Committee on Water
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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
Lake Mead and Lake Powell:

- **Lake Mead**
  - **1/1/2000**: 91% Full (25 MAF)
  - **07/17/17**: 38% Full (9.9 MAF)

- **Lake Powell**
  - **1/1/2000**: 87% Full (21.3 MAF)
  - **07/17/17**: 64% Full (15.5 MAF)
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

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Inflow</td>
<td>9.0 MAF</td>
</tr>
<tr>
<td>(Release from Lake Powell plus smaller rivers)</td>
<td></td>
</tr>
<tr>
<td>Normal Outflow</td>
<td>-9.6 MAF</td>
</tr>
<tr>
<td>(Deliveries to AZ, CA, NV, and Mexico + downstream regulation and gains/losses)</td>
<td></td>
</tr>
<tr>
<td>Evaporation</td>
<td>-0.6 MAF</td>
</tr>
<tr>
<td>Balance</td>
<td>-1.2 MAF</td>
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</tbody>
</table>

-Approximately 12 foot decline in normal year
Impacts of the Structural Deficit

- 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

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)

- Surplus Guidelines (CA QSA (CA to 4.4 MAF))
- '07 Shortage Sharing (AZ-NV shortages)
- Minute 319 (MX Shortage Sharing)
- Drought Contingency Plan????
- AWBA 1996 – P
- Brock Reservoir
- YDP Pilot Run
- Pilot System Conservation
- LB Reservoir Protection MOU
- 242 Wells
- CA QSA (CA to 4.4 MAF)
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Elevation (ft)


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

Structural Deficit
Lake Mead Elevations

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

Structural Deficit

Equalization

Treading Water!
Conservation

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

- 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

- Unused on-river water
  - Water 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

- 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 3rd party impacts
- Degree of conservation certainty and ability to verify
- Opportunities to test new approaches
Pilot System Conservation Projects

[Map showing various projects across the southwestern United States, including projects in Arizona, Colorado, Utah, Nevada, and California. Markers indicate specific projects such as Mountain King Ranch, High Lonesome Ranch, and others.]
Lake Mead Elevations

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

Structural Deficit
Equalization
Treading Water!
Conservation

Observed Elevation
Projected 24 Month
1075 - First Shortage Level
Tier 2
Tier 3
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
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
Colorado River Water Rights

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

• 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 fallowing = 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
State Water Project Programs

Banking programs provide groundwater storage:
Total storage capacity = 950,000 af
2014/15 withdrawals = 104,206 af

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

- Emergency Storage
- Dry-Year Storage
- 2017 Projected Available Supplies

Management actions not yet secured

Million Acre-Feet

Year

2000: 1.1
2001: 1.1
2002: 1.4
2003: 1.5
2004: 1.4
2005: 1.8
2006: 2.2
2007: 1.8
2008: 1.1
2009: 1.0
2010: 1.7
2011: 2.4
2012: 2.7
2013: 2.3
2014: 1.2
2015: 0.9
2016: 1.3
2017: 1.3
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)
  ➢ 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:

North and North-East Coast - 64.7%
Murray-Darling Basin - 6.1%

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
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
Committee on Water