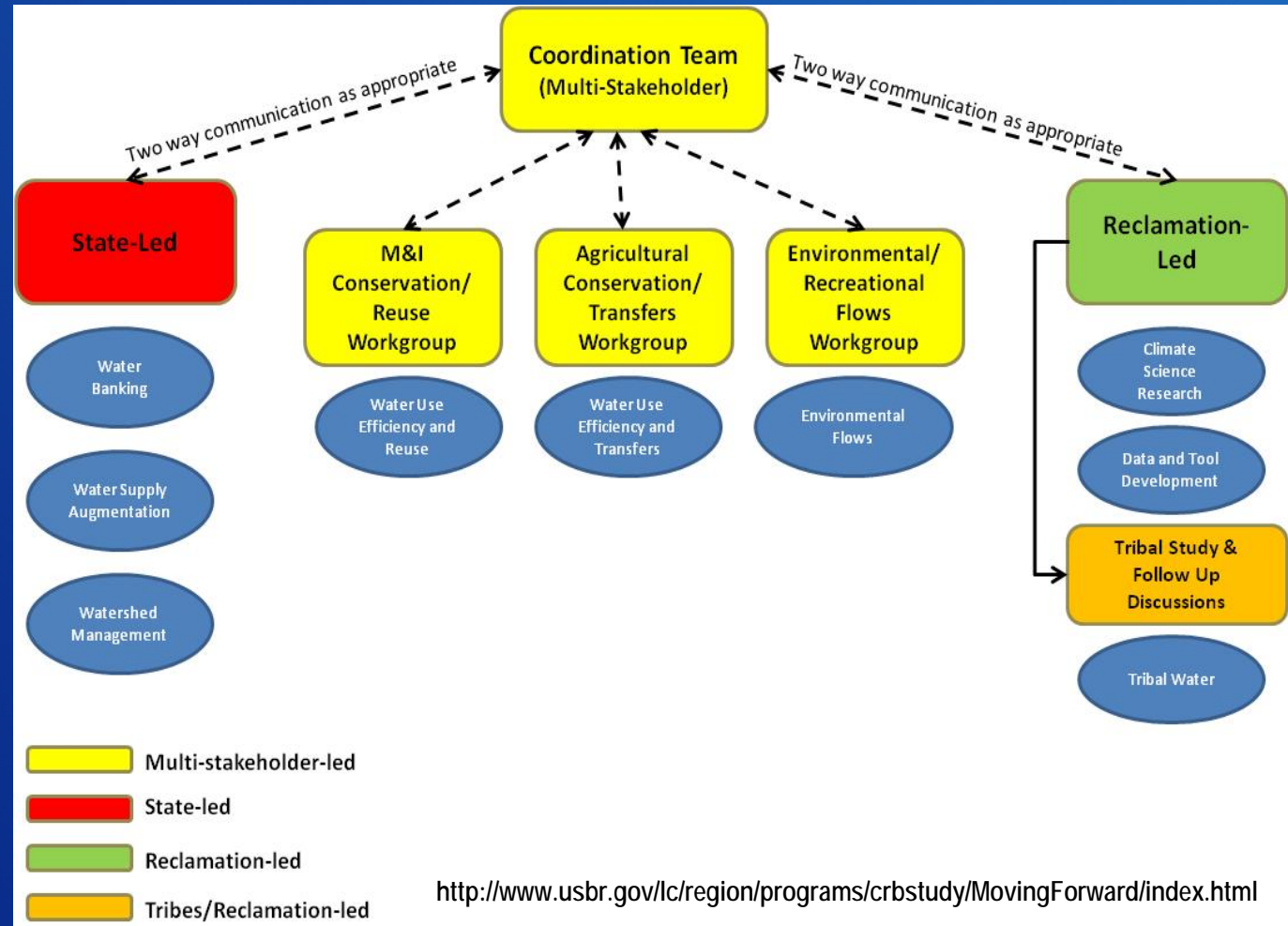


<http://www.usbr.gov/lc/region/programs/crbstudy.html>

# RECLAMATION

# Moving Forward to Address Challenges Identified in the Study

- Addressing future imbalances will require diligent planning and collaboration at all levels
- In May 2013 the *Moving Forward* process was initiated to build on technical foundation and partnerships established in the Study



# Next Steps Workgroups

- Coordination Team
  - Directs and reviews the efforts of the 3 workgroups
- M&I Water Conservation and Reuse Workgroup
  - Collecting information from municipalities to better understand the role of conservation and reuse in addressing imbalances
- Agricultural Water Conservation, Productivity, and Water Transfers Workgroup
  - Collecting information from ag users and districts to better understand role of conservation, transfers and productivity
- Environmental and Recreational Flows Workgroup
  - Exploring potential solutions that enhance eco/rec resources and achieve integrated benefits
- Phase 1 nearly complete and report anticipated to be released in November 2014

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# Colorado River Basin Ten Tribes Partnership Tribal Water Study

- Tribal Water Study Objectives:
  - Assess current and future water use for those tribes of the Ten Tribes Partnership
  - Assess system impacts resulting from the development of tribal water
  - Identify tribal water development challenges and opportunities
- Builds off the limited assessment of tribal water issues conducted in the Colorado River Basin Study
- Conducted jointly by Reclamation and the Ten Tribes Partnership
- Approximately a 2-year Study which began in September 2013

RECLAMATION



# Colorado River Basin Updates

## Questions?

For more information

- Lower Colorado River Operations: <http://www.usbr.gov/lc/riverops.html>
- Basin Study: <http://www.usbr.gov/lc/region/programs/crbstudy.html>
- Next Steps:  
<http://www.usbr.gov/lc/region/programs/crbstudy/MovingForward/index.html>

RECLAMATION



# Water Efficiency in the Colorado River Basin: Closing the Gap

## Making Every Drop Count

*Water Smart Innovations 2014*

*October 10, 2014 - Las Vegas, NV*

 **John Currier, Chief Engineer**  
**Colorado River District**

Protecting Western Colorado Water Since 1937





# Colorado River District

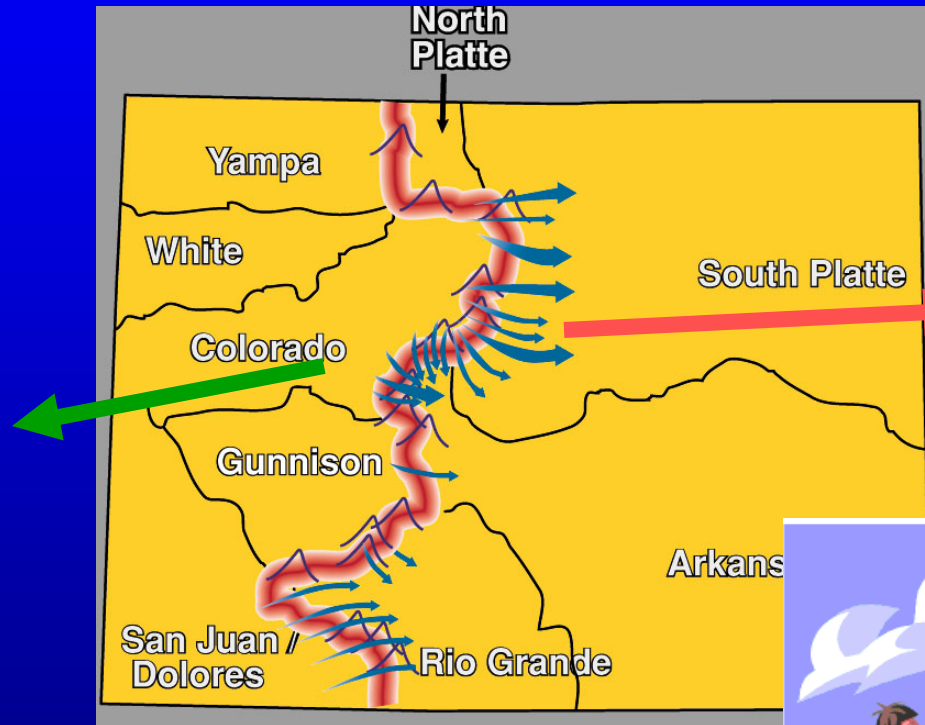


**Colorado River District**

*Protecting Western Colorado Water Since 1937*

# Transmountain Diversions (to east) and Downstream Delivery (to west)

6 to 10  
MAF/Yr

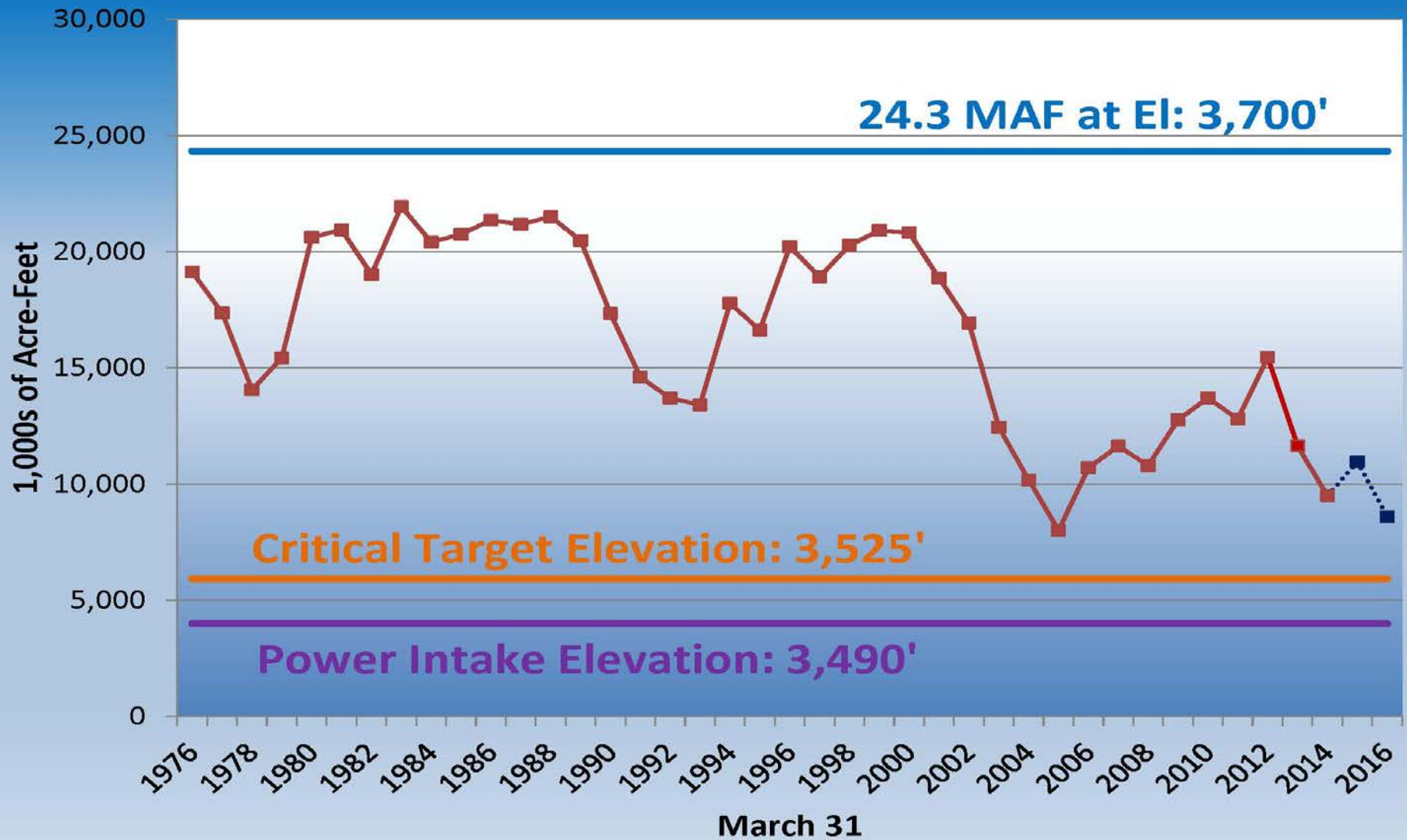


450,000 to  
600,000  
af/yr





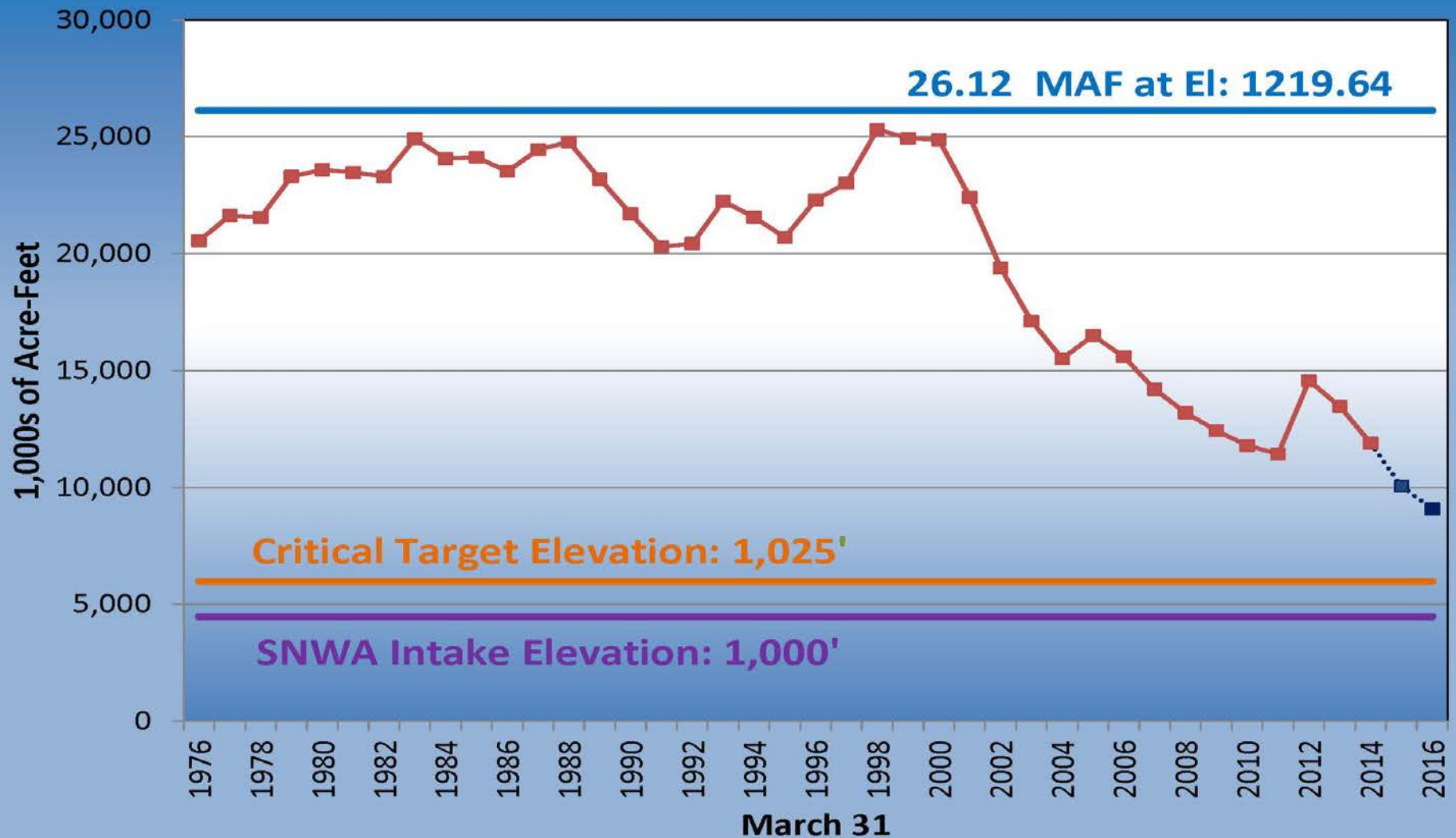
# Lake Powell



**Colorado River District**

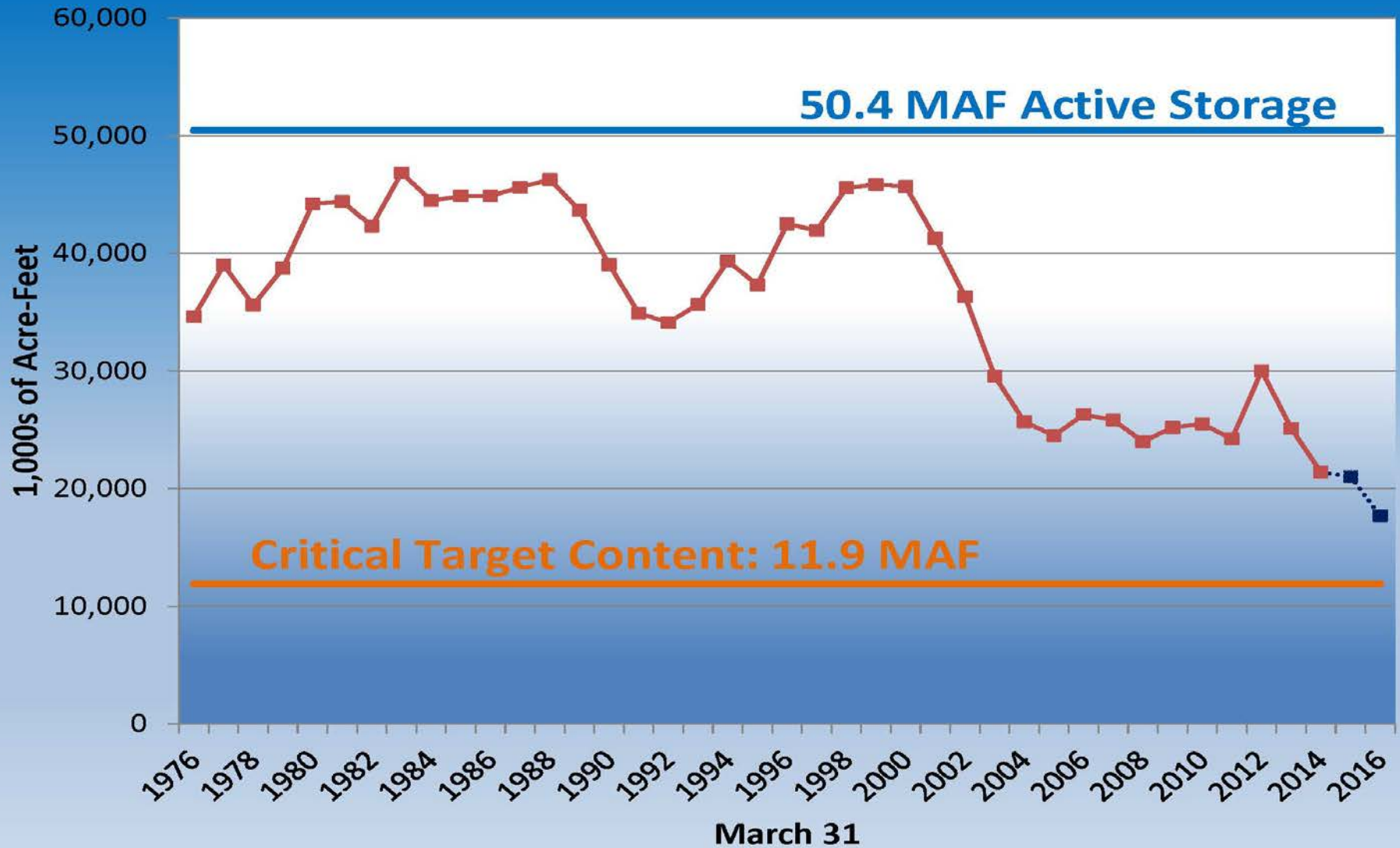
*Protecting Western Colorado Water Since 1937*

# Lake Mead

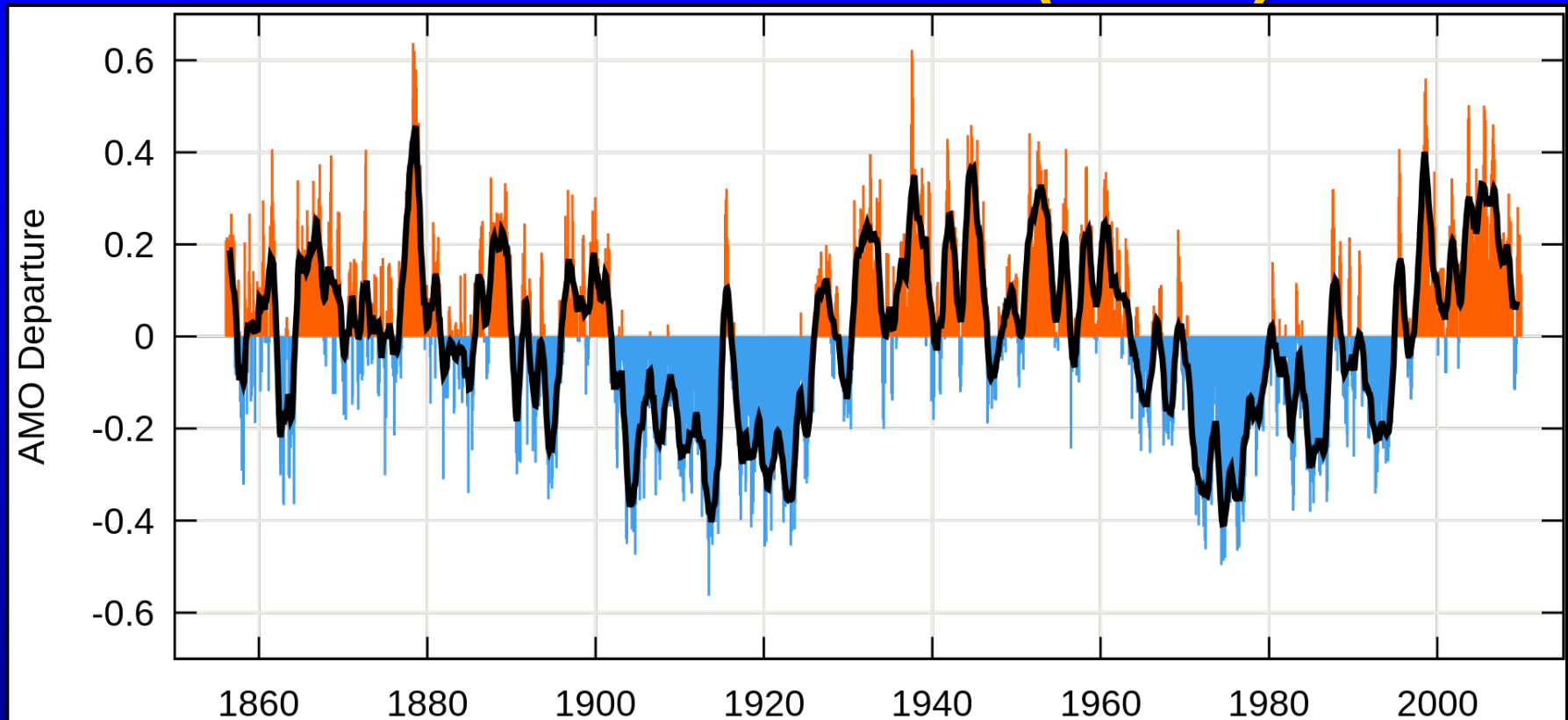




# Mead + Powell



# Monthly Values for the Atlantic Multidecadal Oscillation (AMO) Index



Lee Ferry NF ave. **13.2 MAF/yr** when AMO is **warm**

Lee Ferry NF ave. **16.2 MAF/yr** when AMO is **cool**

*In 1965 Royce Tipton noted that from 1930-1964 the UB could develop about 4.8MAF/yr (2.5 MAF for Colorado)*

# Contingency Planning

**Status Quo** - hope for change

**Action Alternative:**

1. re-operate upper basin storage
2. system augmentation
3. decrease uses (voluntary demand management approach)

# Colorado River Storage Project Units (CRSP)

## Flaming Gorge

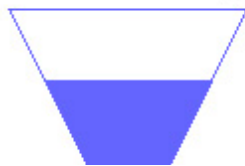
3.7MAF active capacity

**88% full**

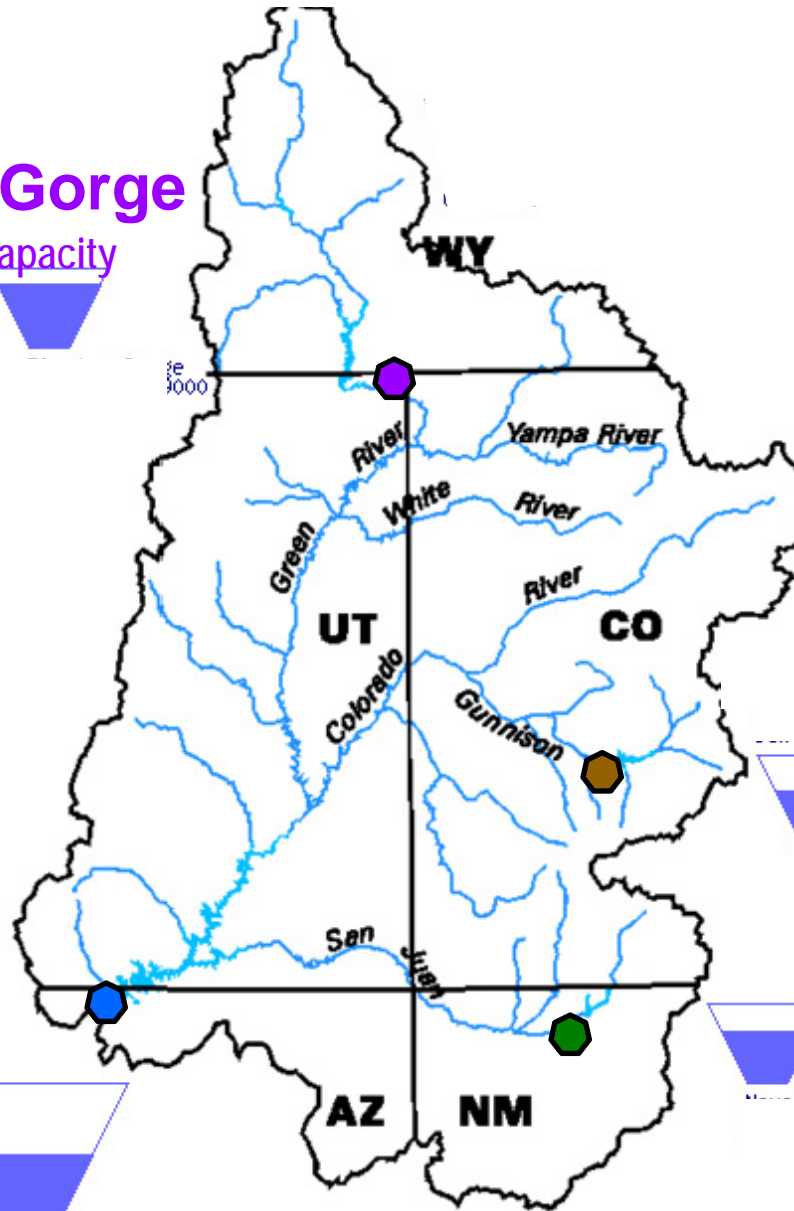


CRSP Acts of 1956 & 1968 authorized construction of facilities for long-term regulation & development of Colorado River water resources

SOURCE: USBR UPPER COLORADO REGION  
LEVELS AS OF 9/29/14



**Lake Powell** 26 MAF active capacity **50% full**



## Blue Mesa

0.84MAF active capacity

**72% full**



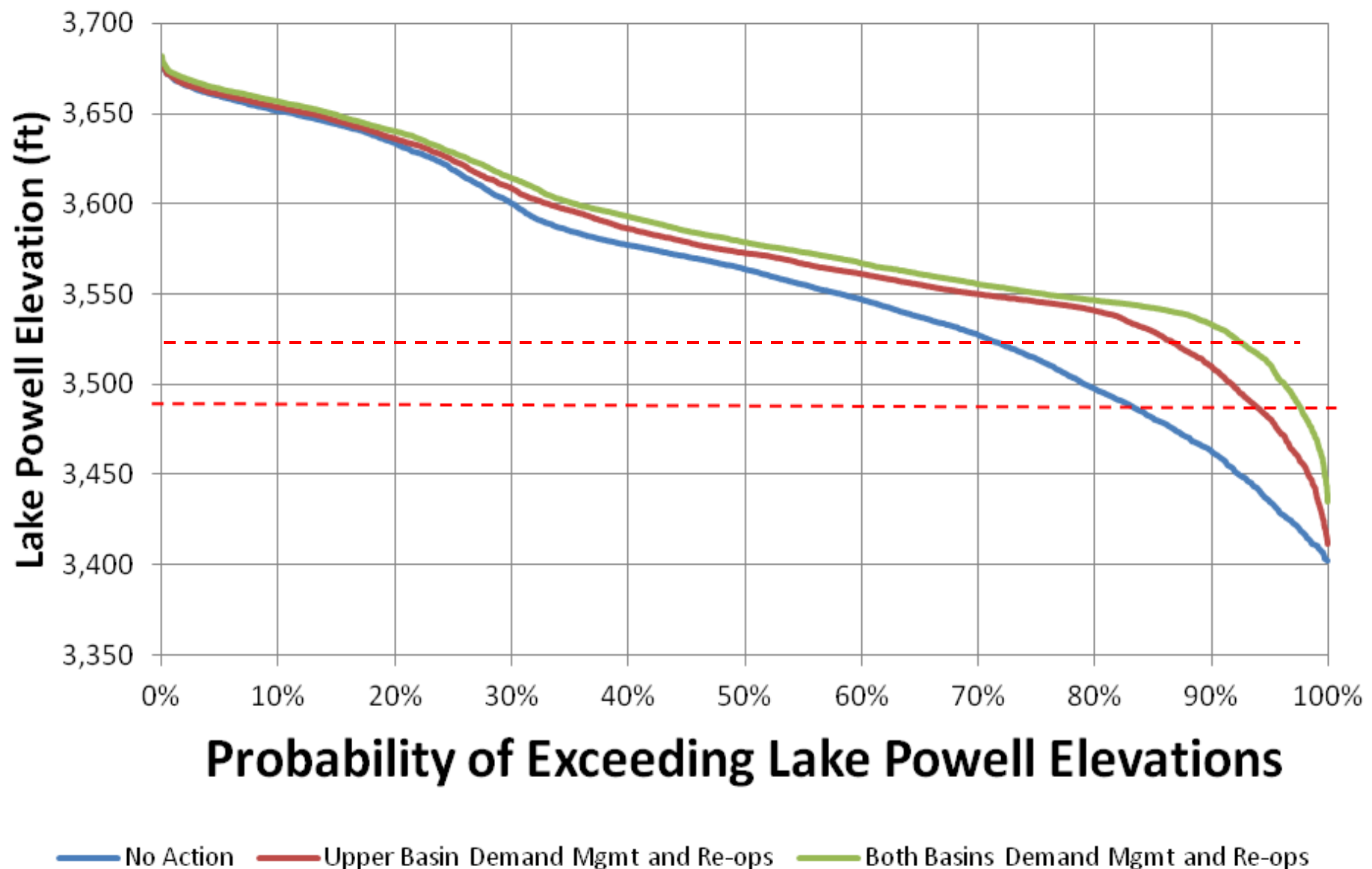
## Navajo

1.7 MAF active capacity

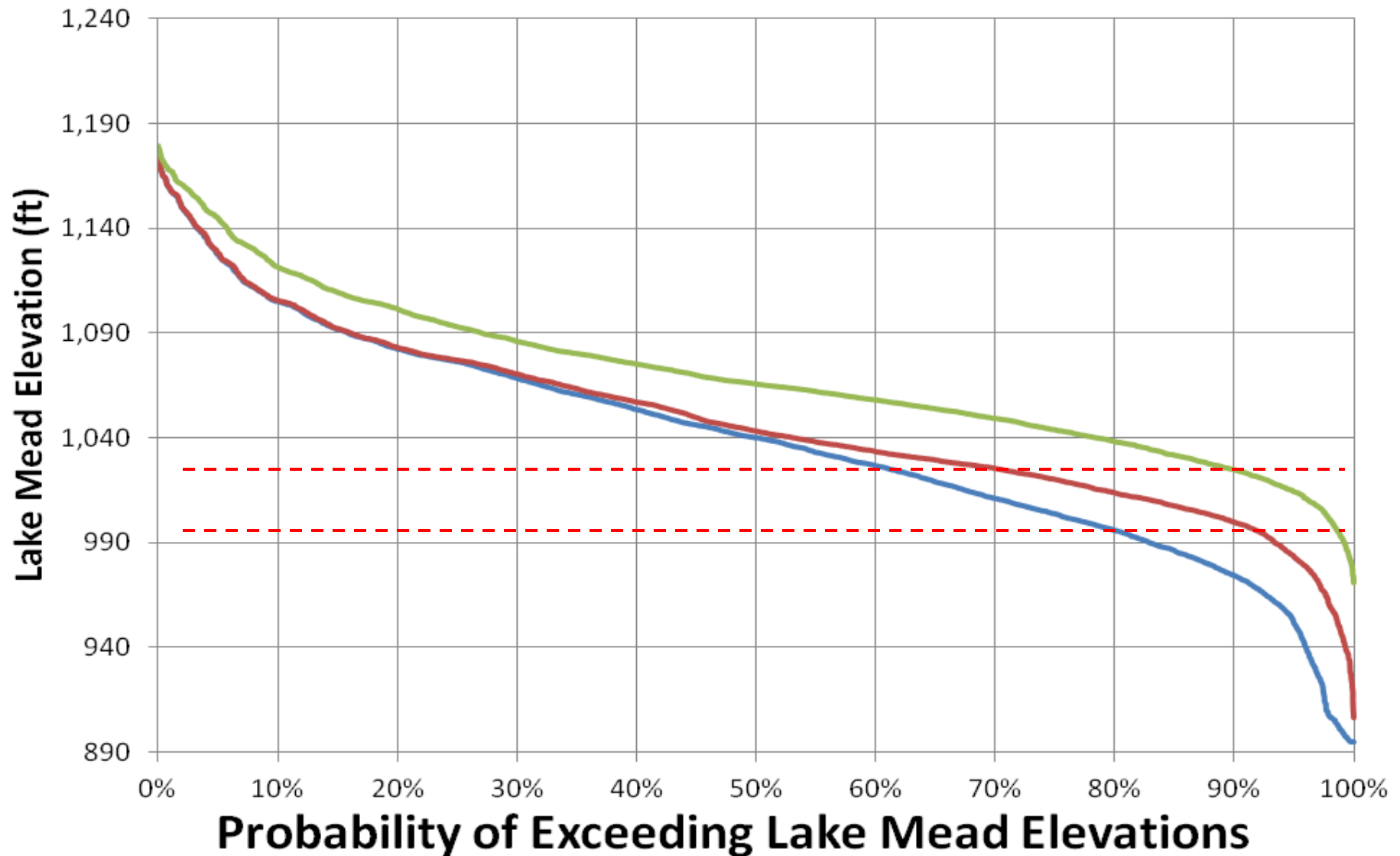
**63% full**



# Lake Powell



# Lake Mead



— No Action — Upper Basin Demand Mgmt and Actions — Upper and Lower Basin Demand Management and Actions

# Take Away Summary

1. This is a contingency plan, not a prediction of future
2. Upper and lower basin synergy is real
3. Continued cooperation toward **BASIN-WIDE** contingency planning essential
4. All planning honors “Law of the River”



# Colorado River District

Protecting Western Colorado Water Since 1937



# Basin Study:

*Perspective of Southern Nevada and the  
Lower Basin States*



**Water Smart Innovations Conference**  
Colby Pellegrino, Colorado River Program Manager  
*October 10, 2014*



# Overview

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- **Southern Nevada's Efforts**
  - **Infrastructure Projects**
  - **Conservation**
- **Multi-state Efforts**
- **Next Steps**



# **Colorado River Basin Study**

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**The Bureau of Reclamation released a Colorado River Basin Water Supply and Demand Study in December 2012.**

**Overall, the study:**

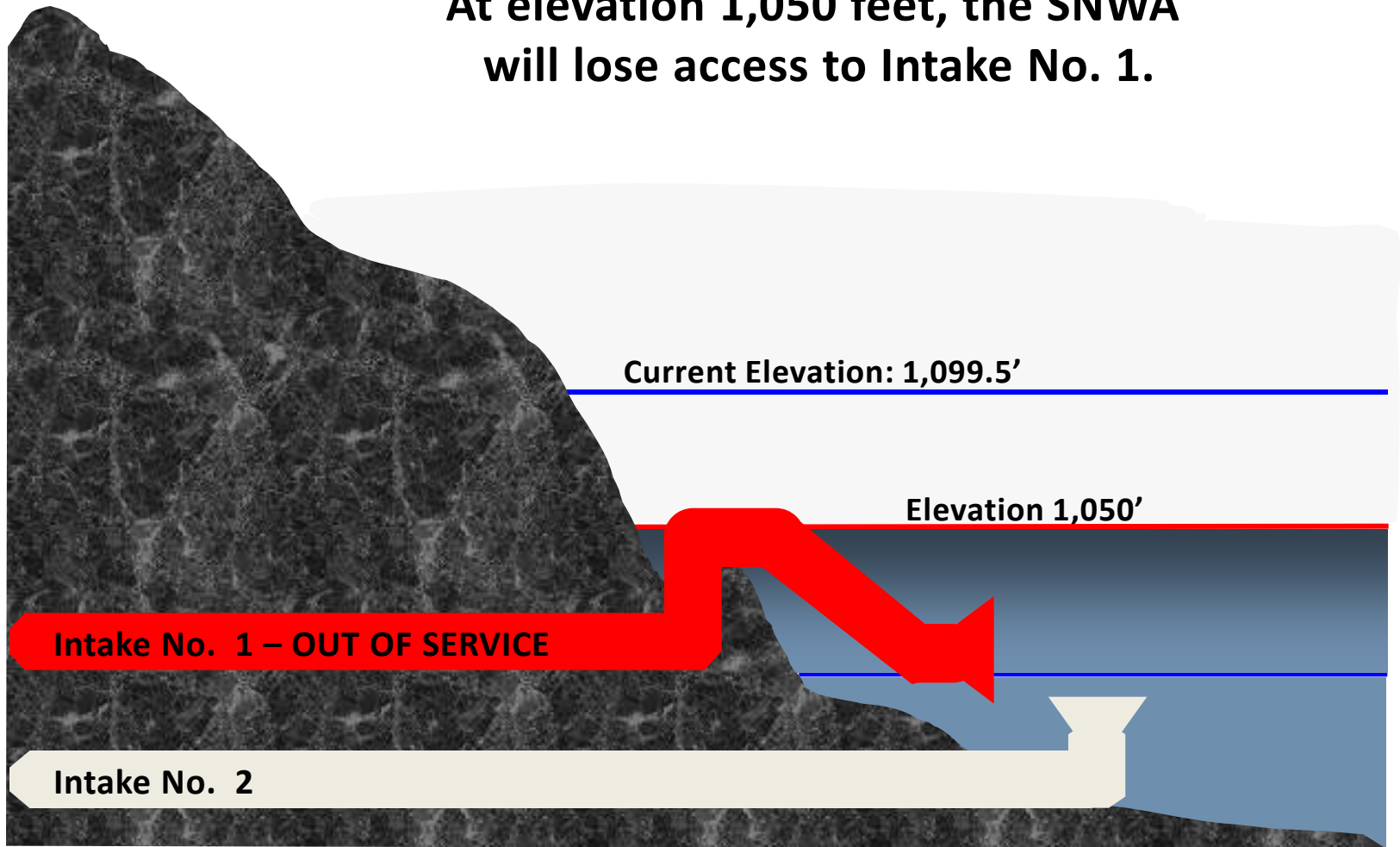
- Addresses future water supplies and demands
- Assesses the reliability of the Colorado River system to meet the needs of the system
- Develops and evaluates options and strategies to address future water supply and demand imbalances



## Intake No. 3: Declining Lake Levels

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**At elevation 1,050 feet, the SNWA will lose access to Intake No. 1.**

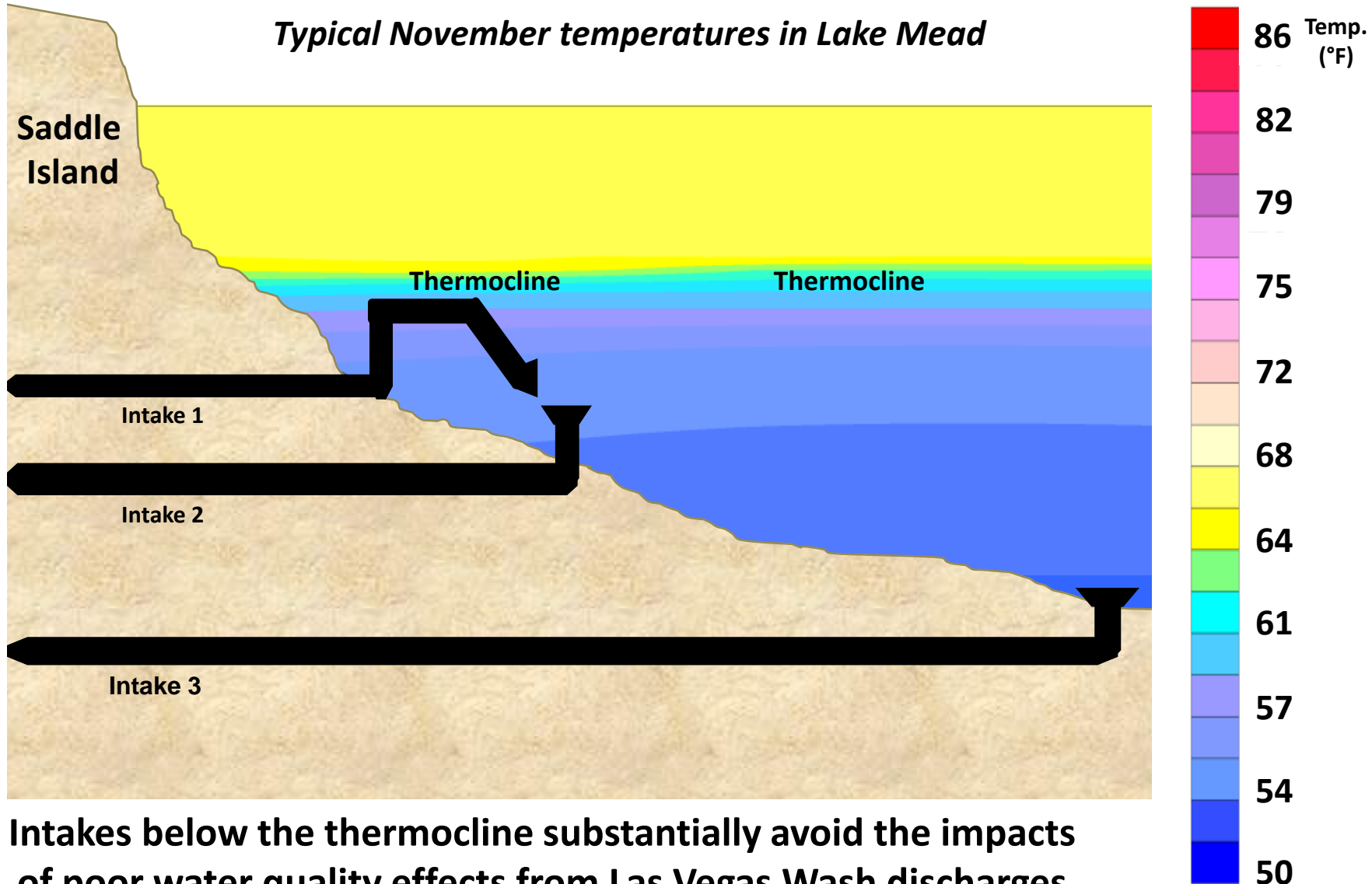






# Intake No. 3: Lake Mead Water Quality

*Typical November temperatures in Lake Mead*



**Intakes below the thermocline substantially avoid the impacts of poor water quality effects from Las Vegas Wash discharges**



## Lake Mead Intake No. 3

- Preserve existing capacity with new deeper pumping station
- Provide access to better quality (cooler) water at elevation 860 ft
- The new intake is scheduled to be completed in 2014





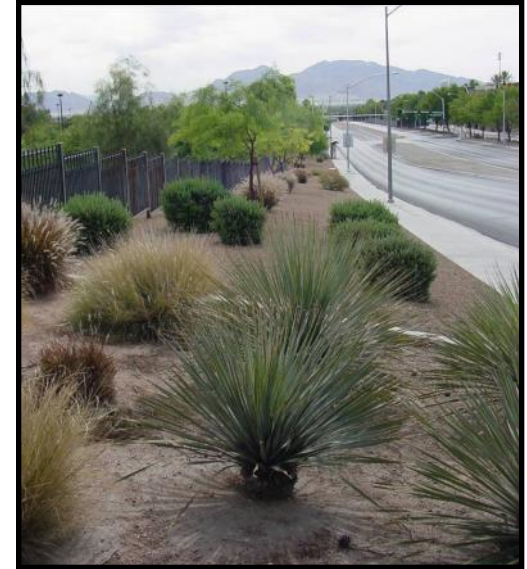
# Conservation

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**The SNWA Water Smart Landscapes Program provides rebates to customers who replace turf with water-efficient landscaping.**



**Before conversion**

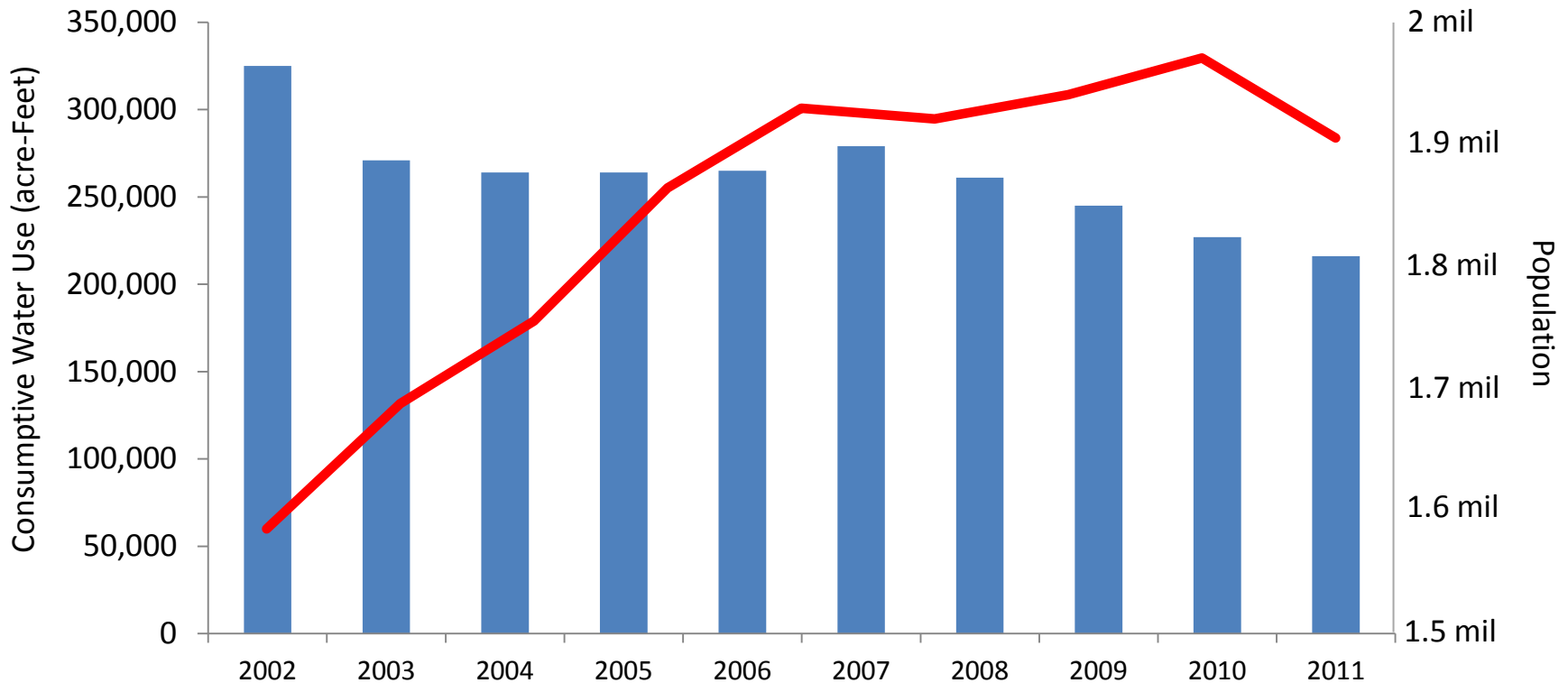


**After conversion**

**To date, Southern Nevada has converted more than  
160 million square feet (14.8 million square meters) of turf,  
saving Southern Nevada more than  
8.9 billion gallons (33.7 billion litres) of water annually.**



# Conservation Achievements



**Over a ten year period, Southern Nevada consumptively used 35 billion gallons less water than in 2002, despite annual population increases and millions of annual visitors.**





# Pilot System Conservation Agreement

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**Initiated by the major municipalities served by Colorado River water to determine to what extent System Conservation is cost-effective and feasible to mitigate drought impacts**

## **Overview:**

- Parties: Bureau of Reclamation, Central Arizona Water Conservation District, Metropolitan Water District of Southern California, and SNWA
- Funding: \$11 million total (\$3 million from Bureau of Reclamation and \$2 million from each municipality)
- Water savings not accrued to any single entity, but rather to improve system storage
- Activities will occur in both basins
- *Shared risk and responsibility among all parties*



# Next Steps

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- **Cooperative working relationships with the Seven Basin States and the Bureau of Reclamation**
- **Explore all feasible options and strategies**
  - Water Banking
  - Water Supply Augmentation
  - Watershed Management
- **Prevent Lake Mead and Lake Powell from reaching critical elevations**



# Summary

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- **Additional conservation is necessary to reduce demands.**
- **A diversified water resource portfolio is essential to provide a reliable water supply for Southern Nevada.**
- **Additional, non-Colorado River water resources must be obtained to protect Southern Nevada from drought.**
- **The future of water development requires that our actions are responsible to the environment and that we consider the long-term sustainability of all our resources.**





# Implementing Water Efficiency Basinwide

Edward R. Osann  
Natural Resources Defense Council  
WaterSmart Innovations 2014  
Las Vegas NV  
October 10, 2014



# Conservation and Efficiency: Already an Established Trend

Rockaway *et al* (2011):

- Found a broad decline in per household water use of about 0.5% per year over a 15-year period in communities across the country – even those without active water conservation programs.
- The authors attributed about 2/3 of this decline to more efficient plumbing and water-using appliances.

# Conservation and Efficiency: Already a major water supply

The Pacific Institute review of M&I use (2011):

- Per capita water use by urban water suppliers drawing water from the Colorado River Basin declined from 1990 to 2008 by a median value of 16%
- Result: annual usage of 6.5 million acre-feet of water in 2008, instead of 8.5 million acre-feet if 1990 per capita consumption levels had remained unchanged, yielding 2 million acre-feet of savings.

# Water Savings Potential in SoCal alone is still HUGE

- Pacific Institute (2003) -- potential savings in Southern California at 2.3 million acre-feet (MAF)
- CA DWR (2010) -- potential savings and reuse in Southern California at approximately 1 million acre-feet (MAF)\*

\* DWR did not include enhanced conservation rate structures or implementation of revised Model Landscape Ordinance





# Colorado River Basin Study

## Findings --

- Approx 500,000 af of M&I savings under current policies
- Approx 1 Maf of M&I savings possible under each demand scenario
- Together, M&I and ag conservation can deliver more water sooner than all other options
- These ultimately yield more water than supply options of water imports and reuse
- Only desalination and watershed management (including weather modification) potentially deliver more in long run

Significant demand management is in our future no matter what.

# Conservation Options are Here Today

- Conservation pricing
- Multi-family submetering
- Advanced metering infrastructure
- Stronger building & plumbing codes
- Water loss reduction
- High efficiency washers
- Pool covers

## 2014

January

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
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April

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June

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July

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December

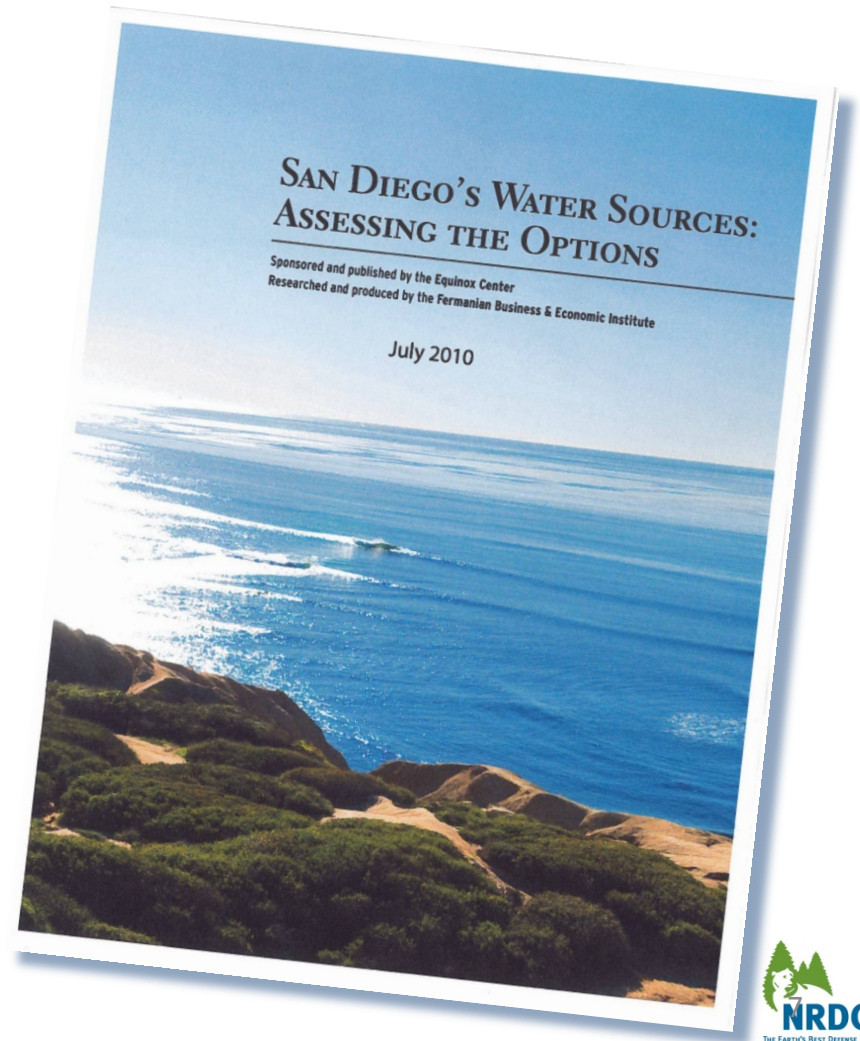
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28	29	30	31			



# Water Efficiency is Still a Bargain

For San Diego, comparing 7 water source options, efficiency is –

- Lowest cost in 2010
- Lowest projected rate of real cost increase through 2030
- Lowest cost in 2020 and 2030





# Let's Get Started

“Business as Usual” is not sustainable

Historically, interstate institutions were most concerned with preserving allocations and ensuring fair share

More collaborative approaches today can pool expertise, identify best efficiency practices, and start saving water quickly

Key focus should be to avoid “lost opportunities”

- Building codes
- New landscapes
- Graywater/rainwater capture





# State & Local Building Codes

New editions of national model codes will come out  
in 2015 --

Uniform Plumbing Code (UPC)

International Plumbing Code (IPC)

International Energy Conservation Code

Green or “stretch” codes are also being updated

UPC’s Green Supplement

IPC’s Green Construction Code (IgCC)

Opportunity: Most states considering  
code revisions in 2016 and 2017.

# More Targets for Collaboration

Similar opportunities for collaborative development of best practices –

New landscapes: installation criteria and water budgets

Graywater and rainwater catchment systems – standardizing health code treatment of applications, quality standards, inspection and maintenance





# Water Loss Reduction

One way to locate leaks



A better way . . .



- 870,000 AF lost to leaks in California statewide
- 350,000 AF could be cost-effectively eliminated

Standardized water loss reporting will be required statewide in 2015.

# Getting Organized for the Long Haul

The real question at the moment is not what efficiency measures will work.

- Many efficiency strategies are “shovel ready” today
- Technology and economics will continue to produce new options to save water

Rather, the question is –

- Can we get organized quickly to make projected and potential water efficiency savings a reality?
- How do we find out who's interested and active in key aspects of water efficiency?



# Regional Collaboration to Advance Water Efficiency

## Water Efficiency Action Network for the Colorado River Basin

- Bottoms up: work groups can be formed on any topic
- Multi-stakeholder: open to all with an interest in water efficiency
- Nominal dues; minimal meetings



Submetered apartments  
in Santa Monica

# Contacts

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Water Efficiency Action Network for the Colorado  
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