



What Do I Need to Know About Water, and Why? The Future of Water in Southern Arizona: Issues, Innovation, and Impact

Sharon B. Megdal, Ph.D.
Univ of AZ Osher Lifelong Learning Institute (OLLI)
January 26, 2026



THE UNIVERSITY OF ARIZONA
COOPERATIVE EXTENSION

**WATER RESOURCES
RESEARCH CENTER**

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wrrc.arizona.edu

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Outline

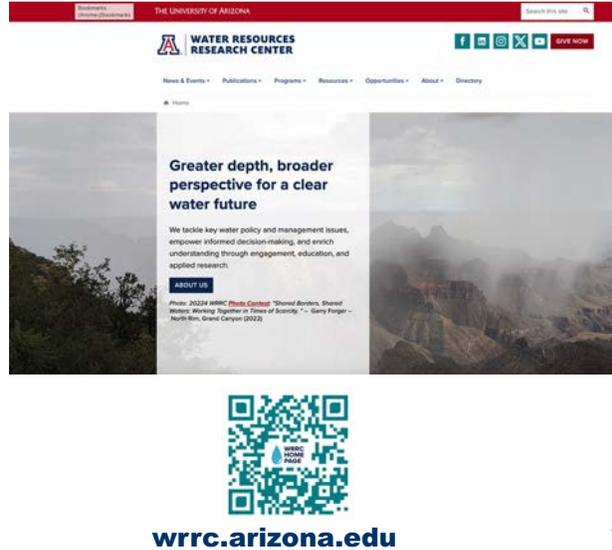
- About the University of Arizona Water Resources Research Center
- Determinants of Water Policy and Management
- Importance of Context
- Varying and Changing Water Management Landscape
- Wicked Water Problems
- The Tucson region
- Solutions and Innovation
- Process Factors for Success
- Call to Engage

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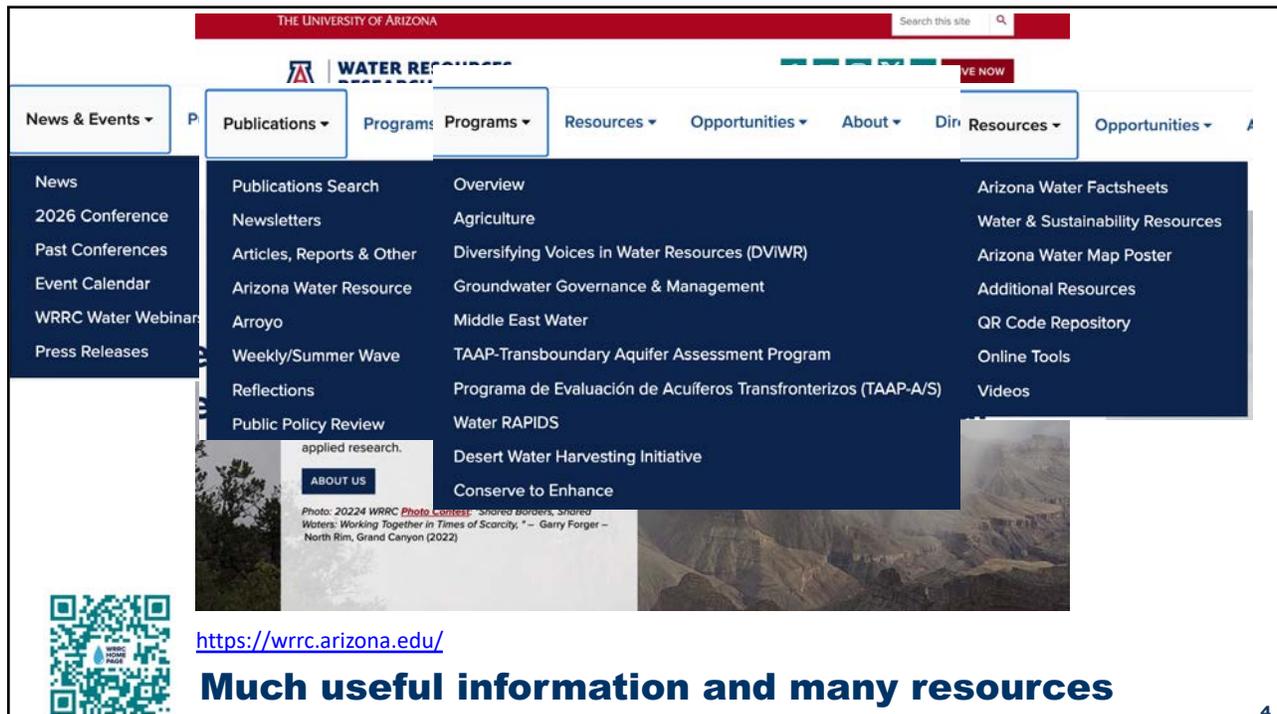
About the WRRC Bridging academic and non-academic communities

- Applied research
- Extension and Engagement
- Work across different water-using sectors
- Partnerships are foundational to our work
- Applied research, engagement, and education efforts are interwoven



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<https://wrrc.arizona.edu/>

Much useful information and many resources

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WRRC Annual Conference, Webinars, and Other Events

WRRC 2025 ANNUAL CONFERENCE
SHARED BORDERS SHARED WATERS
 Working Together in Times of Scarcity

MAY 20-21
 Student Union Memorial Center
 The University of Arizona



SPECIAL WRRC WATER WEBINAR:
THE "HOW" OF WATER DIPLOMACY
 An Introduction to the Routledge Handbook of Water Diplomacy

Monday, December 15, 2025
 12:00 - 1:30 pm Arizona Time

WRRC 2026 ANNUAL CONFERENCE

WATER FOR TECH, MINING & ENERGY
 PATHWAYS TO ARIZONA'S FUTURE

APRIL 14-15
 University of Arizona
 Student Union
 Tucson, Arizona

Register Here!

wrrc.arizona.edu/conference

WRRC 22nd Annual Chocolate Fest



When **Feb 12 at the WRRC and online**
 4:00 to 5:00 pm MST, February 12, 2026

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ARROYO

Water Issues Critical to Arizona

The WRRC's Arroyo is a unique publication produced each spring to look in depth at a single topic of timely importance to Arizona. Intended for the lay public, it reaches educators, water managers, decision makers, students, and interested individuals and has been used to inform policy discussions.

wrrc.arizona.edu/arroyo

ARIZONA WATER FACTSHEETS

Get to Know Water in Your County

These county-level factsheets are designed to answer common questions about water resources, tailored to every county in Arizona so as to foster understanding of the local nature of Arizona water resource challenges and solutions.

wrrc.arizona.edu/az-water-factsheets

WEEKLY WAVE
 Be Informed

Keep up with our news and events with a subscription to the Weekly Wave.
wrrc.arizona.edu/subscribe

Arroyo Publications, Factsheets, Reflections Essays and more!!

Reflections: Planning for the Future
 by Sharon B. Magle
 January 6, 2026

On the Colorado River water front, 2025 did not end on a high note. Reservoir storage was low, snowpack was below average, and the relationship between the Upper Basin and Lower Basin state negotiations was fraught. Discussions and presentations at the December 16-18, 2025 Colorado River Water Users Association's (CRWUA) annual conference suggested the potential to arrive at a negotiated agreement by February 14, 2026, the deadline established after an agreement was reached by the prior November 13, 2025, deadline. But specifics were lacking. Moreover, federal representatives were unwilling to indicate what they would do should the deadline continue. They stated that the Draft Environmental Impact Statement would not specify a preferred alternative.

As I was interviewed in December by media representatives, I commented that people work to meet deadlines, especially if there are negative consequences to not meeting them. And Colorado River water users must figure out how to work with what Mother Nature is providing. As I wrote in my August 2022 *Reflections*, the Colorado River is not waiting. I noted that feelings of frustration were prevalent. Another matter I covered in some interviews was process. For some time, I've been speaking and writing about the importance of process for identifying solutions and debating their trade-offs before acting to address wicked water problems. I enumerated seven process factors in a case study published as Chapter 43 in the freely available in PDF format Routledge Handbook of Water Diplomacy. This recently published volume has much useful information and insights into water diplomacy, which were highlighted during the December 15, 2025, *WRRC Water Webinar* featuring Handbook editors and authors.

When speaking about the list of seven process factors in my case study, I often add transparency. Transparency is lacking in Colorado River negotiations. Not only are meetings closed, but there is limited opportunity for others to offer suggestions. The closed-door process does not allow for people to voice ideas through, for example, a call to the public. Such a call could allow all of us to hear alternative options. There are a lot of good minds out there. It would help if we could have some of them rather than follow a process that only allows for writers' comments at very limited points in time. It also could be helpful to have more reporting out, in summary form, on the status of the negotiations. There is so much at stake.

Before leaving Las Vegas, the site of the CRWUA conference, on December 18, 2025, many attended a gathering convened by the Women in Water Diplomacy Network and Indigenous Women's Leadership Network, with support from the Central Arizona Project and Salt River Project. There, we heard from several speakers about how life experiences shape who we are as professionals — and as people. The event provided an opportunity close to this business trip, the last one for almost all of us before the end-of-year holidays and work slowdowns.

As I returned home to Tucson, I thought that I would experience a quiet holiday break in relatively warm Tucson. But that was not to be. Underestimating the reminder that we have personal lives and families was the early arrival on Christmas Eve of my first grandchild. So, I hurriedly packed for an early Christmas Day flight from warm Tucson to the very cold and snowy Northstar to greet my granddaughters, Nita, and spend time with my daughter and son-in-law. Her arrival underscores the importance of family and the cycle of life. And she provides a much needed reminder that we must plan well for many generations into the future. The little ones are depending on us. We cannot fail them!

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 Sharon B. Magle, Ph.D.
 Colorado Water Resources
 The University of Arizona

Scan this QR code to check out *Reflections*

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Reflections: Dry Times, Bold Moves – Innovation for Arizona’s Water Future

by Sharon B. Megdal
September 19, 2025

My work, in formal classroom instruction, presentations to audiences of varied backgrounds, and written materials, centers on fostering understanding of water challenges and options for addressing them. As a faculty member and Director of the University of Arizona Water Resources Research Center, I interweave my applied research, education, and engagement/outreach programs and design them to bridge academic and non-academic communities. I try to write and present materials that are understandable to broad audiences, and convene forums, such as the WRRC’s Annual Conference and Water Webinars, that are accessible to all, regardless of background.

Listening to and learning from others often inspire ideas for programs or publications. At the WRRC’s **2025 Annual Conference**, *Shared Borders, Shared Waters: Working Together in Times of Scarcity*, there was focus on innovation and investing with impact, sharing good information in inclusive ways, and incentivizing changes that contribute to a more secure water future. These themes were fertile sources of inspiration.

Inclined toward alliteration, I started jotting down words that began with the letter “I.” Here is my list: innovation, information, investment, infrastructure, institutions, incentives, inclusive involvement, industry, impact, interrelationships, and interactions. The goal for innovation, defined by the **Cambridge Dictionary** as “a new idea or method,” when stated simply, is to bring about positive impacts. Information is needed for evidence based decision making on investments in infrastructure, research, and both educational and engagement programs. Information on trade-offs associated with policy change is necessary, too. Governmental institutions and industry will be involved. Often, incentives are better ways to bring about change—the carrot rather than the stick. Inclusive processes can ensure that differing perspectives are heard and various viewpoints weighed. Our interrelationships and interactions contribute to robust deliberative processes and support cooperative action.

Arizona’s water challenges are well known and documented. Key among them are diminished availability of water from the Colorado River and overdrafting of groundwater. Twenty-five years ago, when I served on **Governor Jane Dee Hull’s Water Management Commission**, we asked what would be the next bucket of water



<https://wrcc.arizona.edu/publication/reflections>



Reflections: On Planning for the December 2026 UN Water Conference and the Women in Water Diplomacy Network

by Sharon B. Megdal
July 25, 2025

The December 2026 United Nations Water Conference, which will be held in the United Arab Emirates, was the focus of meetings at UN Headquarters in New York on July 9 and 10, 2025. On July 9, the UN General Assembly held a meeting in which themes for the interactive dialogues to occur at the conference, as documented immediately below, were adopted by consensus.

Themes of the interactive dialogues of the 2026 United Nations Water Conference to Accelerate the Implementation of Sustainable Development Goal 6: Ensure availability and sustainable management of water and sanitation for all

The General Assembly, recalling its resolution 78/327 of 6 September 2024, decides that the themes, in no particular order of priority, of the six interactive dialogues of the 2026 United Nations Water Conference to Accelerate the Implementation of Sustainable Development Goal 6: Ensure availability and sustainable management of water and sanitation for all, mandated in paragraph 6 of the resolution, will be:

- (a) Water for people: the human rights to water and sanitation, including for those in vulnerable situations, for healthy societies and economies;
- (b) Water for prosperity: valuing water, water-energy-food nexus, advancing integrated and sustainable water resource management, wastewater and water-use efficiency across sectors, and economic and social development;
- (c) Water for planet: climate, biodiversity, desertification, environment, source to sea, resilience and disaster risk reduction;

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Water policy and management reflect many determining factors

- Resource Availability
- Location of water demands and supplies
- Economics
- ➔ • Historic and Current Legal/Institutional Framework
- The nature of involvement of multiple governmental and non-governmental entities, including the extent of centralized versus decentralized decision making
- ➔ • Politics of Area
- Public values and socio-cultural factors
- Historical context
- Information
- Etc...

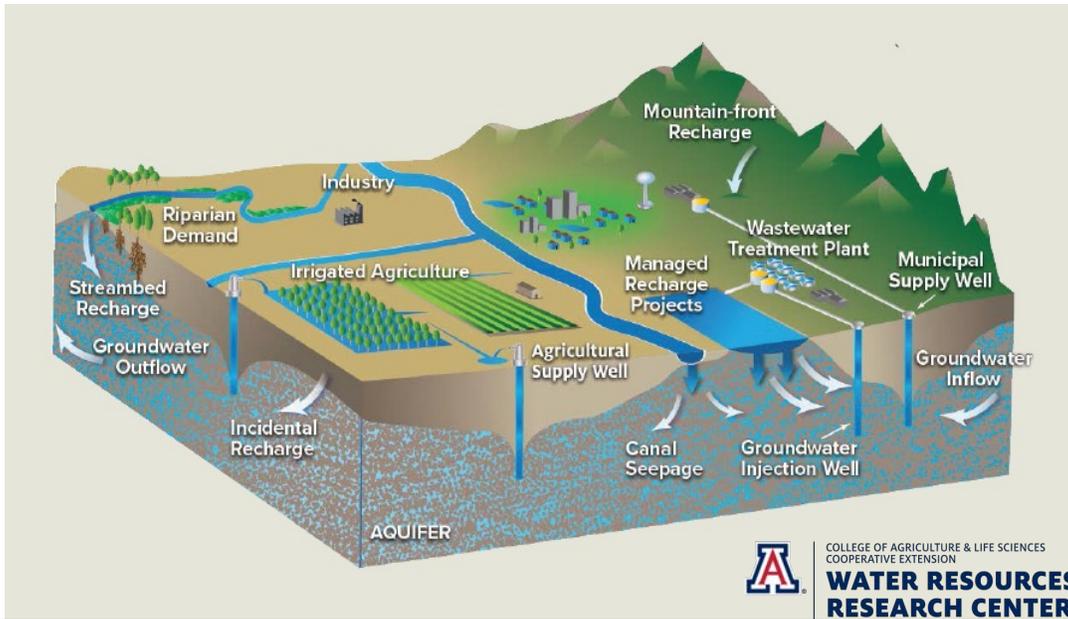
Importance of Context



Megdal, Graduate Water Policy class, January 16, 2026

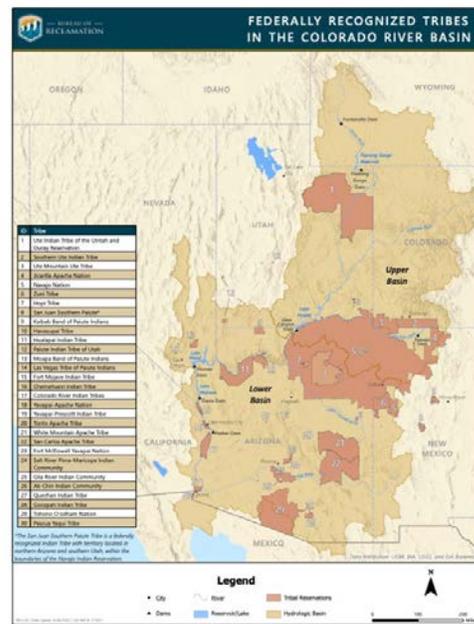
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Water Cycle Context



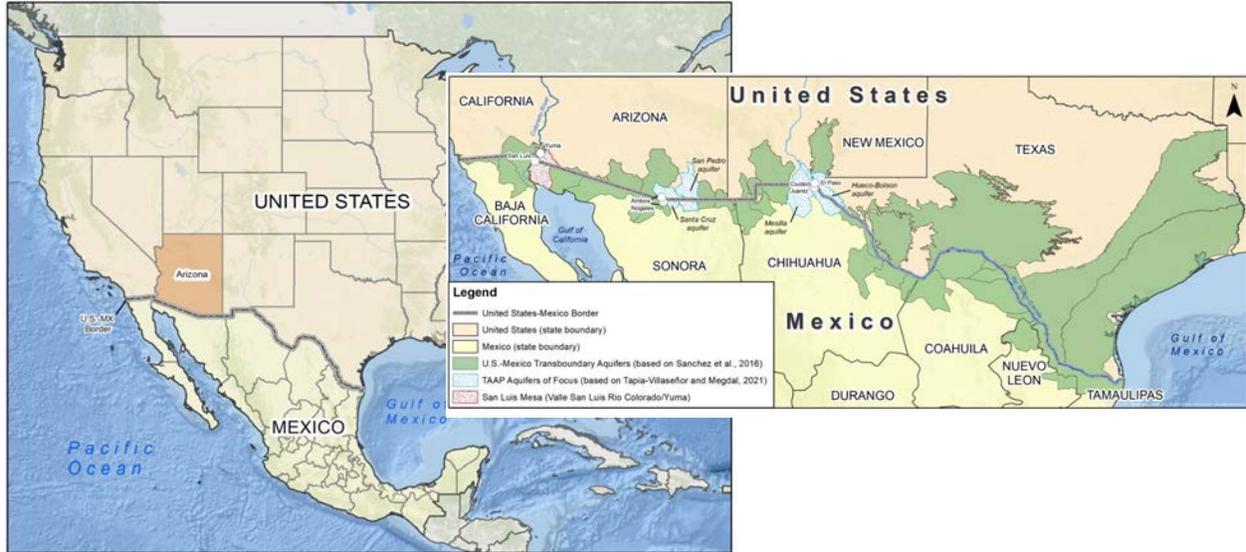
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Geographic and Jurisdictional Context



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Context: Our border location

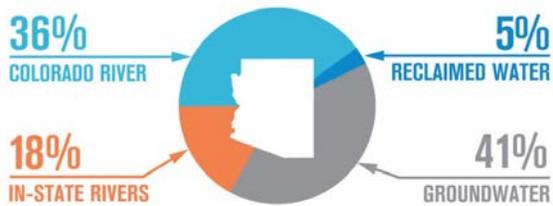


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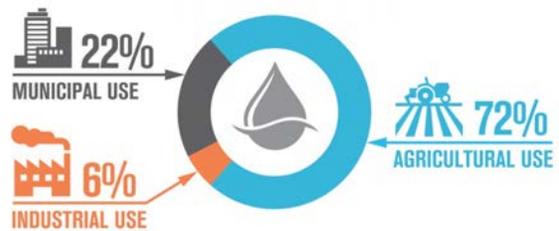
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Statewide context: Arizona's water sources and demand

ARIZONA'S WATER SUPPLY

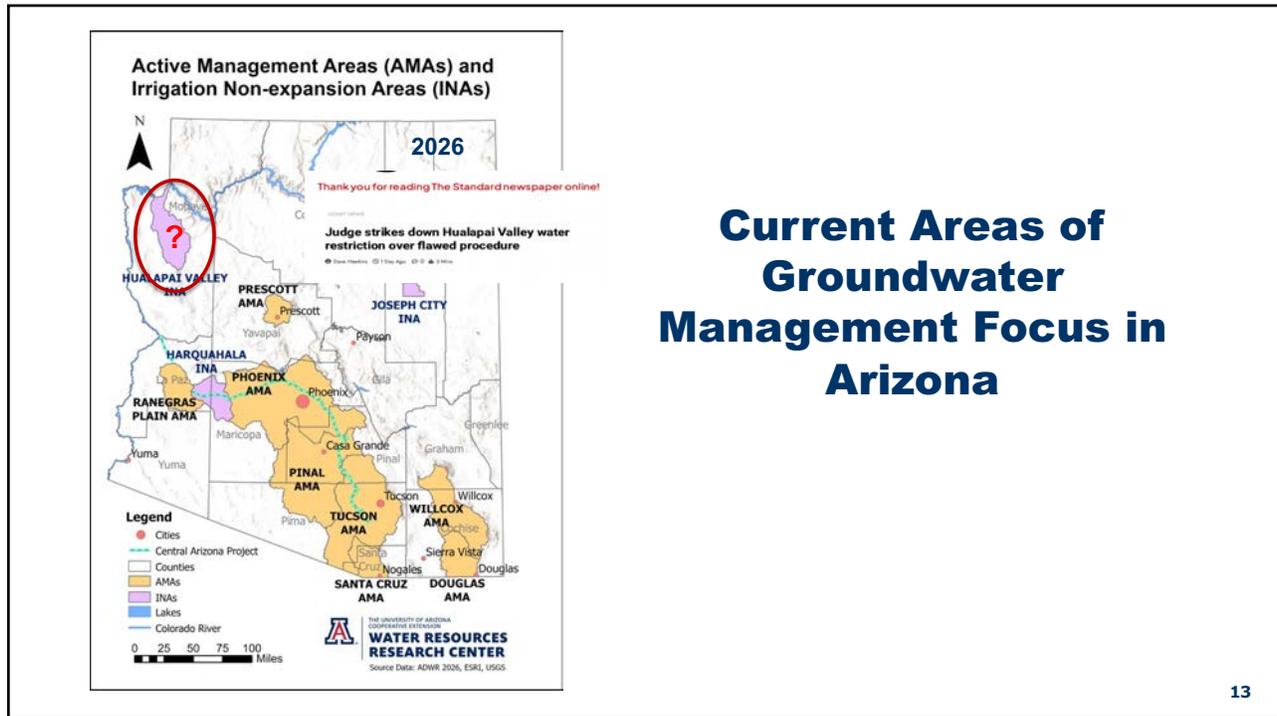


ARIZONA'S WATER USE BY SECTOR (2019)

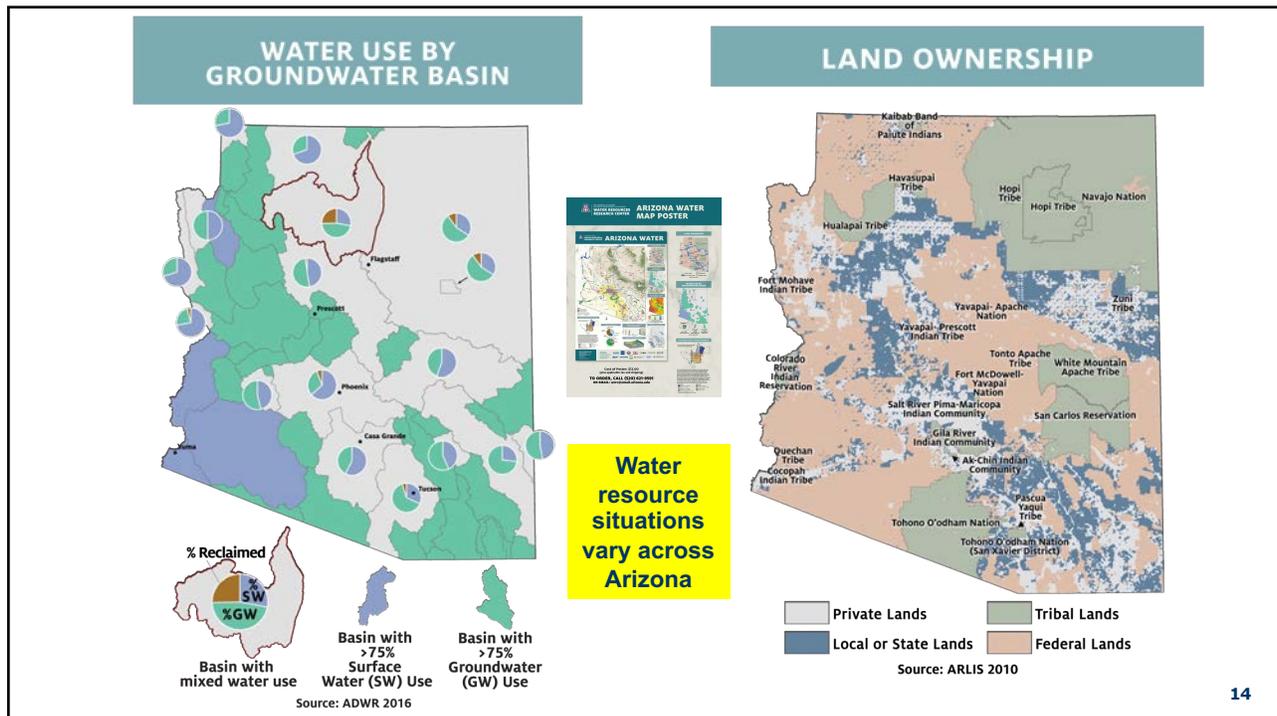


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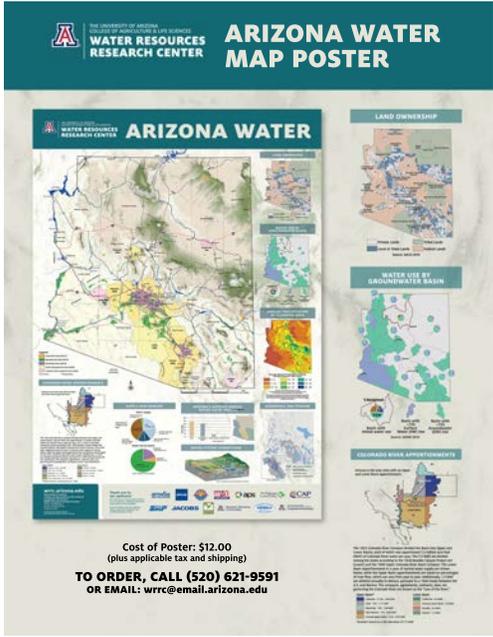
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ARIZONA WATER MAP POSTER

Cost of Poster: \$12.00 (plus applicable tax and shipping)
TO ORDER, CALL (520) 621-9591
OR EMAIL: wrrc@email.arizona.edu

Selected Agricultural Zones



Colorado River Indian Tribes

Central Arizona

Yuma

Cochise County

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Wicked Water Problems Context

- Wicked Water Problems are big problems that do not have a simple pathway to resolving them.
- Two of the Wicked Water Problems Arizona faces:
 - Imbalance of Water Supply and Demand (Colorado River in particular)
 - Groundwater invisibility and overdraft
- Innovation and collaboration are necessary for addressing Wicked Water Problems.



Photos: SB Megdal



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Dry times: Colorado River Basin Affected by Megadrought

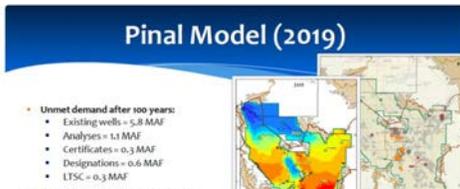


Table Source: Central Arizona Project.

Snowpack vs. Runoff (% of average)		
	Snowpack	Runoff
2020	111%	61%
2021	91%	37%
2022	90%	63%
2023	161%	140%
2024	114%	83%
2025	92%	49%

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Groundwater issues in AMAs And outside AMAs

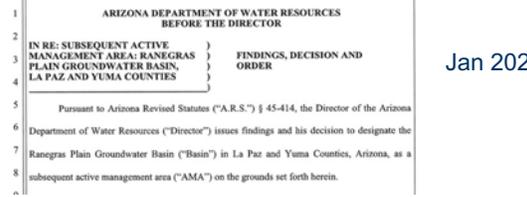


Arizona Department of Water Resources (.gov)
Ag to Urban: An Arizona Water News Podcast
 interview with ADWR's A2U specialist, Ben Bryce
 July 2025

Phoenix area can't meet groundwater demands over next century, threatening growth

A state report released Thursday amounts to a chilling warning for a region that has been a development hotspot for new residents and high-tech businesses

By Joshua Partlow, Yvonne Worell Sanchez and Isaac Starikov-Bosker
 Published June 1, 2023 at 6:56 a.m. EDT | Updated June 1, 2023 at 8:34 a.m. EDT



Framework for rural groundwater management still being worked on.

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TOP STORY

Owner of huge Arizona dairies makes groundwater deal with state

Tony Davis Jan 10, 2026 Updated 10 hrs ago

ALERT TOP STORY EDITOR'S PICK TOPICAL

Deal will reduce groundwater overpumping in southeast Arizona

Tony Davis Jan 10, 2026 Updated 6 hrs ago



That fund will be directly administered by the dairy company. But the fund serving residents farther from the Riverview wells will be administered by a non-profit group not named in the agreement. It will be advised by a five-member review panel appointed by the activist Sulphur Spring alliance, the non-profit Babbitt Center for Land and Water Policy, the ASU Sustainability Institute and the University of Arizona's Water Resources Research Center.

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Arizona's regulatory framework 1980 Groundwater Management Act

- Created the Arizona Department of Water Resources (ADWR)
- Established Active Management Areas (AMAs) in parts of the AZ
 - Hydrologic boundaries
 - Stringent regulations
 - Long-range management goals
- Ensured completion of the Central Arizona Project (CAP)
 - In 1968, grand bargain struck for funding CAP: *Low priority in times of shortage*



Groundwater: To enact a law for the common good

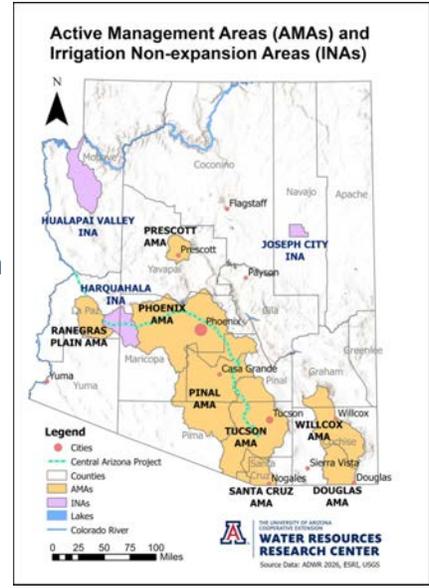
<https://www.youtube.com/watch?v=sNjbqCE9sXU>

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1980 Groundwater Management Act

- Created Active Management Areas (AMAs) with Management Goals and Irrigation Non-Expansion Areas
- Quantified rights for existing groundwater users
- Some rights transferable
- Management Plans with Conservation Programs
- Restricted new groundwater uses but grandfathered in most uses.
- Footprint of agriculture could not expand.
- Placed burden of using renewable supplies on new residential uses through requiring an assured water supply program (AWS)
- Later legislation authorized recharge and recovery program



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Tucson Active Management Area (AMA) established in 1980 due to historical groundwater overdraft

Water Resource Availability for the Tucson Metropolitan Area – July 2006

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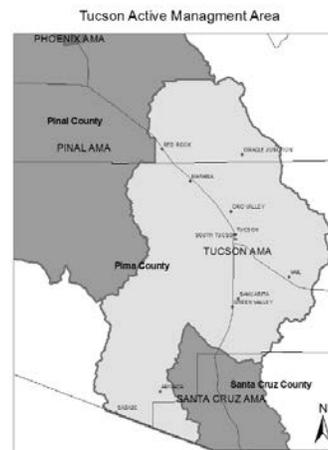
Figure 1: Tucson Active Management Area

Statutory Management Goal: Safe-yield

Water Resource Availability for the Tucson Metropolitan Area

July 2006

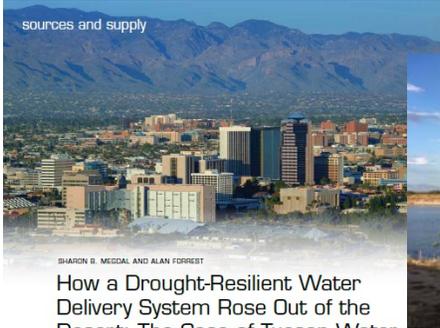
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First effort to deliver Colorado River water via the Central Arizona Project to the Tucson region failed.



sources and supply

SHARON B. MEGDAL AND ALAN FORREST
How a Drought-Resilient Water Delivery System Rose Out of the Desert: The Case of Tucson Water

TUCSON (ARIZ.) WATER'S COMPLEX JURISDICTIONAL EXPERIENCES HAVE DEMONSTRATED THE IMPORTANCE OF AN OPEN AND CONSULTATIVE DECISION-MAKING PROCESS—AND DEMONSTRATED THE BENEFITS OF COLLABORATION WITH OTHER UTILITIES AND JURISDICTIONS AND THE VALUE OF SHARING LESSONS LEARNED.

TUCSON'S INTRICATE WATER AUTHORITIES
 There is a complex jurisdictional interweaving of water responsibilities in Tucson. Other water providers, both publicly and privately owned and operated, serve parts of the Tucson metropolitan region. Tucson Water does not collect and treat wastewater from its customers; instead, Pima County provides wastewater collection and treatment services to most Tucson Water customers. Through an intergovernmental agreement, in 2013 Tucson Water had control over about 41% of the 76×10^6 m³ of treated wastewater produced by



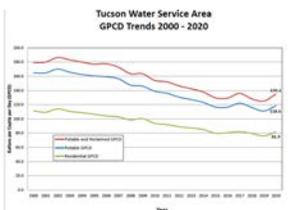
Recharge to the rescue!

Slide courtesy of Joe Olson (Megdal graduate class, April 2025)

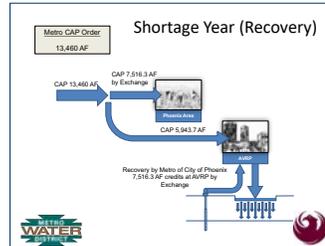
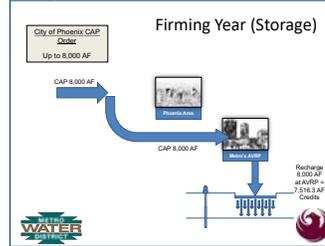
The Tucson region has adapted to changing water conditions through innovation and partnerships



One Water 2100 Plan Announcement
<https://www.youtube.com/watch?v=UnWqUbrS5Tg>



Cooperation with Phoenix area

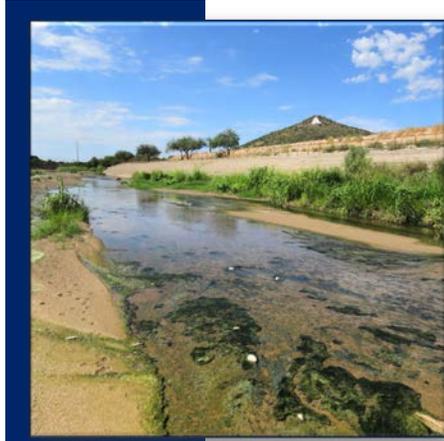


Source: Metro GM Joe Olsen

Noon – 1:15 p.m., April 11, 2025
WRRC Water Webinar: Advanced Water Purification in Arizona –



Tucson's Reclaimed Water System



Tucson Water's Reclaimed Water System Serving Tucson for 40 Years



John Kmiec, Tucson Water Director
August 6, 2025, Mayor and Council Study Session



Project Blue and large, non-agricultural water users



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Arizona and Semiconductor Manufacturing: What about the Water?
Center for East Asian Studies Roundtable on Semiconductor Manufacturing:
Opportunities and Challenges to the US and Beyond

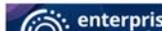
Sharon B. Megdal, Ph.D.
7 April 2023
smegdal@arizona.edu

Fabrication Plants and Data Centers Tax Arizona Resources

Arizona faces a growing challenge of balancing data center growth with environmental limitations.

Samuel Greengard, Contributing Reporter
February 13, 2023

6 Min Read



<https://www.informationweek.com/it-infrastructure/data-centers-and-fabrication-plants-tax-arizona-resources>



Intel announces historic expansion of semiconductor manufacturing operations in Chandler

Home News Center
March 23, 2021



CHANDLER, Ariz. - Intel announced today that it would invest \$20 billion expanding its semiconductor manufacturing operations by building two new fabrication facilities at its Ocotillo Campus in Chandler.
Chandler Mayor Kevin Hartke represented the City of Chandler at Intel's announcement of the largest private investment of any kind in Arizona history.

Evaluating economic effects of semiconductor manufacturing in water-limited regions

DAVID K. HUBLER,¹ JAMES C. BAYGENTS,¹ CHRISTINE MACKAY,² SHARON B. MEGDAL,³ AND JAMES FARRELL¹

¹Department of Chemical and Environmental Engineering, University of Arizona, Tucson
²Department of Economic Development, City of Chandler, Ariz.
³Water Resources Research Center, University of Arizona, Tucson

Hubler et al. | <http://dx.doi.org/10.1042/jwms.2012.104.004>
Journal - American Water Works Association
Peer-Reviewed

High-volume semiconductor manufacturing (HVSM), with its associated high demands for freshwater, is often located in regions with limited water resources. This nexus of water demand and scarcity has generated concerns among municipal governments, prompting several to consider water supply restrictions as they plan for economic growth and development. By assessing water use data and economic valuations of land use from Chandler, Ariz., this study compared the economic benefit of HVSM with three alternative water uses: office, retail, and

general manufacturing. Normalizing the economic benefit to net water use (after reclamation) had a marked effect on the fiscal consequences of water uses. The effects generated by mostly nonconsumptive water uses (such as HVSM and general manufacturing) increased significantly relative to less water-intensive, but more consumptive, water uses. Results showed that water-intensive land uses need not be avoided in communities where water is scarce, provided the community has the facilities necessary to reclaim the wastewater.

Categories of solution options to address imbalance of supply and demand

- Conservation
- Greater efficiency
- Water reuse
- Water storage/banking/managed aquifer recharge (MAR)
- Desalination (augmentation example)
- Moving water
- Marketing and other mutually agreed-upon transactions
- Rainwater and stormwater capture
- How we design our buildings, communities, and landscapes

Policy changes

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About Innovation (New Ideas or Methods)

Arizona has been a water innovator.

- Groundwater Management Act, including its Assured Water Supply Program
- Water banking and recharge
- Rules and regulations regarding water re-use, including treatment to drinking water standards
- Indian Water Rights Settlements, but some still outstanding
- And more...

But we can't rest on our laurels.



Pima Mine Road Recharge Project (South of Tucson)

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The need for innovation has never been greater...

- Innovation in the policy arena is front-and-center.
 - ****Sharing the burden of reduced Colorado River flows****
 - Rural groundwater management
- Innovation is central to discussions of how to reduce water use by the agricultural sector.
 - Water Irrigation Efficiency Program, carried out by Arizona Cooperative Extension
- Innovation in government institutions.
 - The Water Infrastructure Finance Authority's Long-term Water Augmentation Fund supports "the development of projects intended to supplement Arizona's existing water supplies."
- Innovation in policies related to location of large non-agricultural water users, such as facilities (data centers) that require large amounts of water to provide quick and reliable access to data and information.

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Process Factors for success, Megdal case study in *Routledge Handbook of Water Diplomacy*

Seven factors contributing to successful outcomes:

1. A functioning mechanism for cooperation, including knowledge co-production
2. Mutual respect contributing to trust
3. Involvement of interested parties (stakeholders)
4. Good communication
5. Persistence and Patience
6. Eating with your partners
7. Leadership



Additional factors:



Transparency

Sharing Lessons Learned (+ and -)

Search Routledge Handbook of Water Diplomacy for link to free PDF.

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Why Do I Need to Know About Water?!

It should be obvious.

- All – people, businesses, agriculture, nature – depend on it.
- Colorado River water availability is lower than assumed.
- Groundwater continues to be pumped at rates faster than it is replenish, though the situation is better in parts of Arizona than others.
- Though we have focused mostly on water quantity, water quality is important!

What can I do?!

Stay informed!

- We all must be good water stewards.
- We need to think about water all the time so to avoid waste.
- Recognize that we are “decision-maker influencers”.
- Engage with the WRRC and others to acquire information.
- Subscribe to the Weekly Wave and/or check our event calendar!

**Stay connected for information on WRRRC resources
and activities!**

Thank you!!
smegdal@arizona.edu



<https://wrrc.arizona.edu/>



<https://wrrc.arizona.edu/publications/weekly-wave>