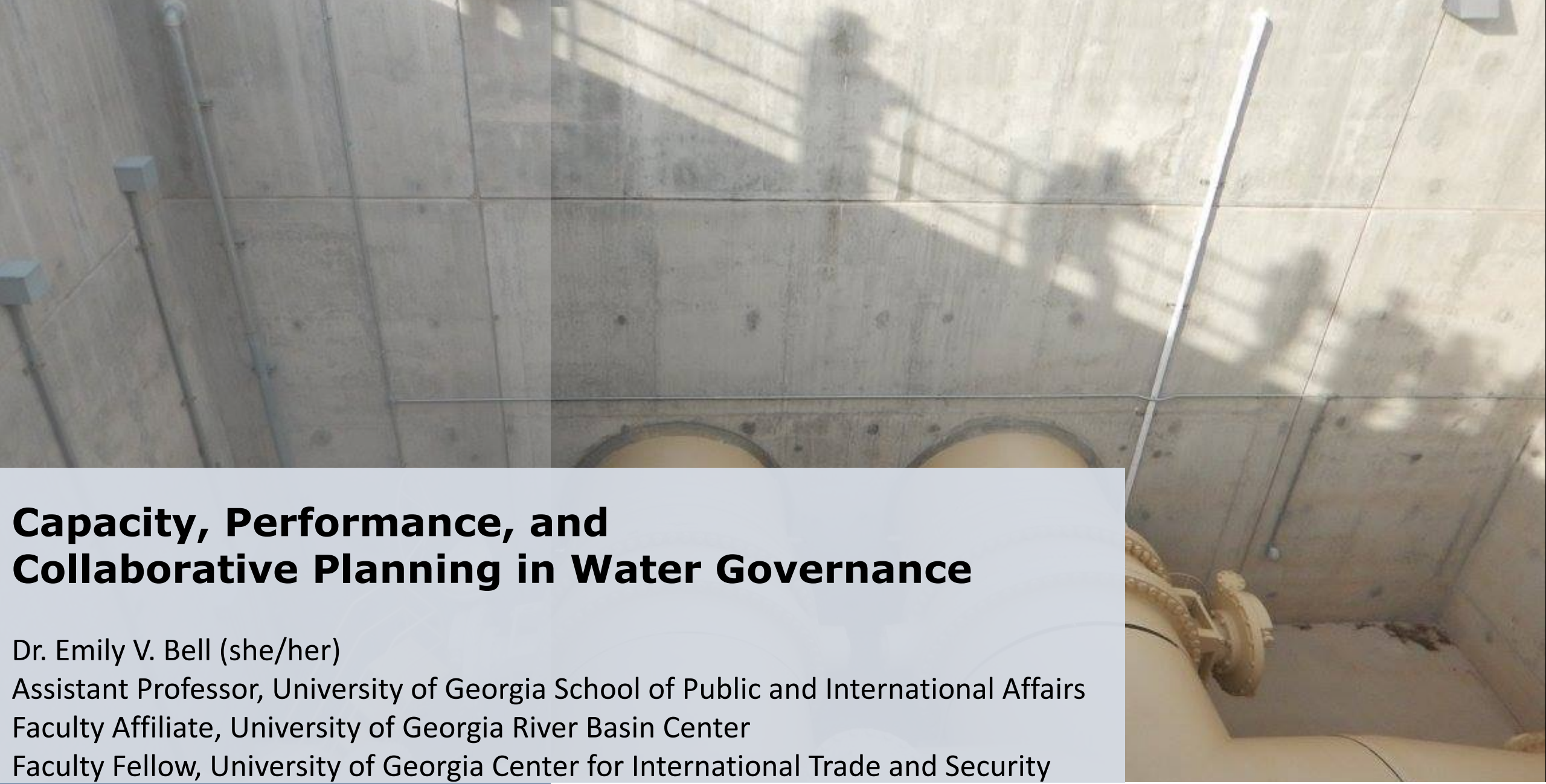


Capacity, Performance, and Collaborative Planning in Water Governance

Dr. Emily V. Bell (she/her)
Assistant Professor, University of Georgia School of Public and International Affairs
Faculty Affiliate, University of Georgia River Basin Center
Faculty Fellow, University of Georgia Center for International Trade and Security

November 2, 2023

University of Arizona WRRC Water Webinar

Today

1. Motivation, goals, and background
2. Areas of research and engagement: collaboration and assessment
3. Arizona water challenges and the WRRC

Motivation

Climate extremes and variability place increasing pressures on water

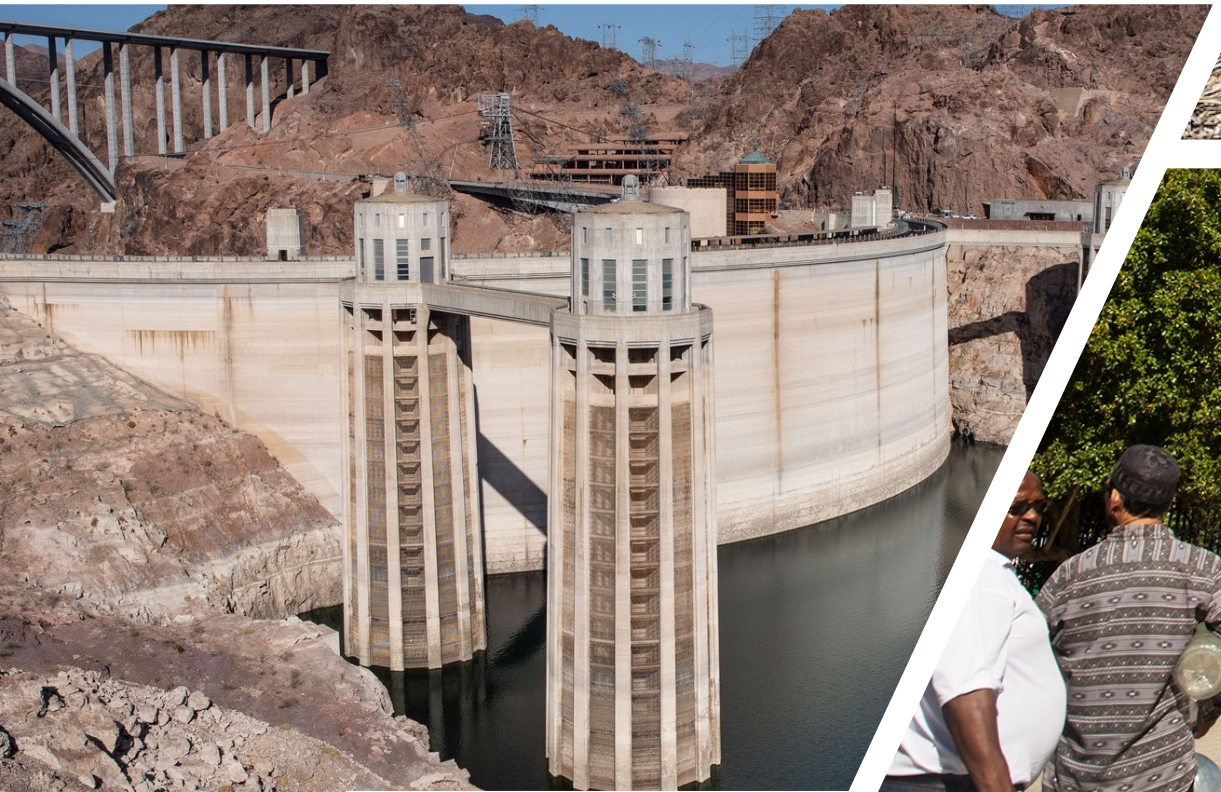
- resource availability and quality
- reliable supply

Creates short- and long-term challenges and risks

- Balance urgent needs with long-term planning
- Integrating diverse goals; equitable distribution of benefits and burdens

Key question

How do those invested in water resource decisions navigate temporal, spatial, and social challenges under uncertainty?



Goals

To understand and improve climate adaptation and hazard mitigation in water governance

To develop diagnostic tools and approaches that can inform decisions about performance, capacity, and collaboration to solve complex problems

My background

University of Arizona (2018)

- PhD: Public Policy and Management (minor in Natural Resource Studies)
- Green infrastructure, adoption and coordinated implementation

University of California, Davis (2018-2019)

- Regional water planning

Duke University (2019-2020)

- Public water system capacity/performance + collaboration

Three areas of my work

Collaborative water governance

Participation and representation in water planning

Decision making support tools

Network and automated text analysis of water systems and people

Perceptions

Risk, values, sentiments about water

Three areas of my work

Collaborative water governance

Participation and representation in water planning

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Network and automated text analysis of water systems and people

Perceptions

Risks, values, sentiments about water

Collaborative governance

An approach to address collective water challenges:

- structures or processes for decision-making in policy or management
- engages interested actors from public, private, and civic realms
- designed to achieve common purpose otherwise not possible
  (Emerson et al. 2011)

Decision-making support tools

Network analysis: insight on complex relationships in social, built, and natural systems

Automated text analysis: systematic (often large-scale) analyses of the "paper trail" of events

- Council meeting minutes
- Environmental impact statements
- News

My interest in the WRRC

Opportunities to innovate and advance…

- decision making
- research
- education

Collaborative	Goal-oriented	Local and global
1) Support faculty affiliates and students: connect research to practice	1) Applied research	1) Share place-based information
2) Expert resource for practitioners	2) Diagnostic tools	2) Tackle transboundary issues in AZ and abroad
	3) Co-produce knowledge	

Overview

1) A snapshot of my work: research and engagement

a) What is the role of collaboration in policy and management? Decision-making?

b) What are ways to work with actors involved in decision making to assess the status of
   - public water systems?
   - water resource governance?

2) Tying it all together: reflections on Arizona's and global water insights to inform governance of food, energy, and water, and prospects for the WRRC

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Collaborative water planning

A lens to understand different aspects of decision making:

a) Who participates, and why?

b) Whose interests are represented in ultimate decisions?

Collaborative water planning

A lens to understand different aspects of decision making:

a) **Who participates, and why?**

b) Whose interests are represented in ultimate decisions?

Who participates, and why?

Public water systems face pressures

- water-intensive growth
- climate change

Local decisions may have broad impacts

Collaborative planning to coordinate, overcome challenges

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ORIGINAL ARTICLE

PSJ POLICY STUDIES JOURNAL

External drivers of participation in regional collaborative water planning

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[3]Nicholas School of the Environment, Duke University, Durham, North Carolina, USA

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Funding information
Duke University Provost's Collaboratory Grant

Abstract

What drives participation in collaborative planning? How does this vary across different institutional contexts? Public managers must navigate emerging challenges in public service provision; perceived risk and capacity to act can play a pivotal role, shaping managerial behavior. In water management, for example, issues stemming from climate change and water-intensive growth create new concerns about continued water supply. Strategic decisions may improve local public service provision, but can also have cascading effects on other systems, as water is a mobile—and subtractable—resource. Many public water systems have participated in collaborative planning to overcome collective challenges for this reason, but participation is not feasible for all prospective participants. Using data from adminis-

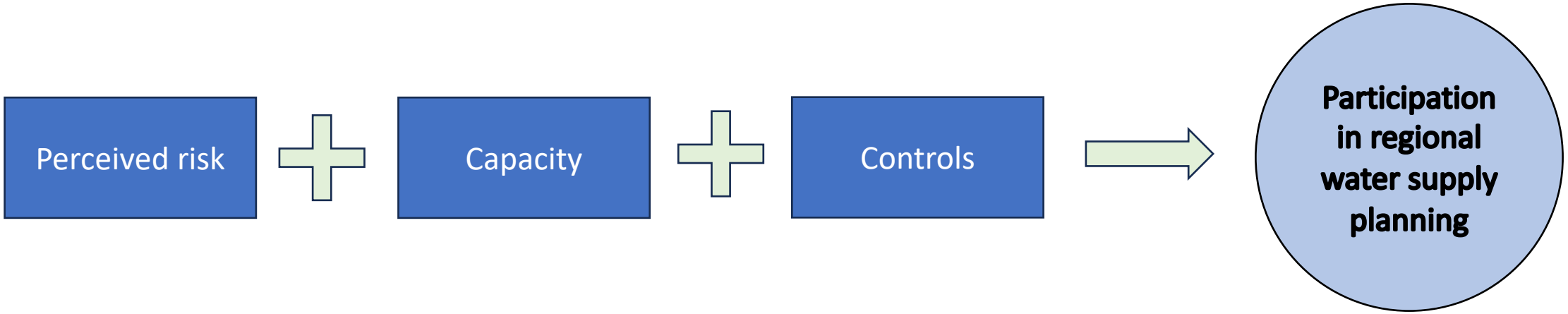
Who participates, and why?

Historic focus on what prospective members think of the process itself (North 1990; Lubell 2013)

Recent attention to external factors: climate risk (Kalesnikaite & Neshkova 2021)

What about variation by climate, state-level policy, and culture?

Who participates, and why?



Who participates: key takeaways

Perceived climate risk *does* correspond to participation, but…

- some states may require or better support planning (participation follows)
- unique challenges: Mediterranean climate (CA) vs. local saltwater intrusion (NC)

Capacity plays a role: systems with larger service populations: potentially greater economies of scale, and more resources

- finance
- human capital
- time

Collaborative water planning

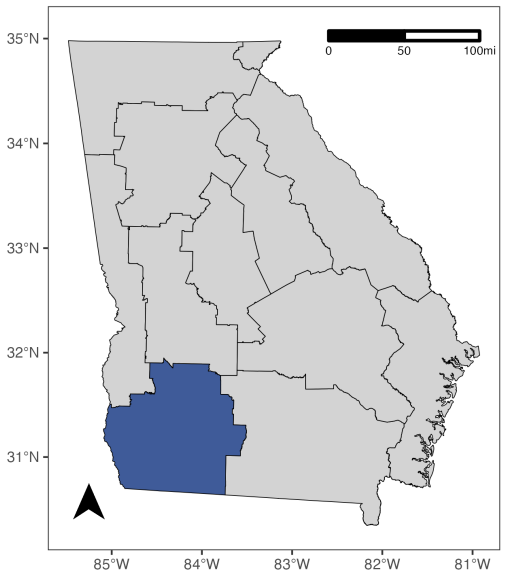
A lens to understand different aspects of decision making:

a) Who participates, and why?

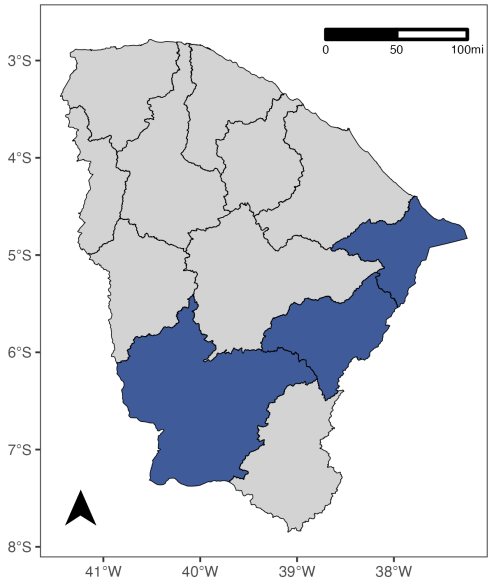
b) Whose interests are represented in ultimate decisions?

Interest representation: sentiments

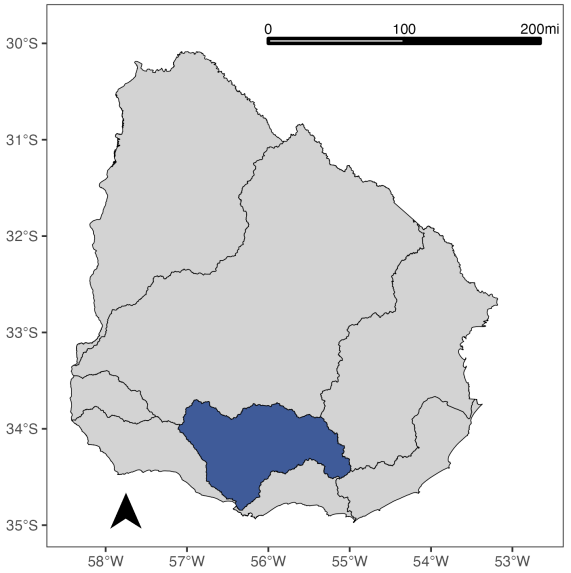
USA



Brazil



Uruguay



UNIVERSITY OF GEORGIA

FUNCEME

SARAS²

South American Institute for Resilience and Sustainability Studies

UNIVERSIDADE ESTADUAL DO CEARÁ

UNIVERSIDADE FEDERAL DO CEARÁ

Interest representation: sentiments

Participating members have different sentiments about water governance—sentiments likely to vary by language/culture

Engage participating actors to develop sentiment dictionary

Diagnostic tool: detect potential needs for collaborative structure, facilitation

Important to diagnose the status of the collaborative decision-making to ensure equitable decisions/outcomes

Please provide a word that indicates how you feel about each of the terms provided.

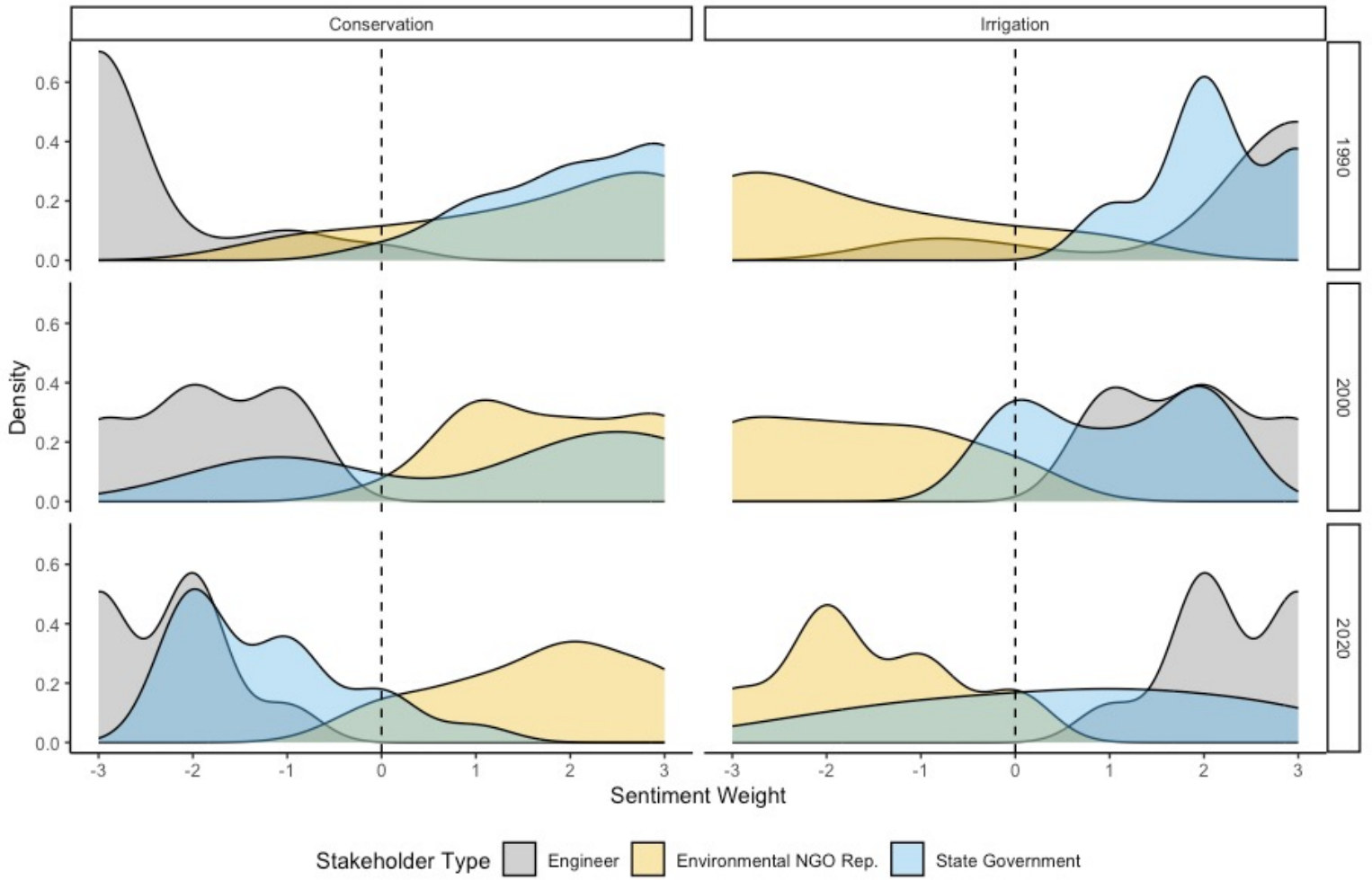
access

committee

1) Associated sentiment to term

2) Record sentiment strength (-3 to +3)

3) Sentiment by actor type over time



Interest representation: anticipated insights

Opportunities to identify need to restructure or better facilitate collaborative process

Can inform questions for further participant feedback on process

Way to assess evolution of the collaborative approaches

Can reassess strategies where representation has historically lacked

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System capacity & performance


Case Study

Check for updates

ASCE

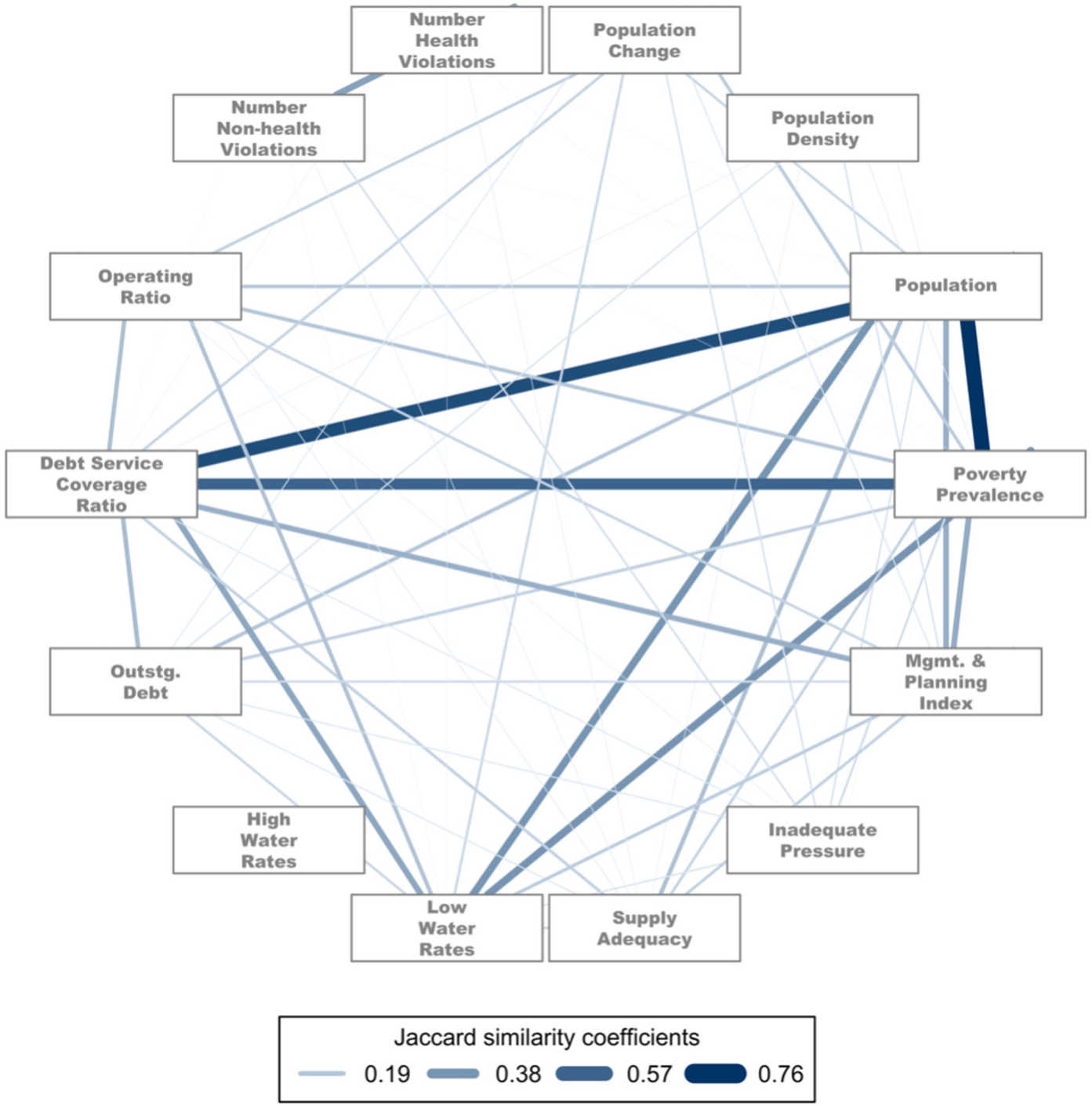
Assessing Performance and Capacity of US Drinking Water Systems

Emily V. Bell[1]; Katy Hansen[2]; and Megan Mullin[3]

Performance often measured by compliance with SDWA

How can we better understand drivers of compliance/failure?

Tool for holistically and systematically assess capacity and performance



NC SM

Environmental Quality

Duke

NICHOLAS INSTITUTE

FOR ENVIRONMENTAL POLICY SOLUTIONS

Takeaways

Transportable tool to use across states (some variation given data)

Can help inform state technical, managerial, and financial decisions

Particularly useful for less-resourced, smaller systems – potentially less capacity to report, communicate needs

Overview

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Arizona water resource challenges

Key challenges

1) Climate extremes and uncertainty
2) Recent and future cuts to Central Arizona Project (CAP) supplies, more dependence for some on (nonrenewable) groundwater

Needs

1) collaborative approaches to balance Arizona's water budget
2) innovative planning strategies for the future, iteratively assess representation

Issue of interest

Surface and groundwater conservation + food/energy/water needs in active management areas (AMAs) in AZ's Sun Corridor, outside AMAs moving forward

Governor Hobbs' 2023 Executive Order:

"…incomplete water stewardship by the broader community, the achievement of safe-yield by 2025 is now highly improbable"

"goals of the GMA cannot be achieved without updates to current law developed through bipartisan, State-wide collaboration"

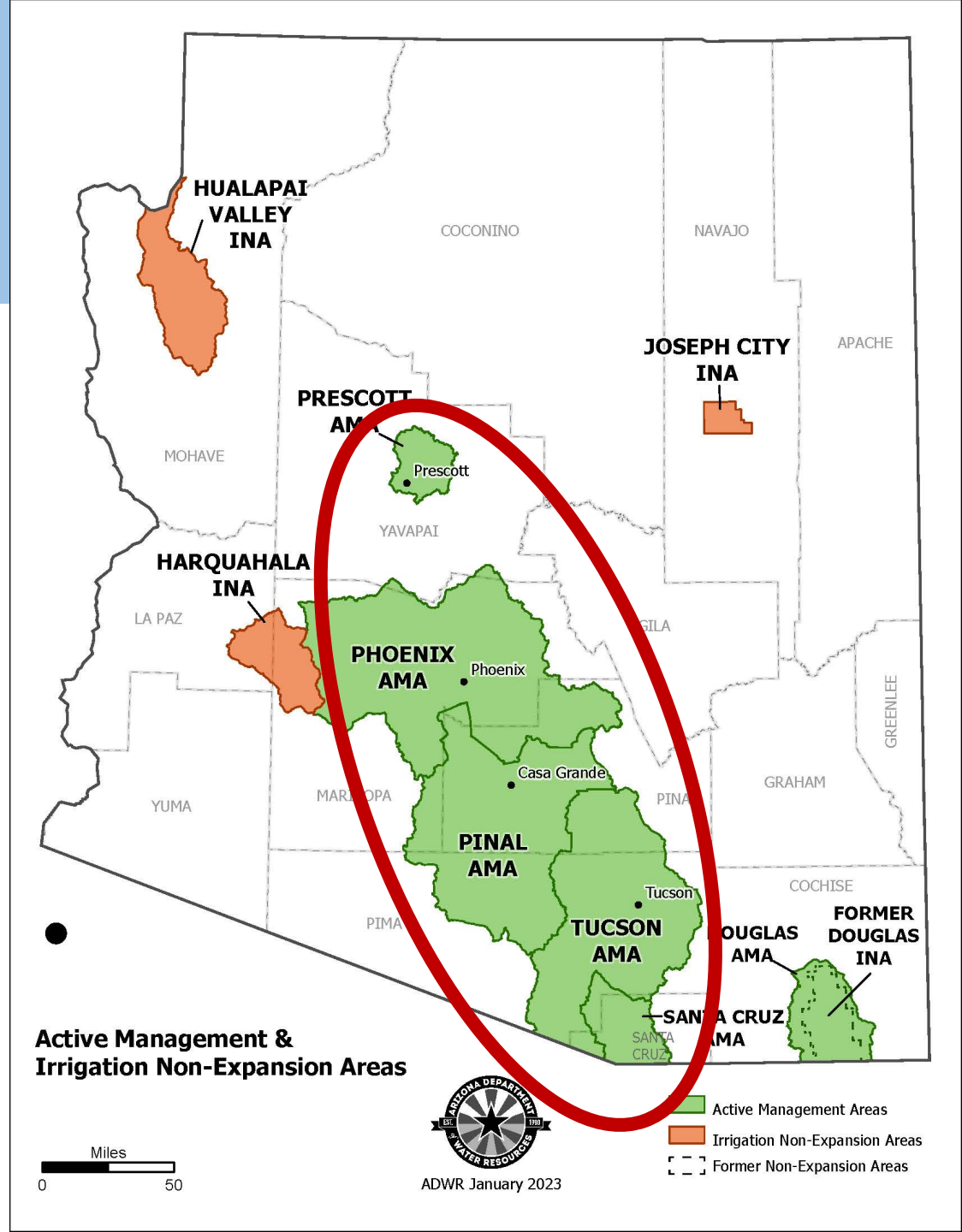
Water-use future in active management areas

Prescott, Phoenix, Pinal, Tucson:

- need to achieve safe-yield by 2025
- groundwater withdrawals < replacement

Santa Cruz: maintain safe-yield

What to expect by 2025 and beyond?



Next steps: collaboration strategies

All three sectors need to shift strategies, otherwise challenge such as

- Inability to prove Assured Water Supply in growing areas (especially supplanting agricultural land)
- Discontinuity of energy production (e.g., hydropower), limits to copper mining
- Fallowing and increased groundwater use, increased food costs

Consider what this means across boundaries

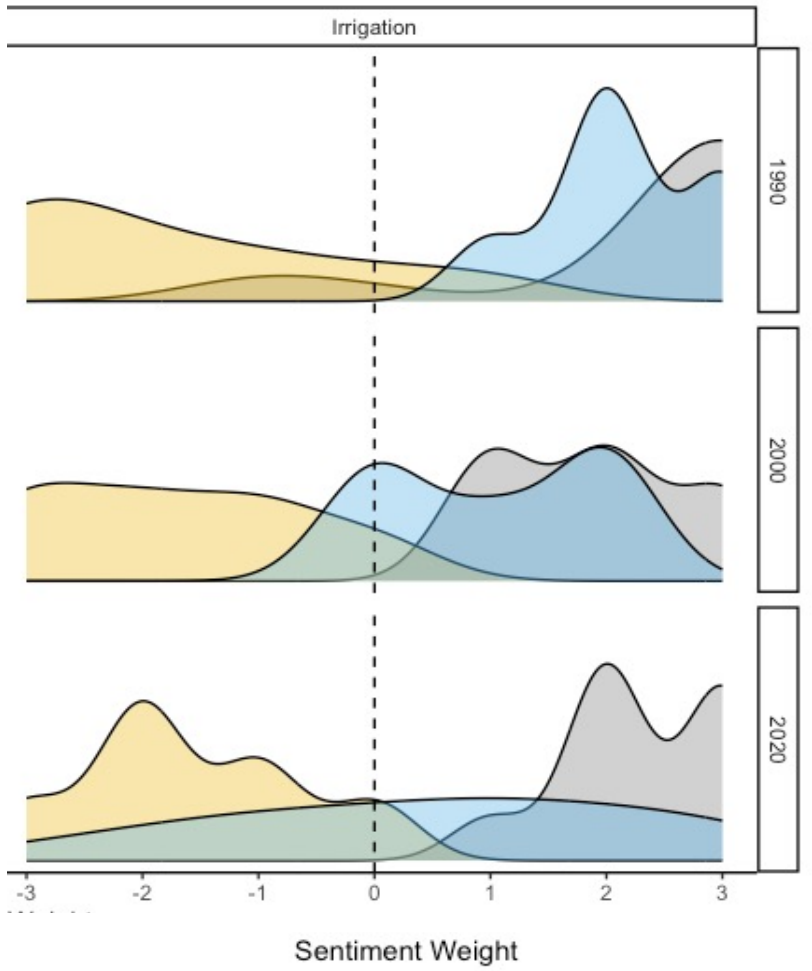
Continued efforts to work together, identify innovative solutions to conserve water

Vision for the WRRC

WRRC can broker information among Governor's Water Policy Council participants

Strategic scenario planning: description of potential future, based on set of assumptions about relationships + driving forces

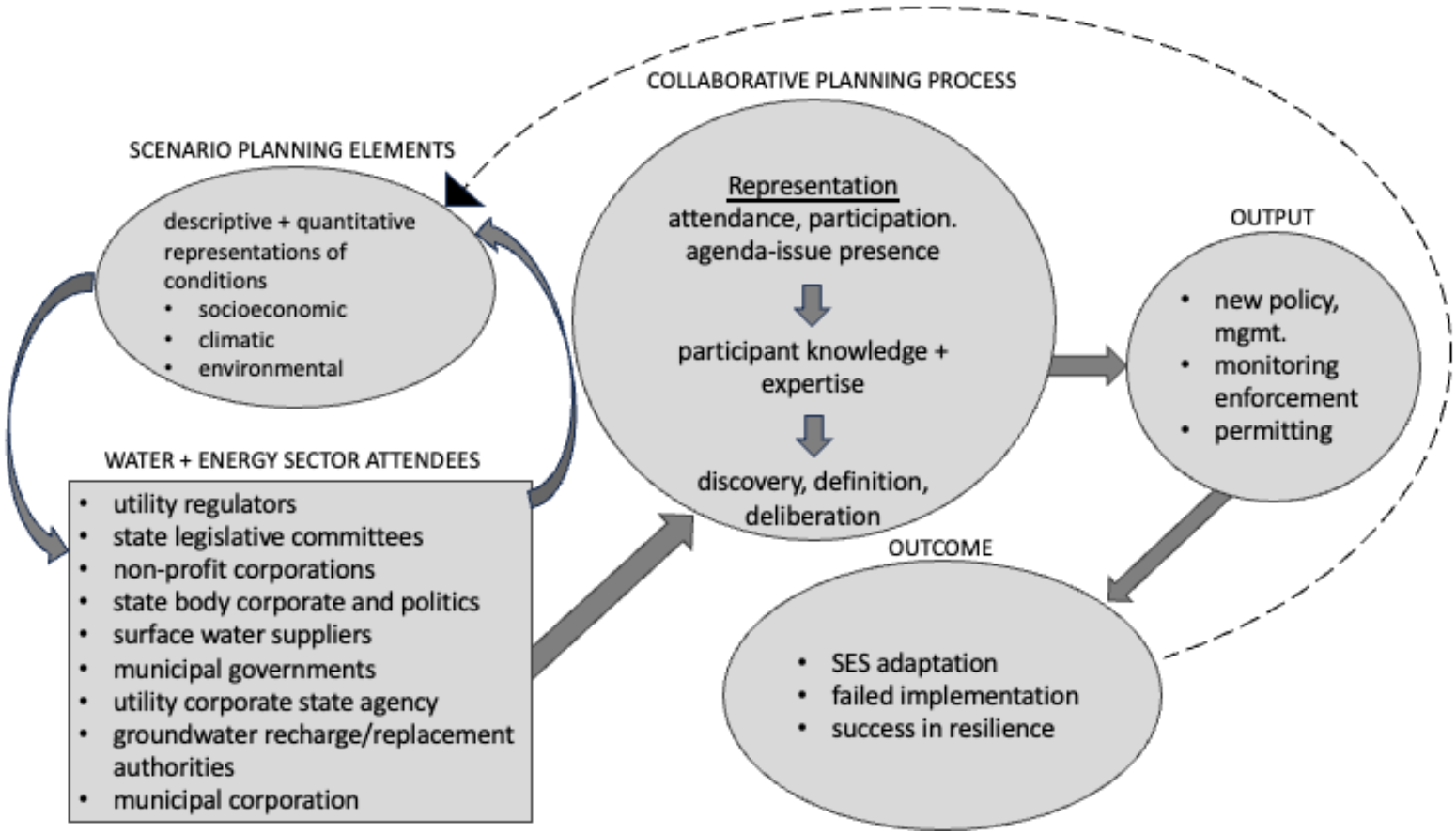
Assess substantive representation of participants



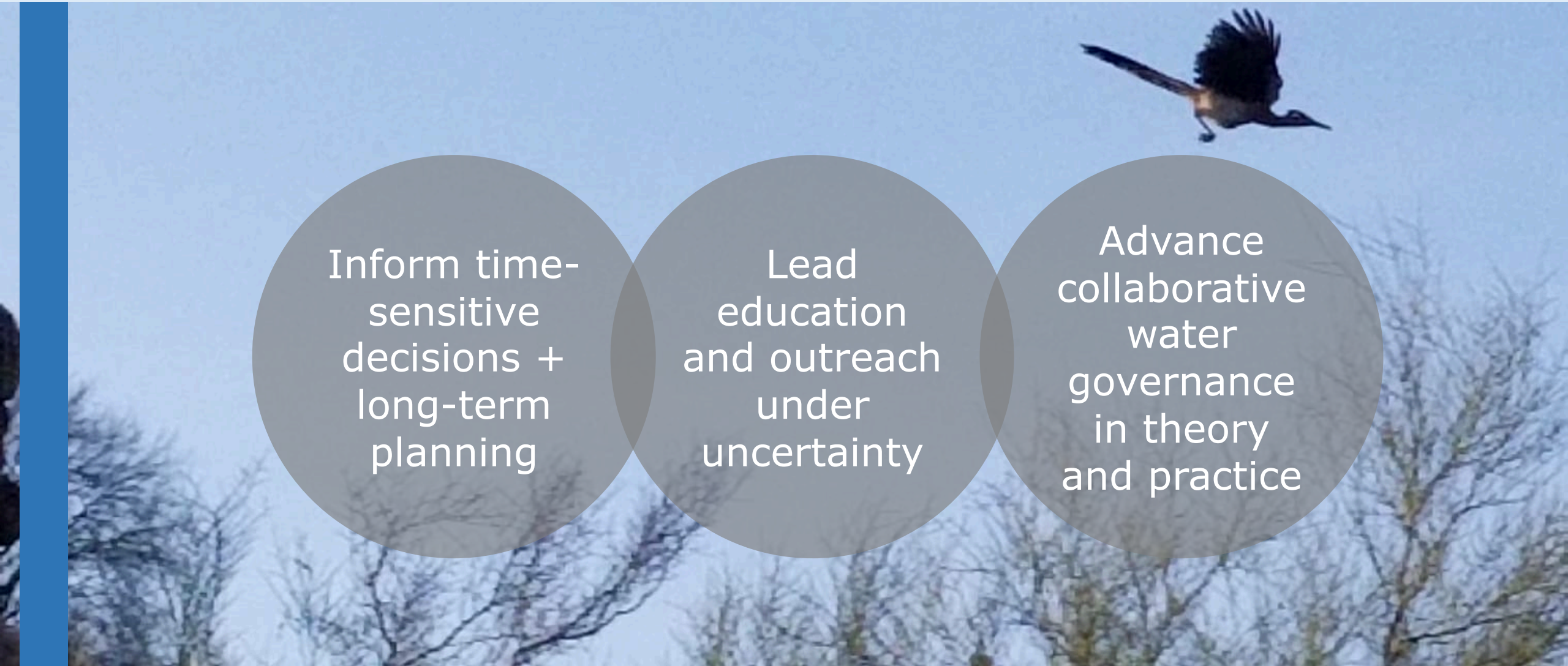
Next steps

NSF Decision, Risk and Management Sciences

Colorado River Basin: How do actors interested in adaptive natural resource governance collaborate, given deep uncertainty in complex dynamic contexts?



In closing: goals for the WRRC moving forward




Thank you!
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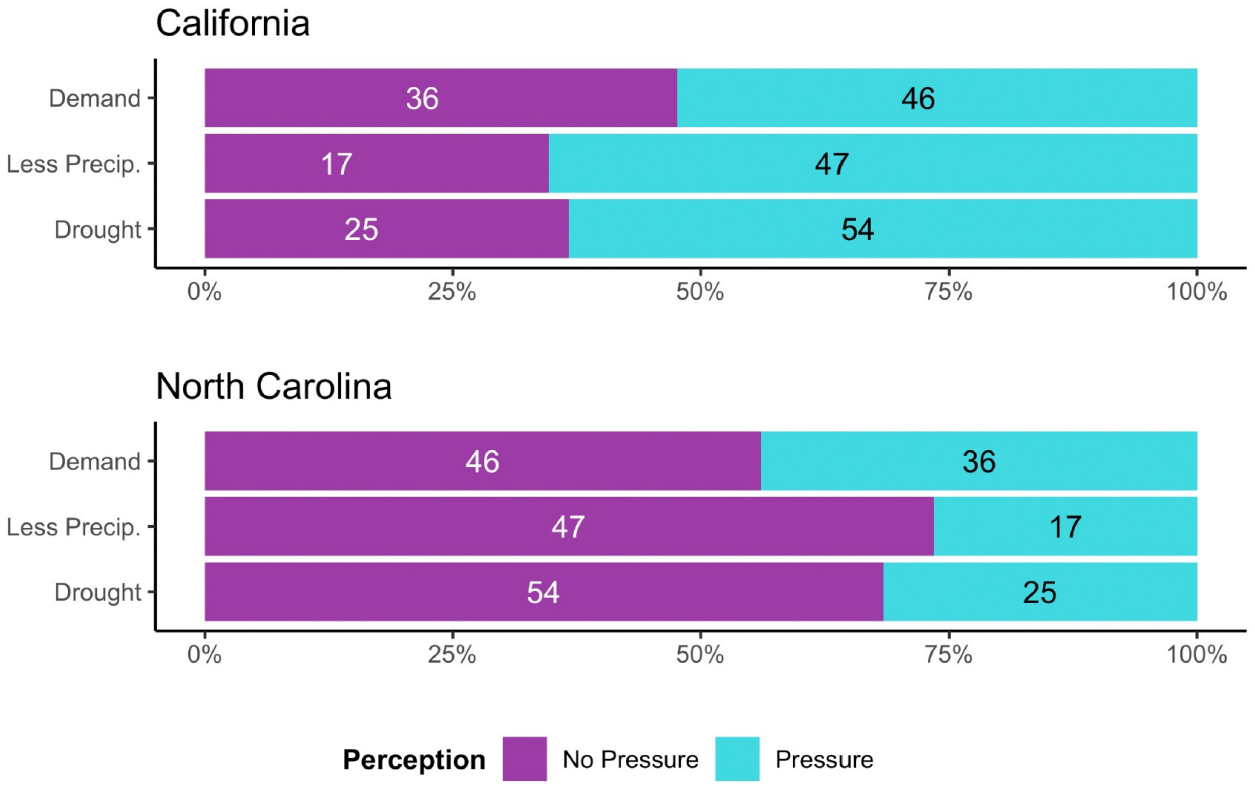
Appendix

Drivers of regional collaborative planning participation

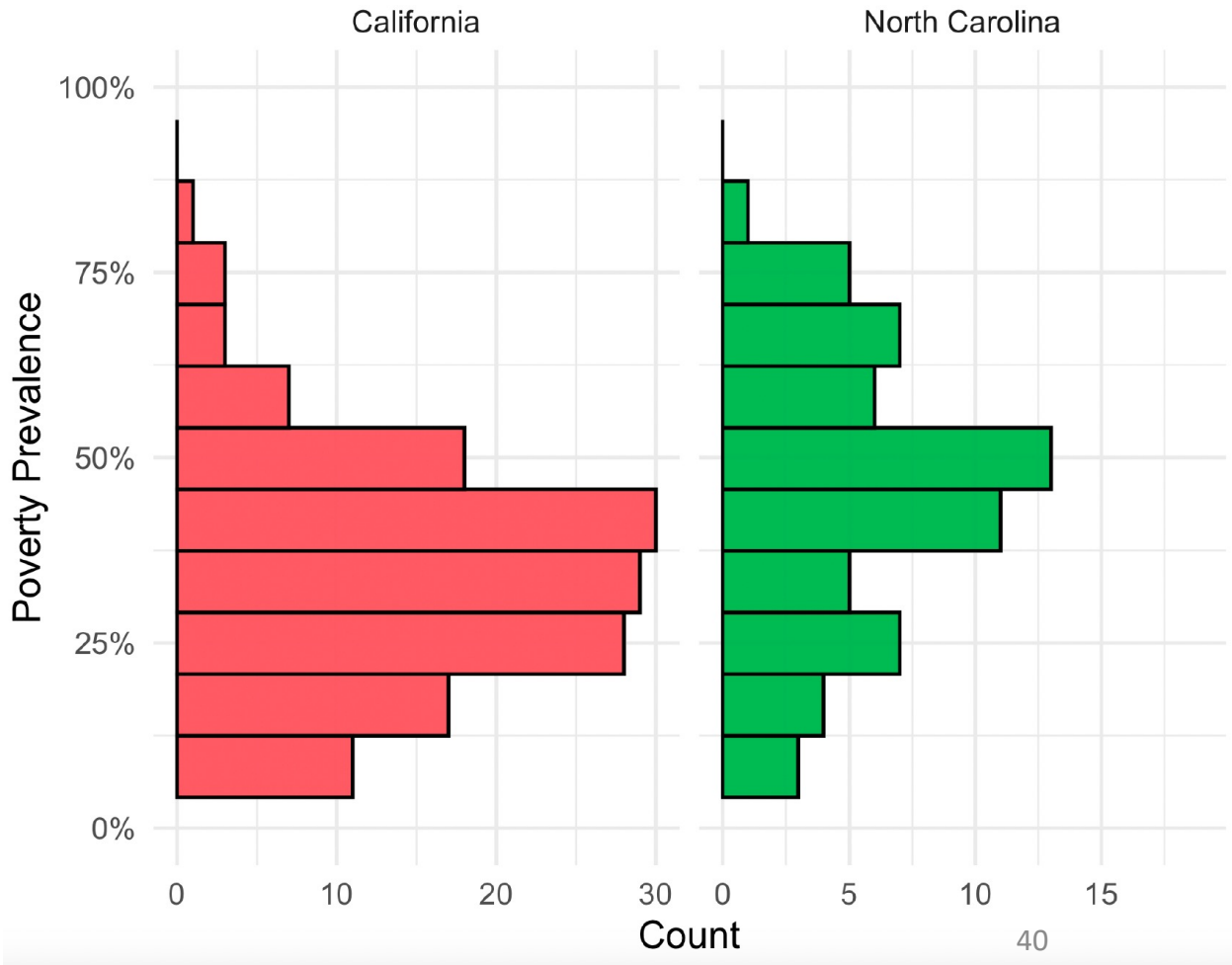
Coefficient (standard error)		
Variables	**California**	**North Carolina**
Less water (drought + less precipitation)	0.489* (0.282)	1.024*** (0.407)
Local demand	0.315 (0.459)	−0.533 (0.586)
Log poverty prevalence	−0.142 (0.443)	0.809 (1.582)
Log service population	0.133** (0.052)	0.573*** (0.176)
Source: SW	−0.025 (0.499)	−0.947 (0.896)
History of drought	0.015** (0.007)	−0.009 (0.014)
SGMA region (CA): Participates	1.240** (0.482)	
CAMA region (NC): Participates		−0.001 (0.857)
Intercept	−1.630** (0.795)	−5.512***(1.406)
n	147	83
AIC	150.354	99.689
Pseudo R^2 (McFadden)	0.174	0.230

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$.



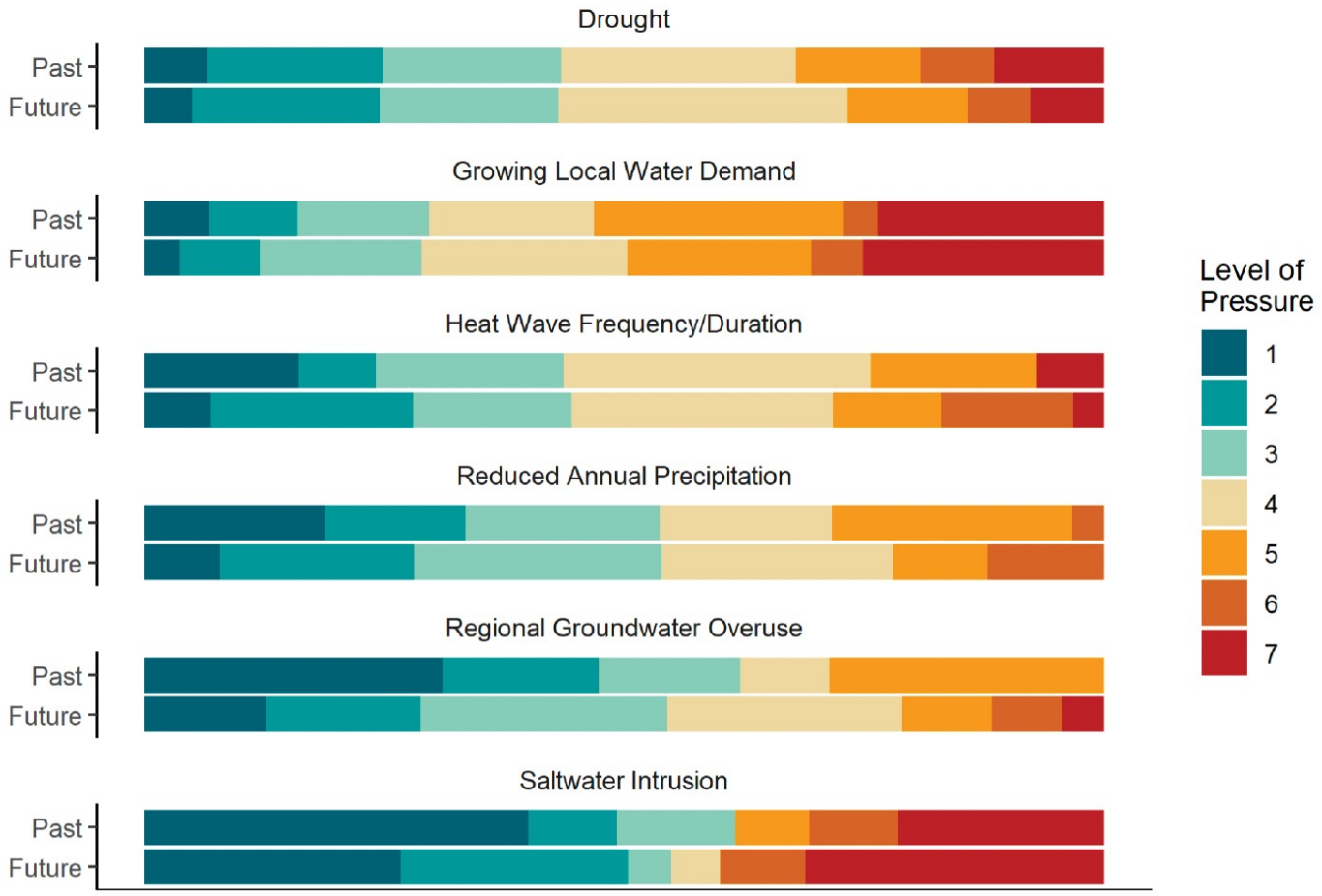
Water managers' perceived climate-related pressures (perceptions aggregated by system)

Poverty prevalence of water system customers served



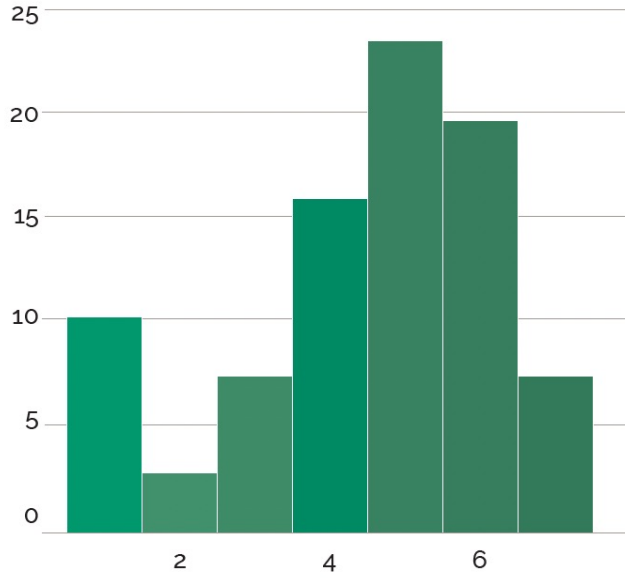
We would like to know how what problems you think might place pressure on your system's ability to supply enough water to meet demand over the past/next 10 years.

For the following items, please select your response on a scale from 1 to 7, 1 meaning "Not at all a problem", 7 meaning "A severe problem."

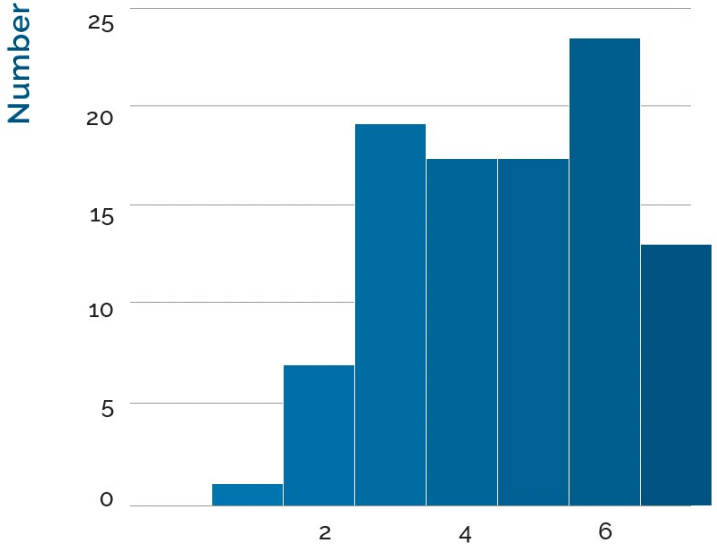


To ensure long-term water security...

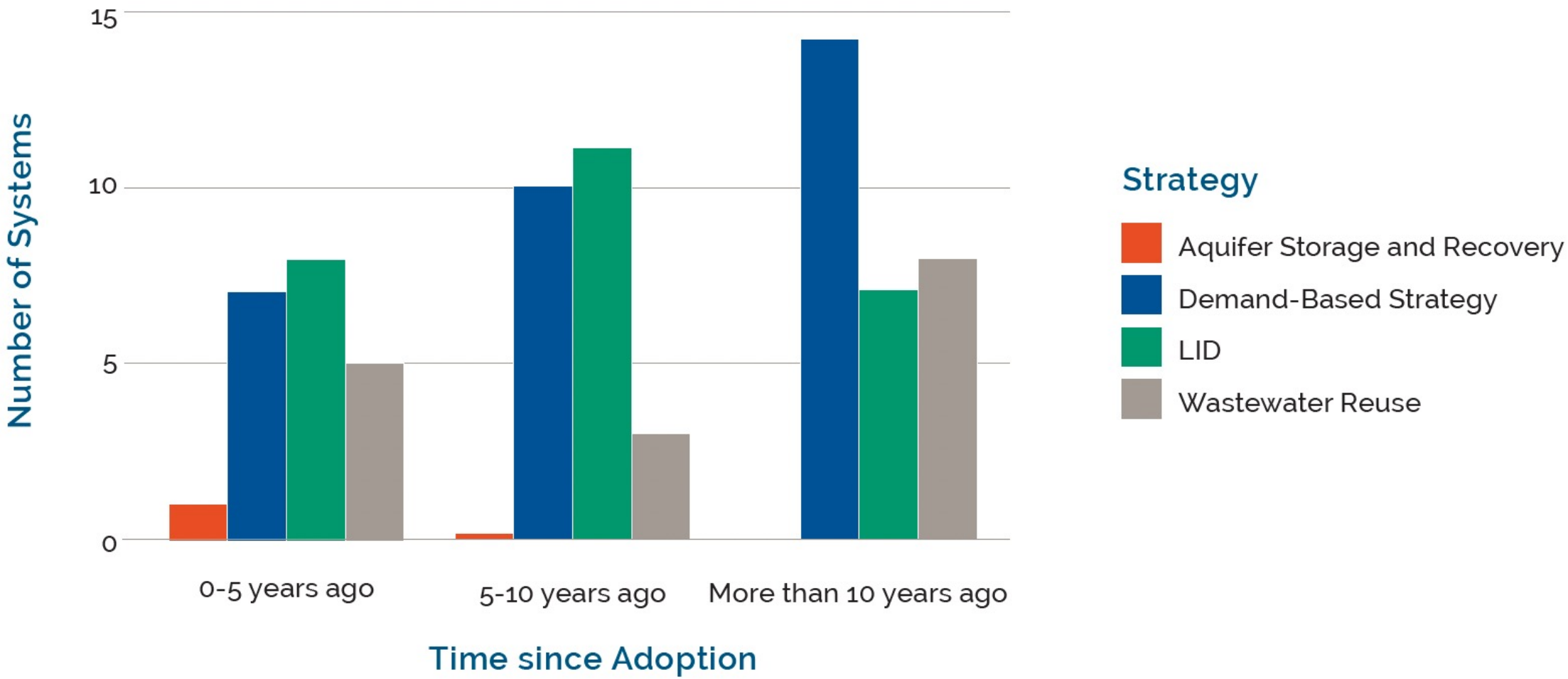
... water systems need to increase reliance on surface water resources.



... conserving groundwater is critical.



To what extent have the following problems put pressure on your system's ability to supply enough water to meet demand the past 10 years on a scale 1 ("No pressure") to 7 ("A lot of pressure")?

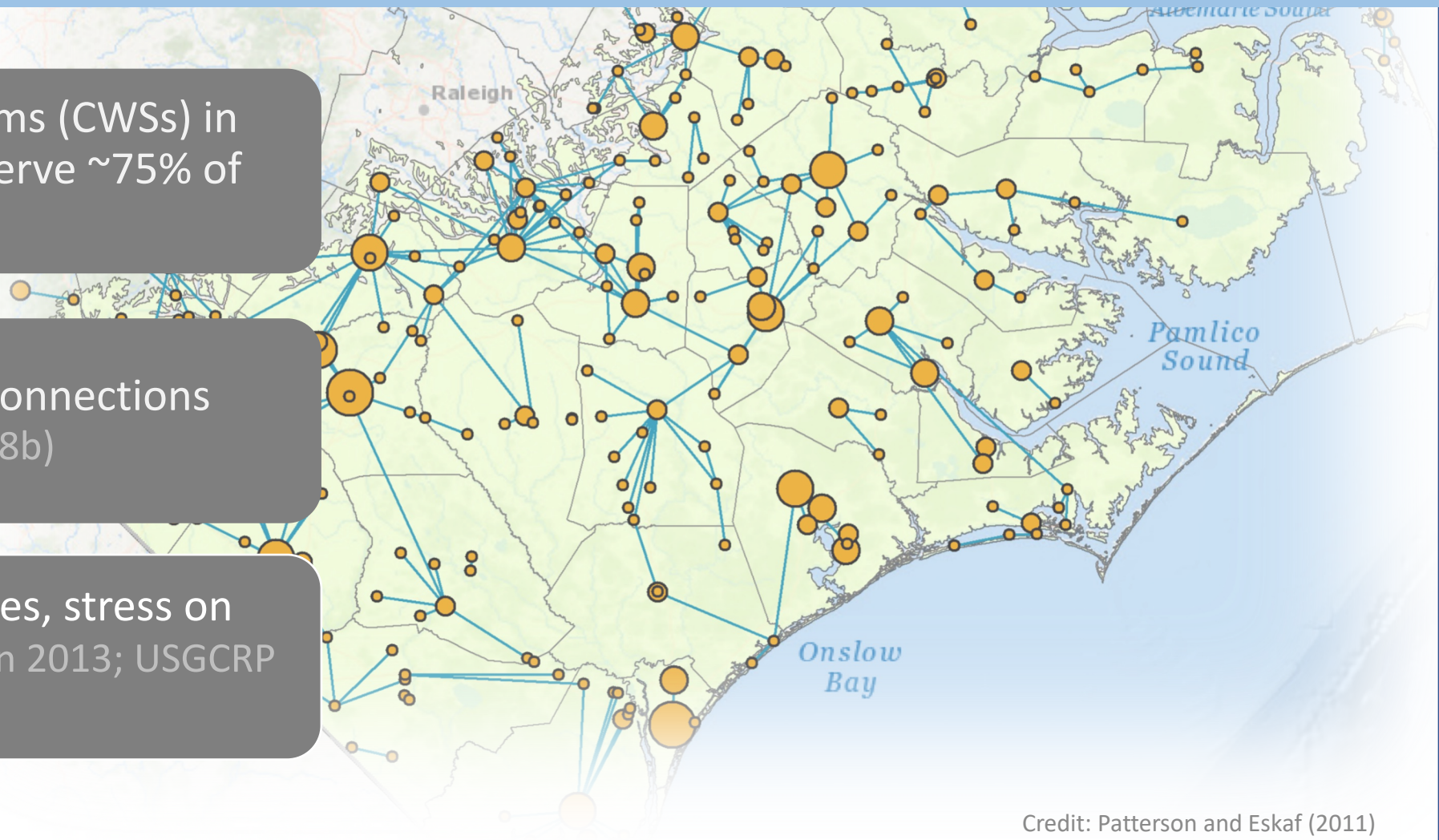


Risky collaboration and interconnection contracts

Community water systems (CWSs) in North Carolina: >2000 serve ~75% of population

~30% CWSs share interconnections (NCDEQ 2020; NCDEQ 2018b)

Variable climate pressures, stress on local water supplies (Sun 2013; USGCRP 2018)



Credit: Patterson and Eskaf (2011)

Risky collaboration: takeaways

Buyers with greater perceived climate risk will likely renew contracts—sellers will *not*

Buyers that have adopted local conservation strategies will be *less* likely to renew contracts—sellers will prefer to renew

Questions surrounding risk and sunk costs in infrastructure

May show water managers when to adopt risk-reducing measures