ADVANCING WATER SUSTAINABILITY: A VISION FOR RESEARCH AND ENGAGEMENT AT THE UA WATER RESOURCES RESEARCH CENTER

JAMIE MCEVOY, PHD

ASSOCIATE PROFESSOR OF GEOGRAPHY

MONTANA STATE UNIVERSITY

UA WATER RESOURCES RESEARCH CENTER WEBINAR

OCT. 31, 2023

MY BACKGROUND:
ASSOCIATE PROFESSOR OF GEOGRAPHY, MSU (2013-PRESENT)

Research

MT Water Center Faculty Seed Grant on Natural Infrastructure (2015)

Mentorship

MS Graduate Student Dionne Zoanni (2015-17)

Education & Outreach

Fieldtrip Lead (Fall 2022) MSU Grad Students and Gallatin Watershed Council

MY BACKGROUND:
PROUD WILDCAT & GRADUATE OF PUBLIC INSTITUTIONS

PhD in Geography and Development, UA

Minor in Water Policy, UA (2008-13)

MS in Environmental Sociology, USU (2006-08)

BS in Environmental Studies, Minor in Spanish, USU (1997-02)

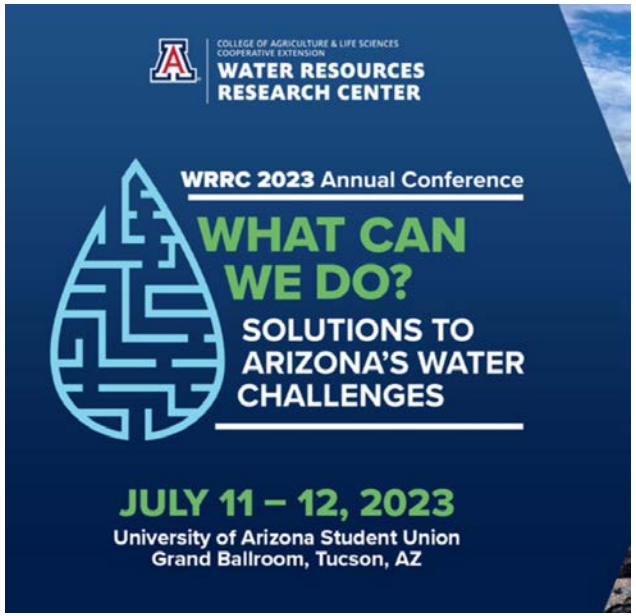
WHY I'M INTERESTED IN THIS POSITION:
1) EXCELLENCE IN WATER RESOURCES RESEARCH & ENGAGEMENT

UArizona ranked among world's best in water resources

The University of Arizona is ranked No. 2 in the U.S. and No. 6 in the world for its water resources program, according to ShanghaiRanking's 2022 Global Ranking of Academic Subjects.

By Nick Prevenas, University Communications
July 20, 2022

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
Cooperative Extension



Images: wrrc.arizona.edu

WHY I'M INTERESTED IN THIS POSITION: 2) OPPORTUNITY TO PAY IT FORWARD

WATER RESOURCES RESEARCH CENTER

News & Events ▾ Publications ▾ Programs ▾ Resources ▾ Opportunities ▾

Opportunities › WRRC Grants & Internships › 104(b) Small Research Grants

104(b) Small Research Grants

WRRC Water Webinars

Grab your lunch and join us for a range of presentations on water-related topics of interest.

Access to the WRRC's Seminar Series is currently being held **live via Zoom webcasts**.

Building Bridges, Wetlands, and Water Sustainability: Lessons from an Arizona-Baja California Sur Partnership

by Jamie McEvoy, Graduate Student, UA School of Geography and Development, and Plácido dos Santos, WRRC Analyst

Members of the Arizona- Baja California Sur Patnership workshop and tour pause for a photo on day four. Source: John Polle, WRRC

Images: wrrc.arizona.edu

WHY I'M INTERESTED IN THIS POSITION:
3) ALIGNMENT WITH MY INTERESTS & EXPERTISE

University of Arizona Water Resources Research Center (WRRC)
2021 STRATEGIC PLAN

WRRC 2021 Vision: By 2021, our expanded applied research programs, increased engagement at the local, state, and broader levels, including international, and continued excellence of educational and outreach programs will cement our position as *the* leader in Arizona in applied water management and policy analysis.

- ✓ **I'm a social scientist focused on water management and policy analysis**
- ✓ **I have built partnerships for applied water research**
- ✓ **I have experience working in Arizona and in a binational context**

WHY I'M INTERESTED IN THIS POSITION:
4) CONTINUE TO BUILD WESTERN WATER PARTNERSHIPS

UCOWR
UNIVERSITIES COUNCIL ON WATER RESOURCES

NIWR
THE NATIONAL INSTITUTES FOR WATER RESOURCES

WAAESD
Western Association of Agricultural Experiment Station Directors
Western Water Network

WWN Purpose: To chart a vision for land-grant-focused research and engagement to address Western U.S. water challenges for the next ten years

KEY FACTORS

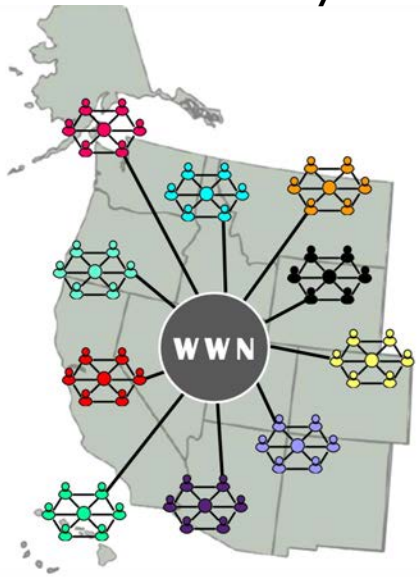
Great People
Doing Great Work
Instinct to Cooperate
Existing Networks

BUT-- **Problems at a New Scale**

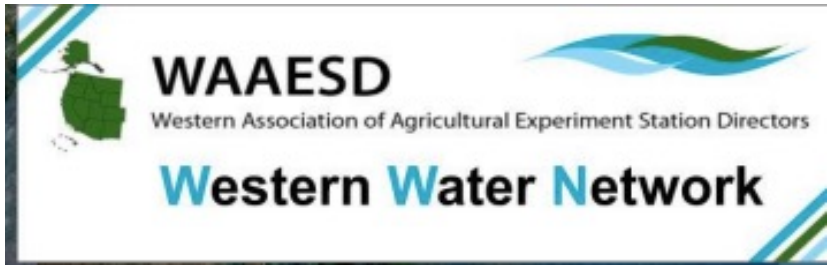
- ✓ Geographic
- ✓ Ecological
- ✓ Complexity
- ✓ Urgency
- ✓ Community

How to Connect these Great Networks?

WWN 2021



WHY I'M INTERESTED IN THIS POSITION:
4) CONTINUE TO BUILD WESTERN WATER PARTNERSHIPS



Future WERA Proposal
(Western Education/Extension and Research Activity)

Breakout Session on Hydrological Processes and Human Water Systems

Facilitators: Ginger Paige, Sam Fernald

Participants: Thushara Gunda, Jamie McEvoy, Bret Hess, Jim Dobrowolski, Alan Cai, Fabian Nippgen, Emile Elias

OVERVIEW OF MY RESEARCH & ENGAGEMENT: WATER GOVERNANCE, CLIMATE CHANGE ADAPTATION, AND EQUITY

OVERVIEW OF MY RESEARCH & ENGAGEMENT: WATER GOVERNANCE, CLIMATE CHANGE ADAPTATION, AND EQUITY

- Draw on social science literature, theories, and concepts
  - Water Equity
    - Different values
    - Historical sacrifices
    - Future needs
    - Distribution of costs and benefits
    - Community interests
    - Fair and transparent decision-making processes
    - Stakeholder involvement

OVERVIEW OF MY RESEARCH & ENGAGEMENT: WATER GOVERNANCE, CLIMATE CHANGE ADAPTATION, AND EQUITY

- Draw on social science literature, theories, and concepts
  - Water Equity
- Utilize social science methods
  - Qualitative
  - Quantitative
  - Applied, community-based, policy-oriented

OVERVIEW OF MY RESEARCH & ENGAGEMENT: WATER GOVERNANCE, CLIMATE CHANGE ADAPTATION, AND EQUITY

- Draw on social science literature, theories, and concepts
  - Water Equity
- Utilize social science methods
  - Qualitative
  - Quantitative
  - Applied, community-based, policy-oriented
- Analyze and evaluate water-related:
  - Policies & Plans
  - Processes & Partnerships
  - Public Perceptions

OVERVIEW OF PAST AND CURRENT RESEARCH & ENGAGEMENT

1. Desalination
2. Nature-based Strategies
3. Ecological Drought

OVERVIEW OF PAST AND CURRENT RESEARCH & ENGAGEMENT

1. Desalination
2. Natural Water Storage and Nature-based Strategies
3. Ecological Drought

- Research Question(s)
- Methods
- Funding
- Approach to Collaborative Research
- Publications and Findings

PREVIOUS RESEARCH & ENGAGEMENT: DESALINATION

DESALINATION: A SOCIAL SCIENCE PERSPECTIVE

Image: Conducting household surveys in Los Cabos, BCS, MX

DESALINATION:
LOS CABOS, BCS, MEXICO

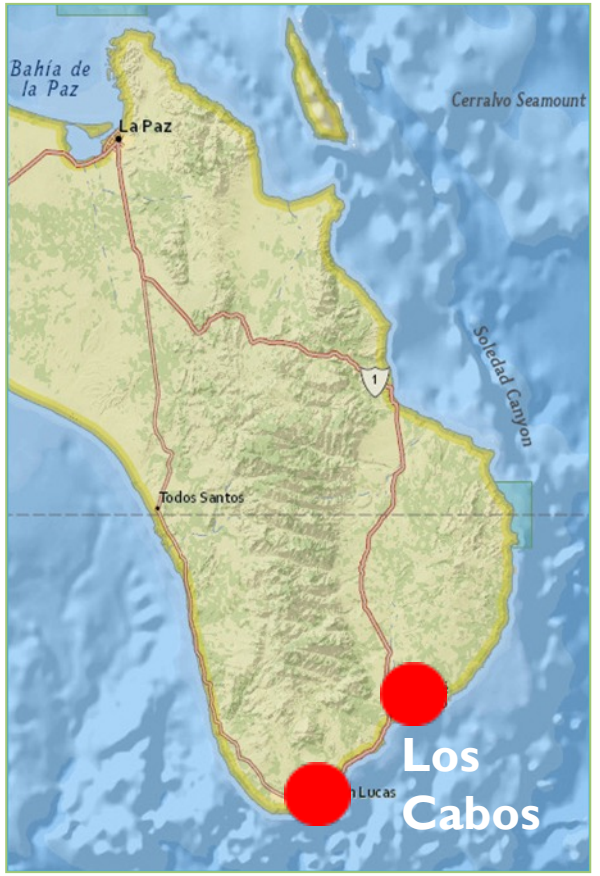
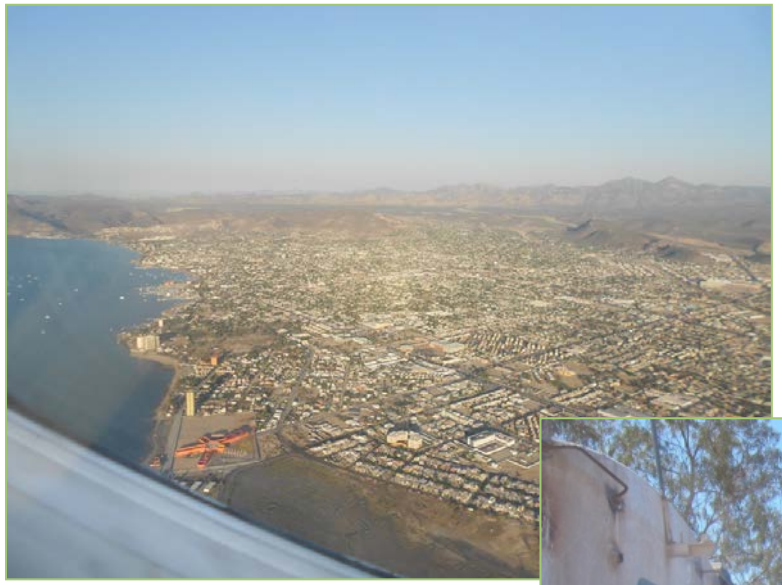
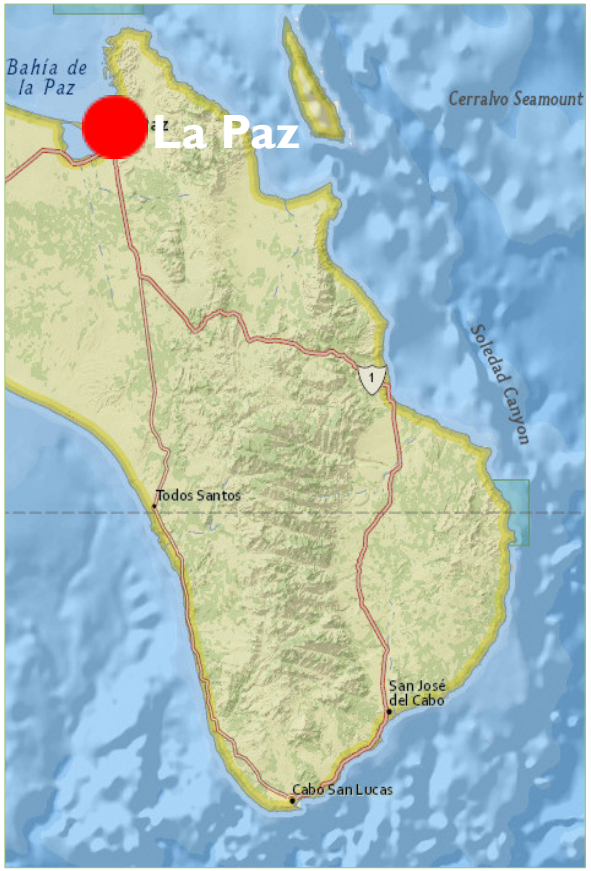


Photo from: Agúndez. 2010. Border Governors' Binational Desalination Conference

DESALINATION:
LA PAZ, BCS, MEXICO





DESALINATION: RESEARCH METHODS & EXTENSION

- Household surveys in Cabo San Lucas (n=160)
- Household surveys in La Paz (n=156)
- Semi-structured interviews* (n=71)
- Focus group
- Exploratory survey (n=36)
- Secondary data analysis
- Participatory workshop
- Host a visiting delegation on 4-day tour of Arizona water facilities

STAKEHOLDER INTERVIEWS

Table 1. List of interviewees by affiliation type.

Affiliation	# of Interviewees
Federal government representatives	9
State government representatives	4
Local government representatives	11
Environmental Non-Governmental Organization (NGO) representatives	5
Academic/Researcher	6
Private sector representatives	10
Community residents	23
Other	3
Total # of Interviewees	71

DESALINATION-RELATED PUBLICATIONS

1. Mumme et al. 2017. "Shipping Water Across the U.S-Mexico Border: International Governance Dimensions of Desalination Export." *Water International*
2. Fragkou and McEvoy. 2016. "Trust Matters: Why Augmenting Water Supplies via Desalination May Not Overcome Perceptual Water Scarcity." *Desalination*
3. Wilder et al. 2016. "Desalination and Water Security in the U.S.-Mexico Border Region: Assessing the Social, Environmental, and Political Impacts." *Water International*
4. McEvoy. 2014. "Desalination and Water Security: The Promise and Perils of a Technological Fix to the Water Crisis in Baja California Sur, Mexico." *Water Alternatives* 7(3): 518-541.
5. McEvoy and Wilder. 2012. "Discourse and Desalination: Potential Impacts of Proposed Climate Change Adaptation Interventions in the Arizona-Sonora Border Region." *Global Environmental Change*
6. Wilder et al. 2010. "Adapting Across Boundaries: Climate Change, Social Learning, and Resilience in the U.S.-Mexico Border Region." *Annals of the Association of American Geographers*
7. McEvoy. 2018. "Water Governance and Desalination in Baja California Sur, Mexico." Chapter 3 in *Tapping the Oceans: Seawater Desalination and the Political Ecology of Water*
8. Wendell and McEvoy. 2013. "Desalination in Arizona: Challenges, Applications and Prospects." Pp. 247-261 in *Shared Borders, Shared Waters: Israeli-Palestinian and Colorado River Basin Water Challenges*
9. Wilder, Margaret et al. 2011. *Water and Urban Development: Coastal Vulnerability in Puerto Peñasco.* Working Paper. Udall Center for Studies in Public Policy, University of Arizona
10. McEvoy, Jamie and dos Santos. 2012. "Building Bridges, Wetlands and Water Sustainability: Lessons from an Arizona-Baja California Sur Partnership." Pp. 1-2 in *Arroyo Newsletter.* Water Resources Research Center, Tucson, AZ

EXAMPLE OF DESALINATION RESEARCH

Water **2015**, *7*, 5224-5238; doi:10.3390/w7105224

OPEN ACCESS

water

ISSN 2073-4441

www.mdpi.com/journal/water

Article

Can the Adoption of Desalination Technology Lead to Aquifer Preservation? A Case Study of a Sociotechnical Water System in Baja California Sur, Mexico

Jamie McEvoy

Department of Earth Sciences, Montana State University, P.O. Box 173480, Bozeman, MT 59715, USA; E-Mail: jamie.mcevoy@montana.edu; Tel.: +1-406-994-4069; Fax: +1-406-994-6923

Research Questions

- What are the existing institutional arrangements for desalination in BCS?
- What specific policy mechanisms could be implemented to better ensure that desalination achieves the stated goals of aquifer recharge and preservation?

PREVIOUS RESEARCH & ENGAGEMENT: DESALINATION

Overexploited Aquifers (2009)

Source: Comisión Nacional del Agua. 2009.

Priority Projects: Desalination

Source: Mexico's 2007-2012 National Infrastructure Program.

Planning Documents

- "There are diverse desalination schemes that… achieve not only the necessary water supply, **but also the recovery of the aquifer**…"

Source: IIUNAM 2010 (emphasis added).

INSIGHTS FROM: POLICY STUDIES & SCIENCE AND TECHNOLOGY STUDIES (STS)

- An "explicit mechanism" is necessary (Cooley et al. 2006)

- It's best to adopt rules governing new technologies early on, before habits and economic investments become "strongly fixed" (Winner 1977)

FINDINGS

Existing Institutions for the Management of Desalination in BCS

- All waters in Mexico, including seawater within 12 nautical miles of the country's coast is property of the Nation and under purview of CONAGUA
- A concession for extraction of seawater or brackish groundwater must be obtained from CONAGUA
- EIA is required to dispose of brine discharge
- A concession for brine discharge must be obtained from SEMARNAT
- CFE must agree to supply the necessary power
- A land-use permit must be obtained for the siting of a desalination facility
- BCS State law allows the State Water Commission (CEA) and local municipal government to
  - establish regulations for desalination systems
  - resolve issues related to desalination
  - Determine the average rate of potable water supply services and desalination

FINDINGS

What's missing

- Regulations that link adoption of desalination to groundwater use or monitoring

What's Needed: Policy Mechanisms for Aquifer Preservation

1. Integrated water-and land-use planning
2. Creation of an institute responsible for coordinated and consistent planning
3. Improved groundwater monitoring
4. Implementation of water conservation measures prior to the adoption of desalination technology

FUTURE RESEARCH ON DESALINATION

Article Publication Date: June 10, 2023

CURRENT RESEARCH & ENGAGEMENT: NATURE-BASED STRATEGIES FOR WATER MANAGEMENT

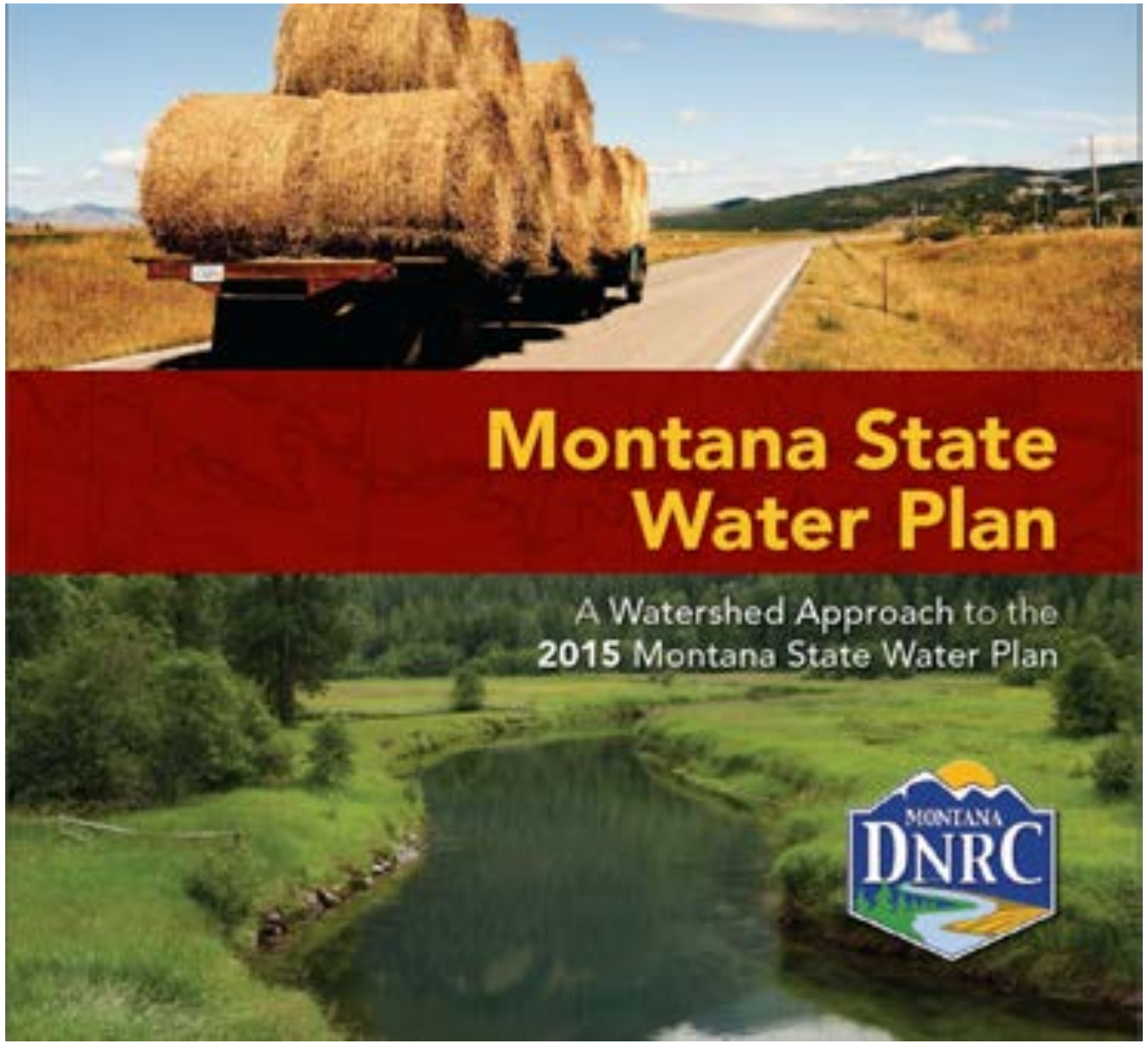
INFRAESTRUCTURA VERDE, LA PAZ, BCS, MX (2012)

CURRENT RESEARCH & ENGAGEMENT: NATURE-BASED STRATEGIES FOR WATER MANAGEMENT

2010

2021

INFRAESTRUCTURA VERDE, LA PAZ, BCS, MX

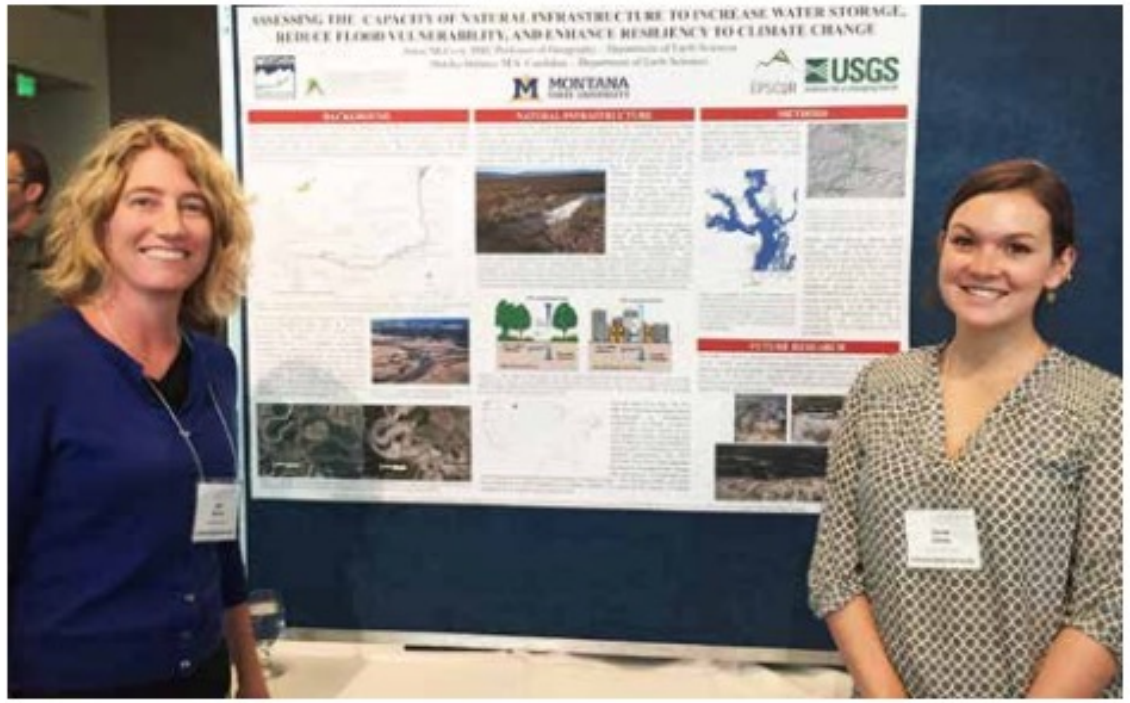


2015 MONTANA STATE WATER PLAN

IDENTIFIES THE NEED FOR INCREASED WATER STORAGE AND RETENTION AS AN IMPORTANT TOOL FOR RESPONDING TO CLIMATE CHANGE.

CALLS FOR EXPLORING THE USE OF **GREEN INFRASTRUCTURE** TO STORE AND RETAIN WATER.

GRADUATE STUDENT PROJECTS ON NATURAL WATER STORAGE: IDENTIFYING, EXPLORING, & QUANTIFYING POTENTIAL SITES



Danika Holmes

Former: MS Student

Current: MT DNRC, Water Rights Bureau

water

MDPI

Article

A Geospatial Approach for Identifying and Exploring Potential Natural Water Storage Sites

Danika Holmes [1,*], Jamie McEvoy [1], Jean L. Dixon [1] and Scott Payne [2]

1 Department of Earth Sciences, Montana State University, Bozeman, MT 59718, USA; jamie.mcevoy@montana.edu (J.M.); jean.dixon@montana.edu (J.L.D.)

2 KirK Engineering, 136 Tuke Lane, Sheridan, MT 59749, USA; scottmpayne@gmail.com

* Correspondence: danika.l.holmes@gmail.com; Tel.: +1-406-542-5881

Received: 10 May 2017; Accepted: 31 July 2017; Published: 8 August 2017

Funding

MONTANA University System WATER CENTER

MONTANA DNRC

GRADUATE STUDENT PROJECTS ON NATURAL WATER STORAGE: PUBLIC PERCEPTIONS, PERMITTING, AND WATER RIGHTS

Megan Moore

Former: MS student

Current: PhD Student, UM

Pfaeffle, T., M. A. Moore, A. E. Cravens, J. McEvoy, and A. Bamzai-Dodson. 2022. Murky waters: divergent ways scientists, practitioners, and landowners evaluate beaver mimicry. Ecology and Society 27(1):41. https://doi.org/10.5751/ES-13006-270141

Research

Murky waters: divergent ways scientists, practitioners, and landowners evaluate beaver mimicry

Tori Pfaeffle[1], *Megan A. Moore*[2], *Amanda E. Cravens*[3], *Jamie McEvoy*[4] *and Aparna Bamzai-Dodson*[1]

JID: RALA
RALA-00345; No of Pages 12
[mNS;July 11, 2022;10:6]

"In Montana, you're only a week away from a drought": Ranchers' perspectives on flood irrigation and beaver mimicry as drought mitigation strategies

By Megan A. Moore and Jamie McEvoy

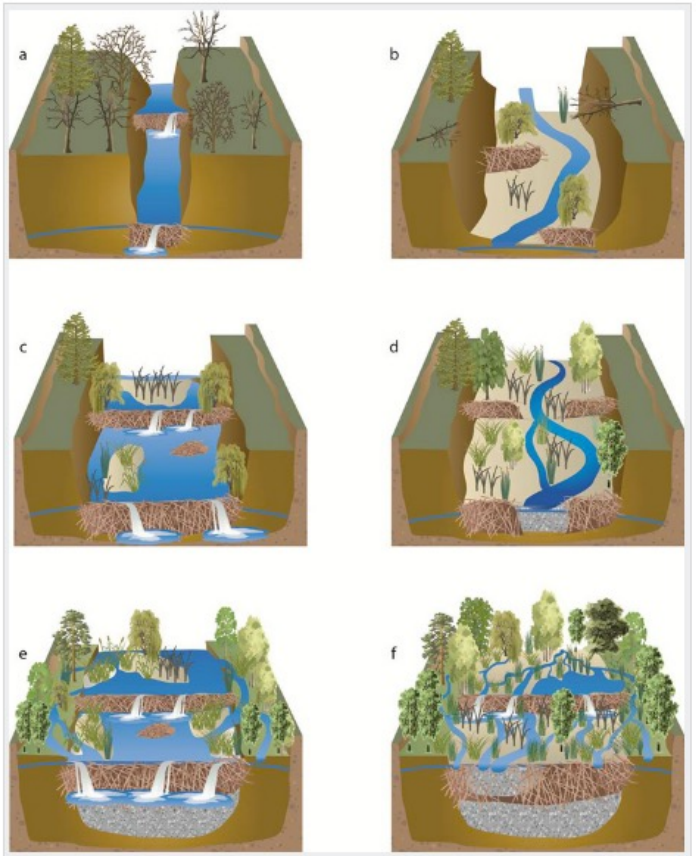
Funding

The Nature Conservancy
Protecting nature. Preserving life.

SNAPP

NATURAL WATER STORAGE:

BEAVER MIMICRY



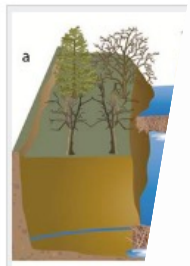
Beaver dams help a stream to progress from an incised trench (a) to an aggraded channel (e–f) by creating a positive feedback loop that changes physical processes and vegetation to improve habitat for themselves and other species.

Photo Credit: Pollock et al., 2014

Photo Credit: The Nature Conservancy website

NATURAL WATER STORAGE:

BEAVER MIMICRY



Overview Articles

Great Expectations: Deconstructing the Process Pathways Underlying Beaver-Related Restoration

CAROLINE S. NASH, GORDON E. GRANT, SUSAN CHARNLEY, JASON B. DUNHAM, HANNAH GOSNELL, MARK B. HAUSNER, DAVID S. PILLIOD, AND JIMMY D. TAYLOR

Received: 18 October 2021 | Revised: 10 March 2022 | Accepted: 12 May 2022
DOI: 10.1002/eco.2430

RESEARCH ARTICLE

WILEY

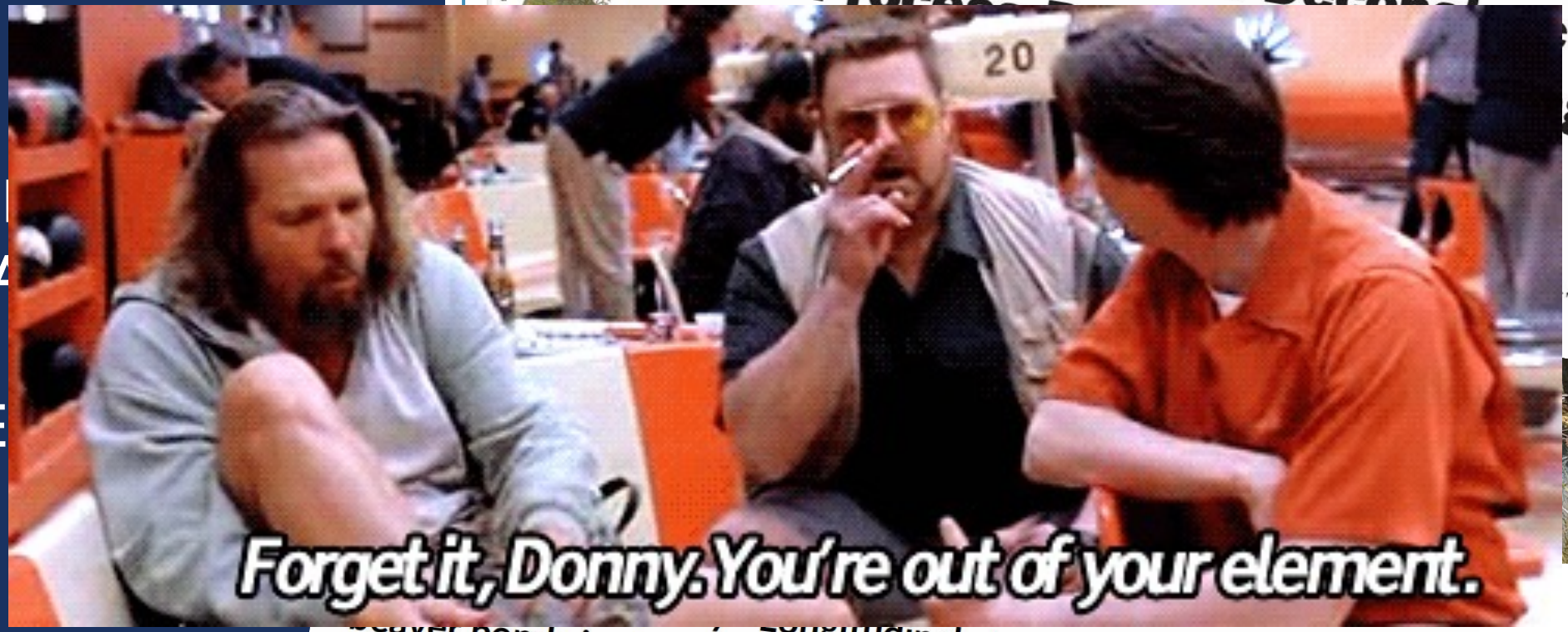
Dammed water quality—Longitudinal stream responses below beaver ponds in the Umpqua River Basin, Oregon

John R. Stevenson[1] | Jason B. Dunham[2] | Steven M. Wondzell[3] | Jimmy Taylor[4]

re Conservancy website

NATU
STORA

BEAVE



Great Expectations: Decon

Overview Articles

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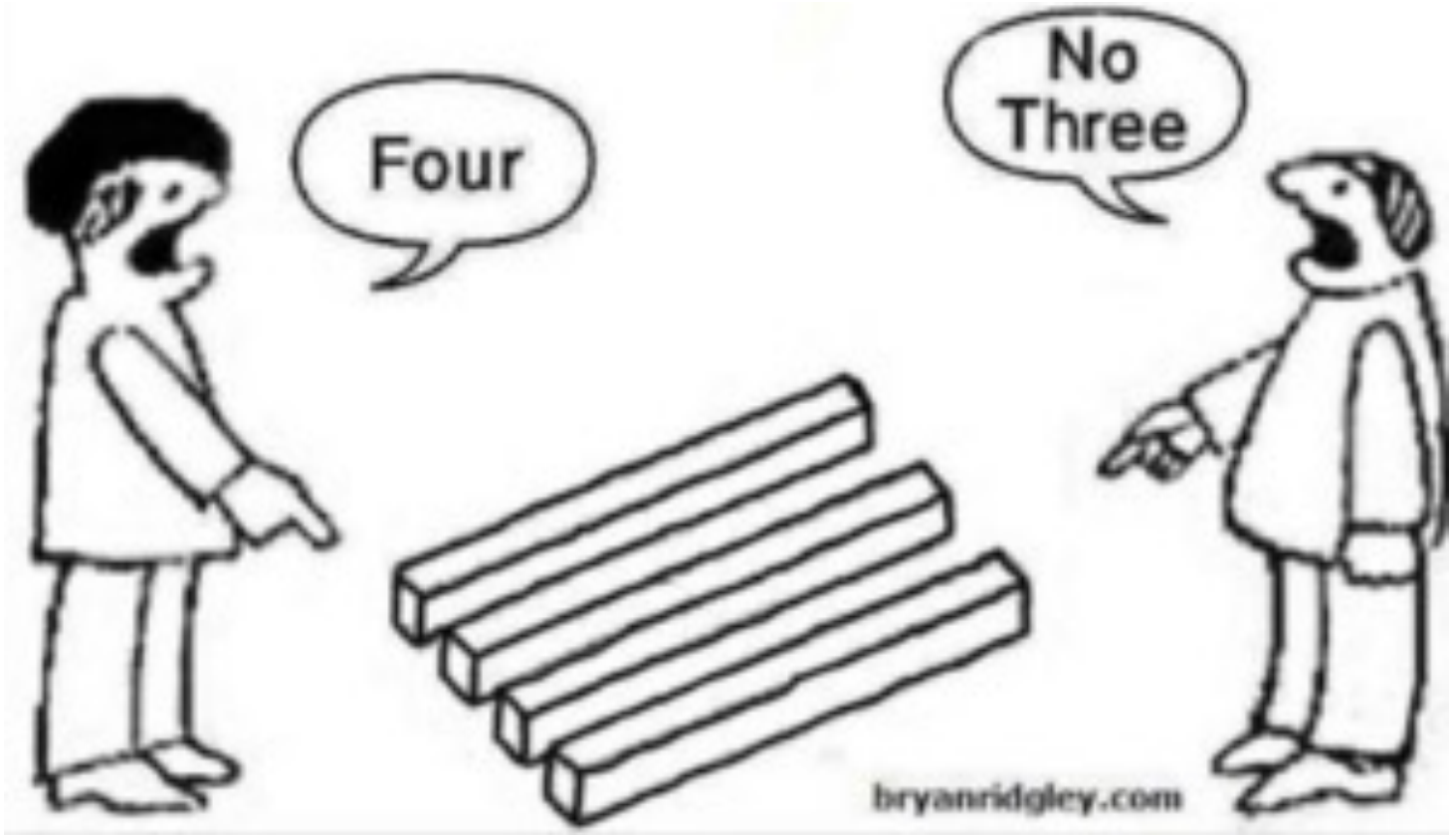
ponds in the Umpqua River Basin, Oregon

Longitudinal stream responses below

John R. Stevenson[1] | Jason B. Dunham[2] | Steven M. Wondzell[3] | Jimmy Taylor[4]

re Conservancy website



(A) ROLE OF SOCIAL SCIENCE:

UNDERSTANDING DIFFERENT PERCEPTIONS & VIEWS ON WATER MANAGEMENT

METHODS:

REANALYSIS OF COMBINED DATASETS

- Interviews (49 total interviews)
  - 15 Scientists
    - Universities (n = 6)
    - Federal agency (n = 7)
    - NGO (n= 1)
    - Private firm (n = 1)
  - 11 Practitioners
    - NGOs (n = 2)
    - State agency (n = 3)
    - Federal agency (n=2)
    - Stream restoration firms (n=4)
  - 23 Landowners in southwest Montana

BEAVER MIMICRY

3 Areas of Contested Claims & Unsettled Science

Pfaeffle et al. 2022. Ecology & Society

3 Areas of Contested Claims & Unsettled Science

BEAVER MIMICRY

1. Ecological Outcomes

"Those [goals] related to streamflow end up being a lot murkier and a lot less likely to happen" (Scientist 9)

Pfaeffle et al. 2022. Ecology & Society

3 Areas of Contested Claims & Unsettled Science

BEAVER MIMICRY

1. Ecological Outcomes
2. Regulatory Uncertainty

"You know ranchers, if somebody starts doing something like this, they're going to say they're taking my water!" (Landowner 2)

Pfaeffle et al. 2022. Ecology & Society

3 Areas of Contested Claims & Unsettled Science

BEAVER MIMICRY

1. Ecological Outcomes
2. Regulatory Uncertainty

"As soon as you say 'dam' that triggers a vision in our [state water rights agency] of something that's impounding water…which would trigger a water right"
(Practitioner 7)

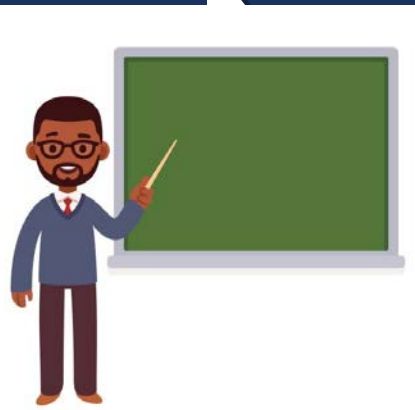
Pfaeffle et al. 2022. Ecology & Society

3 Areas of Contested Claims & Unsettled Science

BEAVER MIMICRY

1. Ecological Outcomes
2. Regulatory Uncertainty
3. Cost and Ease of Projects

"The low tech, low cost thing is appealing…it is more likely to be able to scale up and affect larger landscapes and not be cost prohibitive" (Scientist 10)



Pfaeffle et al. 2022. Ecology & Society

3 Areas of Contested Claims & Unsettled Science

BEAVER MIMICRY

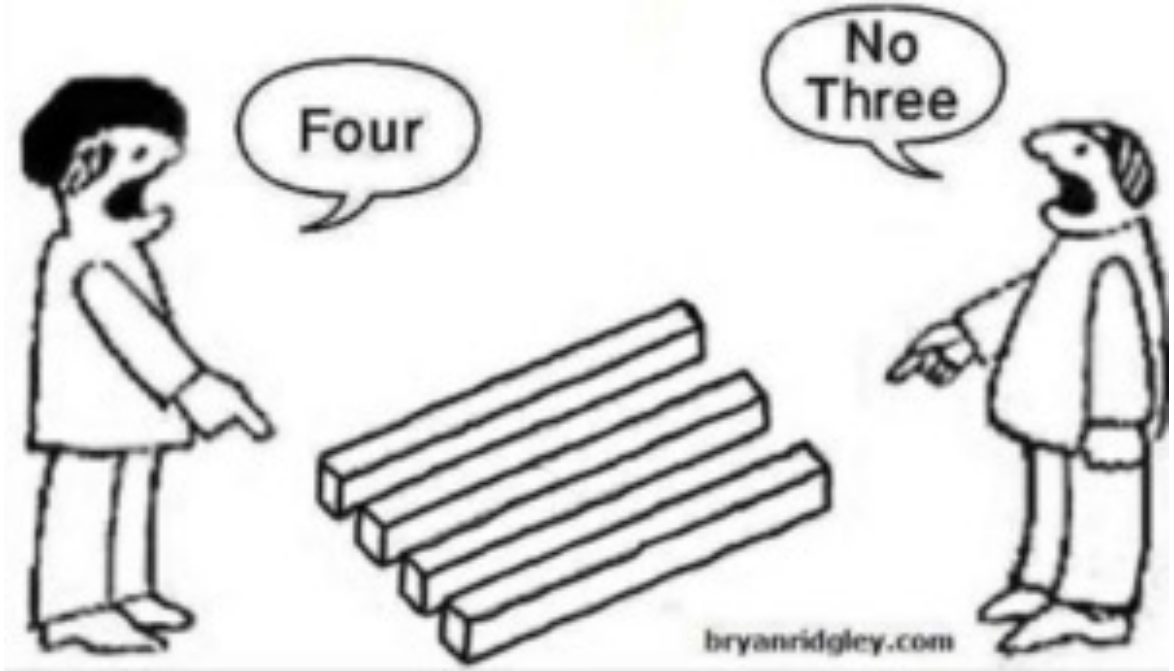
1. Ecological Outcomes
2. Regulatory Uncertainty
3. Cost and Ease of Projects

"I think it would be a nice hobby and I think the results are probably desirable, but I don't have time and money to even think about it" (Landowner 10)

Pfaeffle et al. 2022. Ecology & Society

SO WHAT?

- Recognizing the differences in how stakeholders evaluate evidence can lead to new and different approaches to addressing conflicts



FUTURE RESEARCH ON NATURE-BASED STRATEGIES

Tucson: How a Desert City Became a Leader in Green Infrastructure Masterclass

Image: research.arizona.edu

Norman et al. 2022
Science of the Total Environment

CURRENT RESEARCH & ENGAGEMENT: ECOLOGICAL DROUGHT

Funding & Partners

USGS science for a changing world

WILDLIFE CONSERVATION SOCIETY

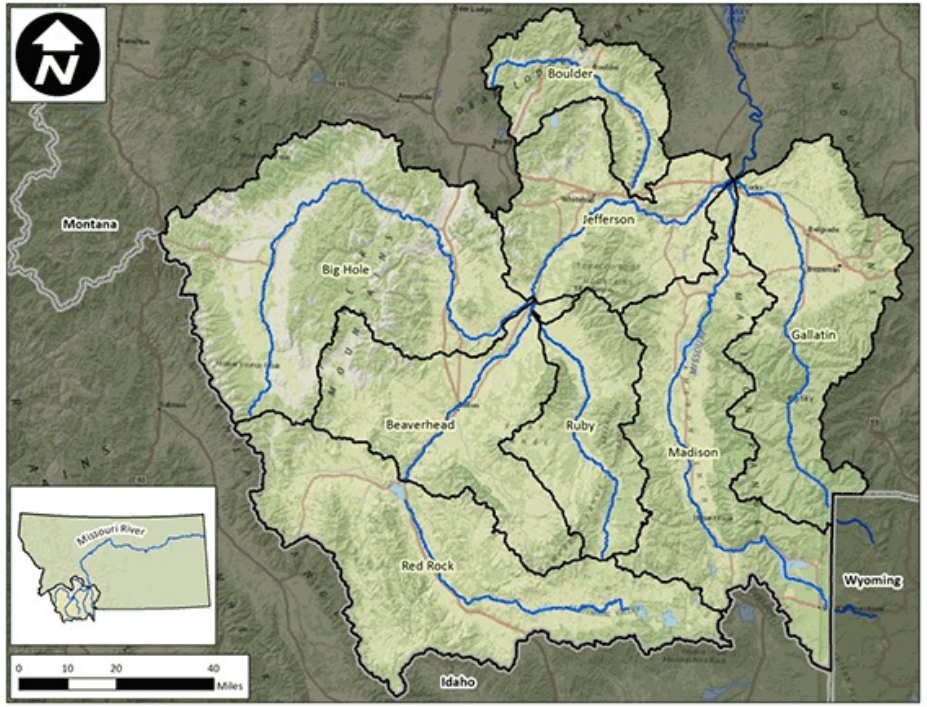
The Nature Conservancy

SNAPP

NCEAS National Center for Ecological Analysis and Synthesis

National Drought Mitigation Center

UPPER MISSOURI HEADWATERS REGION



Graphic Credit: Schwend and Laidlaw 2017

NATIONAL DROUGHT RESILIENCY PARTNERSHIP (NDRP) IN MONTANA

Graphic Credit: Laidlaw

PARTNERSHIP TO BUILD DROUGHT RESILIENCY

Engage Communities

Build Local Capacity

Involve Resource Partners

Discuss Vulnerabilities (includ. Ecological Impacts)

Develop Adaptation Strategies

SAMPLE FRAME

MT Demonstration Project Partners

Larry Smith Wichita Wildlife Refuge. Tumbler photo

State Agencies & Organizations

MT DNRC, MT DEQ, MT FWP, MT DES,
MT Dept of Ag, MACD/SWCDMI, MWCC
Big Sky Watershed Corps

Regional Organizations

CLLC, TNC, FW, One Montana,
GYC & HDC

Federal Agency Partners

EPA, NRCS, FEMA, NOAA-NIDIS, NDMC,
GNLCC, BOR, BLM, USFWS, USGS, BIA, USFS,
USACE & Office of Climate Change Policy,

Local Organizations

GRTF, GGWC, GVLT, JCP, MCD, MVRG, MRF,
WCS (CPP), RVCD/RWC, CVA, BWC/BCD,
BCD, BHWC, JRWC & LJWC;
Beaverhead, Broadwater, Gallatin,
Jefferson, & Madison Counties

Graphic Credit: Schwend and Laidlaw 2017

METHODS

- Content analysis of resource planning documents (n~33)
  (Collaboration with National Drought Mitigation Center at UNL)
- Interviews with NDRP demonstration project agencies and organizations (n=44)
- Elicitation of ecosystem services using Common International Classification of Ecosystem Services (CICES) framework (n=18)

RESEARCH QUESTIONS

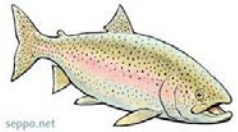
1. How do people in the UMH understand the challenge of drought?

2. To what extent and in what ways do they consider ecological impacts in drought preparedness and response strategies?

PUBLICATIONS ON ECOLOGICAL DROUGHT

1. Cravens et al. 2023. "The patchwork governance of ecologically available water: A case study in the Upper Missouri Headwaters, Montana, USA." *Journal of the American Water Resources Association*
2. Pfaeffle et al. 2022, "Murky Waters: Divergent Ways Scientists, Practitioners, and Landowners Evaluate Beaver Mimicry." *Ecology and Society*. 27(1):41
3. Cravens et al. 2021. "A Typology of Drought Decision Making: Synthesizing Across Cases to Understand Drought Preparedness and Response Actions." *Weather and Climate Extremes*. 33: 1-15.
4. Cravens, et al. *2021*. Integrating Ecological Impacts: Perspectives of Drought in the Upper Missouri Headwaters, Montana. USA. *Weather, Climate & Society 13(2): 363-376*
5. Raheem, et al. 2019. "Planning for Ecological Drought: Integrating Ecosystem Services and Vulnerability Assessment." *WIREs: Water 6:e1352*
6. Dunham, et al. 2018. "Rivers are Social-Ecological Systems: Time to Integrate Human Dimensions into Riverscape Ecology and Management." *WIREs: Water*. Online First: 1-10. DOI: 10.1002/wat2.1291
7. McEvoy, et al. 2018. "Ecological Drought: Accounting for the Non-Human Impacts of Water Shortage in the Upper Missouri Headwaters Basin, Montana, USA." *Resources* 7(1), 14: 1-17
8. Crausbay et al. 2017. "Framing Ecological Drought for the 21st Century." *Bulletin of the American Meteorological Society* 98: 2543-2550

DROUGHT PLANS ANALYSIS: IMPACTS & INDICATORS



Fish/Fisheries (3)

Forests (1-2)

Grasslands (1-2)

"When people say 'health of the river', what they really mean is the health of the fisheries in the river. [It's a] fairly narrow ecological view."

– local watershed coordinator, UMH

McEvoy et al. 2017. Ecological Drought: Accounting for the Non-Human Impacts of Water Shortage in the Upper Missouri Headwaters Basin, MT, USA. *Resources*.

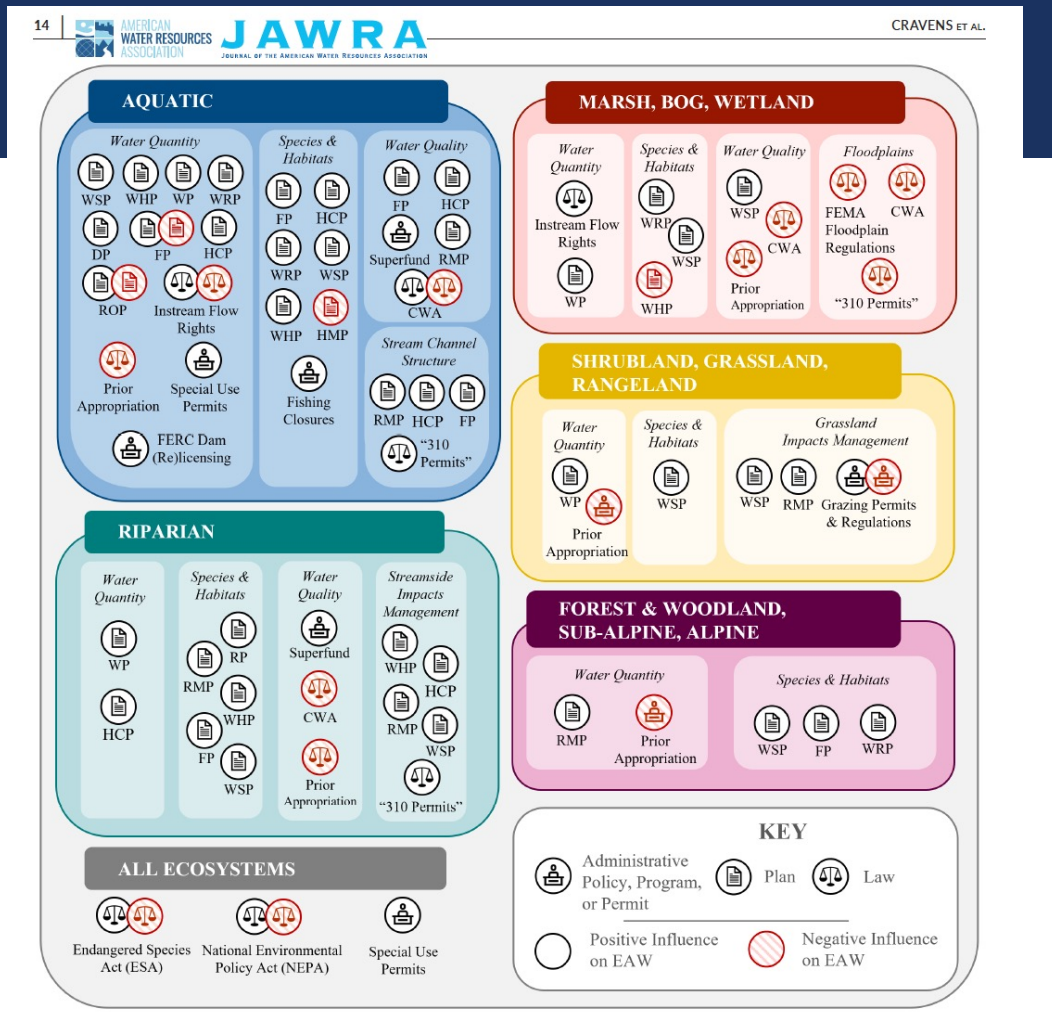
GOVERNING ECOLOGICALLY AVAILABLE WATER (EAW)

RESEARCH ARTICLE

AMERICAN WATER RESOURCES ASSOCIATION JAWRA JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION

The patchwork governance of ecologically available water: A case study in the Upper Missouri Headwaters, Montana, United States

Amanda E. Cravens[1] | Julia B. Goolsby[1] | Theresa Jedd[2] | Deborah J. Bathke[3] | Shelley Crausbay[4] | Ashley E. Cooper[1] | Jason Dunham[5] | Tonya Haigh[3] | Kimberly R. Hall[6] | Michael J. Hayes[7] | Jamie McEvoy[8] | Rebecca L. Nelson[9] | Markéta Poděbradská[10] | Aaron Ramirez[11] | Elliot Wickham[7] | Dionne Zoanni[8]

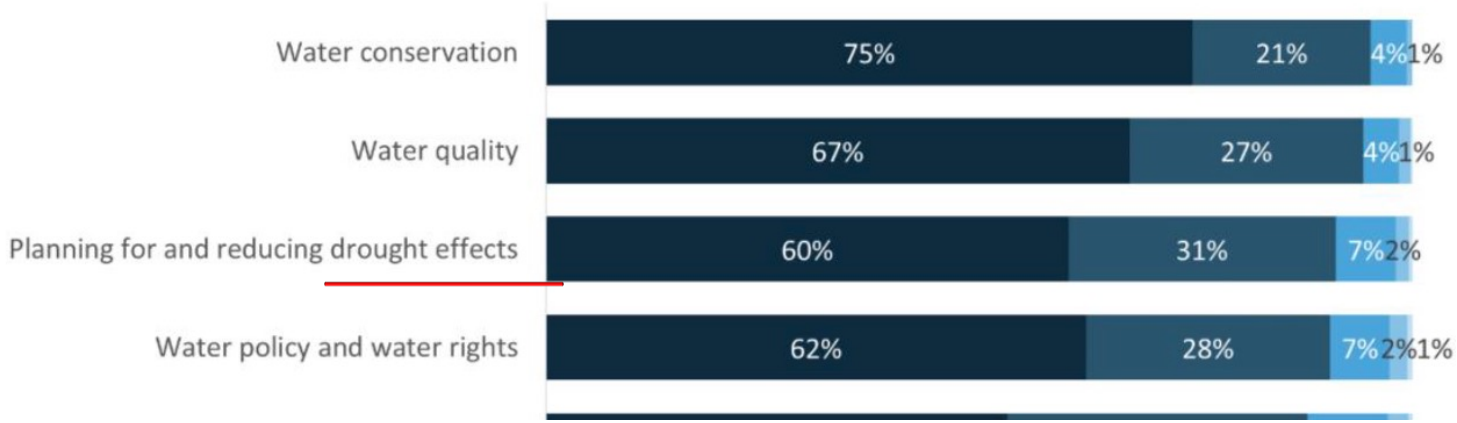


Governance mechanisms that influence EAW by ecosystem type

FUTURE RESEARCH ON DROUGHT

NATURAL RESOURCES & THE ENVIRONMENT

"How important is it to make each of the following issues a priority in your community?"



https://norton.arizona.edu/uace-needs-assessment-2022

CLIMAS
Climate Assessment for the Southwest
A NOAA CAP/RISA TEAM

IRES

Southwest Climate Adaptation Science Center

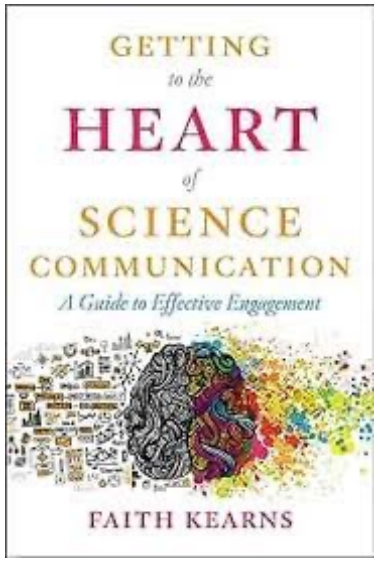
Arizona Institute for Resilient Environments & Societies

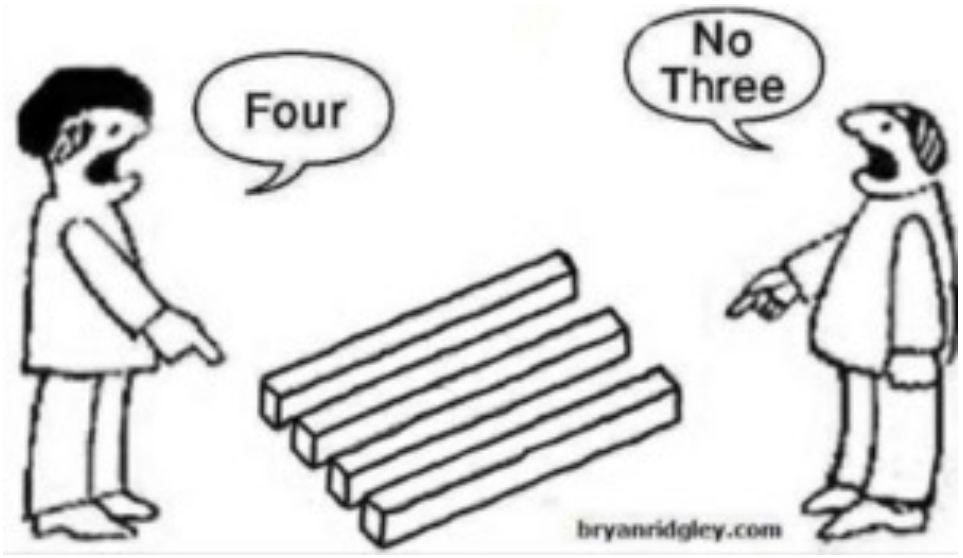
EXTENSION & ENGAGEMENT PHILOSOPHY

1. Seek mentorship and training

EXTENSION & ENGAGEMENT PHILOSOPHY

1. Seek mentorship and training
2. The problem is *not* information deficit



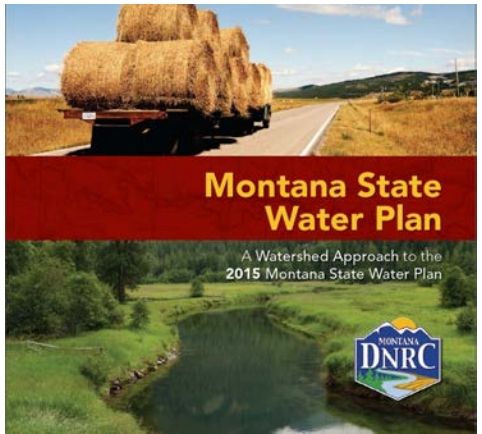


EXTENSION & ENGAGEMENT PHILOSOPHY

1. Seek mentorship and training
2. The problem is *not* information deficit
3. Listen, listen, listen to assess needs and priorities

EXTENSION & ENGAGEMENT PHILOSOPHY

1. Seek mentorship and training
2. The problem is *not* information deficit
3. Listen, listen, listen to assess needs and priorities
4. Face-time to build relationships



WESTERN
EXTENSION
RISK
MANAGEMENT
EDUCATION

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON

1. Climate-Smart Agriculture
2. Tribal Water
3. Groundwater Management

Images: WRRC Photo Contest

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: 1) CLIMATE-SMART AGRICULTURE

- Why agriculture?

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: 1) CLIMATE-SMART AGRICULTURE

- Why did Willie Sutton rob a bank?

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: 1) CLIMATE-SMART AGRICULTURE

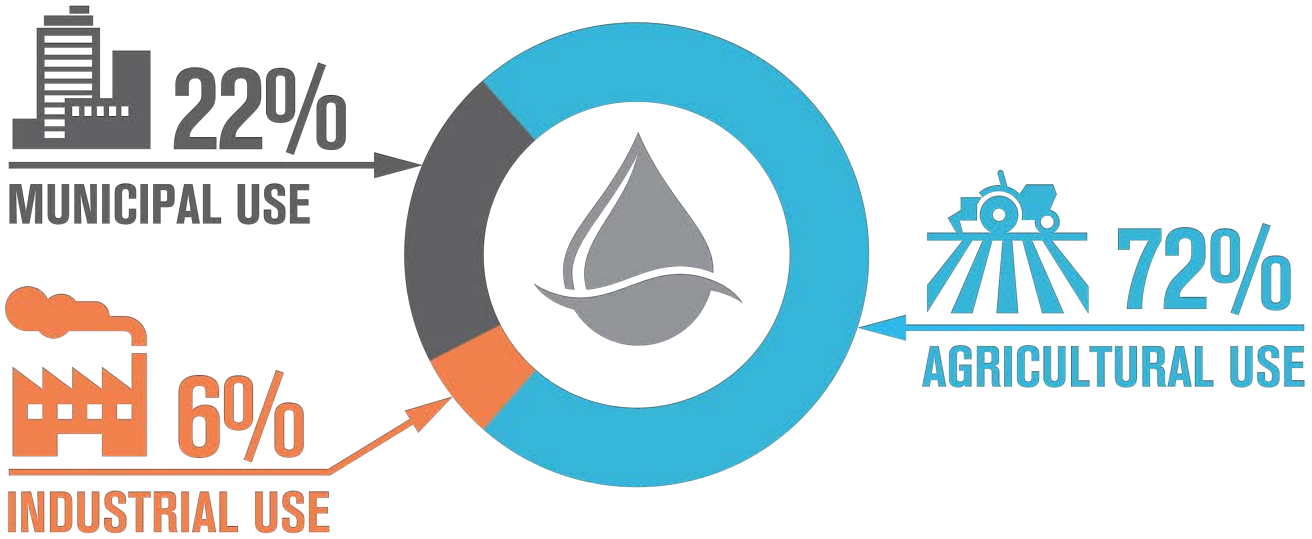
- Why did Willie Sutton rob a bank?

"That's Where the Money is…"

— Willie Sutton

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: 1) CLIMATE-SMART AGRICULTURE

- Why agriculture?
- Because that's where (72%) of the water is

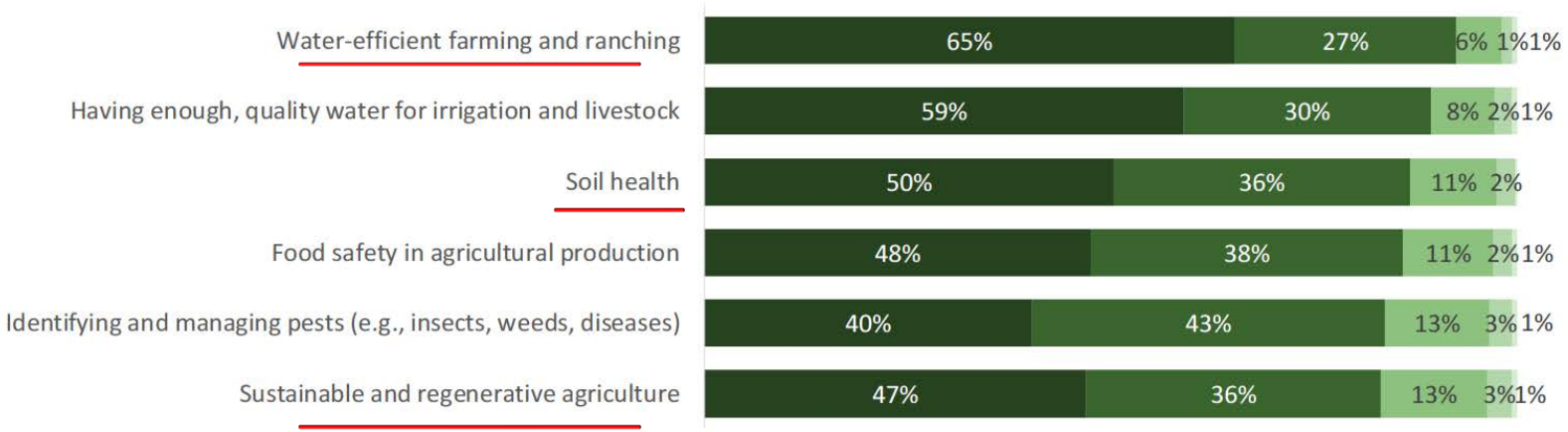


SOURCE: ADWR, 2020

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON:
1) CLIMATE-SMART AGRICULTURE

AGRICULTURE

"How important is it to make each of the following issues a priority in your community?"



https://norton.arizona.edu/uace-needs-assessment-2022

Potential Funding:

- USDA WaterSmart
- Western SARE
- USDA NIFA
- NOAA Coping with Drought

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: 2) TRIBAL WATER

- Tribal agriculture
- Tribal drought resiliency
- Tribal water rights settlements
- Tribal water infrastructure (drinking water & sanitation)
- Tribal water quality
- Traditional ecological knowledge
- Tribal partnerships

IRES

Native American Advancement & Tribal Engagement

INDIGENOUS KNOWLEDGE FIELDCAMP

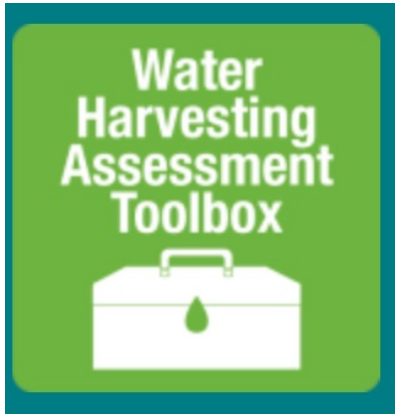
AGEP: Alliance for Graduate Education and the Professoriate

Dionne Zoanni, MS (2015-17)
Thesis: Traditional Ecological Knowledge and Tribal Water Governance at Fort Peck, MT

3 KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: 3) GROUNDWATER MANAGEMENT

- Transboundary Aquifer Assessment Program (TAPP)
- Managed Aquifer Recharge (MAR)
- Nature-based Strategies (NBS), Green Infrastructure (GI)
- WRRC Desert Water Harvesting Initiative
- WERA: Human and Natural Water Systems (groundwater-surface water interactions)
- Babbitt Center for Land and Water Policy: Land-Water Interactions
- Evaluating status of Groundwater Management Act (GMA) & Active Management Areas (AMAs)
- USDA Southwester Climate Adaptation Center – Water Adaptation Techniques Atlas (WATA)

Images: wrrc.arizona.edu



KEY AZ WATER ISSUES I'D LIKE TO FOCUS ON: *4) SURPRISE ADDITIONAL TOPIC

- AZ Water Innovation Initiative
  - Kyl Water Policy
  - Impact Water
  - Arizona Water for all
- Need for partnership with UA Cooperative Extension with expertise in:
  - Working with agricultural communities
  - Agricultural water policy
  - Agriculture-Climate-Land-Water
  - Water management & water policy
  - Environmental water

- Thank you & Questions

- jamie.mcevoy@montana.edu

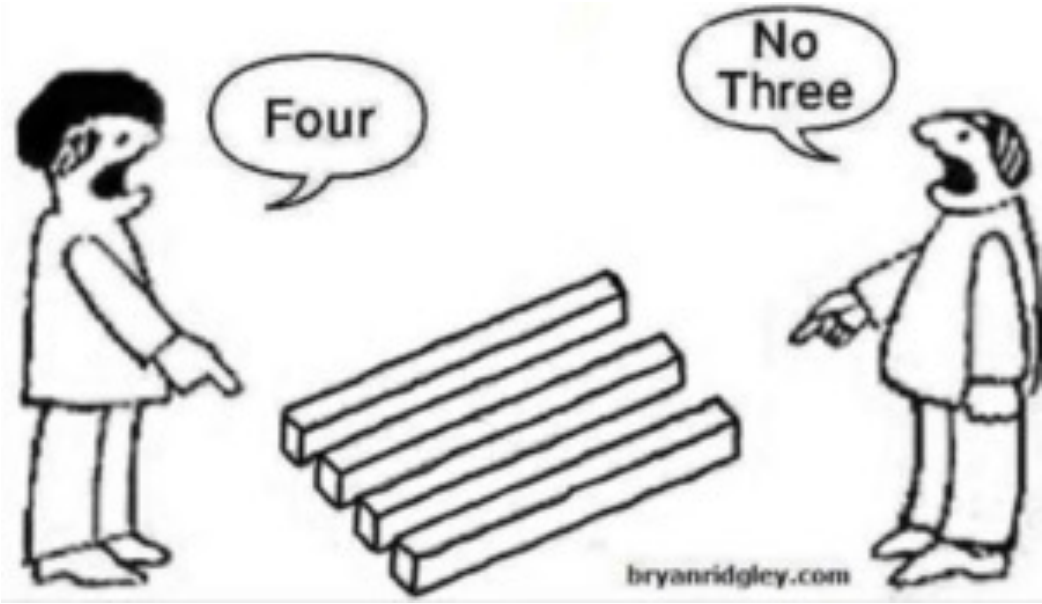
WRRRC Water Photo Contest
Stevi Zozaya
Home Grown Yuma 2013

NATURAL WATER STORAGE: BEAVER MIMICRY

Salience: Relevant to decision context

Credibility: Produced by sources that are perceived to be authoritative

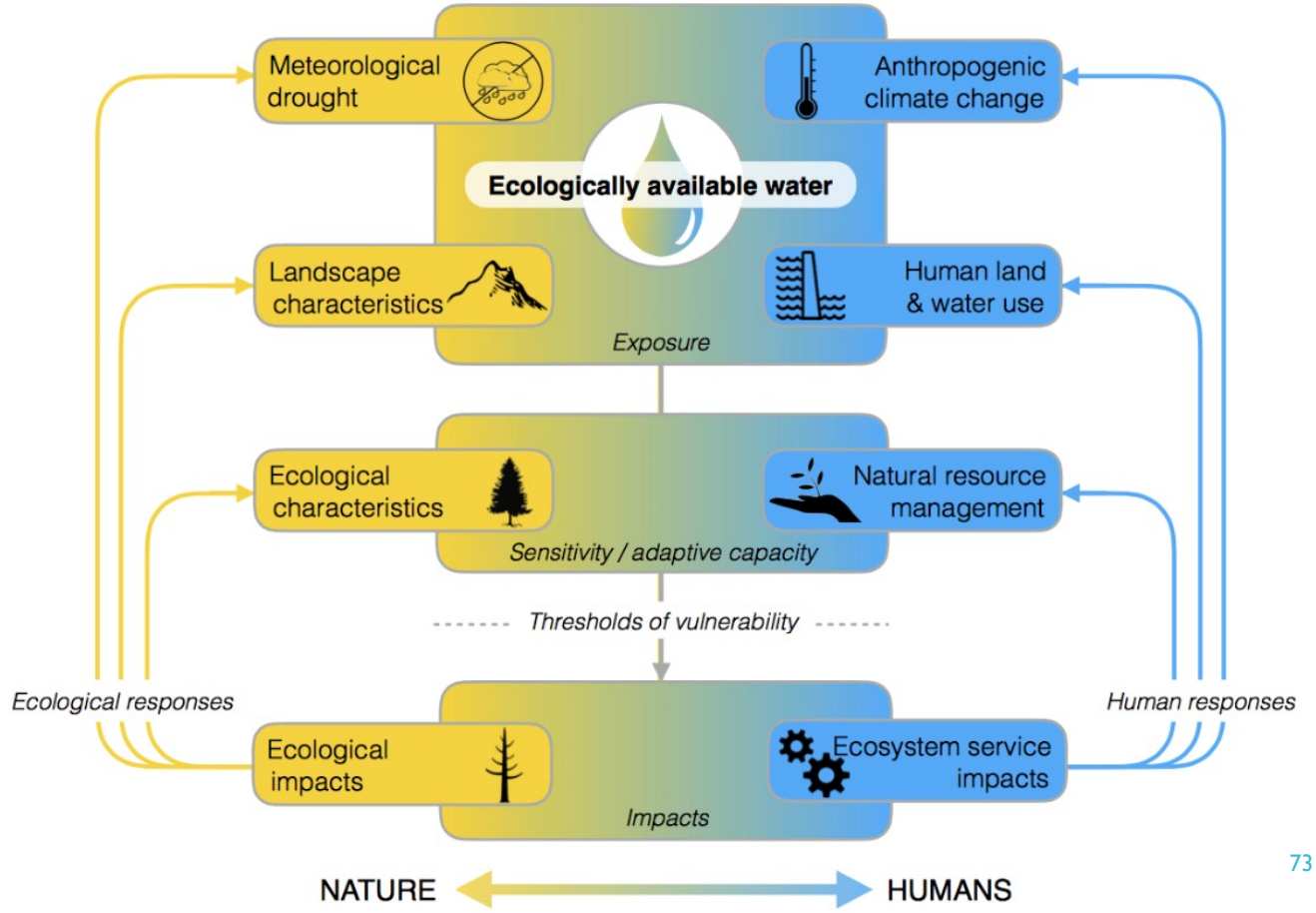
Legitimacy: Created through processes that are perceived to be fair and unbiased



Pfaeffle et al. 2022. Ecology & Society

Ecological Drought:

"Episodic deficit in water availability that drives ecosystems beyond thresholds of vulnerability, impacts ecosystem services, and triggers feedbacks in natural and/or human systems."



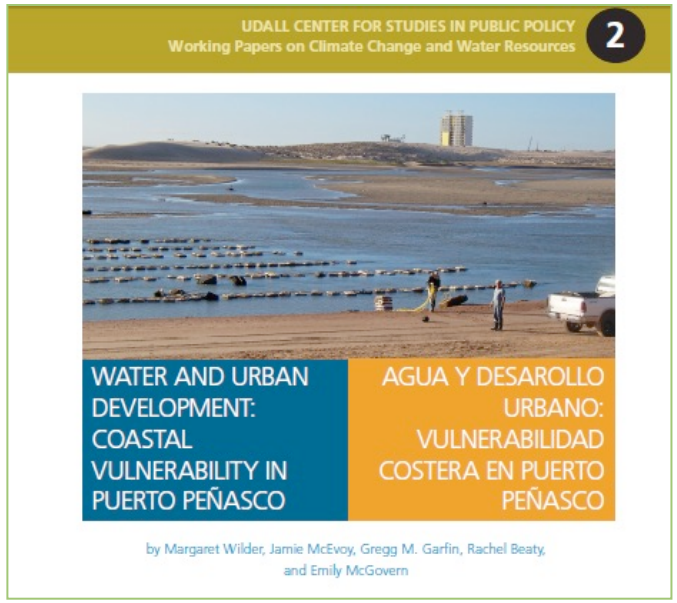
Crausbay & Ramirez et al. 2017, BAMS

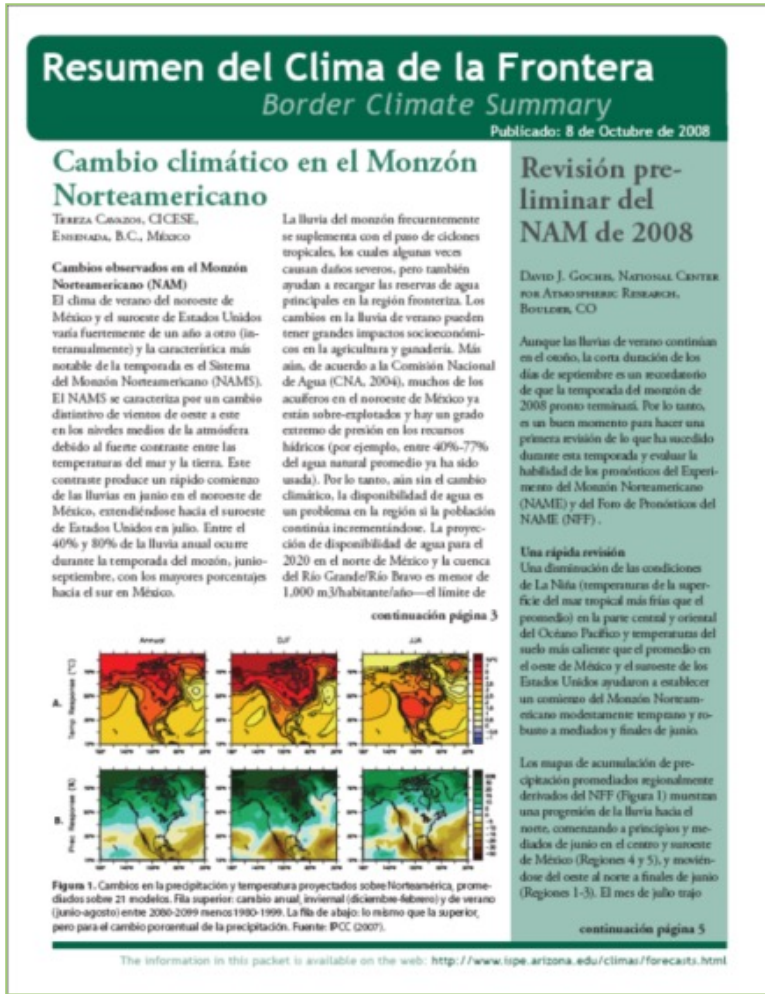
PROPOSED AZ-SON BINATIONAL DESALINATION PROJECT

Source: HDR. 2009. Investigation of Binational Desalination for the Benefit of Arizona, United States and Sonora, Mexico. Final Report.

UDALL CENTER RESEARCH ASSISTANTSHIP

1. Evaluate the utility of climate information
2. Stakeholder workshops to build adaptive capacity
3. Conduct vulnerability assessments






TUCSON
WATER
Tours