



# WATER POLICY FORUM ARIZONA SOLUTIONS TO COLORADO RIVER SUPPLY CHALLENGES

**Friday, April 10, 2015 / 10:00 a.m. – 11:00 a.m.**

**University of Arizona  
Center for Creative Photography Auditorium  
1030 N. Olive Road, Tucson**

On April 10th, **Senator Jeff Flake** is convening a water policy forum at the University of Arizona to hear about current Colorado River supply challenges and future strategies. The forum will be hosted by the Water Resources Research Center.



THE UNIVERSITY OF ARIZONA  
**College of Agriculture  
& Life Sciences**

Cooperative Extension

# Colorado River System & Central Arizona Project

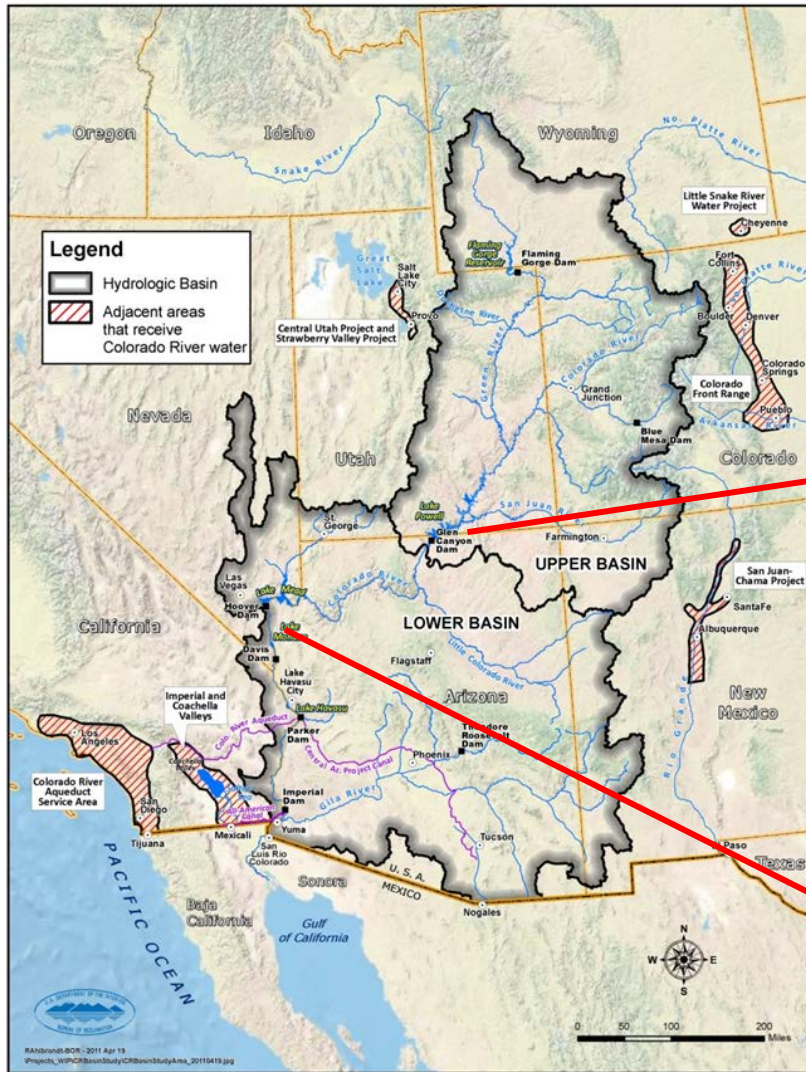
## System Status, Risks & Vulnerabilities

April 10, 2015



YOUR WATER. YOUR FUTURE.

# Colorado River Basin

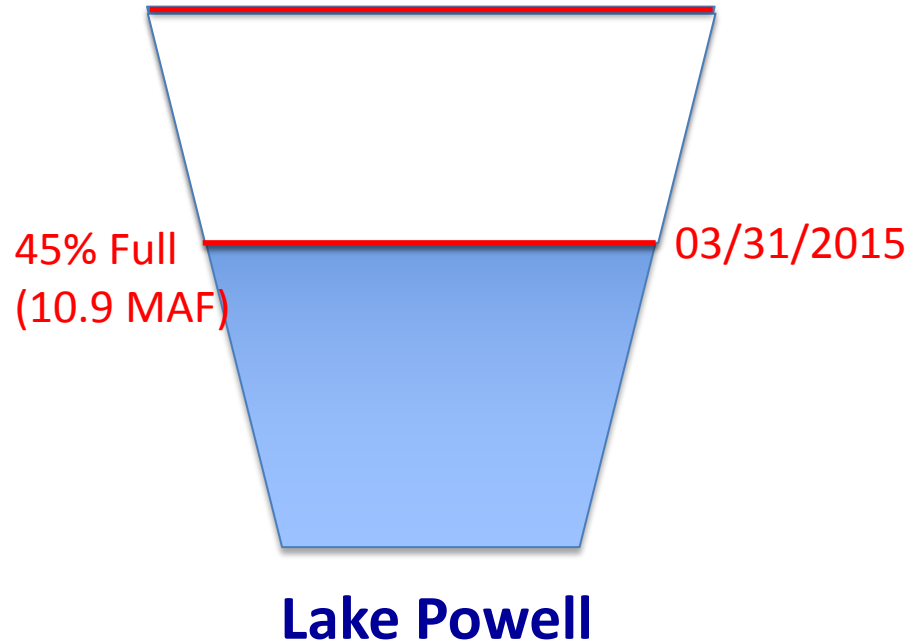
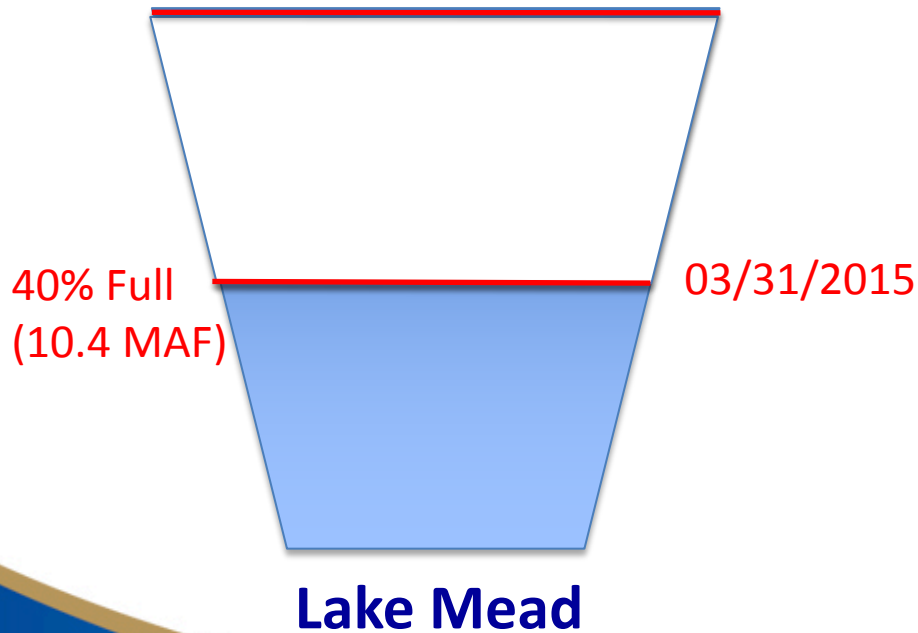


Lake Powell



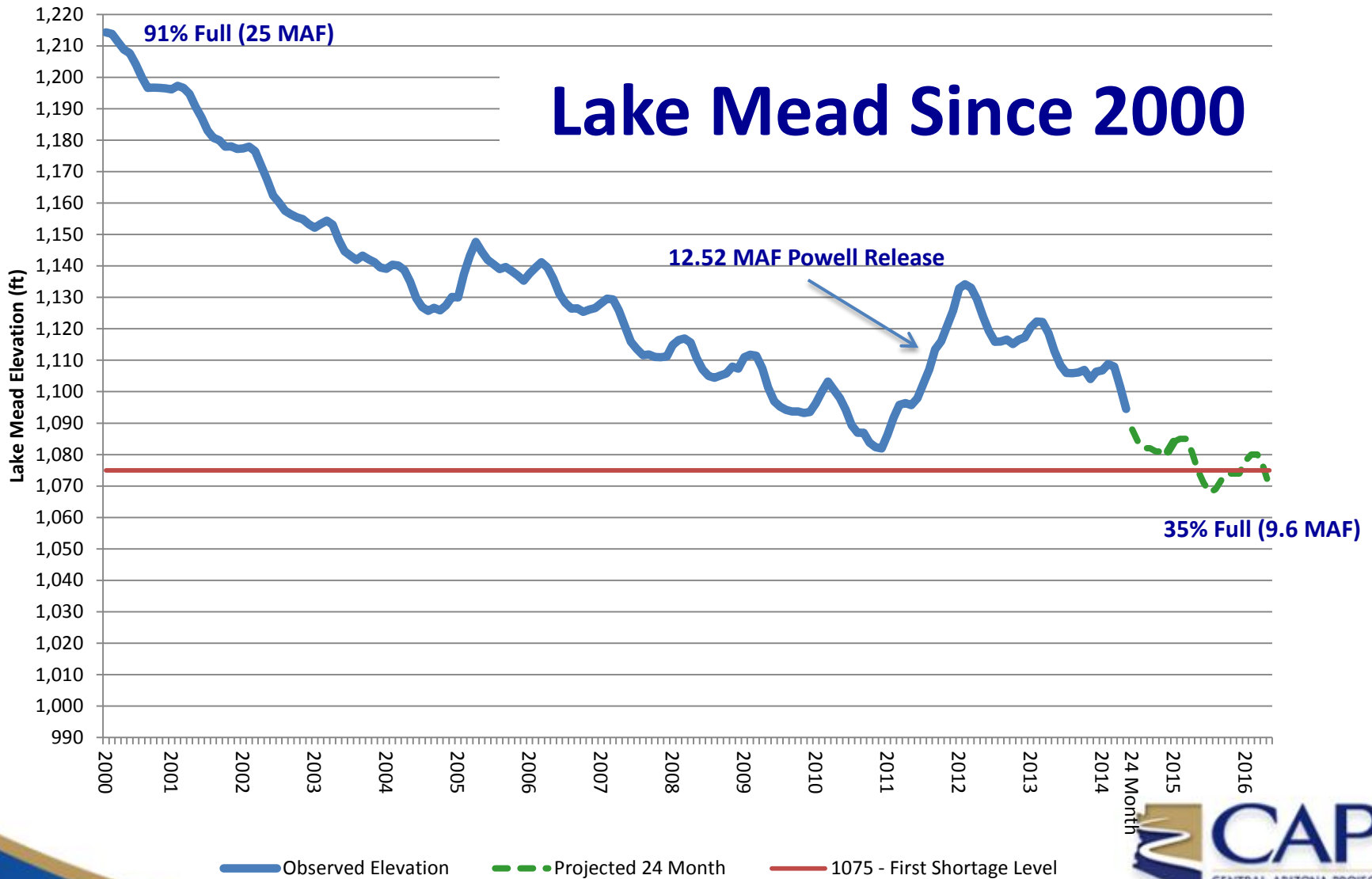
Lake Mead

# Impact of Drought & Supply/Demand Imbalance on Storage



# Looming Shortage

## Lake Mead Since 2000



# Central Arizona Project



**336-mile aqueduct stretches from Lake Havasu to Tucson**

**14 pumping plants lift water nearly 3,000 feet**

**8 siphons, 3 tunnels**

**Lake Pleasant/New Waddell Dam**

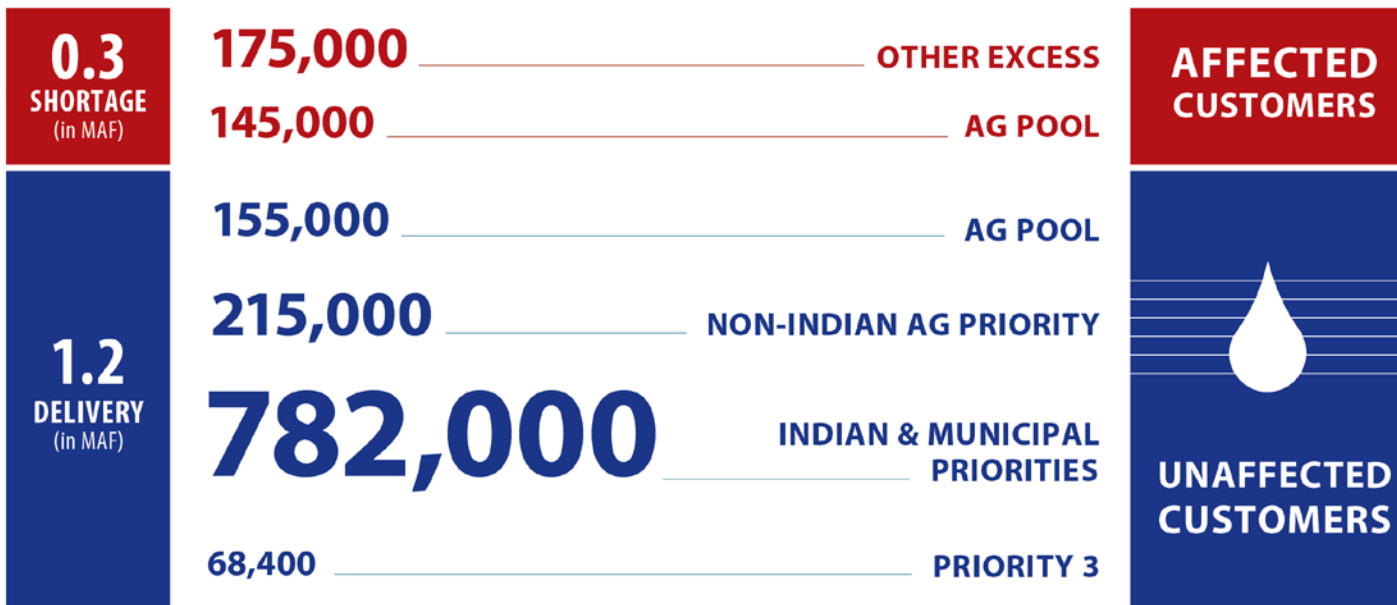
**Annually delivers approx. 520 billion gallons (1.6 mill acre-feet)**

**Delivery of Colorado River water began in 1985 in Maricopa County**

**Construction complete in 1993**

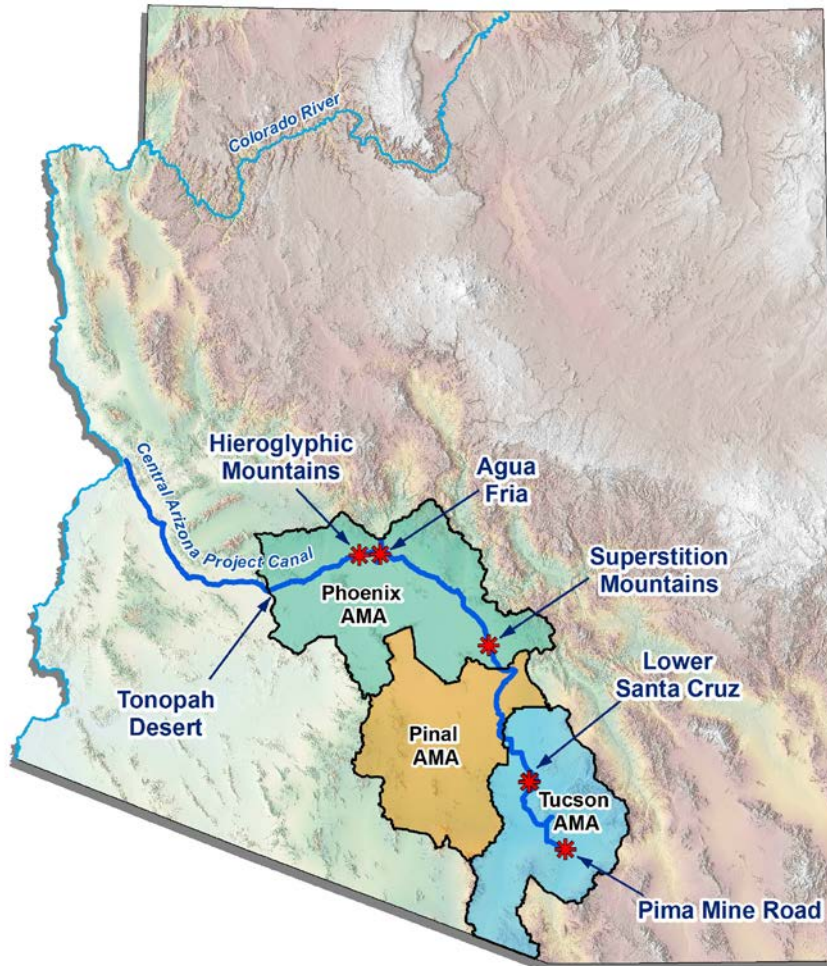
# TIER 1 SHORTAGE

2017 - CENTRAL ARIZONA PROJECT - PROJECTED IMPACTS



CITIES & INDIAN COMMUNITIES  
**ARE NOT IMPACTED**

# CAP Underground Storage



**CAP operates six underground storage facilities**

**Permitted capacity of 390,000 acre-feet per year**

**AWBA and CAP have stored 3.4 million acre-feet for cities and tribes**

**Nevada has stored 600,000 acre-feet**



# Arizona's Water Supply Annual Water Budget

Water Source	Million Acre-Feet (MAF)		% of Total
<b>SURFACE WATER</b>			
Colorado River		2.8	40 %
CAP	1.6		22.5%
On-River	1.2		16.9%
In-State Rivers		1.2	17%
Salt-Verde	.7		
Gila & others	.5		
<b>GROUNDWATER</b>		2.7	40%
<b>RECLAIMED WATER</b>		0.2	3%
<b>Total</b>		<b>7 MAF</b>	

Source: ADWR, 2015



# Probabilities of Lower Basin Shortage

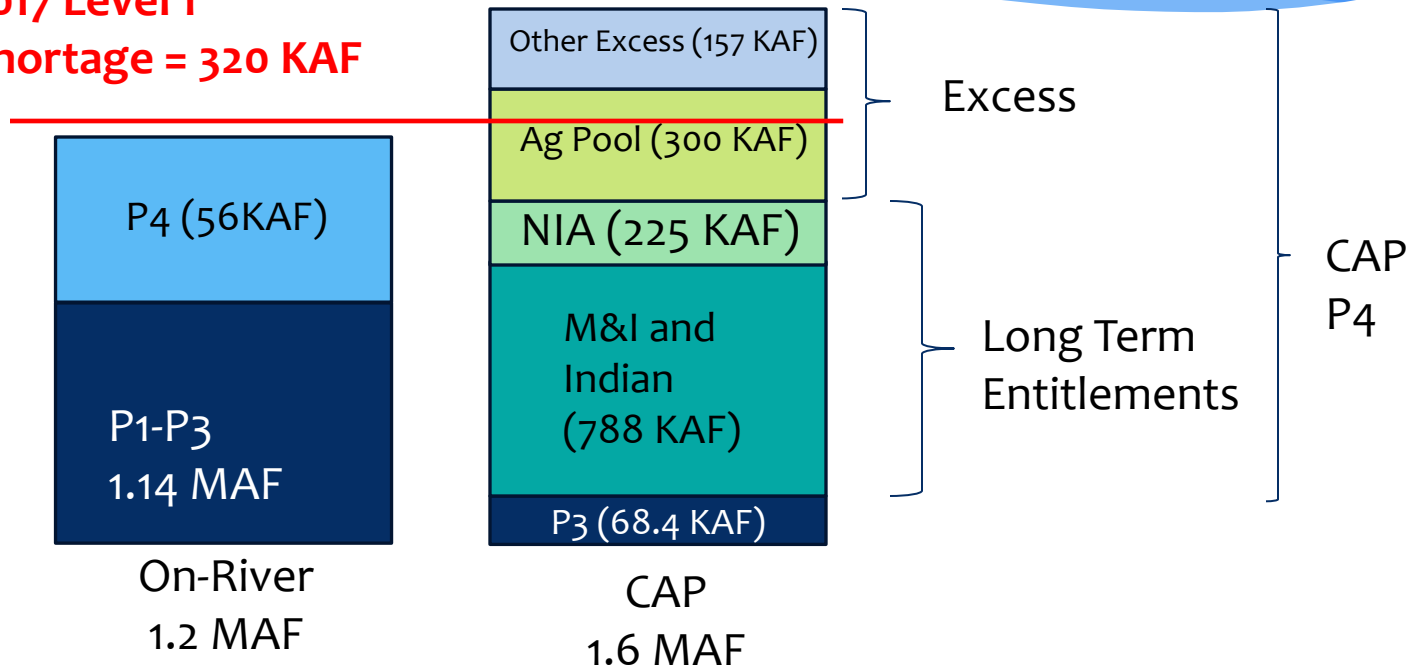
	2015	2016	2017	2018	2019
<b>Probability of any level of shortage (Mead <math>\leq</math> 1,075 ft.)</b>	<b>0</b>	<b>21</b>	<b>54</b>	<b>62</b>	<b>59</b>
1 <sup>st</sup> level shortage (Mead $\leq$ 1,075 and $\geq$ 1,050 ft)	0	21	45	40	33
2 <sup>nd</sup> level shortage (Mead $<$ 1,050 and $\geq$ 1,025 ft)	0	0	9	19	19
3 <sup>rd</sup> level shortage (Mead $<$ 1,025)	0	0	0	3	7

Source: Bureau of Reclamation January 2015 CRSS modeling.



# Lower Basin Shortage Tiers and Volumes

2017 Level 1  
Shortage = 320 KAF



Arizona Priorities – 2.8 MAF Total



# Water Stored

Phoenix Active Management Area	3,533,831 AF
Pinal Active Management Area	1,024,148 AF
Tucson Active Management Area	611,126 AF
Arizona Water Banking Authority	3,897,588 AF
<b>Total Certified Credits</b>	<b>9,066,693 AF</b>
	<i>*Credit Balances as of 2/12/2014</i>

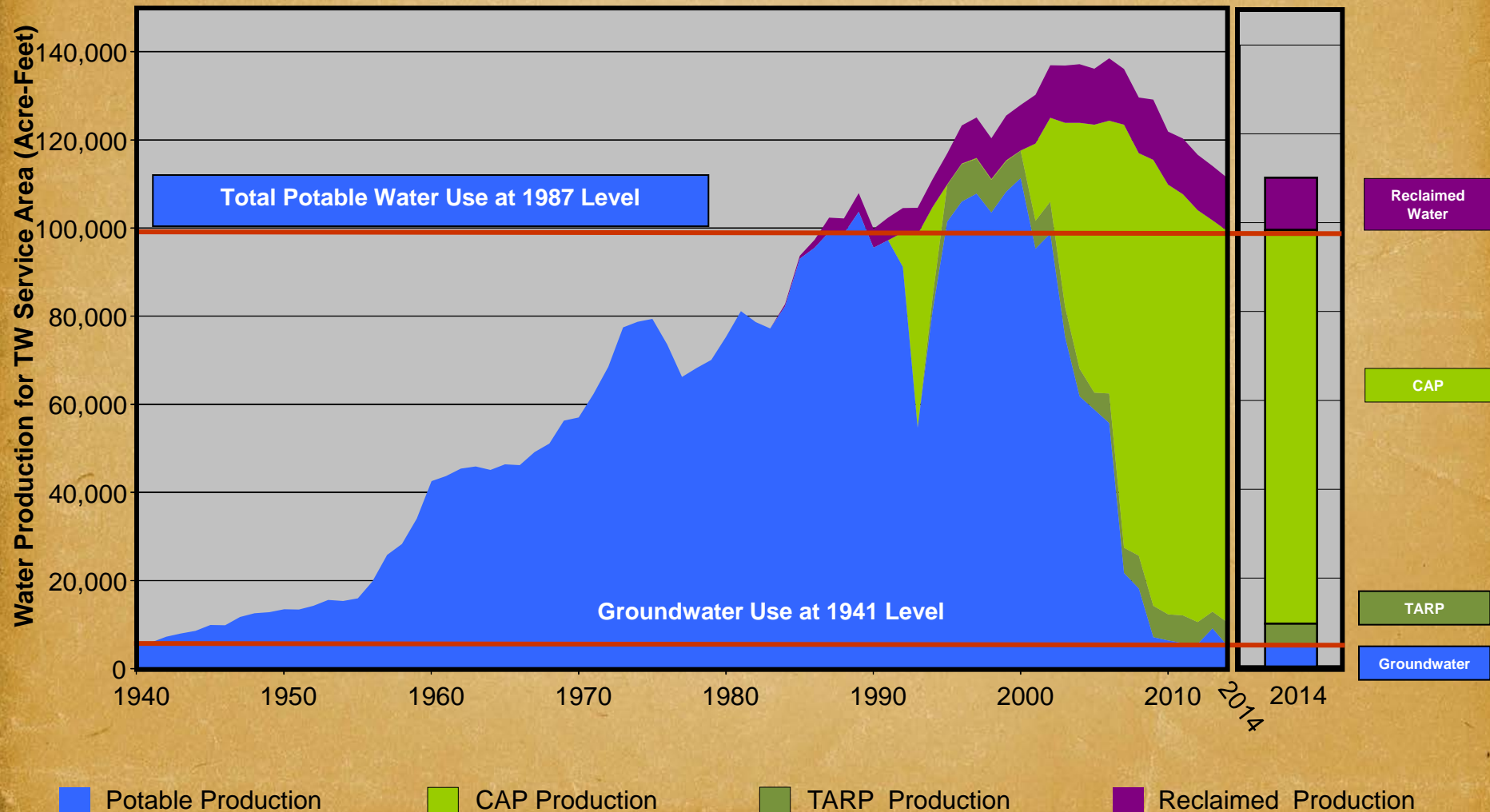


# Proactive Water Management Programs

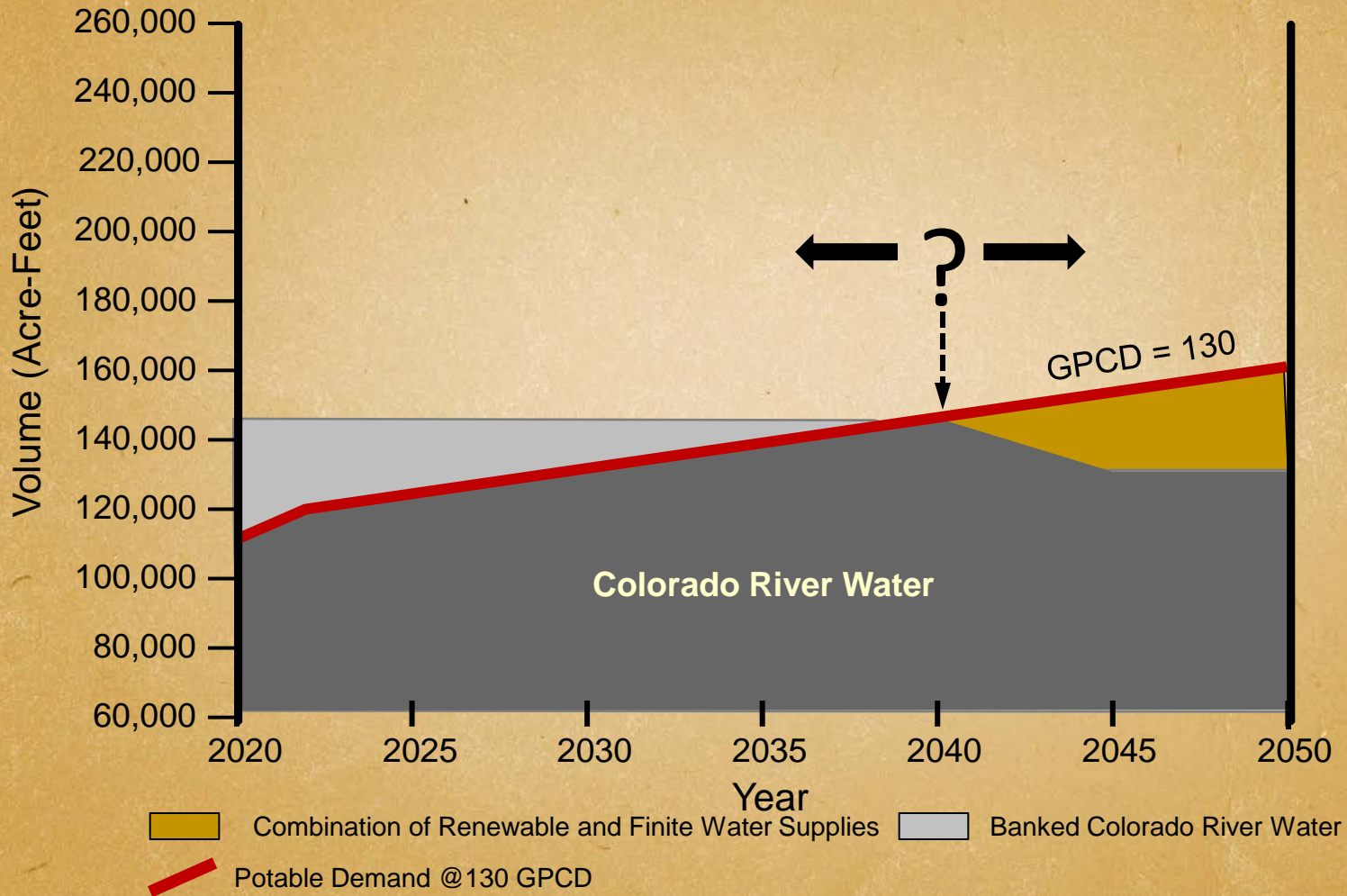
- Lake Mead Protection Volume:
  - 740,000 AF
- Pilot System Conservation Program:
  - ~ 75,000 AF
- Augmentation
  - Weather modification in the Upper Colorado River Basin
  - Potential local and binational desalination opportunities
  - Basin States Augmentation Work Group



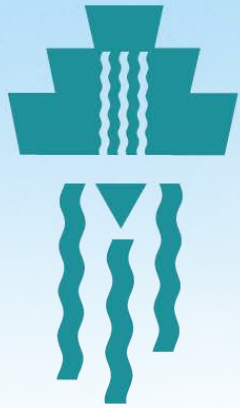
# Water Production for Tucson Water Service Area 1940-2014



# Potable Water Use - Projection to 2050 with Shortage



\* The population data was provided to TW by United States Census Bureau



**WRRC**  
WATER RESOURCES RESEARCH CENTER



COLLEGE OF  
AGRICULTURE  
& LIFE SCIENCES  

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COOPERATIVE EXTENSION

# Water Policy Forum: Arizona Solutions to Colorado River Supply Challenges

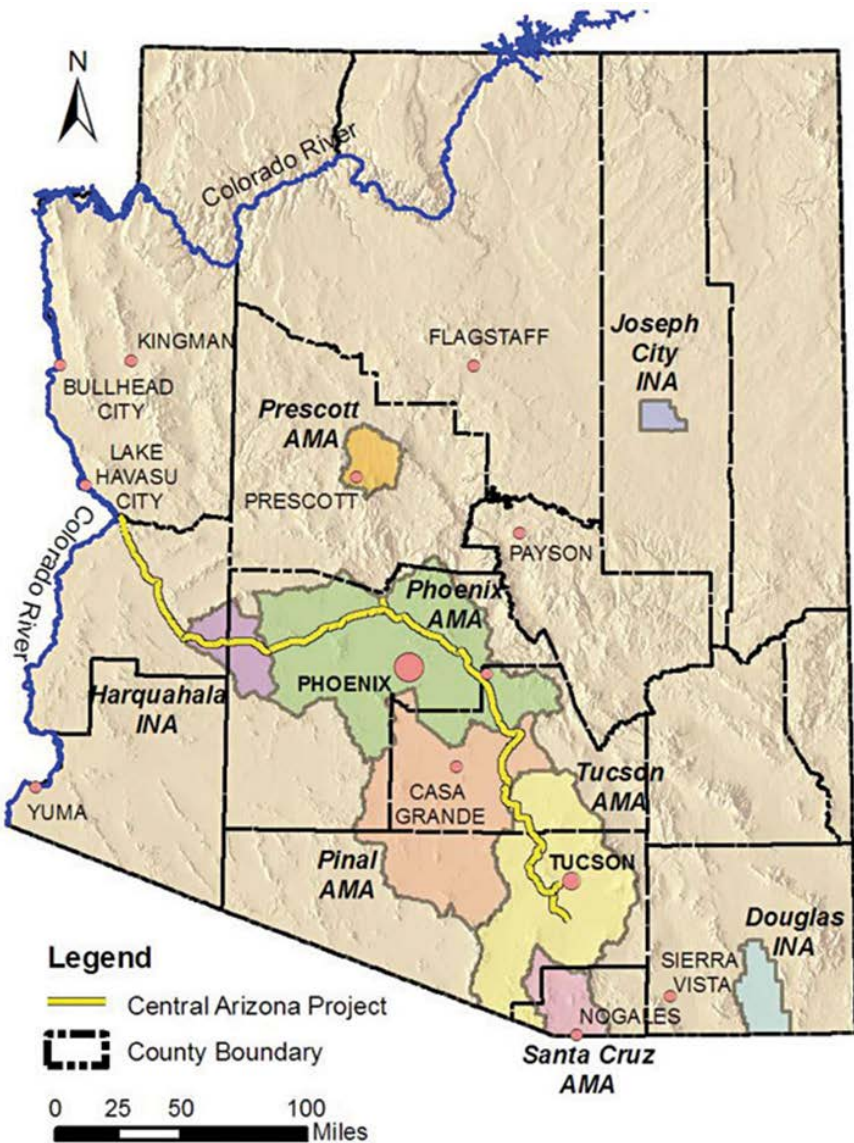
Comments by Sharon B. Megdal, Ph.D.

[smegdal@email.arizona.edu](mailto:smegdal@email.arizona.edu)

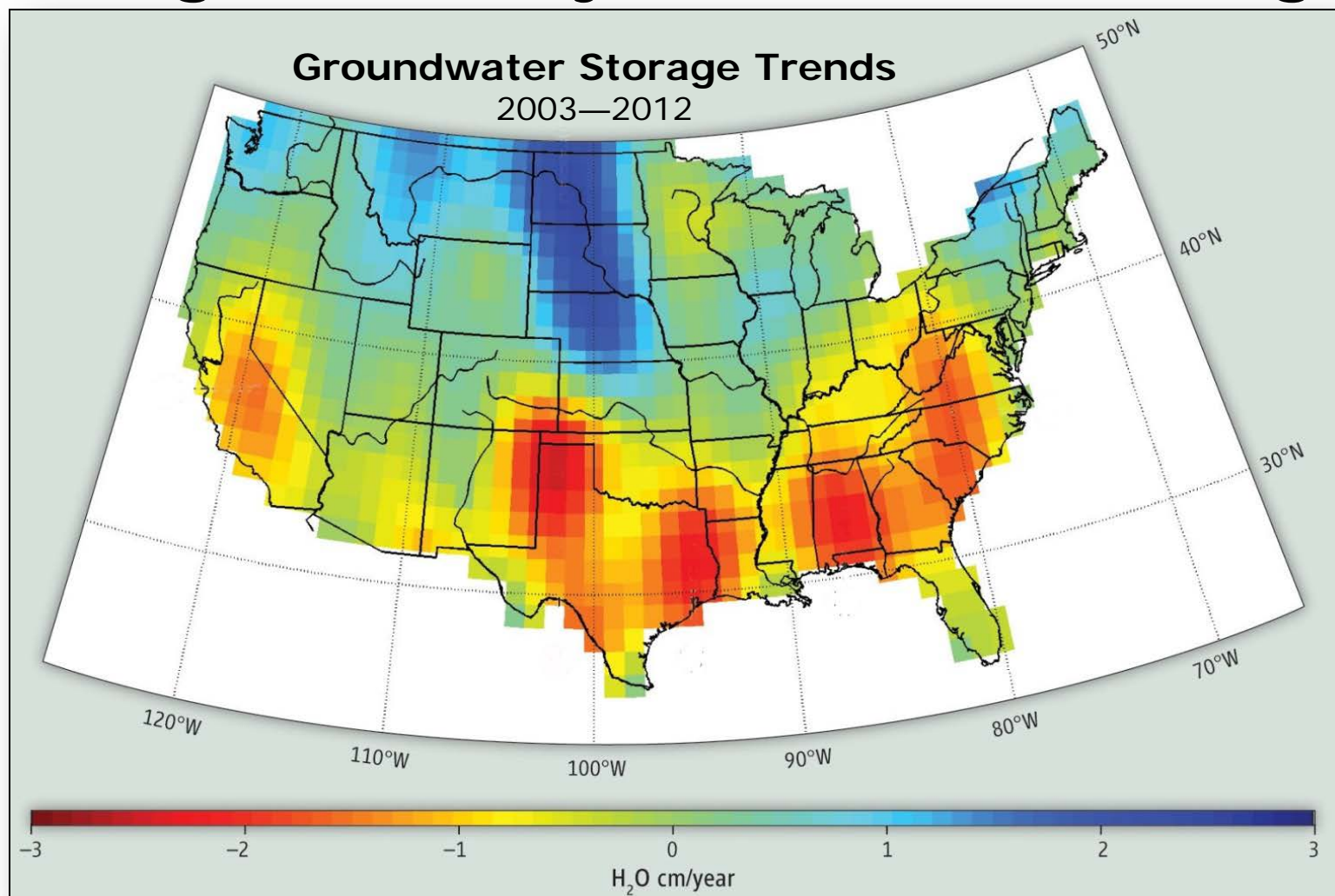
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# Importance of Colorado River water and groundwater management



# Importance of Arizona Water Banking Authority and other storage



J. S. Famiglietti and M. Rodell, Water in the Balance, *Science*, 340, 1300 (2013)

Graphic courtesy of



S.B. Megdal et al. "Water Banks: Using Managed Aquifer Recharge to Meet Water Policy Objectives." <http://www.mdpi.com/2073-4441/6/6/1500>

# Different sectors and locales are impacted differently by drought and Colorado River shortage



Central Arizona – drip irrigated field



Yuma, Arizona



# Importance of Education and Engagement

## Public Policy Review

### Connecting Students to Water Policy and Management in Practice



by Sharon B. Megdala

One of the highlights of the graduate course in Arizona Water Policy I teach each Spring semester is our class field trip. The annual outing provides students with the opportunity to see in practice what we have been exploring in the classroom and through readings. This year's field trip, conducted on March 27, 2015, included stops at Tucson

Water's Advanced Oxidation Plant for removing localized groundwater contaminants, the Southern Avra Valley Storage and Recovery Project for recharging Colorado River water for current and future use, and the Sweetwater Wetlands for further processing of treated wastewater. Each site represents an important component

of Tucson Water's water supply portfolio and overall groundwater management strategy. In addition, the students visited Central Arizona Project's Twin Peaks Pumping Station, where they saw the CAP canal and the pumps that push water uphill. They also visited Pima County's new Agua Nueva Water Reclamation Facility, which replaced the old (and smelly!) Roger Road Wastewater Treatment Plant and where they saw modern lab facilities used for water quality monitoring. In addition to making all of

widespread recognition that addressing water issues in practice requires a multi-disciplinary approach. Course size is limited to 15 in order to enable a truly interactive and participatory experience throughout the semester.

This course is just one of many choices included in the curriculum for a relatively new graduate program at the University of Arizona, the **Master's degree program in Water, Society, and Policy**. In order to help prepare them for jobs in public agencies, private businesses, and non-governmental organizations, the program offers students considerable choice of coursework. In lieu of a research-based thesis, the program's capstone requirement is a six-unit Master's Project. As noted in the brochure for the program: "All students complete a Master's Project selected in consultation with a faculty advisor. Projects are as unique and diverse as the students that participate in this program. [The student] may produce a professional paper, internship report, series of public presentations, public outreach activity with associated background materials, water-focused curriculum, or other substantive product." (<https://werc.arizona.edu/WS-and-PDP>)

This Master's Project connects the student with an external organization with which to work for a minimum of 270 hours on aspects of water management and policy important to the host entity. Students have connected with a diverse set of organizations. I assist my students in identifying a potential host and in reviewing the "scope of work" developed in consultation with the host. Students have connected with different types of organizations, including a large city, a grass-roots sustainability coalition, a business-oriented water coalition, and a foreign scientific research institute. Project work is finalized by a summary report to the student's advisor and a final



Sharon B. Megdala's Arizona Water Policy graduates class visits Tucson's Sweetwater Wetlands. Source: Betsy Wilkening.

