

**WRRC**  
WATER RESOURCES RESEARCH CENTER



COLLEGE OF  
AGRICULTURE  
& LIFE SCIENCES  

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COOPERATIVE EXTENSION

# **A Look at Arizona Groundwater Management and Governance through the Lens of World-wide Efforts to Identify Best Practices**

Sharon B. Megdal, Ph.D.

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

AZ Water 2014 Annual Conference

Glendale, Arizona May 7, 2014



[wrrc.arizona.edu](http://wrrc.arizona.edu)

# WRRC Mission

The University of Arizona Water Resources Research Center (WRRC) promotes understanding of critical state and regional water management and policy issues through applied research, community outreach and public education.

The WRRC is committed to:

- assisting communities in water management and policy;
- educating teachers, students and the public about water; and
- encouraging scientific research on state and regional water issues.

Web site: [wrrc.arizona.edu](http://wrrc.arizona.edu)  
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# Subscribe to keep up with WRRRC news and events: [wrrc.arizona.edu/subscribe](http://wrrc.arizona.edu/subscribe)



## The Weekly Wave e-News Digest

The Weekly Wave e-News Digest is distributed each Friday, and contains WRRRC news, events and much more. The Wave features weekly updates on the WRRRC's ongoing **Brown Bag Seminar Series** – informal water-focused presentations open to the public – as well as information on the **WRRRC Annual Conference**. Look for news on WRRRC programs like **Arizona Project WET, Conserve to Enhance (C2E), Water RAPIDS** (Research And Planning Innovations for Dryland Systems), **GCASE** (Groundwater, Climate and Stakeholder Engagement), and many more. You'll also find helpful information on the WRRRC's many outreach efforts, updates on research projects, social media news, and links to our press appearances.



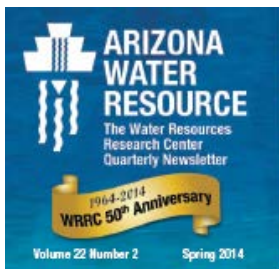
## Arizona Water Resource and Arroyo Newsletters

The **Arizona Water Resource (AWR)** is the WRRRC's quarterly newsletter that provides timely and informative coverage of water issues, research and events. The AWR offers information of interest to a broad variety of audiences, including water professionals, academicians, policy makers and the public, and is available via email and on the WRRRC website. The **Arroyo** is the annual WRRRC newsletter published each spring, with each issue devoted to a single water topic of timely concern in Arizona. Past Arroyo topics include Contaminants of Emerging Concern in Water (2013), U.S.-Mexico Border Water (2012) and Water Desalination (2011).



## WRRRC Annual Conference News

News and updates on the **WRRRC Annual Conference** are distributed via the WRRRC Weekly Wave e-newsletter. The Annual Conference engages WRRRC stakeholders and addresses important water issues in Arizona and the Southwest. The conference draws representatives from government, academia, the water community, non-profits, private businesses, universities and the public sector, and often features international speakers. The topic of the WRRRC's upcoming April 8, 2014 Annual Conference (co-organized with the Arizona Department of Water Resources) is "Closing the Gap Between Water Supply and Demand."



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### 50 Years at the WRRRC

The WRRRC celebrates its 50th anniversary this year. See the insert on the Center's history in this issue.



The Annual Water Resources Research Center Conference convened April 8, 2014 to discuss how to close the gap between water supply and demand. Source: Lynn Ketchum

## Conference Speakers Address "Closing the Gap Between Water Demand and Supply"

by Lucero Radonic, WRRRC Graduate Outreach Assistant

On April 8, 2014, over 350 people from 49 Arizona communities gathered at the University of Arizona Student Union Memorial Center for the Water Resources Research Center annual conference. Thirty-five speakers from the private and public sectors presented on the gap between water supply and

## Public Policy Review

### Learning Globally, Acting Locally

By Sharon B. Megdal

involvement in groundwater recharge goes back over 20 years, to when I served as Executive Director of the (now defunct) Santa Cruz Valley Water District. It continues to this day through my service as a member of the board of directors of the Central Arizona Project and through my Arizona Water Policy class. Our class field trip focuses on

# Some connections to international projects

- GEF (Global Environmental Facility) funded Transboundary Waters Assessment Program (TWAP)
  - Five waters: Oceans, large marine ecosystems, lakes, rivers and groundwater
  - Medium size project – part of the expert panel working on gw
  - Full size project underway. Groundwater effort being led by UNESCO IHP.
- **GEF funded Groundwater Governance Project**  
([www.groundwatergovernance.org](http://www.groundwatergovernance.org))
- Federally authorized US-MX Transboundary Aquifer Assessment Program (TAAP)
- Comparative policy analysis
  - Israel – Led group on Israel Water Management Program
  - Jordan – grey water project
  - Australia – water banking paper
- OECD (Organisation for Economic Co-operation and Development) water governance, urban cities and climate adaption projects

# Global interest in Arizona and the Colorado River Basin

- Water Scarcity
- Groundwater experience
- Border location
- Colorado River
- Central Arizona Project
- Climate change and adaptation
- Water banking & recharge
- Growing cities

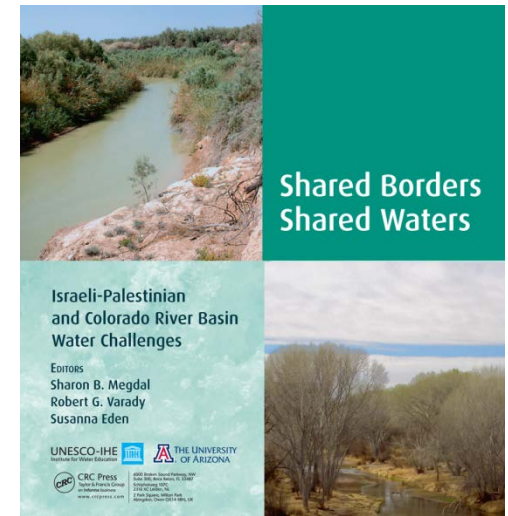


Photos courtesy of Central Arizona Project



# Selected Publications

- **Performance of Grey Water Pilot Plant Using a Multi-Layer Filter of natural Materials for Agricultural Purposes in the Jordan Valley**", Ayoup Ghrair, Othman Al Mashaqbeh, and Sharon B. Megdal, *CLEAN - Soil, Air, Water*, Accepted for publication, April 2014.
- **"The role of the public and private sectors in water provision in Arizona, USA,"** in *The Future of Public Water Governance: Has Water Privatization Peaked?*, Christopher A. Scott and Bernard de Gouvello, eds., Routledge Special Issues on Water Policy and Governance Series, Taylor and Francis, ISBN-13: 9780415713139. February 2014. (Reprint of article previously published in *Water International*.)
- **"Water banks: Using managed aquifer recharge to meet water policy objectives,"** Sharon B. Megdal, Peter Dillon, and Kenneth Seasholes, *Water*, Special Issue, Policy and Economics of Managed Aquifer Recharge and Water Banking, Edited by Guest Editors Sharon B. Megdal, Peter Dillon and Andrew Ross. Accepted with minor revisions, April 2014.
- **"A Tale of Two Rivers: Pathways for improving water management in the Jordan and Colorado River Basins,"** Assaf Chen, Adam Abramson, Nir Becker, Sharon B. Megdal, Special Issue of *Journal of Arid Environments*, under final review, 2014.



# Searching for Best Practices

- Groundwater Governance Project [www.groundwatergovernance.org](http://www.groundwatergovernance.org)
  - Inception meeting at UNESCO in September 2011, followed by a series of five regional consultations around the globe, with the US part of the March 2013 (last) regional consultation held in The Hague
  - Series of Thematic Papers



# Thematic Papers

[www.groundwatergovernance.org/resources/thematic-papers/en/](http://www.groundwatergovernance.org/resources/thematic-papers/en/)

1. Trends in groundwater pollution
2. Conjunctive use & management
3. Urban-rural co-management
4. Management of recharge/discharge
- 5. Groundwater policy and governance (Varady, et al.)**
6. Legal frameworks for groundwater governance
7. Trends in local groundwater management
8. Social adoption of technology
9. Macro-economic trends
10. Governance of subsurface space
11. Political economy of groundwater governance
12. Water and climate change



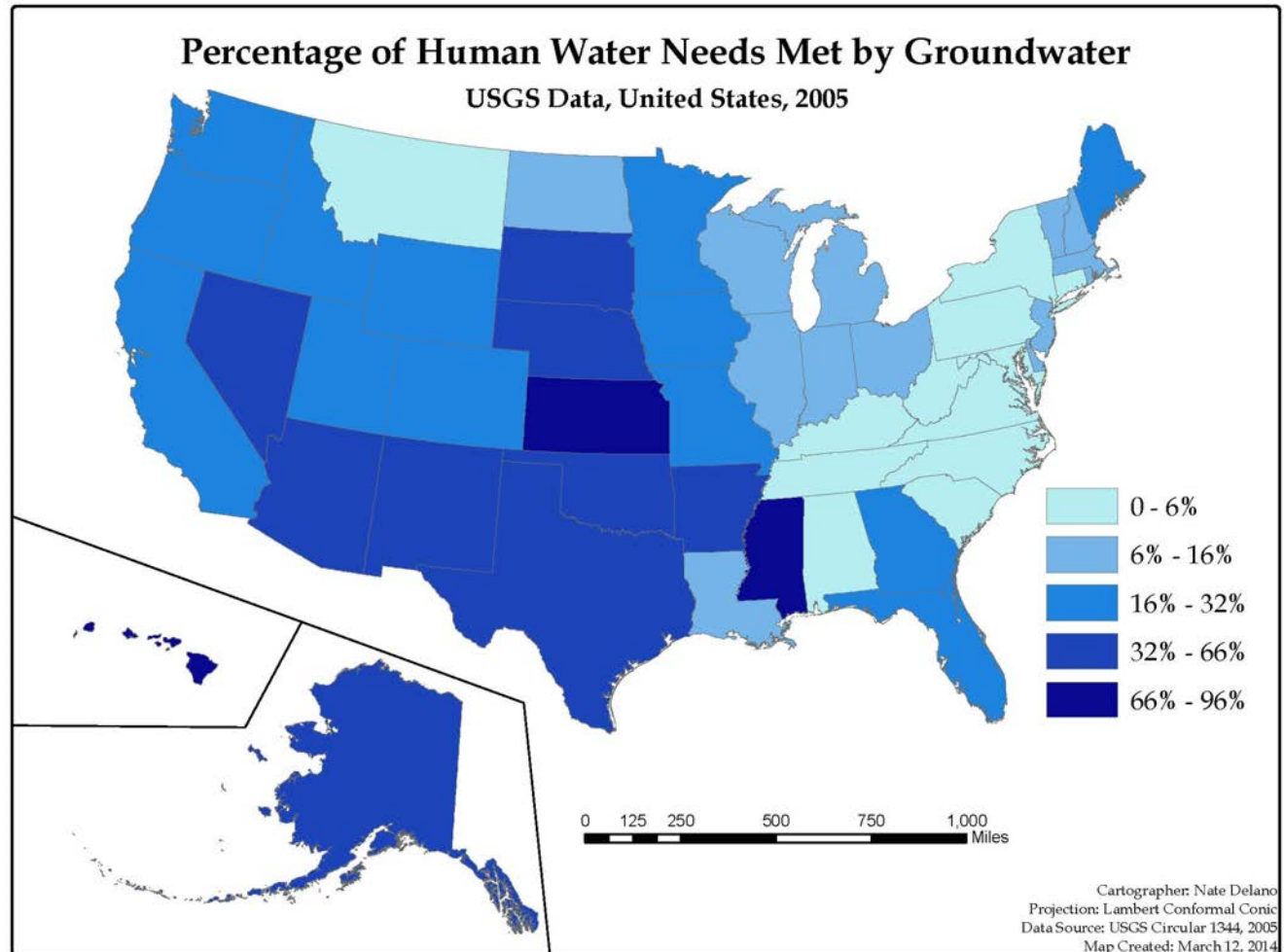
# Governance and Management

- Working (draft) definition:
- Groundwater governance is the overarching framework of groundwater use laws, regulations and customs, as well as the processes of engaging the public sector, the private sector, and civil society.
- It may involve coordinating administrative actions and decision-making between and among different jurisdictional levels.
- The governance framework, which can be complex, determines the *management* of groundwater resources and the use of aquifers.

# Management vs. Policy

- Water management is *what we do*. Examples:
  - The actors operate wells, treat water for use/reuse, store water through managed aquifer recharge, conserve water, etc.
  - laws can authorize water banking, but actual management decisions on the water banking done in a region can vary, depending on circumstances.
- Definition of policy: “a course or principle of action adopted or proposed by a government, party, business, or individual.” (google search)

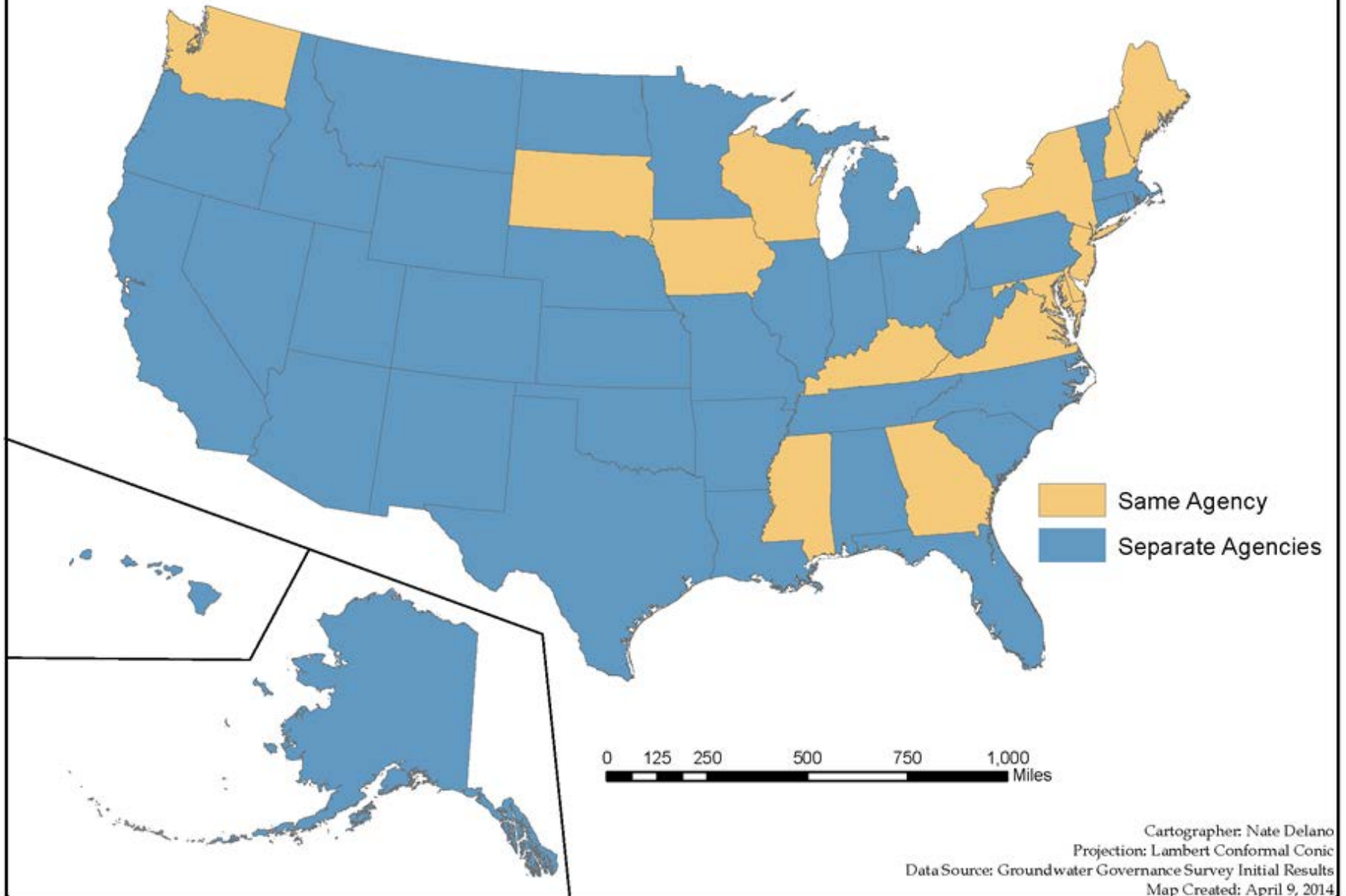
# Motivation for survey of groundwater governance: Groundwater governance in the U.S. is highly decentralized; we can't paint the picture with a single brushstroke



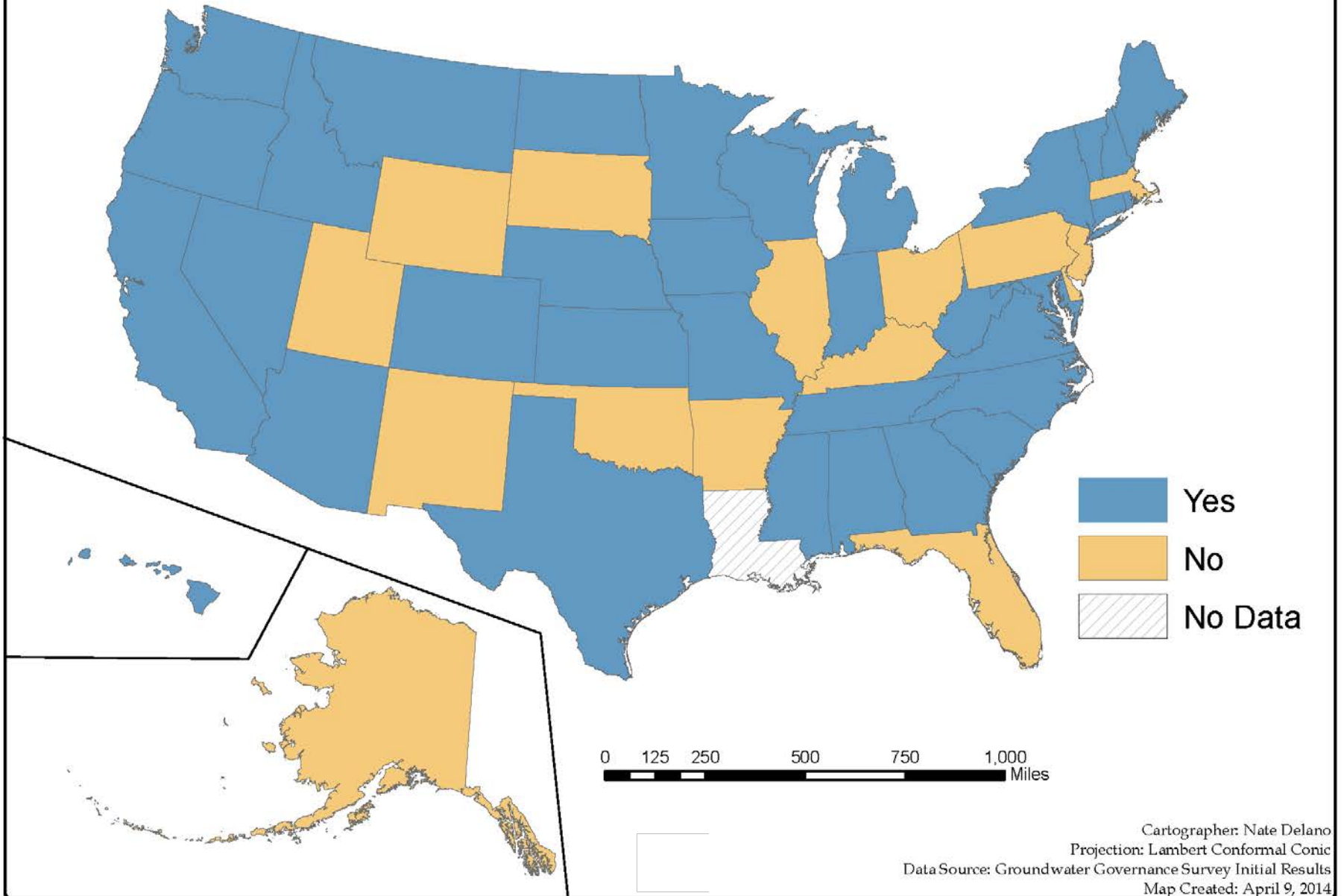
# The U.S. Groundwater Governance Survey Project

- Collaborators: Andrea Gerlak and Robert Varady
- Overall objectives
  - To inventory current trends in U.S. groundwater governance – *define the state of practice*
  - Provide information in support of policy strategies and technical use in understanding and improving groundwater governance and water governance generally.
- Phase I (mostly descriptive): Initial Survey
  - “Groundwater Governance in the U.S. - Summary of Initial Survey Results,” Gerlak et al. 2013 ([wrrc.arizona.edu/groundwater](http://wrrc.arizona.edu/groundwater))
  - Survey a single, knowledgeable point of contact in each state and the District of Columbia to obtain information on the state of the groundwater governance. Survey conducted November 2012 to February 2013.
  - Funded internally by the Technology Research Initiative Fund, The University of Arizona Water Resources Research Center

# Do Separate Agencies Deal with Water Quantity and Quality?

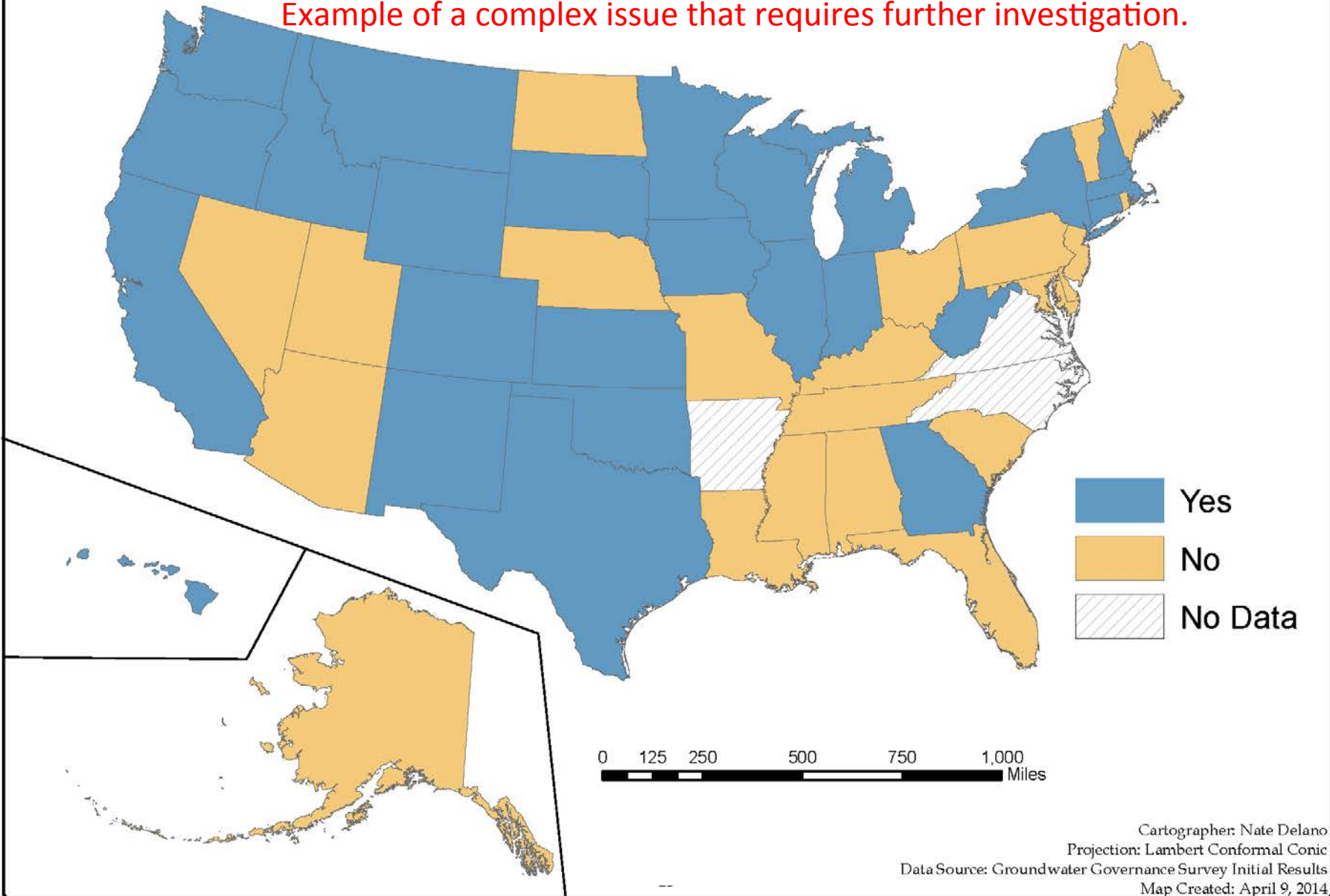


# Substantial Changes in Groundwater Management Over the Last Few Decades?

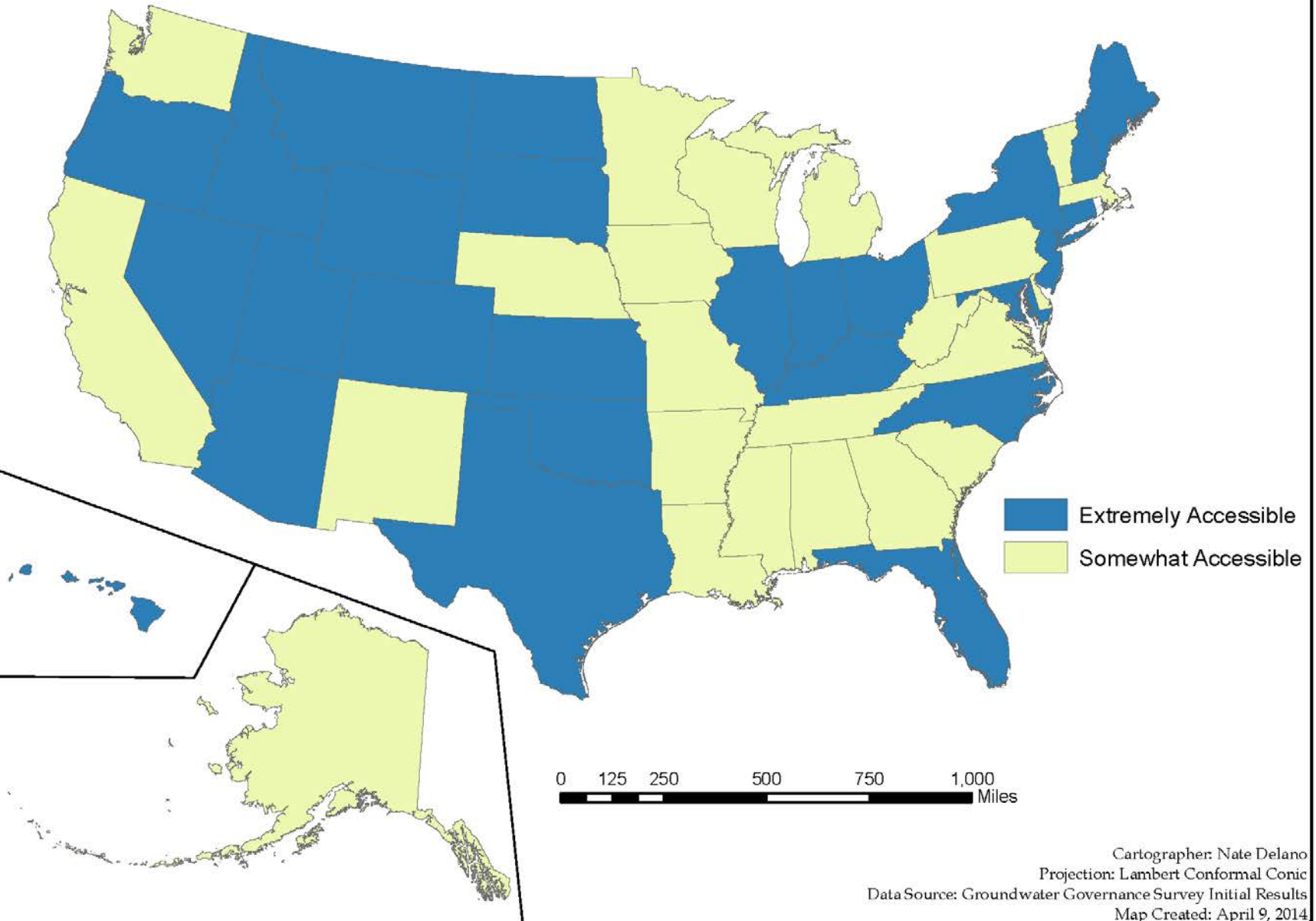


# Does State Law Recognize the Connection Between Surface and Groundwater?

Example of a complex issue that requires further investigation.

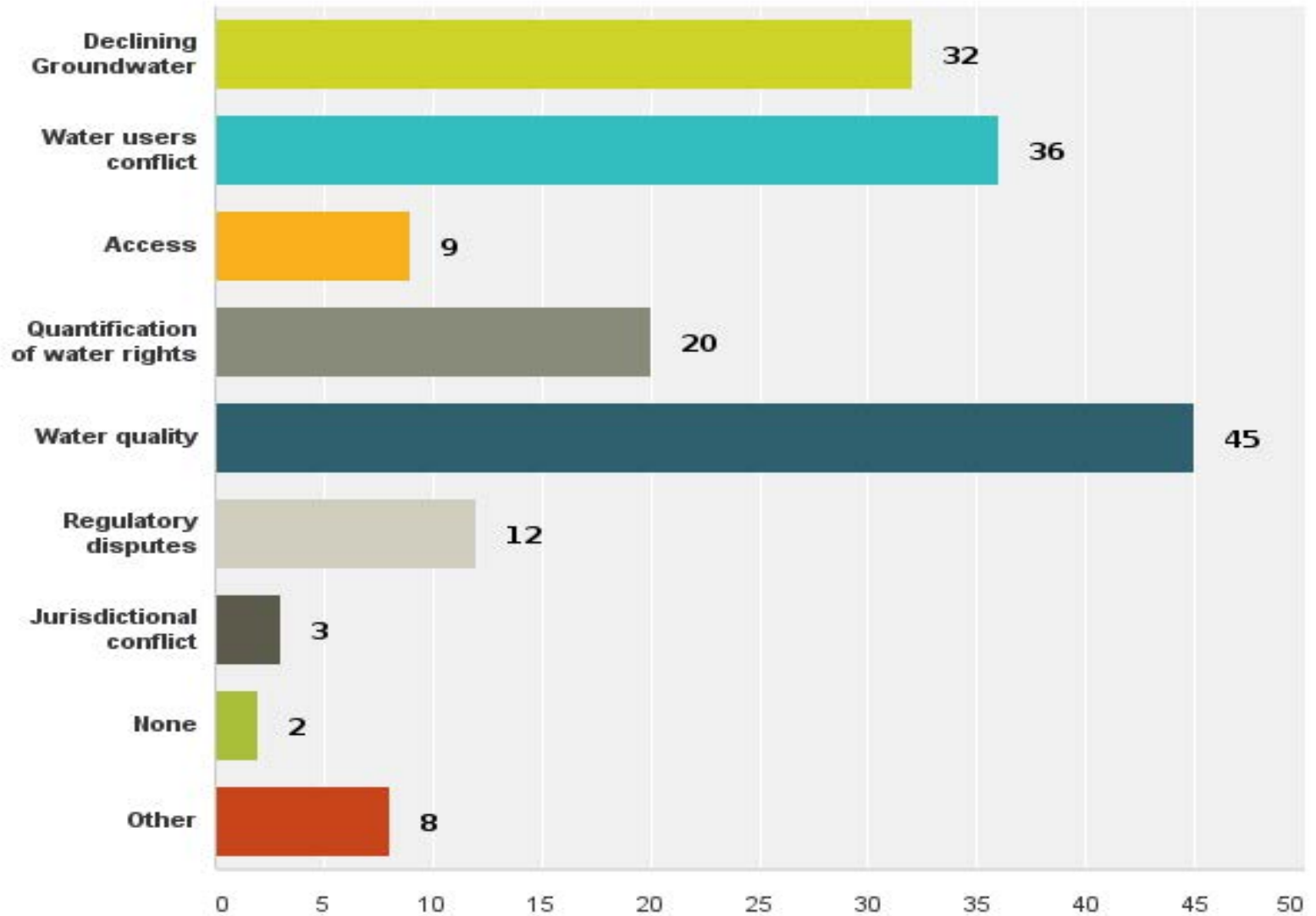


# How Accessible is Groundwater Information to the Public?



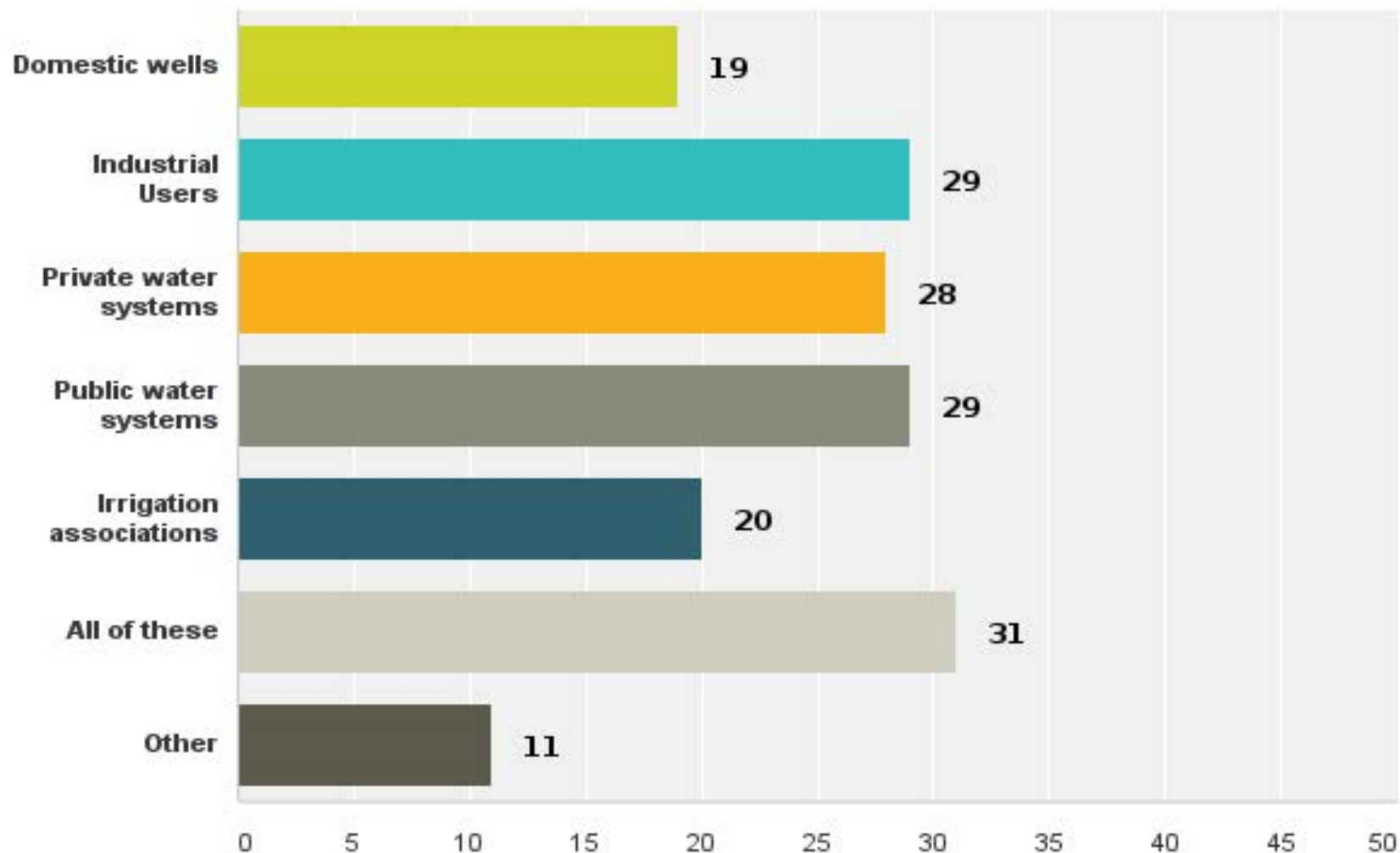


## Q9 What are the state's groundwater governance priorities?



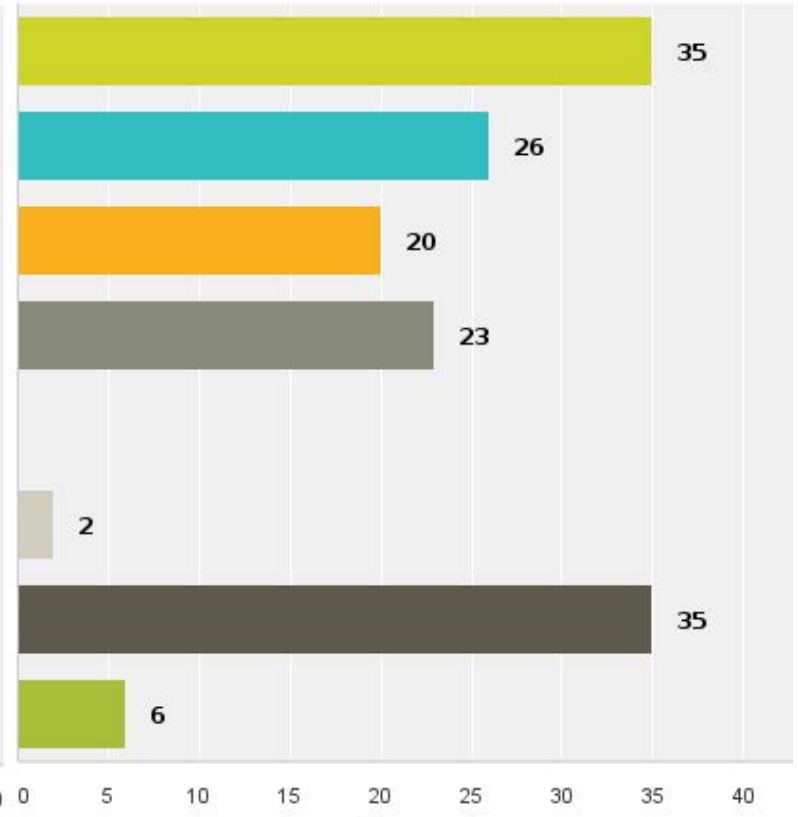
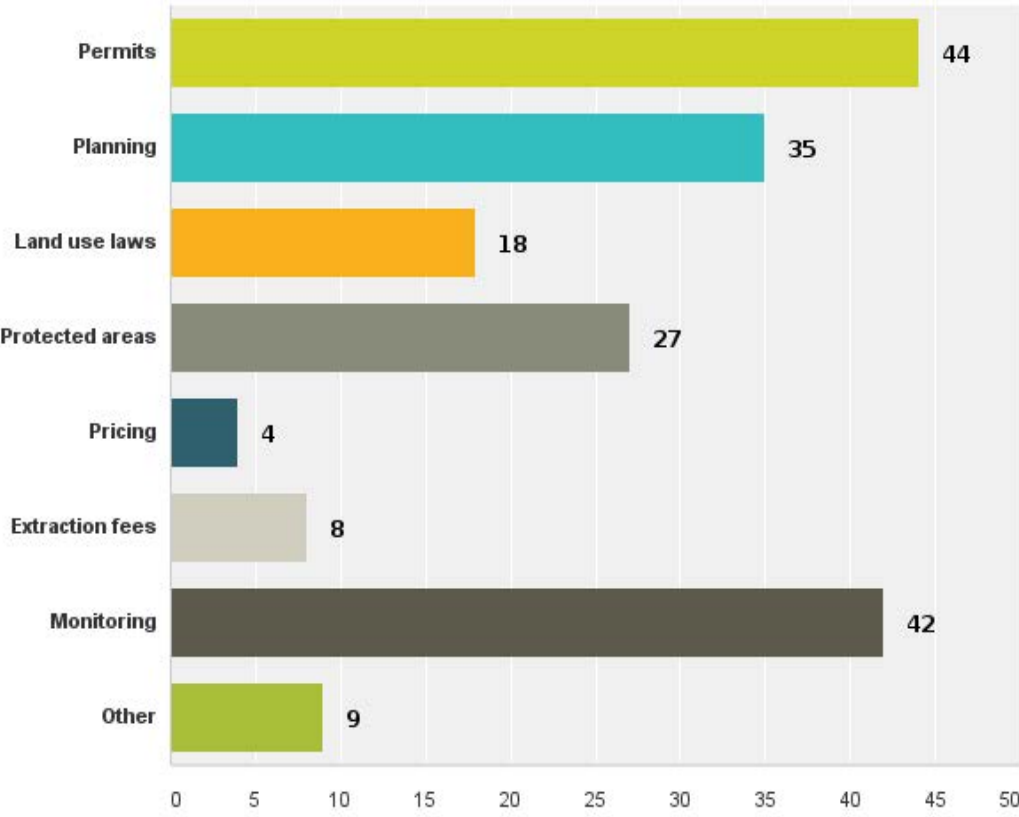


## Q18 To which of the following user groups do groundwater regulations apply?



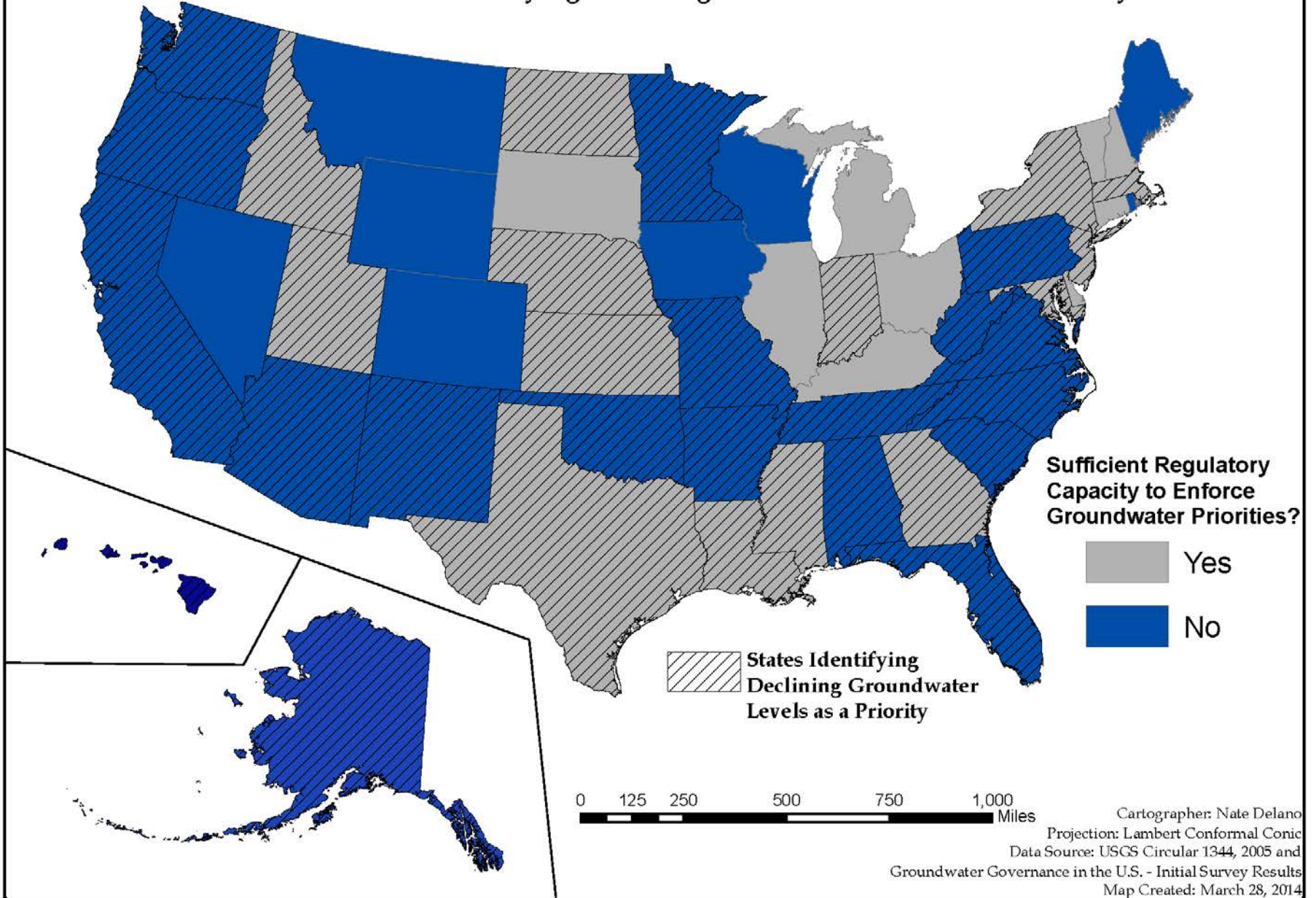
**Q21 Which tools does the state use to manage groundwater use/quantity?**

**Q24 Which tools does the state use to manage groundwater quality?**



# States Lacking Sufficient Capacity to Enforce Groundwater Priorities

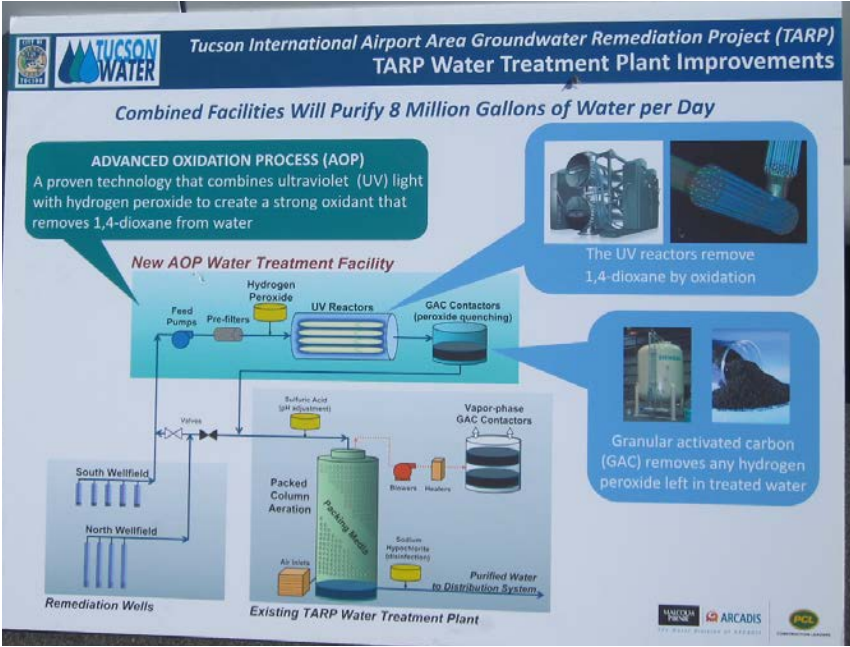
Overlaid with States Identifying Declining Groundwater Levels as a Priority



# Research Plans and Conclusions

- Journal article based on Initial Survey and analysis
- Additional Research Underway
  - Small project looking at three case studies
- Proposal pending to undertake a larger survey and more in-depth analysis
  - Involving interaction and consultation with numerous expert groundwater groups
- Other work continuing as well.

# The search for solutions is ongoing



# From “The State of the Colorado River” CAP Agenda Item number 9. May 1, 2014

“It now appears that the delivery reductions in the Guidelines will be insufficient to prevent the continued decline of Lake Mead to critical elevations. Absent an equalization release from Lake Powell or other corrective measures, Lake Mead will fall below elevation 1000 within the next 6 to 8 years, even after deliveries are reduced in accordance with the Guidelines. ...If steps are not taken in the next few years to correct the structural deficit, there is increased likelihood of conflict among the Basin States, the United States and Mexico.”





# Questions?

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