This presentation premiered at WaterSmart Innovations

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WATER EFFICIENCY ACTION NETWORK
FOR THE COLORADO BASIN STATES

WATER EFFICIENCY AND THE COLORADO BASIN: HOW'S OUR PROGRESS?

WSI Panel, Oct. 9, 2015

Colorado River basin

WATER EFFICIENCY ACTION NETWORK FOR THE COLORADO BASIN STATES

Panelists

- Pam Adams, U.S. Bureau of Reclamation
- Carol Ward-Morris, Arizona Municipal Water Users' Association
- Peter Mayer, WaterDM
- Mark Cassalia, Denver Water
- Moderator Cindy Dyballa, Network coordinator, Sligo Creek Resources

WATER EFFICIENCY ACTION NETWORK
FOR THE COLORADO BASIN STATES

Topics

- Current state of the river
- Basin study municipal (M&I) work group recommendations
- Trends in water use
- Progress on current water efficiency efforts
- What this means for the future

WATER EFFICIENCY ACTION NETWORK
FOR THE COLORADO BASIN STATES

How's Our Progress?

- Not enough water is available in the Basin, now and in future
- Years of drought make a bad situation worse
- Ramping up water efficiency is the quickest and least cost solution
- Collaboration can achieve results
- Join the Network! More info at http://www.wean-crb.org

WATER EFFICIENCY ACTION NETWORK
FOR THE COLORADO RIVER BASIN STATES

California Drought

The Other Drought

How's Our Progress?

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WATER EFFICIENCY ACTION NETWORK FOR THE COLORADO BASIN STATES

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RECLAMATION

Managing Water in the West

Colorado River Basin:

- Current System Conditions
- Basin-Wide Activities

WaterSmart Innovations 2015
Las Vegas, NV
October 9, 2015

U.S. Department of the Interior
Bureau of Reclamation

Colorado River Basin Hydrology

- 16.5 million acre-feet (maf) allocated annually
- 14.8 maf average annual “natural” inflow into Lake Powell over past 110 years
- 13 to 14.5 maf of consumptive use annually
- Snowmelt dominated system
- Flow is highly variable year-to-year
- Approximately 60 maf of storage

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Colorado River Drought

- 2000-2015 is the driest 16-year period in over 100 years of historical records (2013-2015 are estimated)
- Tree-ring reconstructions show more severe droughts have occurred over the past 1200 years (e.g., drought in the mid 1100s)
- The preliminary observed 2015 April through July runoff is 94% of average[1] as of October 1

Lake Mead, February 23, 2015
Elevation 1,089 ft.

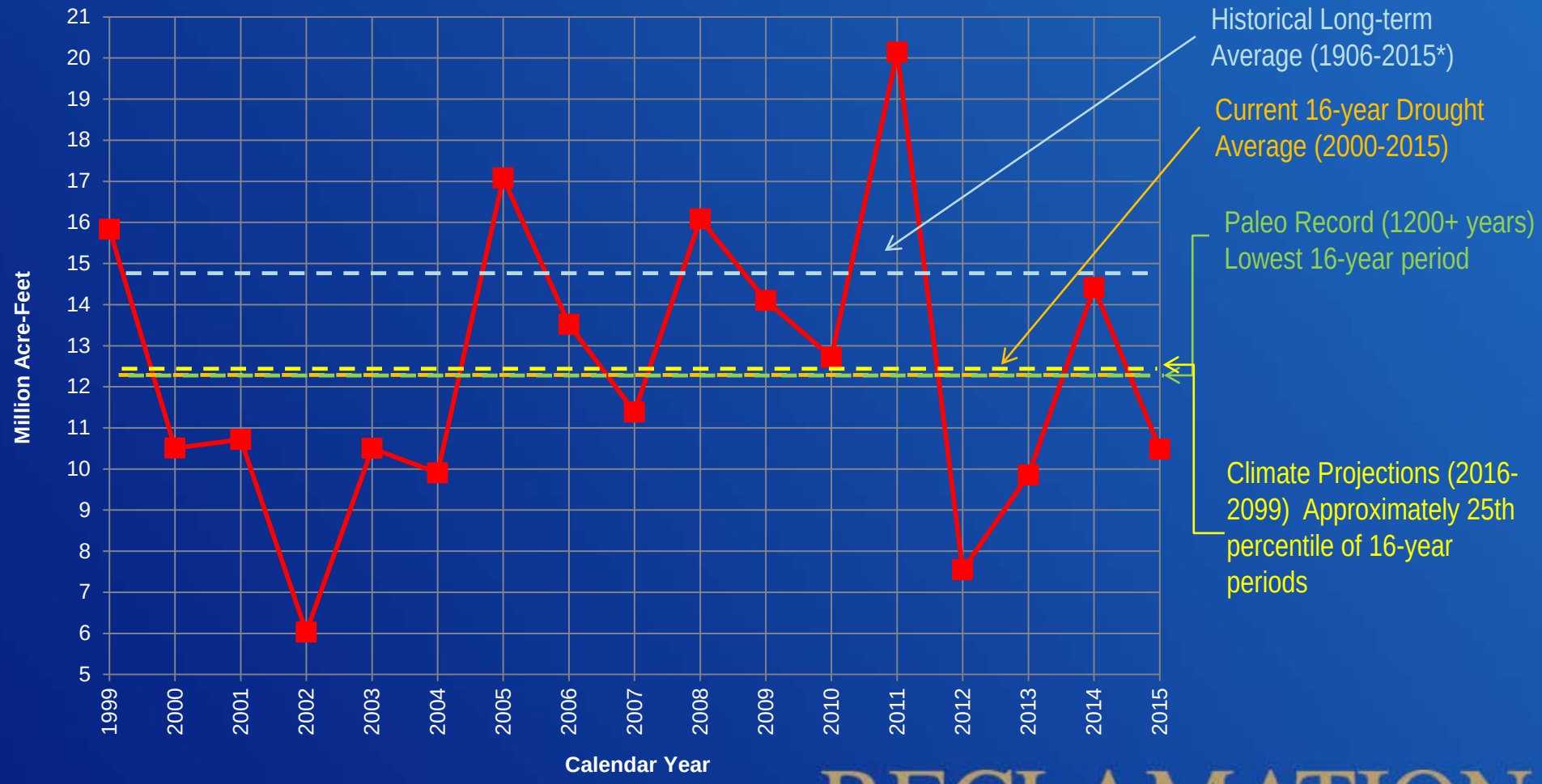
- Not unusual to have a few years of above average inflow during longer-term droughts (e.g., the 1950s)

[1] Percent of average is based on the period of record from 1981-2010.

RECLAMATION

Current 16-year Drought (2000-2015)

Natural Flow at Lees Ferry

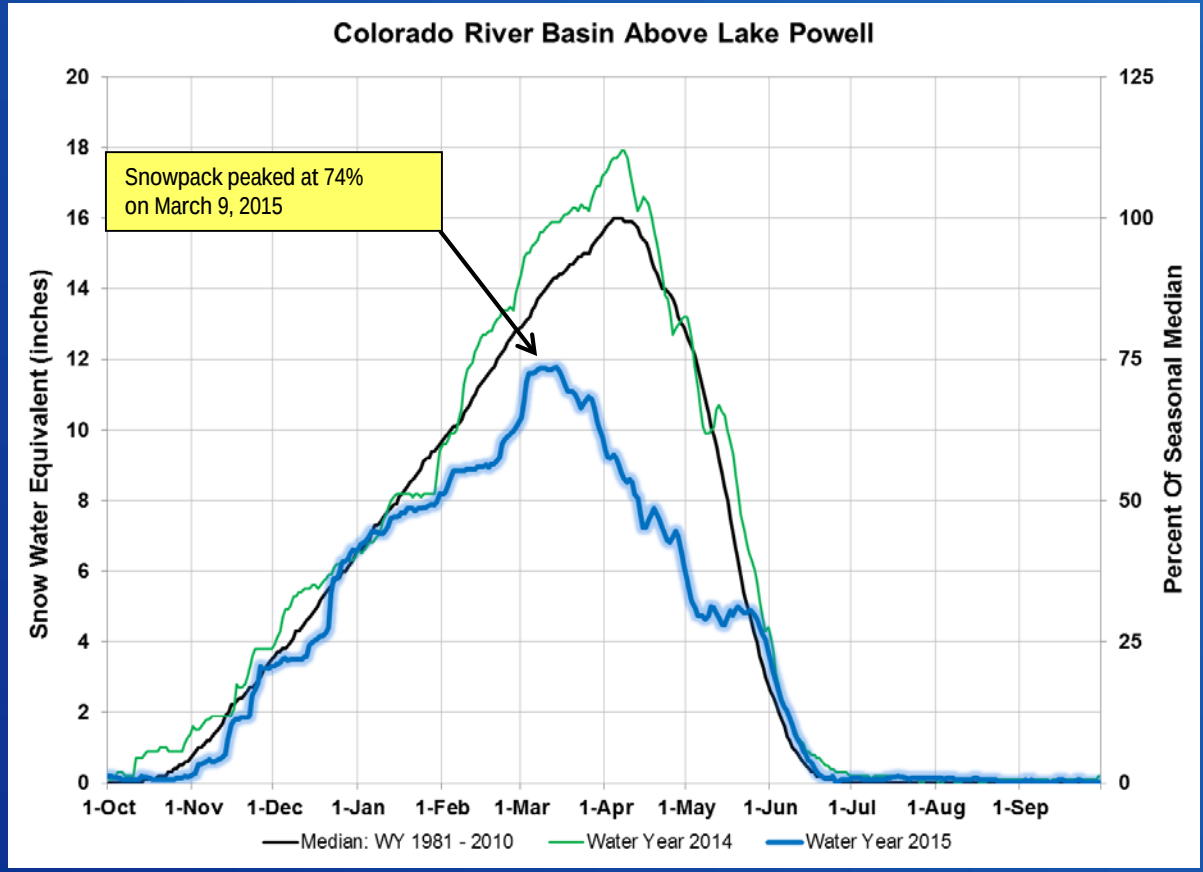


*2013-2015 natural flows are provisional

RECLAMATION

Water Year Snowpack and Precipitation
(as of October 4, 2015)

- Colorado River Basin above Lake Powell
- Water Year 2015 Precipitation to date: 90% of average
- Current Snowpack: NA



RECLAMATION

Colorado River Basin Storage

(as of October 4, 2015)

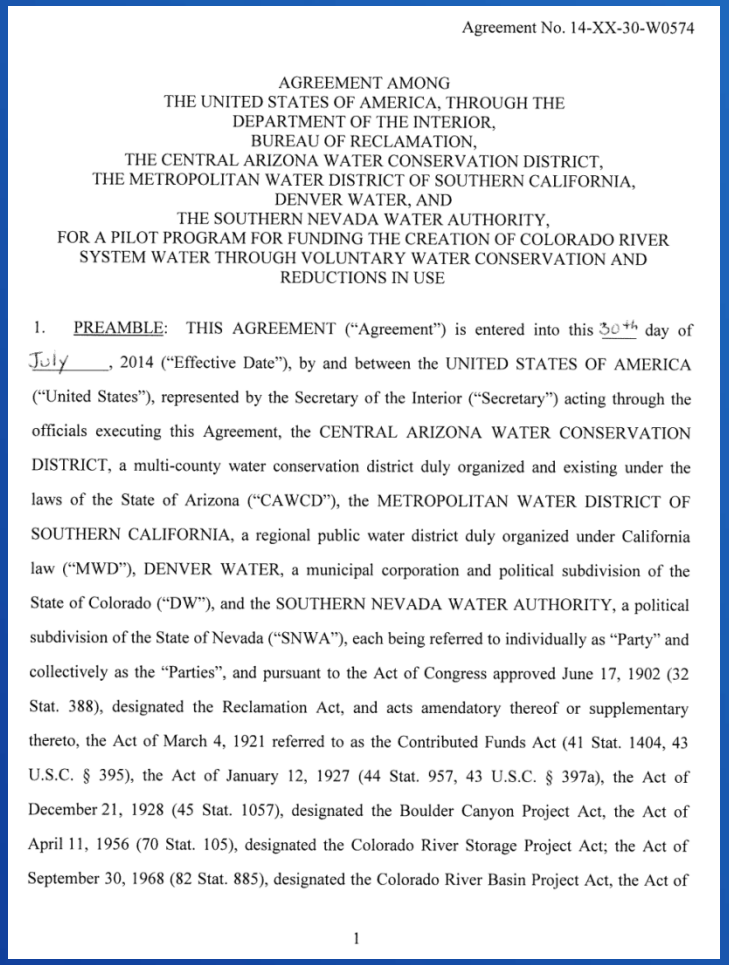
Reservoir	Percent Full	Storage (MAF)	Elevation (Feet)
Lake Powell	51%	12.30	3,606
Lake Mead	38%	9.88	1,078
Total System Storage*	51%	30.25	NA

***Total system storage was 30.09 maf or 50% this time last year**

RECLAMATION

System Conservation Pilot Program

- Funding Partners: Reclamation, CAWCD, SNWA, MWD, Denver Water
- Goal is to examine the effect of Basin-wide solutions on declining levels in Lakes Powell and Mead
- Provides $11 million for voluntary pilot projects that create system water
  - $2.75 million for Upper Basin
- The Program went into effect July 2014 for at least through 2016



Agreement No. 14-XX-30-W0574

AGREEMENT AMONG
THE UNITED STATES OF AMERICA, THROUGH THE
DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
THE CENTRAL ARIZONA WATER CONSERVATION DISTRICT,
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA,
DENVER WATER, AND
THE SOUTHERN NEVADA WATER AUTHORITY,
FOR A PILOT PROGRAM FOR FUNDING THE CREATION OF COLORADO RIVER SYSTEM WATER THROUGH VOLUNTARY WATER CONSERVATION AND REDUCTIONS IN USE

1. PREAMBLE: THIS AGREEMENT ("Agreement") is entered into this 30th day of July, 2014 ("Effective Date"), by and between the UNITED STATES OF AMERICA ("United States"), represented by the Secretary of the Interior ("Secretary") acting through the officials executing this Agreement, the CENTRAL ARIZONA WATER CONSERVATION DISTRICT, a multi-county water conservation district duly organized and existing under the laws of the State of Arizona ("CAWCD"), the METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, a regional public water district duly organized under California law ("MWD"), DENVER WATER, a municipal corporation and political subdivision of the State of Colorado ("DW"), and the SOUTHERN NEVADA WATER AUTHORITY, a political subdivision of the State of Nevada ("SNWA"), each being referred to individually as "Party" and collectively as the "Parties", and pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), designated the Reclamation Act, and acts amendatory thereof or supplementary thereto, the Act of March 4, 1921 referred to as the Contributed Funds Act (41 Stat. 1404, 43 U.S.C. § 395), the Act of January 12, 1927 (44 Stat. 957, 43 U.S.C. § 397a), the Act of December 21, 1928 (45 Stat. 1057), designated the Boulder Canyon Project Act, the Act of April 11, 1956 (70 Stat. 105), designated the Colorado River Storage Project Act; the Act of September 30, 1968 (82 Stat. 885), designated the Colorado River Basin Project Act, the Act of

1

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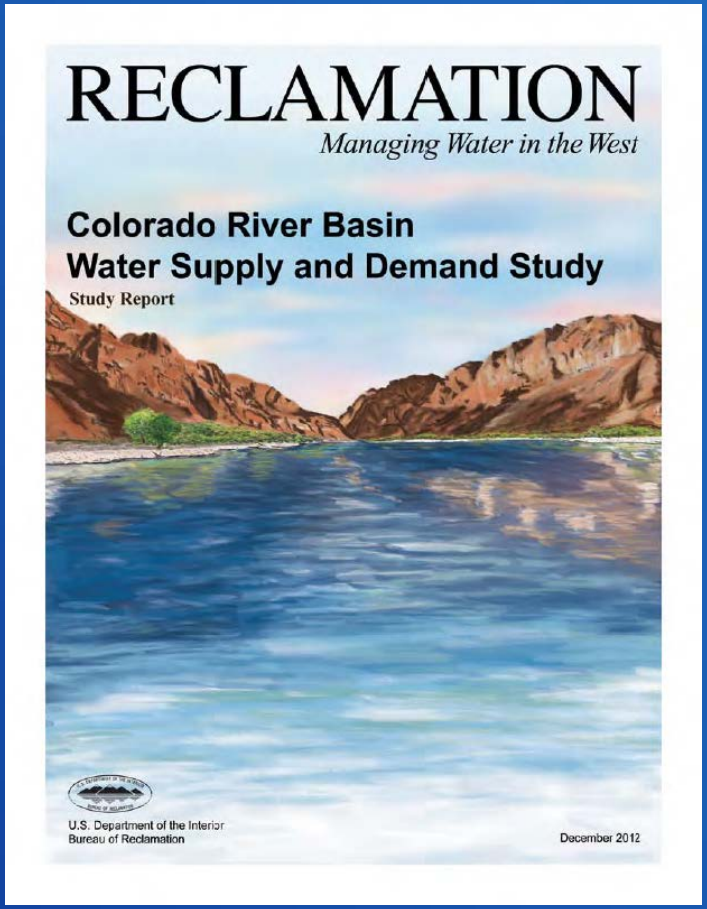
MOU - Pilot Drought Response Actions

- Participants: Reclamation, Lower Basin States, CAWCD, SNWA, MWD
- Identifies goal to create 1.5 to 3.0 maf of protection volumes by 2019
- Commits Reclamation, CAWCD, SNWA, and MWD to “best efforts” to create 740 KAF of protection volumes by 2017
- Identifies consultation triggers
- Commits participants to continue to work on key issues during further consultation

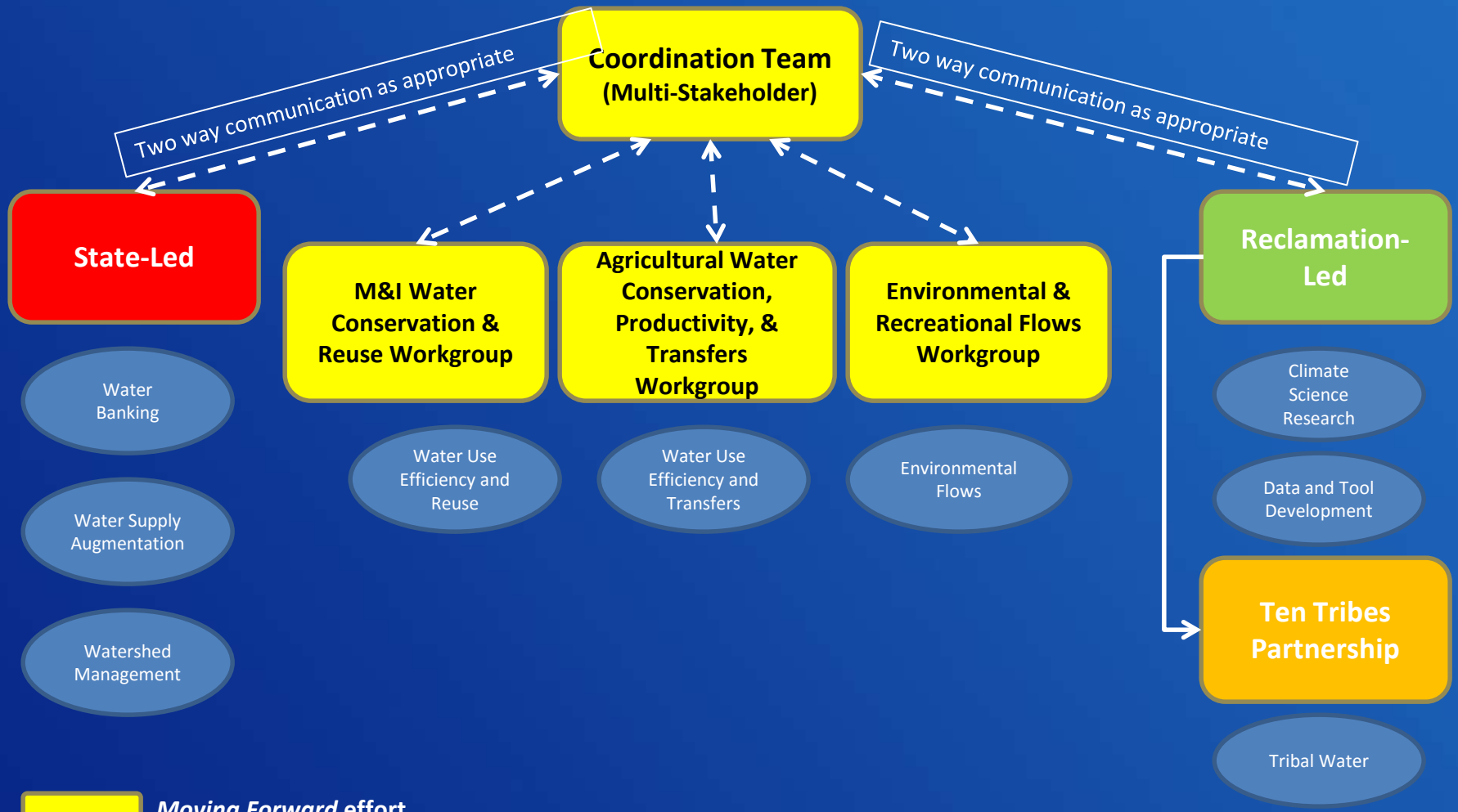
Study Summary

- 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



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

- In the longer term, more tradeoffs emerge to achieve an acceptable level of risk in terms of options, cost, resources, and other implications



Next Steps Areas Identified in the Basin Study

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Moving Forward Effort

- Stakeholder kickoff in May 2013
- Ultimate goal: identify actionable steps to address projected water supply and demand imbalances that have broad-based support and provide a wide-range of benefits
- Phase 1 began with the formation of:
  - Coordination Team
  - M&I Water Conservation and Reuse Workgroup
  - Agricultural Water Conservation, Productivity, and Transfers Workgroup
  - Environmental and Recreational Flows Workgroup
- Coordination Team and Workgroups multi-stakeholder
  - Workgroups comprised of subject matter experts throughout Basin

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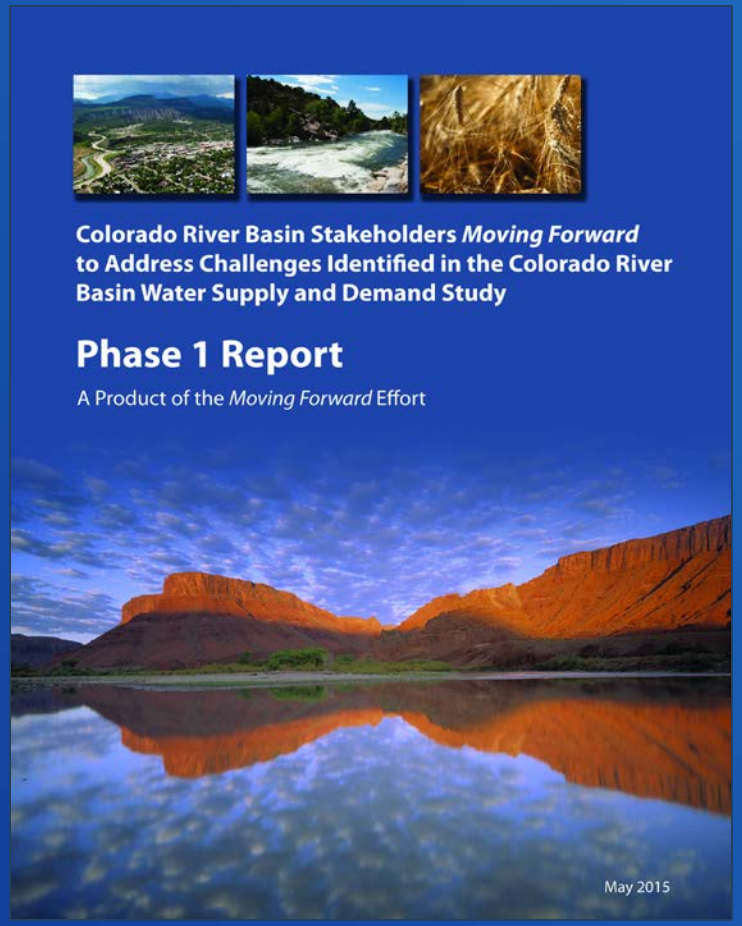
Phase 1 Summary

- Phase 1 Report published in May 2015
- Twenty-five opportunities were identified by the workgroups
  - Identified potential actions associated with each opportunity
- Similar findings between workgroup's include opportunities related to:
  - Funding and incentives
  - Data and tools
  - Outreach and partnerships
  - Coordination and integration
  - Infrastructure improvements
  - Flexible water management



Commenting encouraged!

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Moving Forward Effort, Phase 2

- Phase 2, which will begin in 2015, signals the transition from study to action
- Building from the Phase 1 workgroups' proposed opportunities for future actions, several pilot projects will be identified and implemented
- The specifics of the pilot projects are unknown at this time but will be related to M&I and Ag conservation and environmental and recreational flows

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
- Moving Forward: http://www.usbr.gov/lc/region/programs/crbstudy/MovingForward/index.html

RECLAMATION

CAP

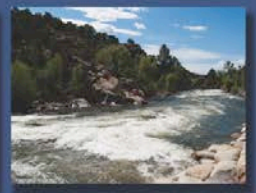
PHX News12

WATER EFFICIENCY & THE COLORADO BASIN: HOW'S OUR PROGRESS?

WaterSmart Innovations Conference 2015

Carol Ward-Morris

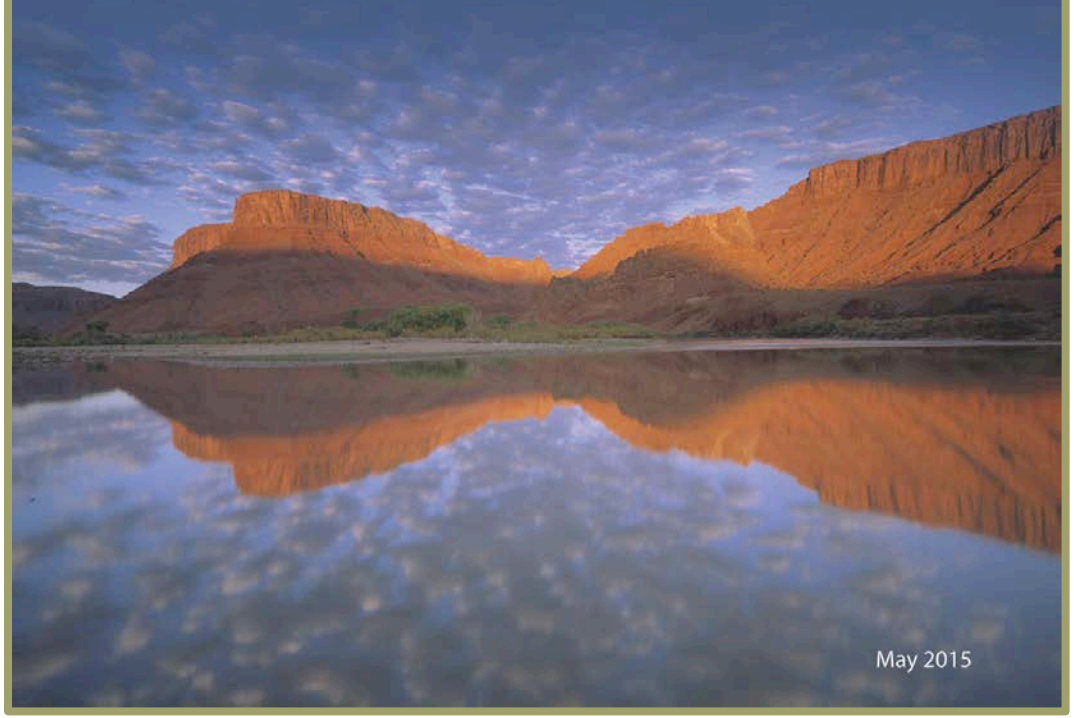
Arizona Municipal Water Users Association


Colorado River Basin Stakeholders *Moving Forward* to Address Challenges Identified in the Colorado River Basin Water Supply and Demand Study

Phase 1 Report

A Product of the *Moving Forward* Effort



May 2015

M&I Conservation and Reuse

SNWA

Historical & Current Programs

Water Use & Reuse Trends

Planned Future Efforts

M&I Conservation and Reuse Opportunities & Potential Actions

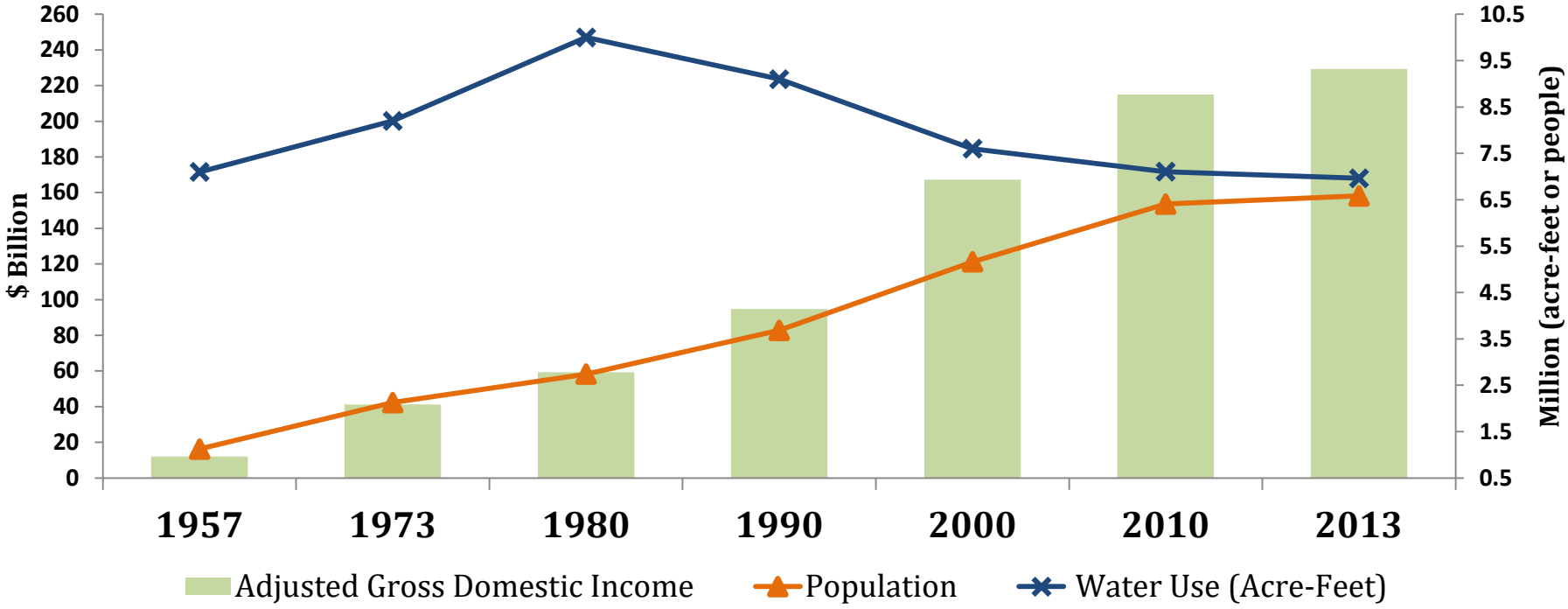
1. Outdoor use
2. Social norming with water customers
3. Integration of water/energy conservation programs
4. Integration of land and water use planning
5. Goal setting for conservation and reuse programs
6. Funding and resources
7. Water system losses
8. Partnerships with commercial, institutional and industrial users
9. Conservation oriented water rates and incentive programs
10. Regulations and ordinances

City of Scottsdale

photo: Eloy District, Pinal County. Dorothea Lange, National Archives

photo: AMWUA archives

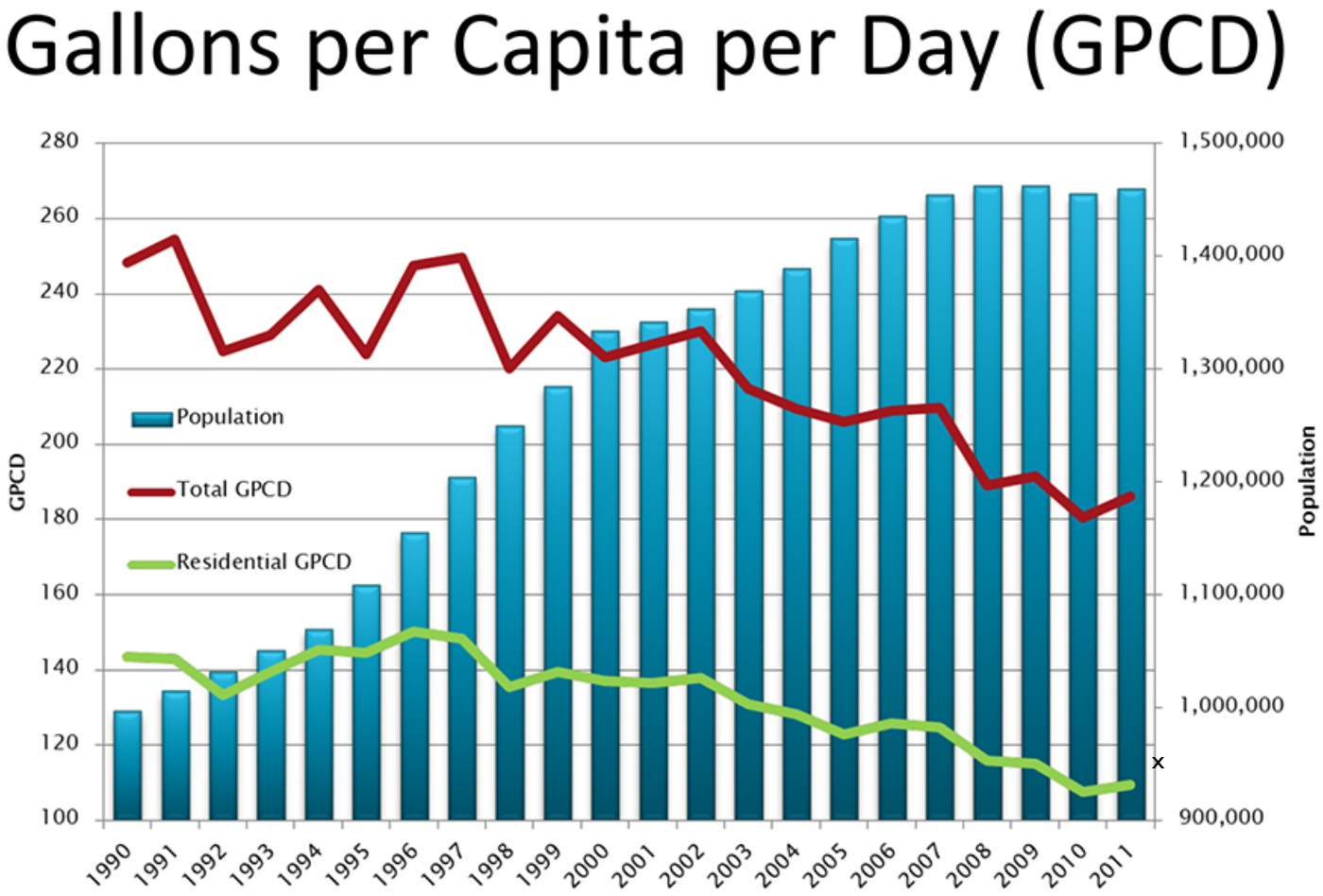
Arizona Water Use, Population and Economic Growth (1957 – 2013)



Year	Total Water Use (in million acre-feet)	Population (in millions)	Gross Domestic Income (in billions)
1957	7.1maf	1.1	$11.99
2013	7maf	6.58	$229.34
Change from 1957-2013	-0.1%	472%	1752%

credit: ADWR

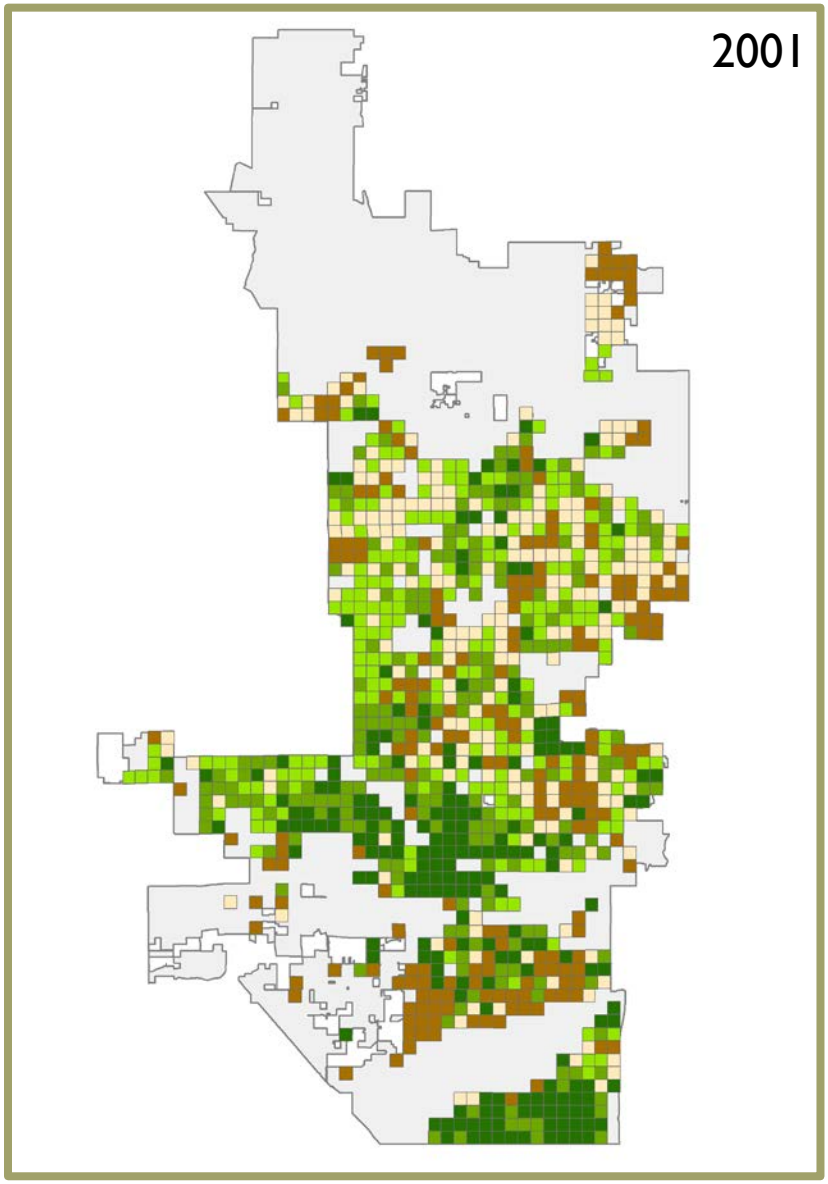
Phoenix Water Use 1990-2011

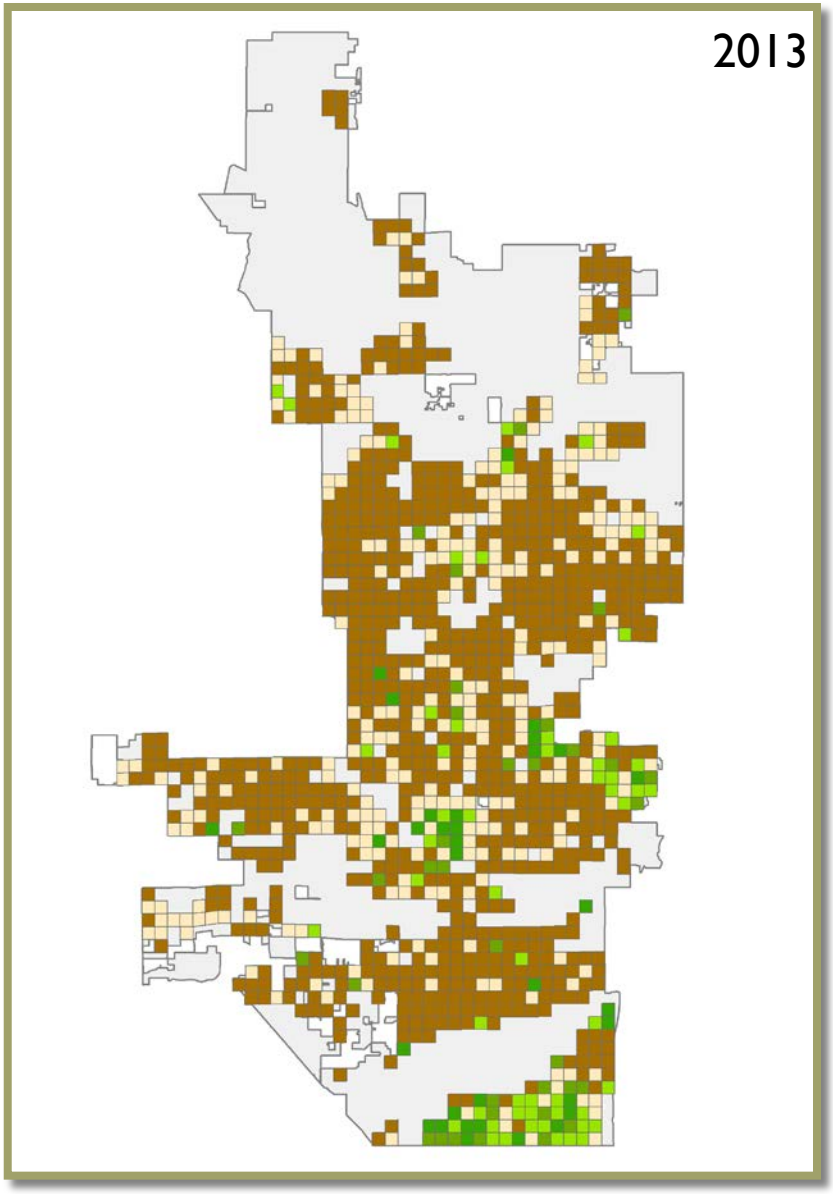


credit: City of Phoenix

Relative Water Use Intensity by Quarter Section

City of Phoenix





Palo Verde Nuclear Generating Station
Photo: APS

Tonopah Desert Recharge Project
Photo: City of Glendale

Egret, Gilbert Riparian Preserve
Photo: Jeff Lee

CWardMorriis

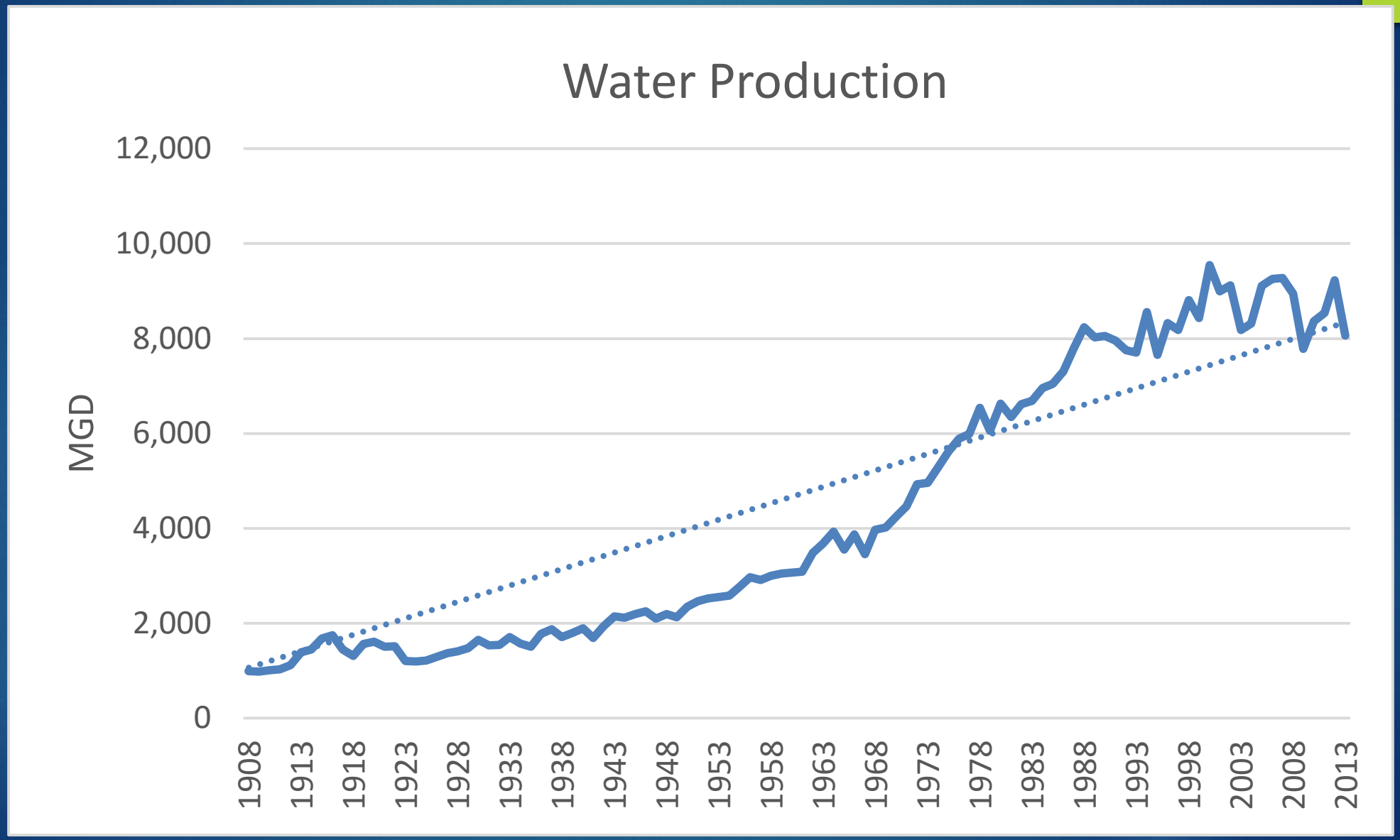
CRB Friday Seminar

PETER MAYER, P.E., PRINCIPAL

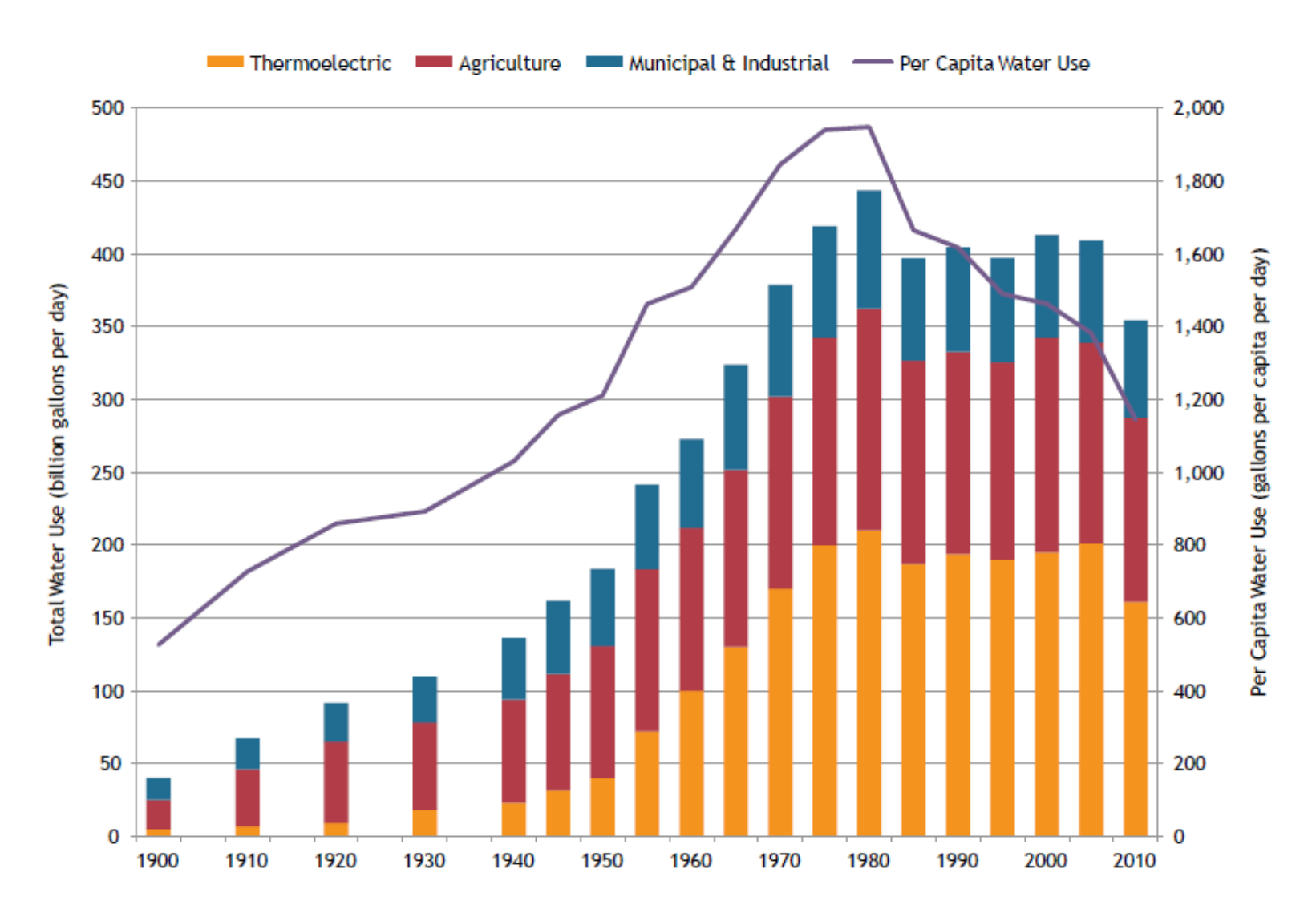
WATER DEMAND MANAGEMENT

WaterDM
DEMAND MANAGEMENT

Historic Demand – Greeley, CO

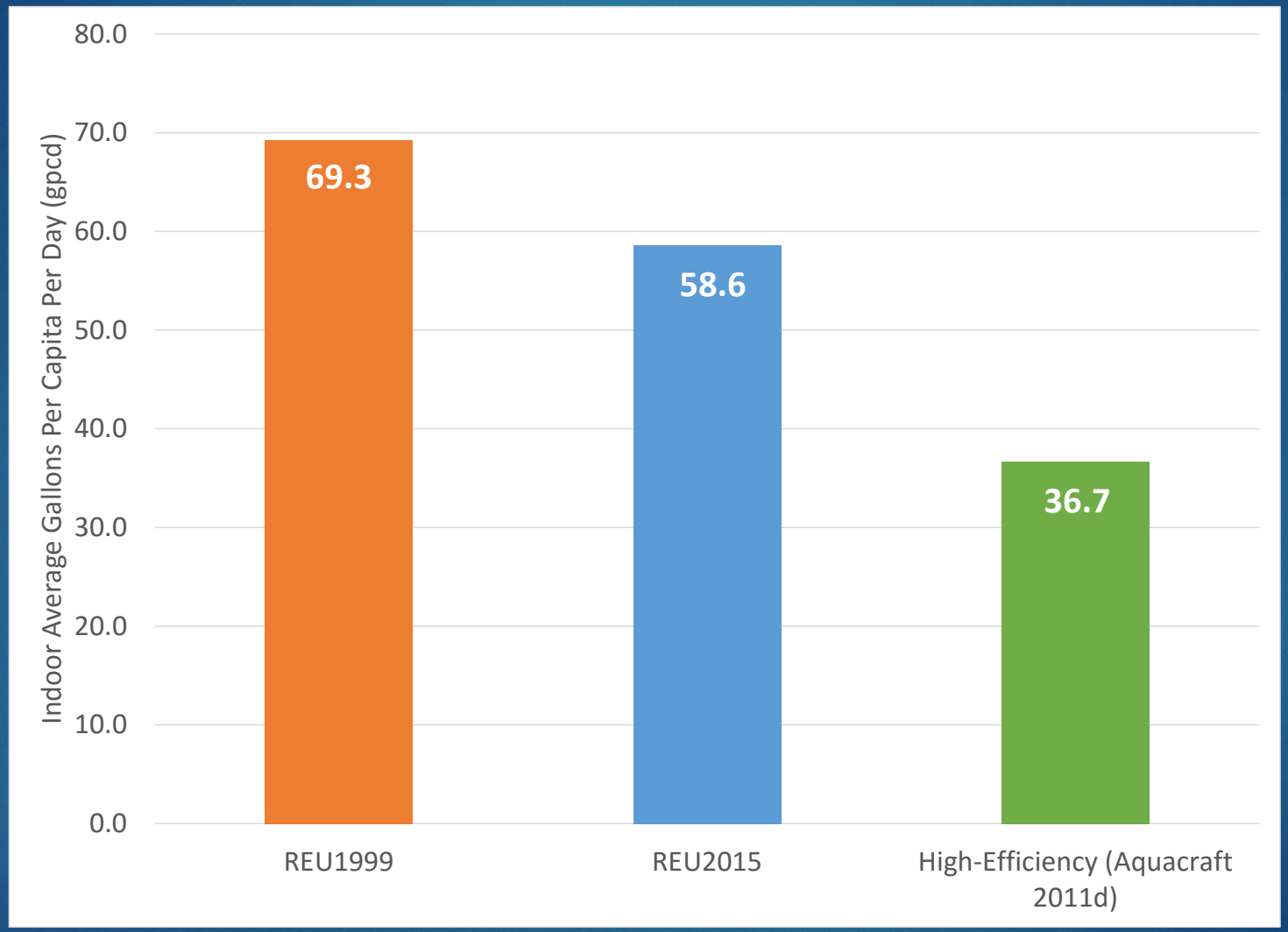


Water Use in the US, 1900 - 2010



Includes fresh and saline water. Source USGS and Pacific Institute 2015

Residential Indoor GPCD

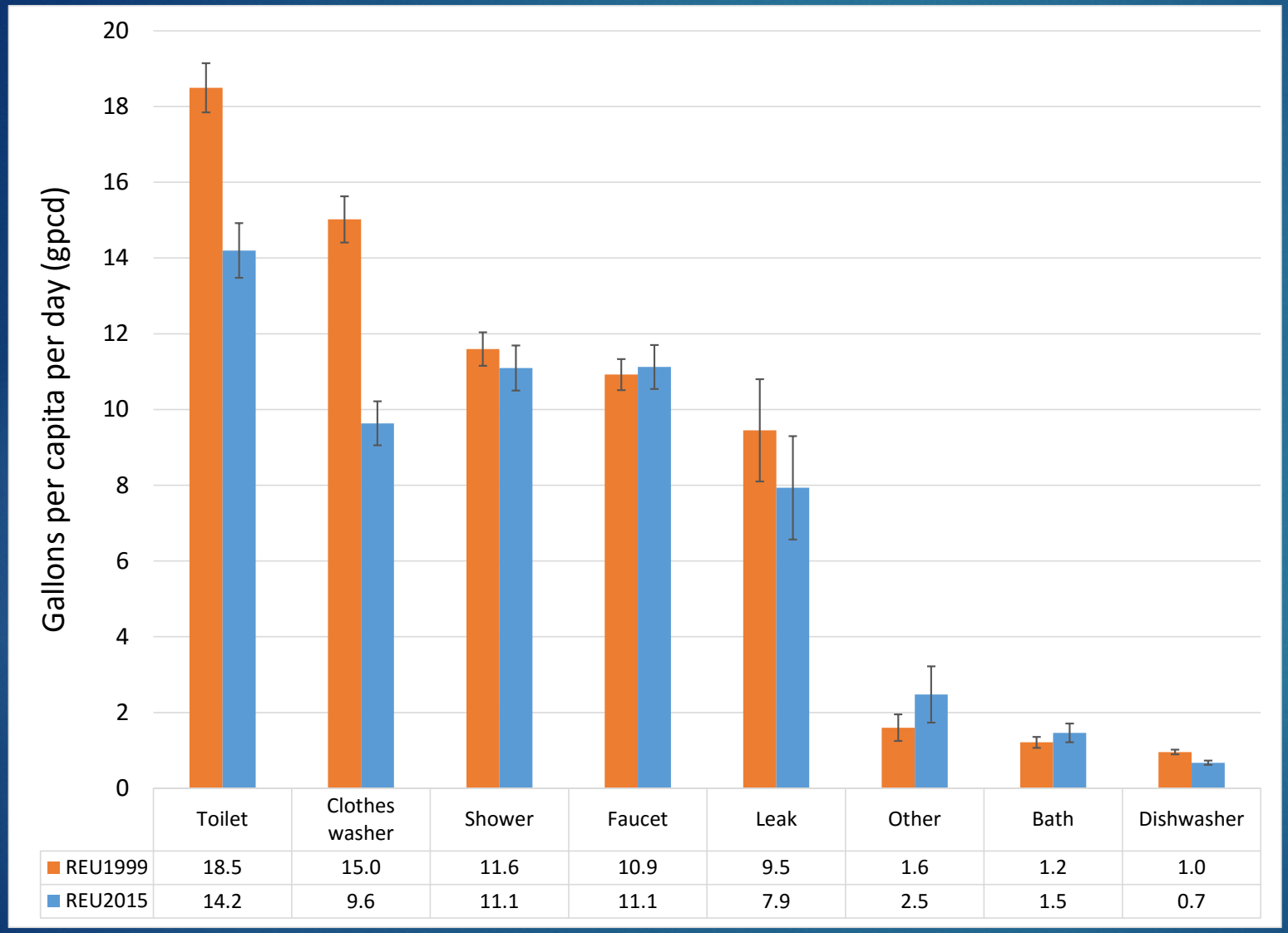


1999 vs. 2015 = 15.4% reduction

2015 vs. HE = 37.4% reduction

Source: Water Research Foundation (2015) Residential End Uses of Water Update – #4309. Denver, CO.

Indoor GPCD Comparison



	Toilet	Clothes washer	Shower	Faucet	Leak	Other	Bath	Dishwasher
REU1999	18.5	15.0	11.6	10.9	9.5	1.6	1.2	1.0
REU2015	14.2	9.6	11.1	11.1	7.9	2.5	1.5	0.7

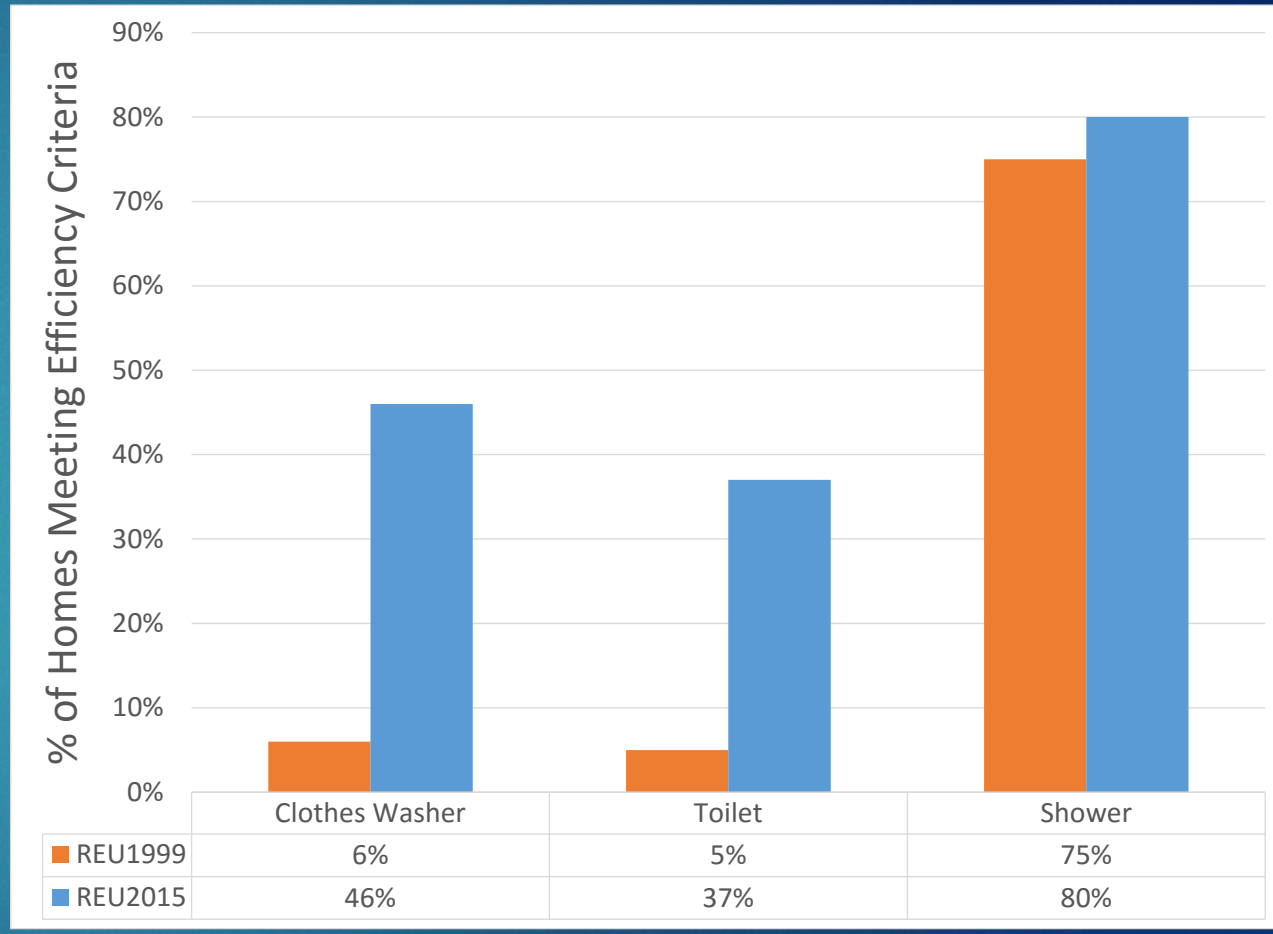
Source: Water Research Foundation (2015) Residential End Uses of Water Update – #4309. Denver, CO.

Statistically significant reductions in:

- Clothes washer
- Toilet
- Dishwasher

Future Conservation Potential

- A lot.
- We're almost…half way there!
- New technology
- Outdoor efficiency
- Leak detection
- Advanced metering
- Customer engagement through data and information

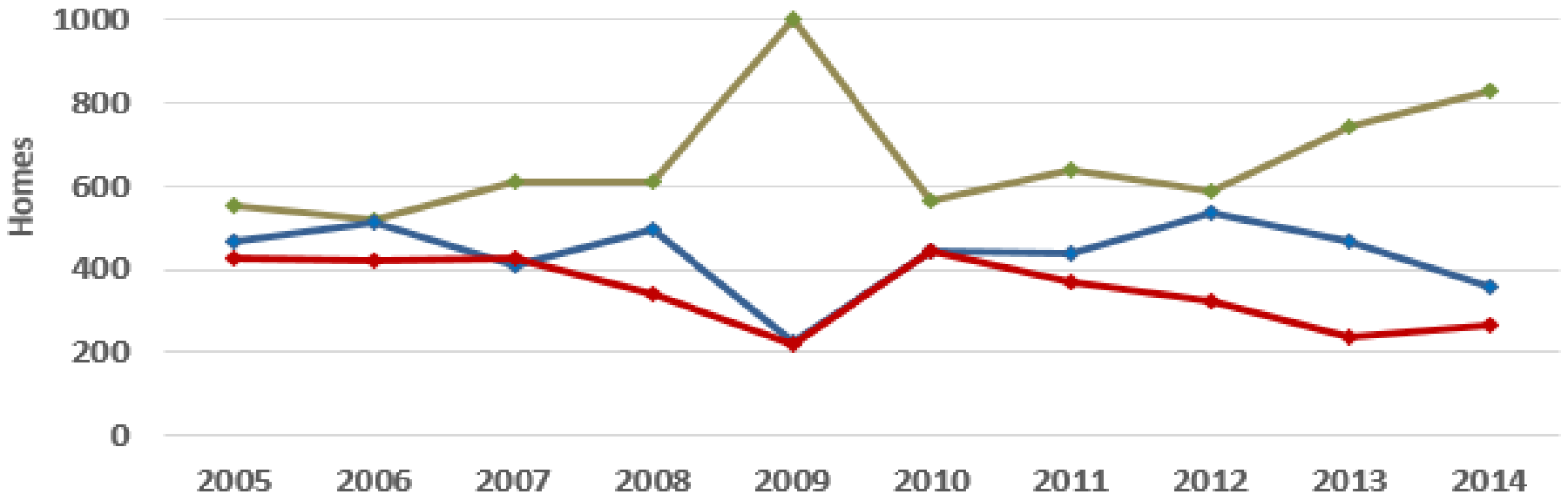


	Clothes Washer	Toilet	Shower
REU1999	6%	5%	75%
REU2015	46%	37%	80%

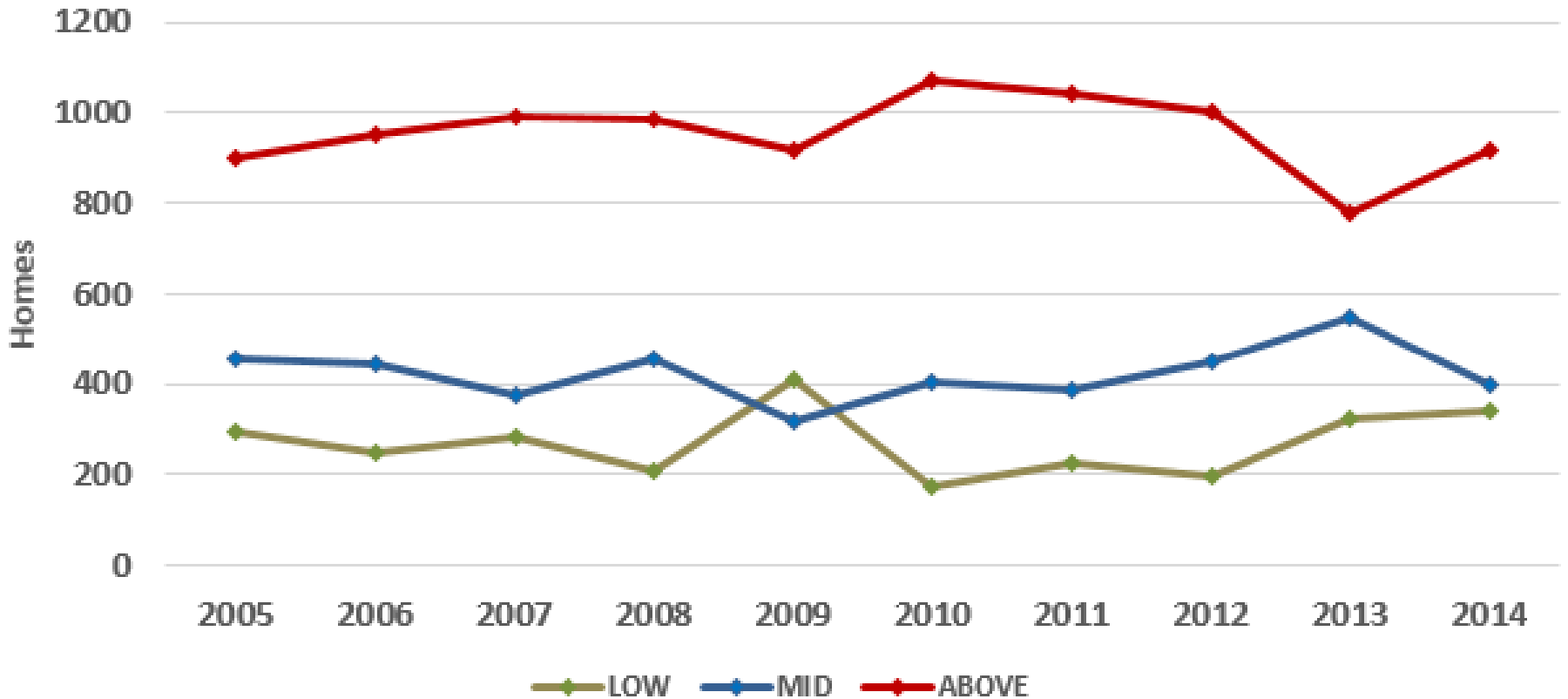
Source: Water Research Foundation (2015) Residential End Uses of Water Update – #4309. Denver, CO.

Average Efficiency Criterial: Clothes washers <=30 gallon per load
Toilets <= 2.2 gallons per flush
Showers <=2.5 gpm

Barnum



Corey Merrill




211 S Downing St
NO PARKING ANY TIME

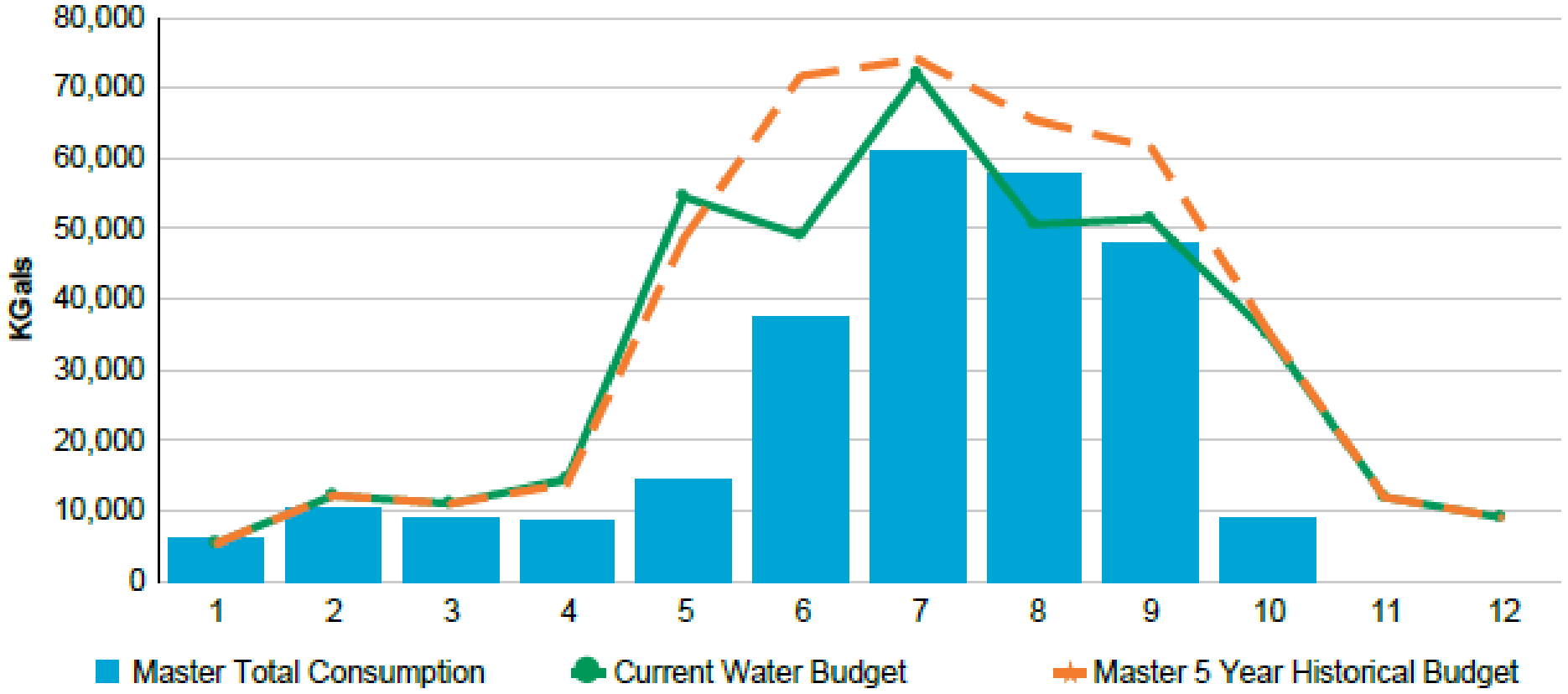
16
SEP

What lies beneath? (We're about to find out)

Posted by Denver Water in Your Denver Water. Tagged: aquifer storage and recovery, aquifers, Denver Basin, Denver Water, leonard rice engineers, long range water planning, underground water storage, water storage. Leave a Comment

Denver Water looks deep underground for new places to store water

By Jay Adams



	1	2	3	4	5	6	7	8	9	10	11	12
Indoor Budget	5,385	12,206	11,059	9,817	11,831	8,949	194	0	8,076	12,697	11,978	9,051
Total Outdoor Budget	0	0	0	4,653	42,762	40,110	71,830	50,624	43,341	22,393	0	0
Master Current Budget	5,385	12,206	11,059	14,469	54,593	49,058	72,024	50,624	51,417	35,090	11,978	9,051
Master Total Consumption	5,965	10,361	9,084	8,557	14,194	37,388	60,900	57,909	48,130	8,767	0	0
% of Monthly Budget	111%	85%	82%	59%	26%	76%	85%	114%	94%	25%	0	0

Housing Authority – Dispersed Housing (Indoor Use)

Efficiency	<30 g/p/d	30-40	40-50	50-60	>60
% of Units	24%	21%	22%	10%	23%


2130