

# Committee on Water

NARUC  Summer  
Policy Summit



# **Committee on Water Water Trading and Other Unique Approaches to Addressing Water Shortages and Shifts in Demand**



# Interstate Cooperation to Protect the Colorado River System

NARUC Summer Policy Summit  
July 18, 2017

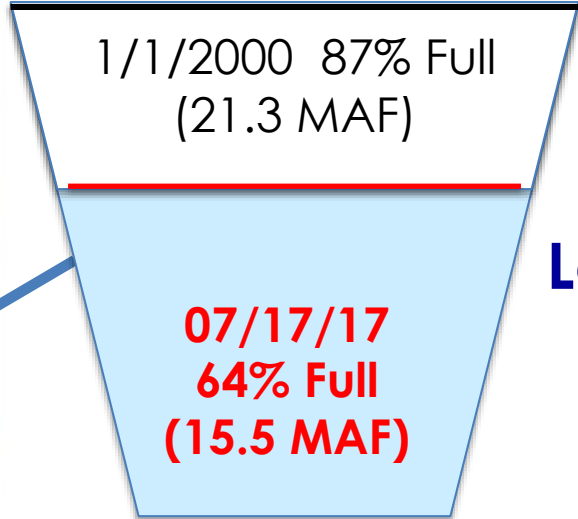
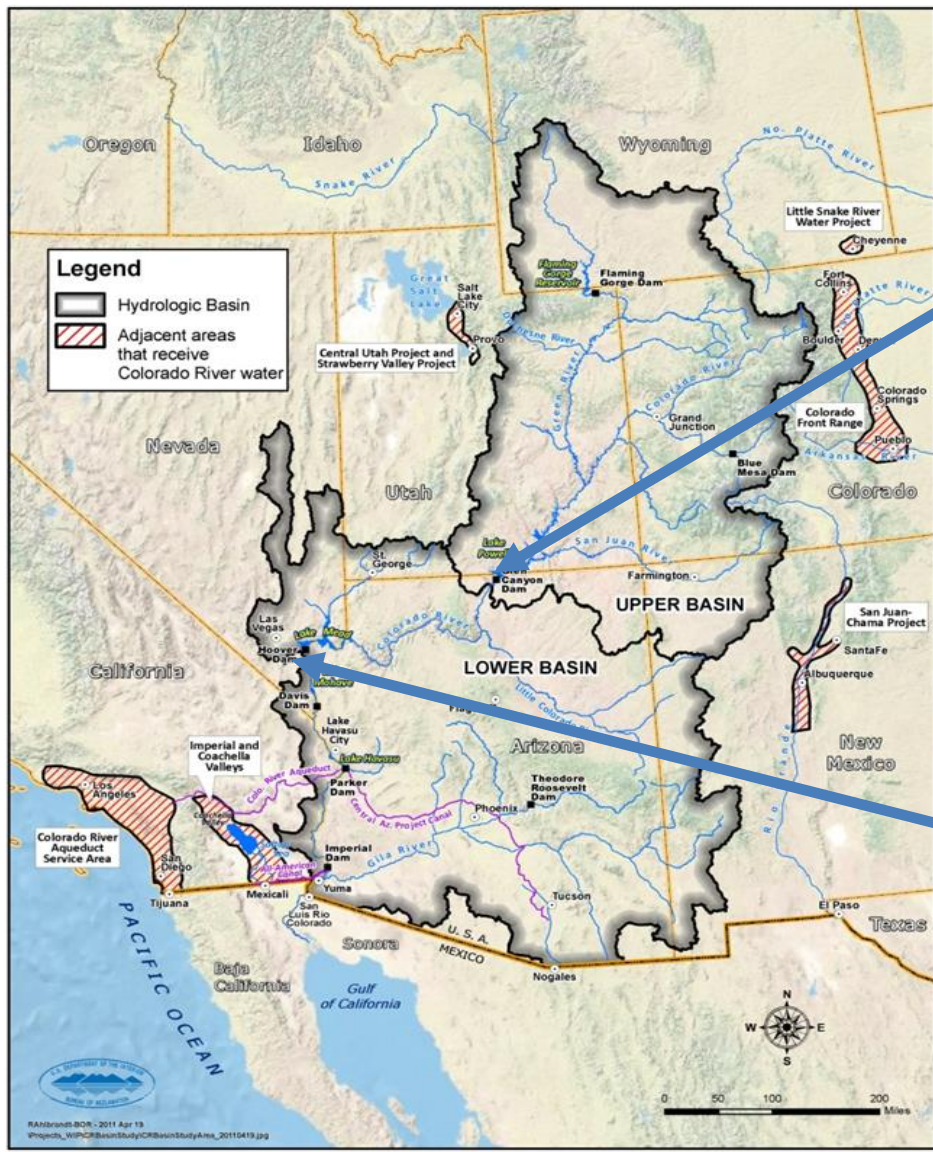
**Chuck Cullom**  
**CAP**  
**Colorado River Programs**



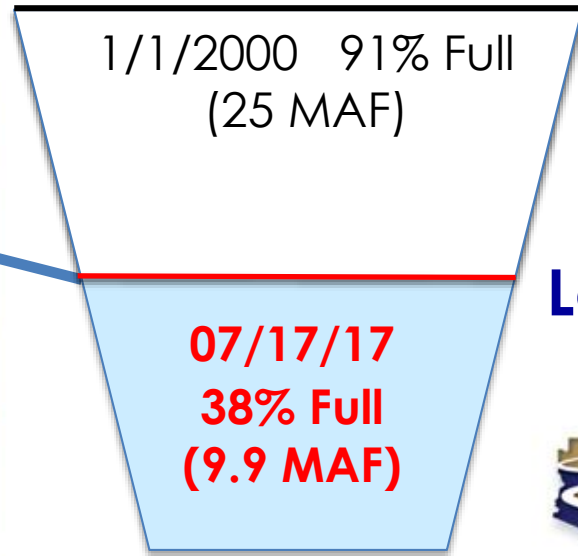
YOUR WATER. YOUR FUTURE.

# Backbone of the Colorado River System

## Lake Mead and Lake Powell:



Lake Powell



Lake Mead





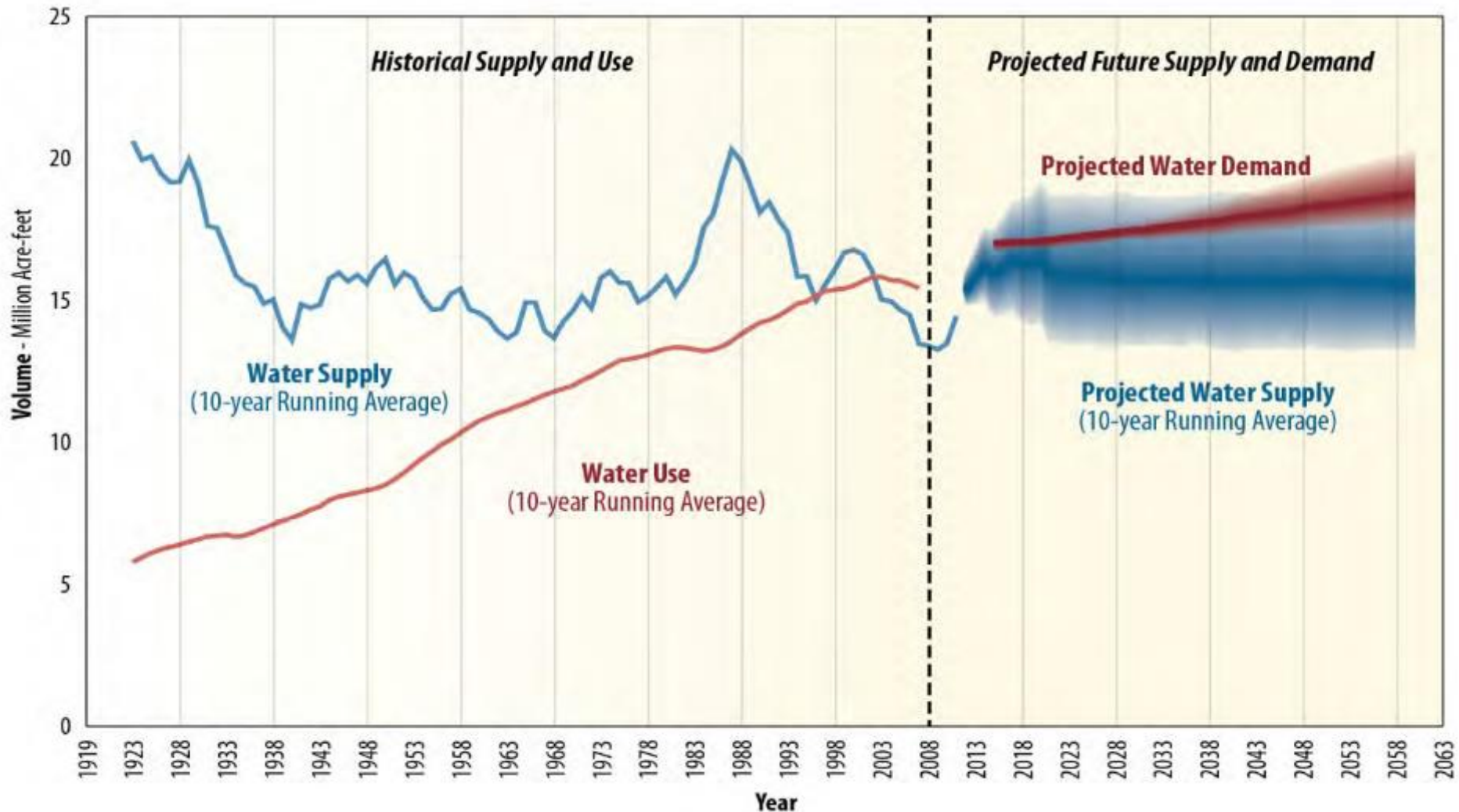
# Central Arizona Project

- Delivers water to 5 million people in Arizona
- Provides water for cities, tribes, & irrigation



# Water Supplies vs Demands – A Growing Gap

## Colorado River Water Supply and Demand Study



# Annual Imbalance Between Supplies & Demands = Structural Deficit

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Normal Inflow	9.0 MAF
(Release from Lake Powell plus smaller rivers)	
Normal Outflow	
(Deliveries to AZ, CA, NV, and Mexico	
+ downstream regulation and gains/losses)- 9.6 MAF	
Evaporation	- 0.6 MAF
Balance	-1.2 MAF

Approximately 12 foot decline in normal year

# Impacts of the Structural Deficit

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- Results in a decline of 12+ feet in Lake Mead every year when releases from Powell are “normal” (8.23 MAF)
- Results in a decline of 4 feet in Lake Mead every year when releases from Powell are “balancing” (9.0 MAF)
- Drives Lower Basin to shortage
- CAP forced to bear obligations of others
  - Evaporation and other system losses
  - Lower Basin’s half of Mexican Treaty obligation



# Consequences of Lake Mead Decline

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- 1075' ▪ Arizona takes 320 KAF shortage
- 1050' ▪ Arizona takes 400 KAF shortage reduction
  - Reductions in hydropower generation
- 1025' ▪ Arizona takes 480 KAF shortage reduction
  - Uncertainty about what actions Secretary will take to protect Lake Mead
  - Potential loss of hydropower generation and instability in the electrical grid
- 1000' ▪ Active storage in Lake Mead is less than CA's allocation (~4.3 MAF)
  - "Run of River" operations – insufficient storage to meet deliveries to AZ, CA, NV and MX
- 895' ▪ Dead pool; only 2 MAF in storage

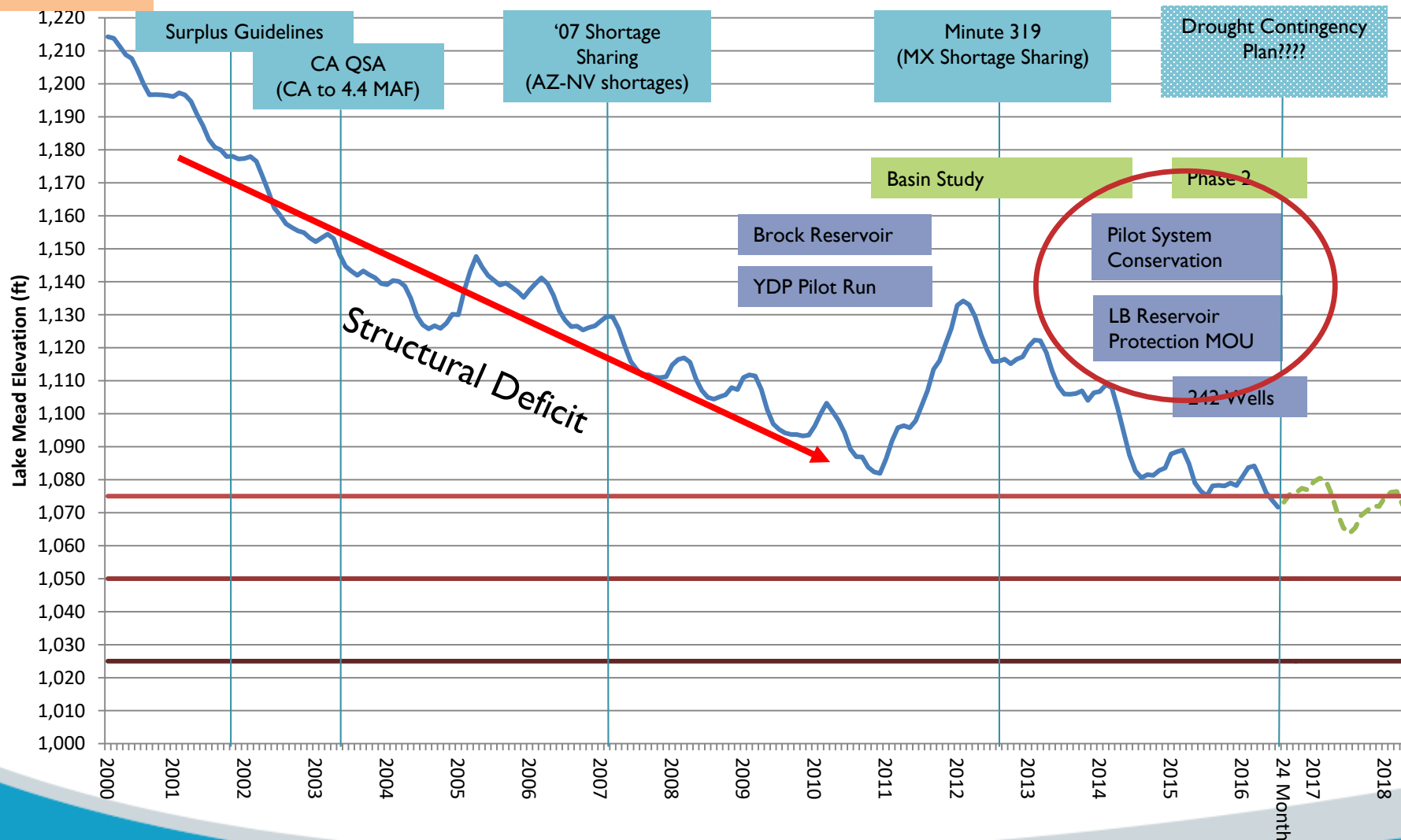
# Interstate Agreements and Projects to Address Declining Reservoir Elevations



## Lake Mead Elevation

(EOM Jan 2000 – March '16 and Projected 24 Months)

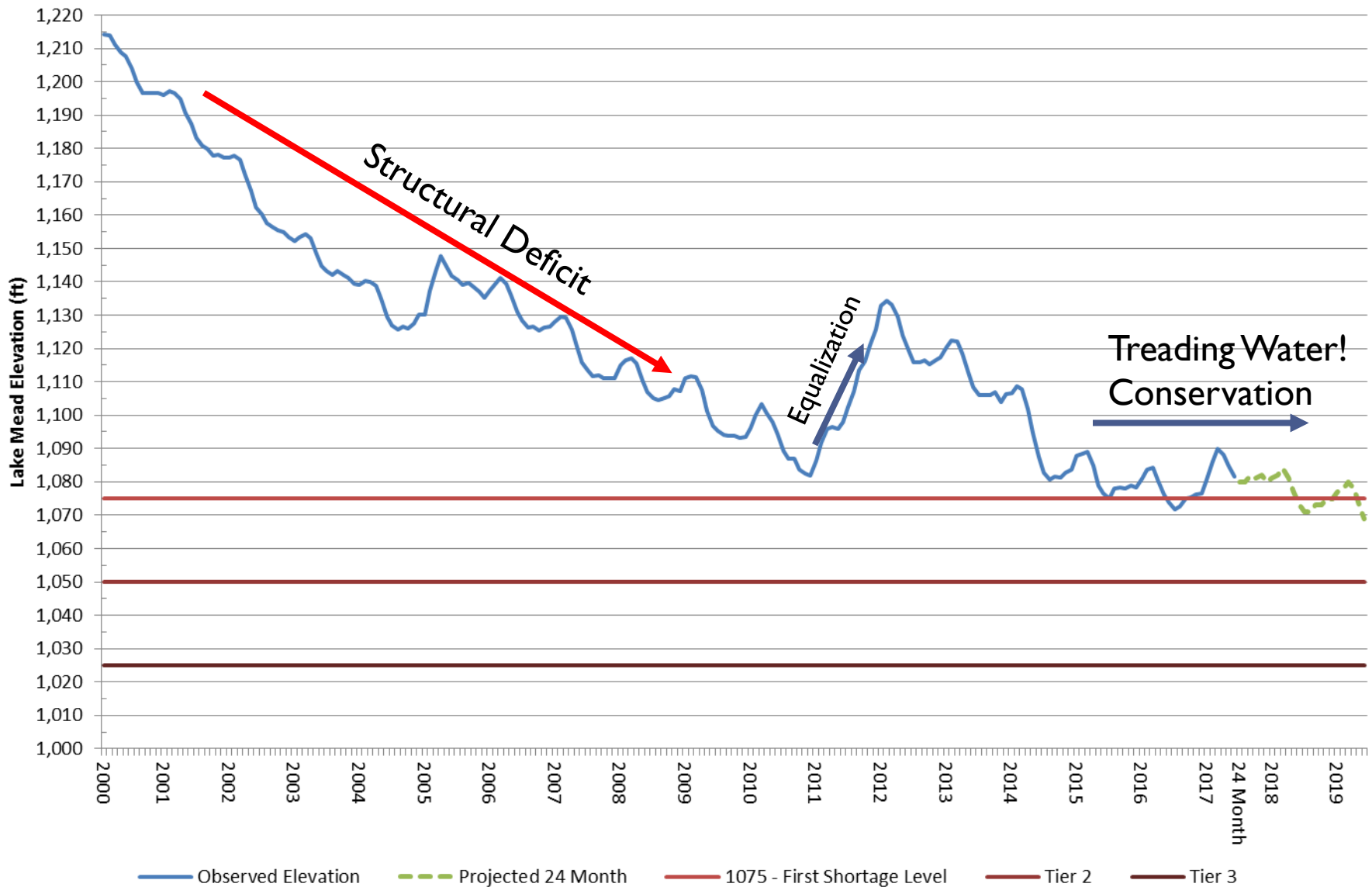
AWBA 1996 – P



Observed Elevation    Projected 24 Month    1075 - First Shortage Level    Tier 2    Tier 3

# Lake Mead Elevations

Lake Mead Elevation  
(EOM Jan 2000 - May'17 and Projected 24 Months)





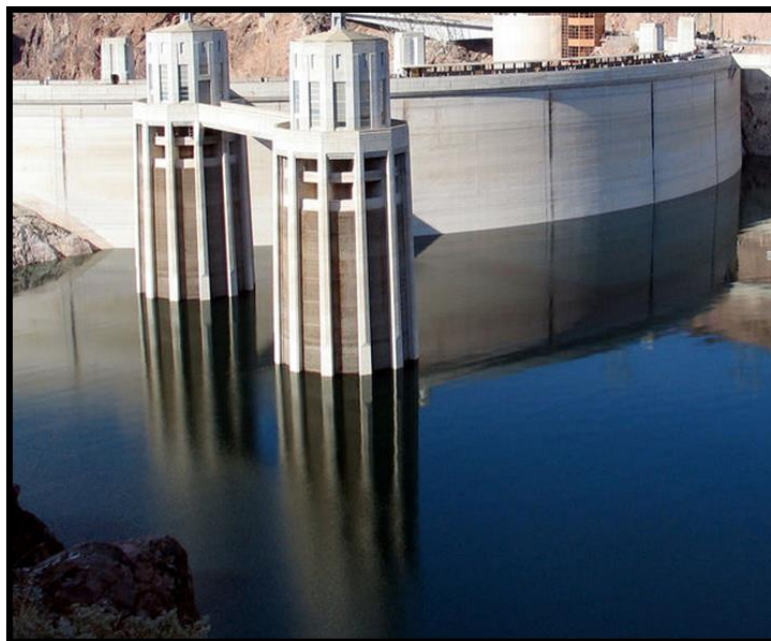
# Pilot Drought Response Action MOU

- Voluntary development of water in Lake Mead
- To reduce risks of reaching critically low elevations in Lake Mead
- Creation of Protection Volumes in 2014-2019

## **MOU 2014-2017**

USBR = 50 kAF  
SNWA = 45 kAF  
MWD = 300 kAF  
CAP = 345 kAF

} 9'



# CAP Cooperative MOU Programs



## 12 Ag Participants

Tonopah IDD  
Roosevelt WCD  
Queen Creek IDD  
New Magma IDD  
Hohokam IDD  
Maricopa-Stanfield IDD  
Central Arizona IDD  
Kai Farms  
BKW Farms  
Maricopa Water District  
Salt River Project  
Yuma Mesa IDD (on-River)

## 4 Cities

Glendale  
Peoria  
Phoenix  
Scottsdale



# MOU: Ag Forbearance Programs

- Ag Forbearance 1 – CAP agricultural districts in Central Arizona
  - To qualify, a district must have accepted full delivery of their Ag Pool Water during 2012-2014
  - Must agree to forbear at least 23% of their Ag Pool Water but less than 75% or 20 kAF, which ever is less
  - In exchange for accepting a reduced delivery, the district would receive a reduced pumping energy charge for any remaining Ag Pool deliveries
    - For 2015, a savings of \$17 per AF
    - For 2016, a savings of \$19 per AF
  - CAP modified its policy to not re-market forborne water
  - ADWR stated this forbearance does not impact a district's ability to serve as a Groundwater Savings Facility



# MOU: Ag Forbearance Programs

- Ag Forbearance 3
  - Forbearance of remaining Ag Pool Water by some districts in 2016
    - Policy flexibility through these Forbearance programs
    - Allowed access to less expensive water sources – GSF water
- These additional forbearances would be at no cost to CAP



# MOU: Supply Replacement Program

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- Glendale
  - Peoria
  - Phoenix
  - Scottsdale
- 
- No cost to CAP
  - Received a local supply in lieu of a portion of their CAP allocation
  - This local supply was CAP credits that were stored in the SRP system

# MOU: CAGRD-YMIDD Fallowing

- Farmers paid to voluntarily fallow lands that would otherwise be farmed
- Total fallowed land ~ 1,500 acres (~10% of irrigated acres within District)
- Qualified land must have produced crops in 4 out of 5 previous years
- Enrollment capped at 15.7% of total irrigated acres (10% for large landowners)
- Conserved water saved as System Water in Lake Mead
- Pilot project lessons learned:
  - Identification of legal land ownership issues
  - Method for quantification of conserved water
  - Proof that temporary agricultural to urban water transfers could be possible
  - Fallowing programs can have System benefits



# MOU: Intentional Creation of System Water

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- Unused on-river water
  - Water that that is available to be diverted by CAP
  - CAP deferred this diversion to create System Water
- Unused CAP water
  - Water ordered but not taken by a CAP customer
  - CAP elected to not re-market this unused water
  - CAP deferred this diversion to create System Water



# Pilot System Conservation Program

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- Determine whether system conservation programs can be effective to partially mitigate drought impacts
- Water users would be compensated for voluntary reductions in water use
- Partners make monetary contributions to implement the program
- Funds can be expended across the Basin

# PSCP Funding and Basin Support

## Phase 1: 2015-2016

BOR = \$3M

CAP = \$2M

SNWA = \$2M

MWD = \$2M

Denver Water = \$2M

Total = \$11M

\$8.25M for Lower Basin

\$2.75M for Upper Basin

## Phase 2: 2016-2017

BOR = \$5.2M

CAP = \$1M

SNWA = \$1M

MWD = \$1M

Total = \$8.2M

\$7.2M for Lower Basin

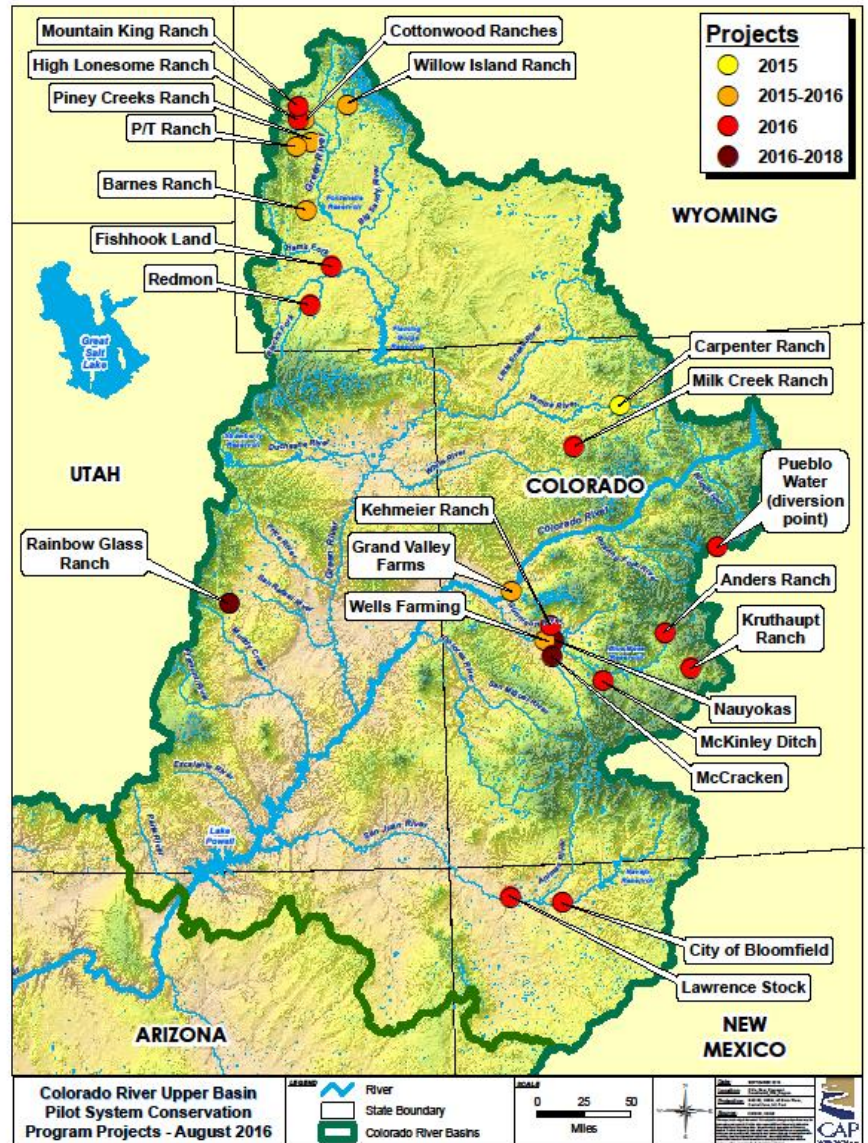
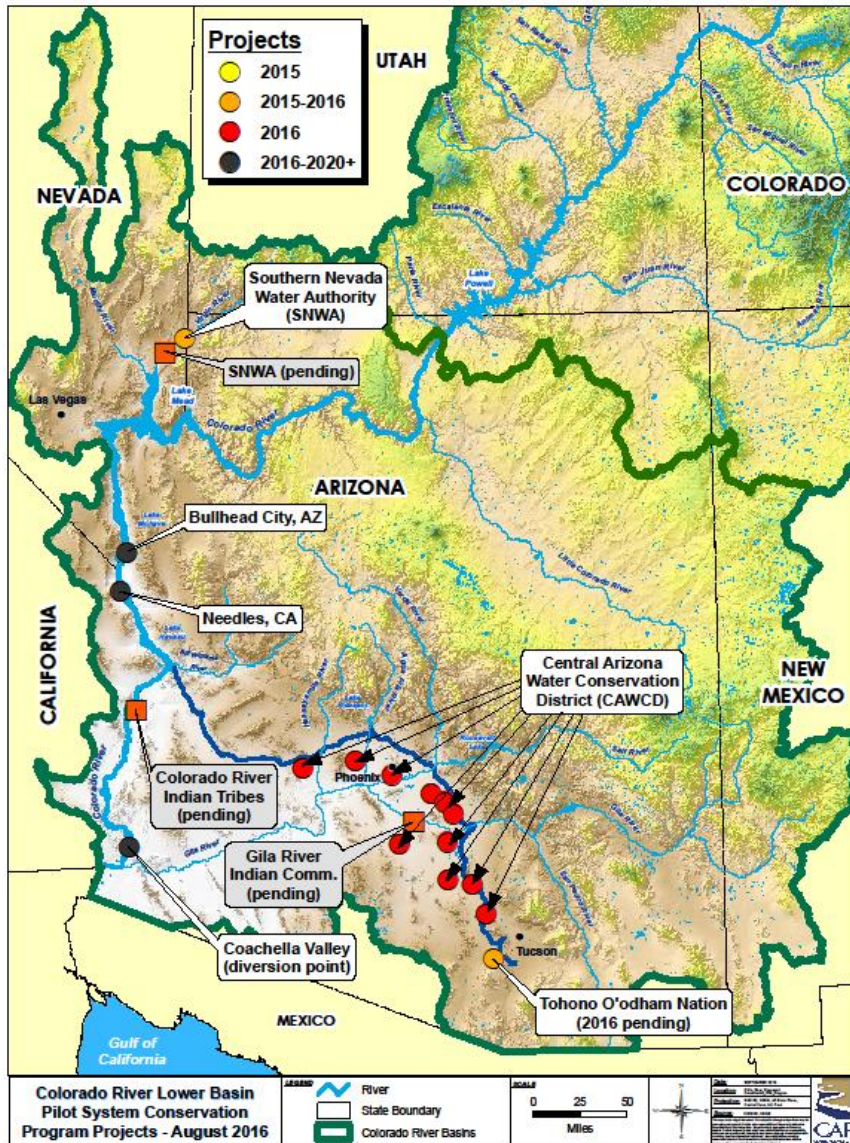
\$1.0M for Upper Basin



# PSCP: Key Factors in Project Selection

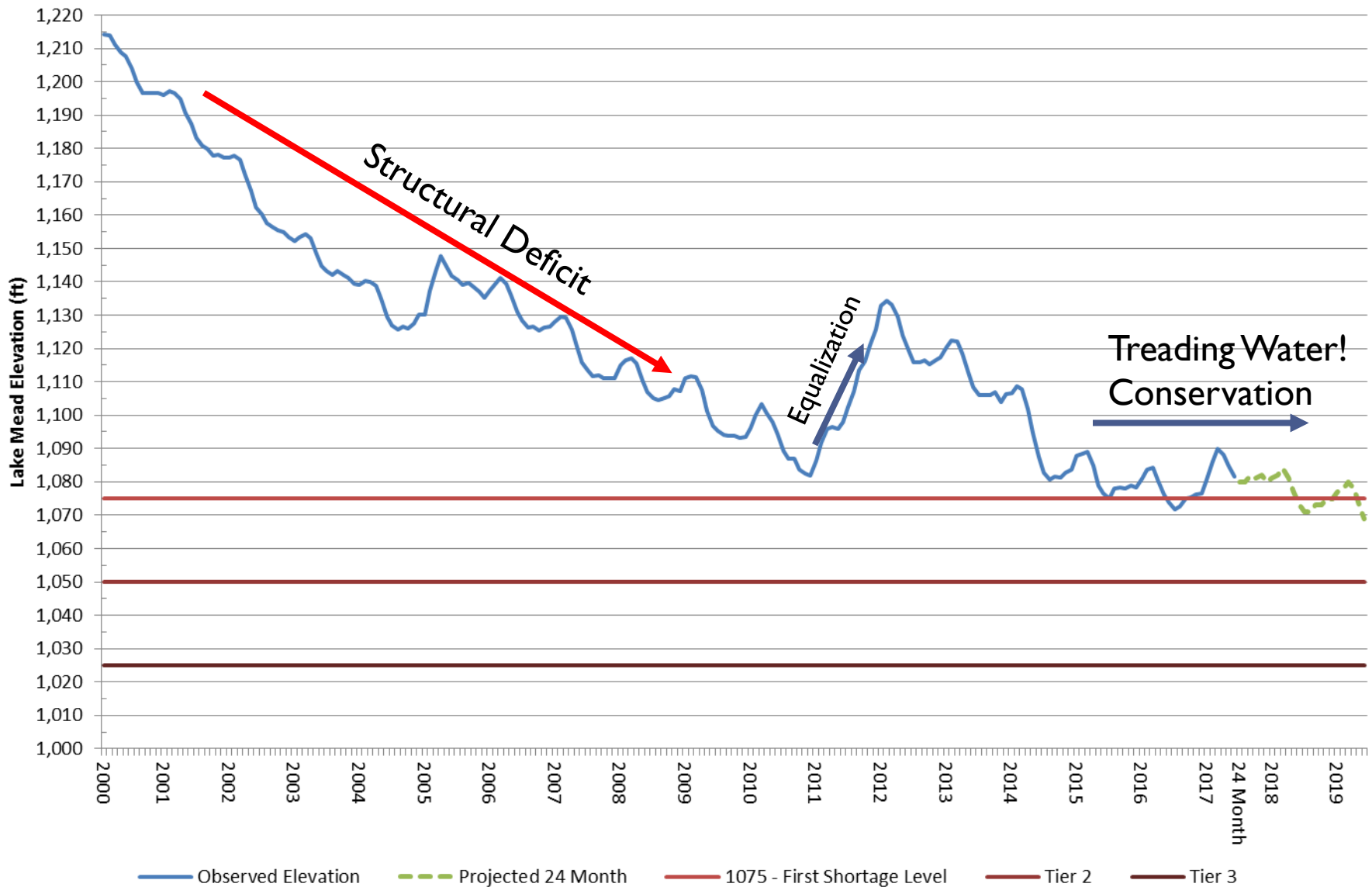
- Geographic diversity – Upper and Lower Basin
- \$/AF proposal to create system conservation
- Diversity in sector
- Ease of implementation
- Minimal 3<sup>rd</sup> party impacts
- Degree of conservation certainty and ability to verify
- Opportunities to test new approaches

# Pilot System Conservation Projects



# Lake Mead Elevations

Lake Mead Elevation  
(EOM Jan 2000 - May'17 and Projected 24 Months)





# Conclusions – Successful Programs!

- The MOU and PSCP have helped to protect the reservoir elevations and change the slope
- Broad range of participants
  - From Upper and Lower Basins
  - Different institutional frameworks
  - Agricultural, Municipal, Industrial and Tribal participants
  - Federal and State agencies and water provider agencies from Upper and Lower Basins
  - Projects of different scales
- Still more that needs to be done





CAP

CENTRAL ARIZONA PROJECT

YOUR WATER. YOUR FUTURE.

PROTECT  
LAKE MEAD



# Metropolitan Water District of Southern California



- Regional water wholesaler to 6 counties
  - 5,200 square mile service area
- 26 Member Agencies
- 19 million residents
- Retail demand:
  - 4 million acre-feet
- Metropolitan provides about one-half of demands

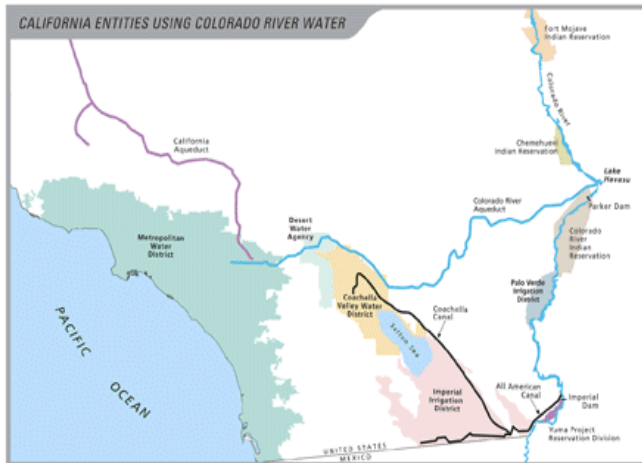
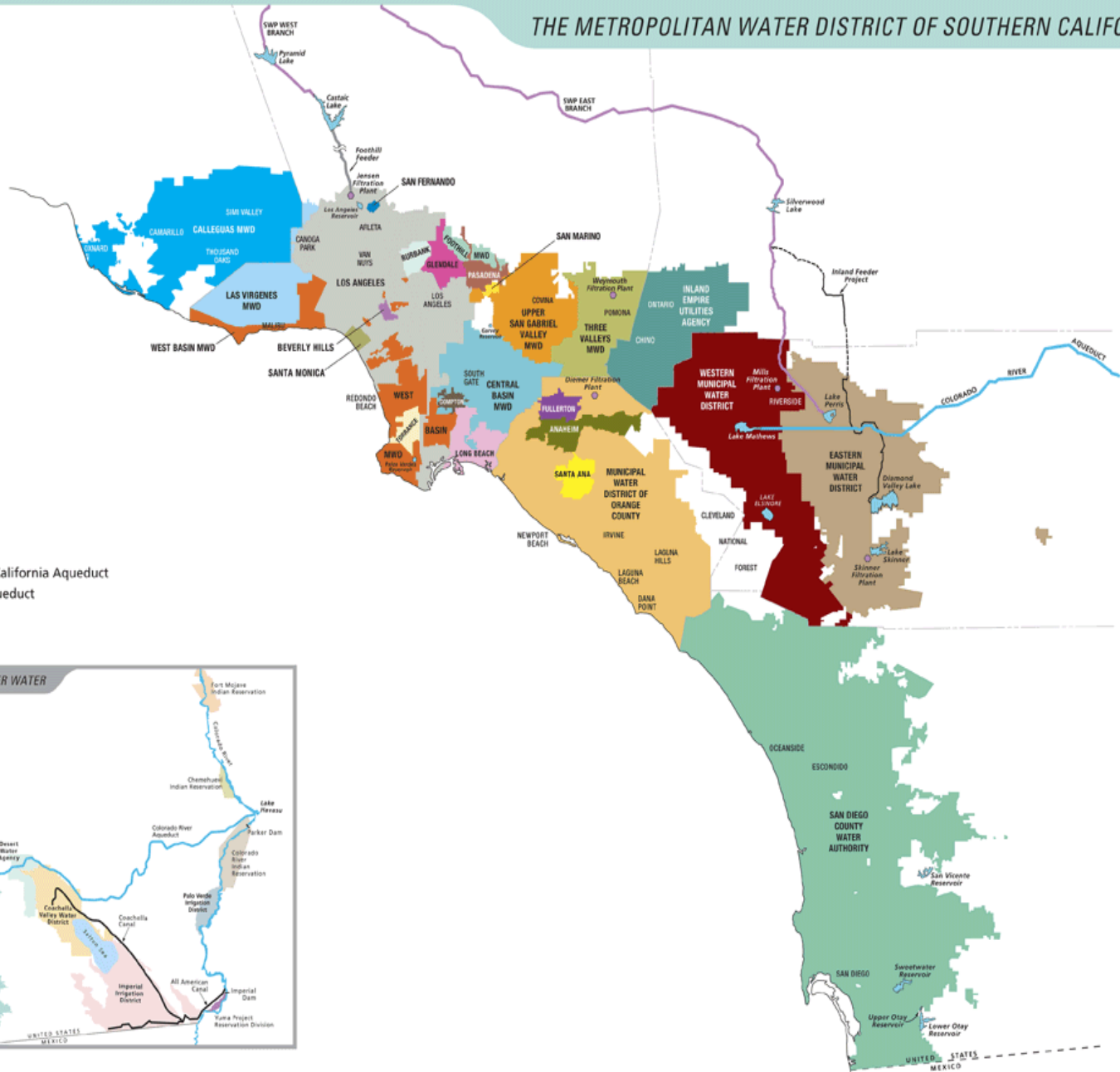
# THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA



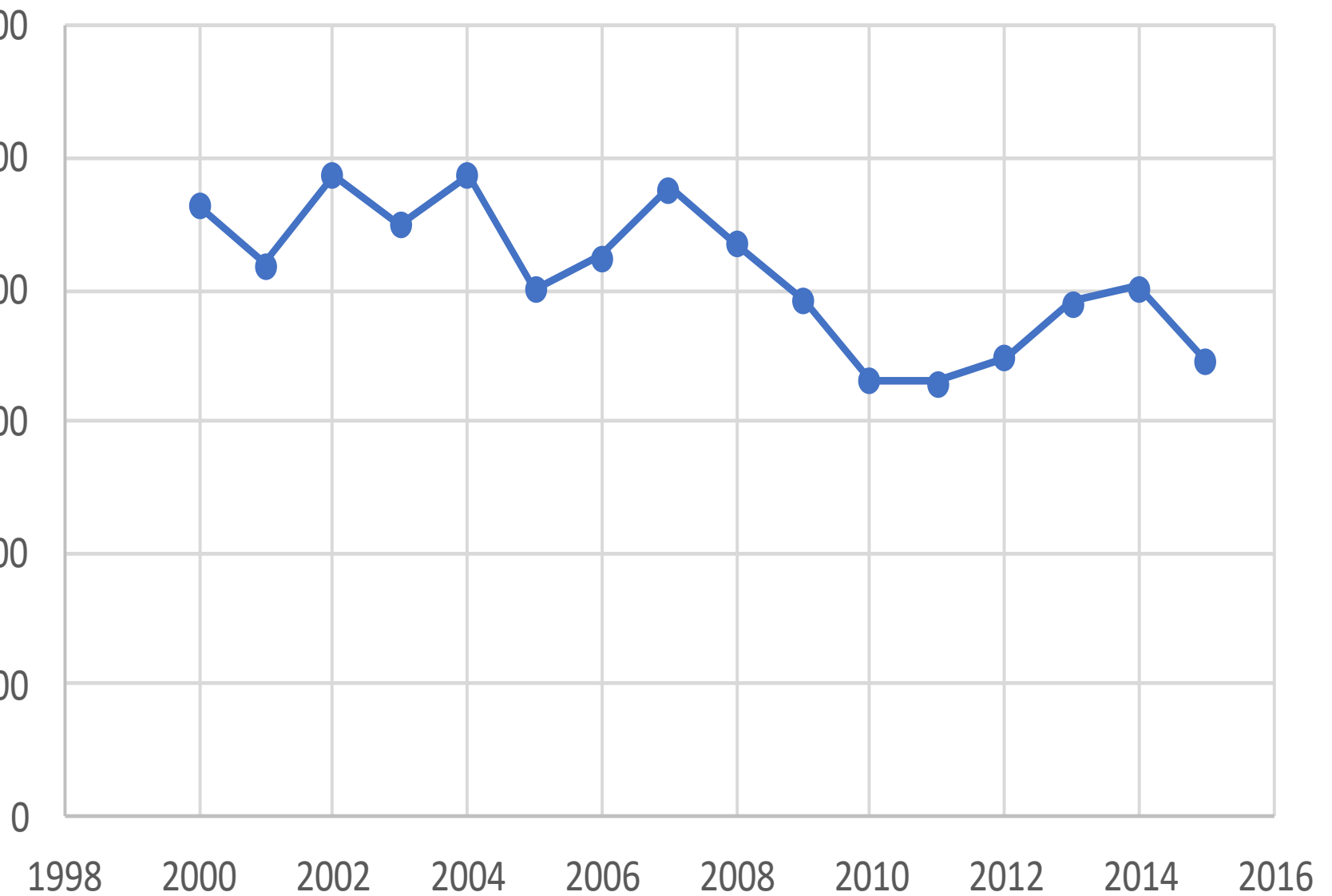
## METROPOLITAN'S MEMBER AGENCIES

### LEGEND

- Department of Water Resources' California Aqueduct
- Metropolitan's Colorado River Aqueduct
- Water Filtration Plants



# Metropolitan Water Deliveries





# Colorado River Water Rights

CA apportionment	= 4,400,000 afy
MWD junior priority	= 550,000 afy
MWD Aqueduct	= 1,250,000 afy

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- 700,000 af shortfall covered by unused AZ and NV apportionment through 1990s
- MWD currently relies on banking/transfer programs to provide Colorado River supplies

# Colorado River Programs

1988 Imperial Irrigation District conservation  
= 105,000 afy

1999 Interstate Banking regulations  
= 330,000 af

2003 Quantification Settlement Agreements  
= 278,000 afy

2004 Palo Verde Irrigation District following  
= 130,000 afy

2007 Intentionally Created Surplus  
= 85,000 af

Total additional supply  
~ 500,000+ afy

# State Water Project Rights

MWD contract entitlement	= 1,911,500 afy
MWD average deliveries	= 1,200,000 afy

- 
- Annual deliveries vary dramatically:

2003/04 fiscal year	= 2,200,000 af
2014/15 fiscal year	= 635,000 af
  - MWD relies on banking/transfer programs to provide State Water Project supplies



Department of Water Resources  
Sierra Snow Survey – May 1, 2014



# State Water Project Programs

Banking programs provide groundwater storage:

Total storage capacity = 950,000 af

2014/15 withdrawals = 104,206 af

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Water transfer programs:

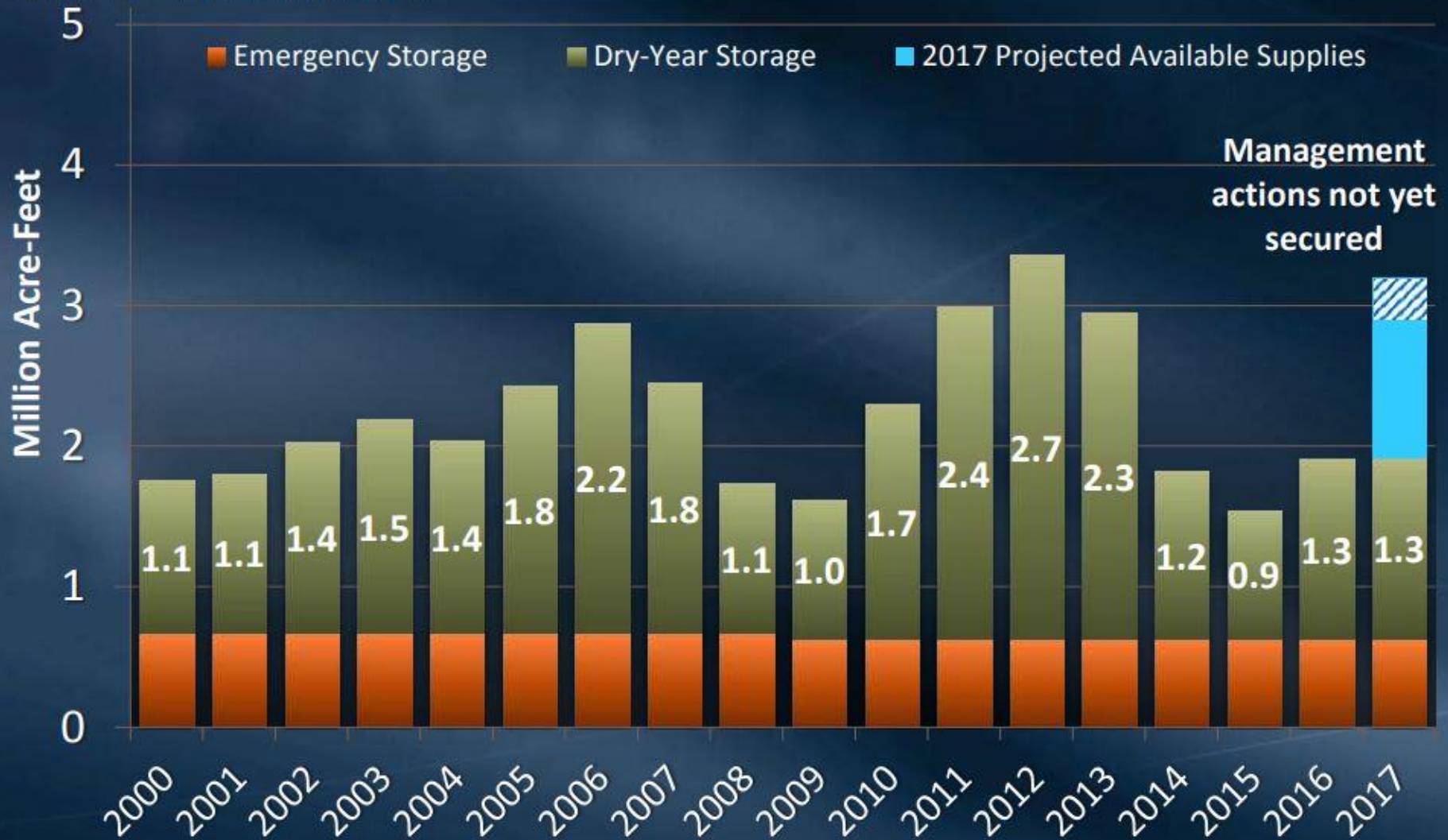
SWP Multi-Year Water Pool among contractors

Non-SWP transfers from Sacramento Valley

2014/15 transfer volume = 15,842 af

# Metropolitan is Forecasting an Increase in Storage Reserves this Year

End of Year Balances



# **WATER TRADING**

## **Why Trade? The Policy Paradigm and Case Studies**

**Scott S. Slater, Water Trading Panel  
NARUC Summer Policy Summit  
July 18, 2017, San Diego, CA**

# WHY?

- Anti “Beijing Needs Water: Beijing Takes Water”
- The Duty of Water Requires More
- People Aren’t Necessarily Where the Water Is
- The Alternative to Build More, Bigger and Better Stuff
- Necessity



# Governor's Commission to Review California Water Rights Law: Clifford Lee, Staff Paper #5 *Water Transfers*

- Definite and certain water rights.
  - Legal: protection against unlawful acts of others
  - Physical: climate / supply variability
  - Tenure: lawful acts of others
- Must be sufficiently flexible (not rigid) –
  - Availability to the broadest number of users

**The Final Report** issued in December of 1978  
Recommended Legislative Changes

# Legislative Acts

- Conservation-based transfers (Water Code §1011)
- Authorized short-term (Temporary) transfers
- Long-term transfers
- Wheeling (Water Code §1810 et seq)
- Feds Join / CVPIA Reform

# SWRCB

- Guide to Water Transfers (1996)
- Working Group Report on Water Transfers (2002)
  - Acknowledges Importance of Water Transfer
  - Maximizing Public Welfare
  - State and Federal Participation
  - Local Agency Participation
  - One Component of Water Supply Solution
  - Groundwater Banking

# OZ Experience: Council of Australian Government Reforms For Efficiency

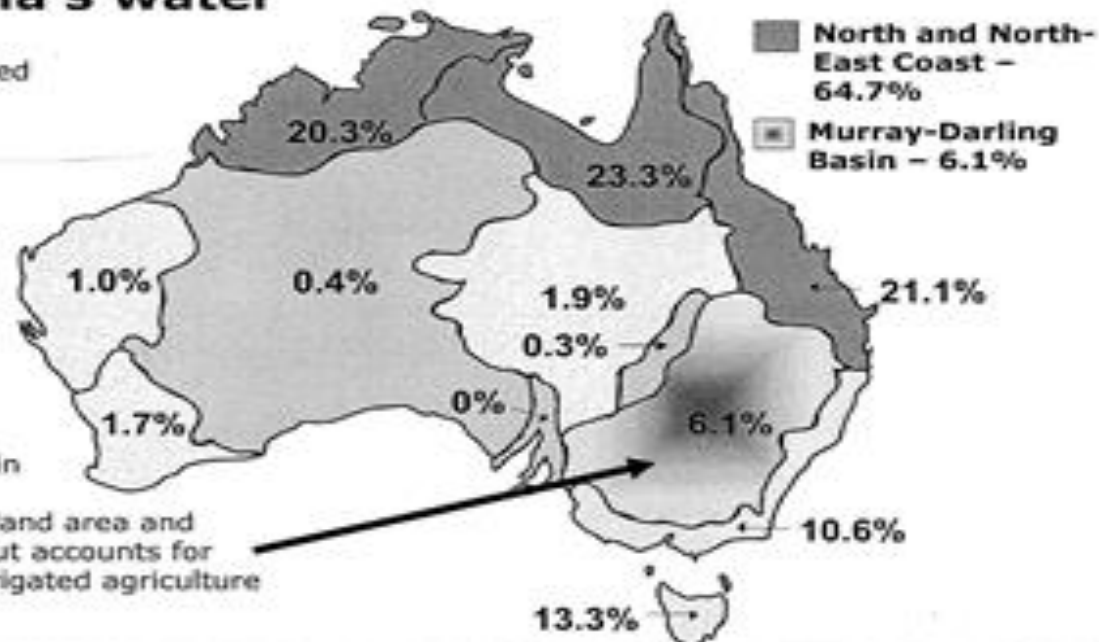
- Over-allocated water resources:  
(unsustainable levels of use)
- Aging water delivery infrastructure
- Environmental concerns

## Australia's water

Land - 0.4% irrigated  
returning:

Murray Darling Basin

14% of Australia's land area and  
6% of the water, but accounts for  
approx 2/3 of all irrigated agriculture





# Framework for Solution

- Tariff pricing
- Water trading
- Environment and water quality
- Institutional structures
- Public consultation
- Murray-Darling Cap

# National Water Initiative – 2004 / From Efficient to Necessity

- Comprehensive and transparent water pricing
- Water supply certainty
- Environmental outcomes
- Investment certainty
- Enhanced water markets and trade

# National Water Implementation 2007- (On Reflection)

- Property rights are clear and secure
- Processes for determining allocation are transparent, inclusive and cost-effective
- Water is able to be traded to its highest value use
- Environmental management is efficient and effective
- Urban and rural services are provided efficiently

# Case Studies in California

- Groundwater
- Conservation-Based Transfer

**Map of Chino Basin**

This map illustrates the Chino River watershed, highlighted in blue. The basin is situated in Southern California, spanning across Los Angeles County, San Bernardino County, and Riverside County. Key cities and towns within or near the basin include San Antonio Heights, Upland, Fontana, Rialto, Bloomington, Ontario, Chino, Eastvale, Norco, Chino Hills, and Diamond Bar. Major highways shown include Interstate 10 (I-10), Interstate 15 (I-15), Interstate 210 (I-210), State Route 57 (SR-57), State Route 60 (SR-60), State Route 71 (SR-71), and State Route 91 (SR-91). The map also shows the geographical features of the region, including the San Gabriel Mountains to the north and the San Bernardino Mountains to the east.

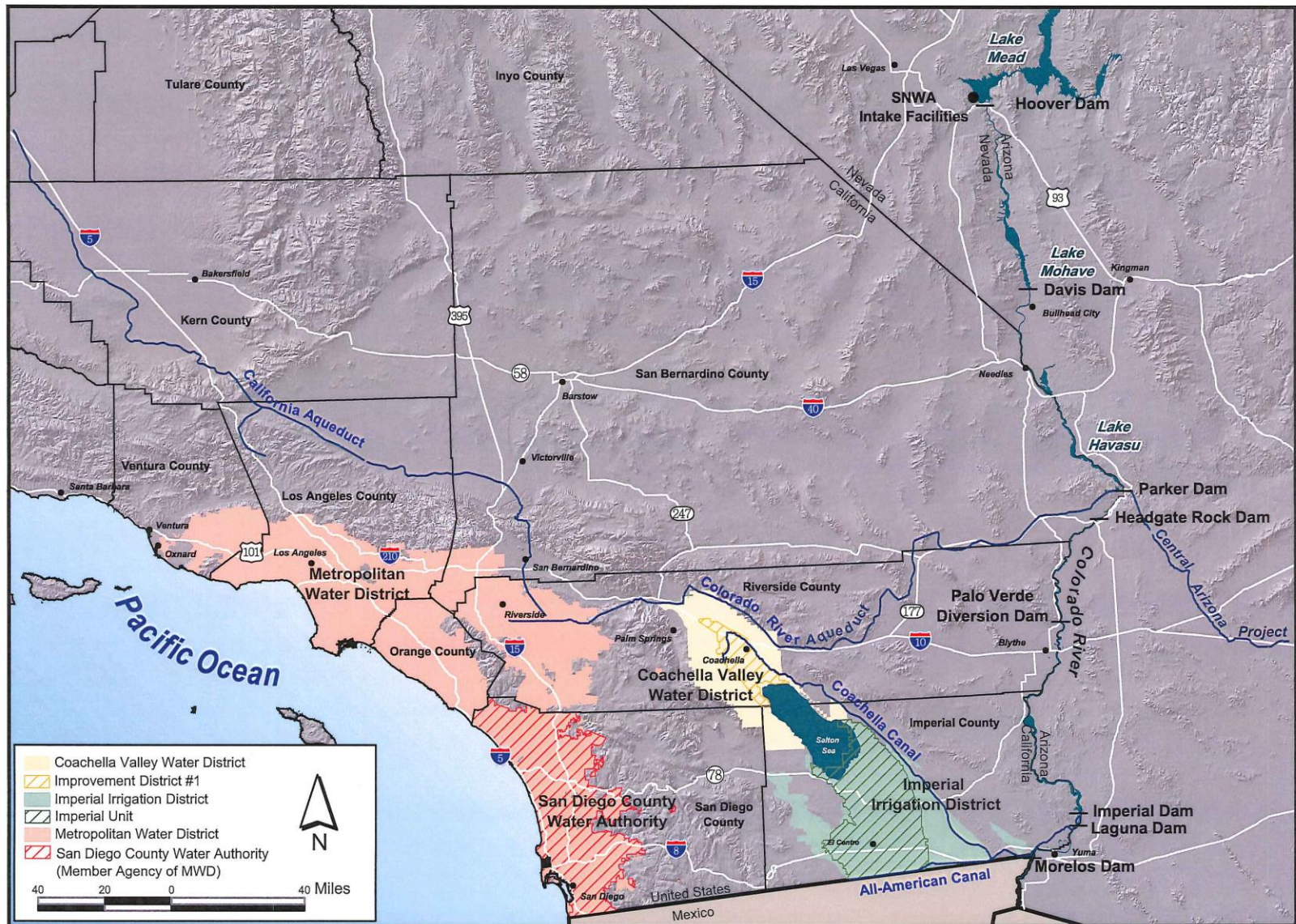


# Chino Basin

- Safe (sustainable yield)
  - Set on long-term hydrologic record
  - Not impacted by annual hydrology
  - Sets Environmental baseline
- Certain Annual Entitlements
- Clear Transparent Rules
- Water Open for Trading to All within the Geography of the Judgment
- Saved water may be traded or stored
- 500,000 AF presently under storage
- 300,000 acre-feet cumulatively traded

# San Diego Water Authority / Imperial Irrigation District Transfer

- District and farmer conservation of 200,000 acre-feet (Water Code §1011)
- Transfer through Colorado River Aqueduct (Wat. Code 1810 et seq.)
- Socio-economic impacts (Third-party) addressed. \$50 million
- Environmental impacts mitigated
- Lining of All-American Canal 77,000 AF



**Figure 1.1-1. Water Service Areas of CVWD, IID, MWD and SDCWA**

# San Diego Water Authority / Imperial Irrigation District Transfer

- Required quantification of Colorado River priorities between states and in California
  - 26 separate agreements
  - SWRCB approval
  - Environmental compliance
  - Transaction costs and degree of difficulty high
  - 15 years in the books without interruption
- January 17



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