



# **Synthesizing Great Plains Social Science: Interdisciplinary Solutions and Responses to Climate Change for Grassland Managers in North Central USA**

Sarah Gonzalez Coffin

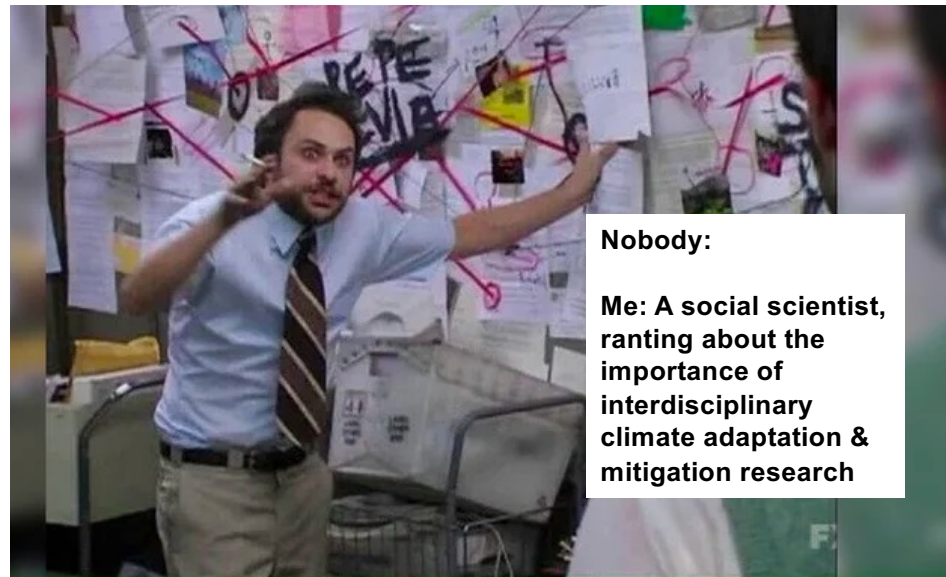
RCAP Summer Research Symposium

August 3, 2023

# Today's Talk

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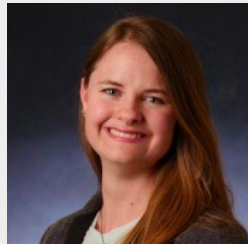
- Project Overview
- Key Findings
- Applications
- Next Steps
- Q&A Session



**Nobody:**

**Me: A social scientist,  
ranting about the  
importance of  
interdisciplinary  
climate adaptation &  
mitigation research**

# Our Team



**Heather  
Yocum**

North Central Climate Adaptation  
Science Center,  
Cooperative Institute for Research in  
Environmental Sciences



**Christy  
Miller Hesed**



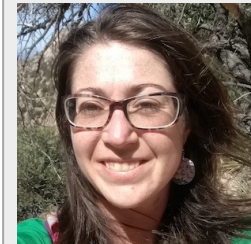
**Sarah  
Gonzalez Coffin**

Psychology &  
Neuroscience,  
CU Boulder



**Creigh Rourke**

Kansas State  
University



**Ashley Gramza**



**Ryan Roberts**

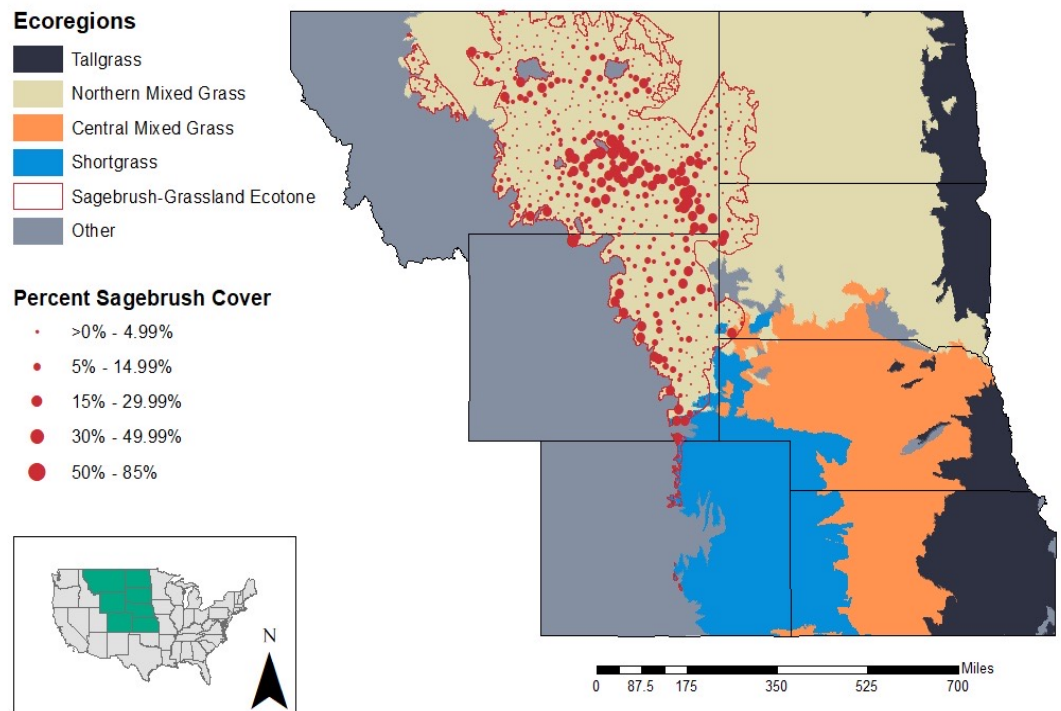
Playa Lakes  
Joint Venture

# Project Goals

- **Synthesize** social science research for the Great Plains
- **Identify Knowledge Gaps** where future research should be directed
- **Review Solutions** and describe how social science insights can be applied to tackle grassland management challenges. Includes solutions from:
  - Community-based research
  - Researchers
  - Practitioners


## Grassland Ecoregions in the North Central Region

(Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Wyoming)



(Miller Hased & Yocum, 2023)

# Ecological Synthesis Identified 15 Information Needs



**U.S. Geological Survey North Central Climate Adaptation Science Center**  
 Prepared in cooperation with the University of Colorado Boulder

**Grassland Management Priorities for the North Central Region**

Section	Information needed
	<b>Direct threat</b>
Grassland loss and fragmentation	1. Where are grasslands most likely to be lost to other land uses?
Grassland loss and fragmentation	2. What are best practices for grassland restoration in a changing climate?
Disruption of historical disturbance regime	3. How will climate change affect disturbance regimes?
Woody encroachment	4. How will climate change impact woody encroachment?
Herbaceous invasives	5. How will climate change impact herbaceous invasives?
Unsustainable grazing	6. How will climate change impact grazing?
Change in water quality and quantity	7. How will climate change impact water quality, quantity, and availability?
Wildlife population declines	8. How will climate change affect animal species of conservation concern?
Conservation on private land	9. How can conservation on private grasslands be achieved?
	<b>Contributing factor</b>
Public understanding of grasslands	10. How can public understanding of grasslands and their importance increase?
Legal and policy drivers	11. What legal and policy changes can support grassland resilience to climate change?
Economic incentives	12. How can grassland protection, enhancement, maintenance, and reconstruction be economically incentivized?
Coordination of actions across agencies, organizations, jurisdictions, and borders	13. How can grassland management be strategically coordinated across agencies, organizations, jurisdictions, and borders?
Availability of useable science and tools	14. How can the accessibility of relevant science and tools be improved?
Frameworks for conceptualizing problems and solutions	15. What novel ways of thinking are needed to successfully manage grasslands amidst climate change?

**Direct Threats**

Where are grasslands most likely to be lost to other land uses?

How can conservation on private grasslands be achieved?

**Contributing Factors**

What legal and policy changes can support grassland resilience to climate change?

What novel ways of thinking are needed to successfully manage grasslands amidst climate change?

**Disciplines**

Anthropology  
 Communications  
 Economics  
 Education  
 Poly-Sci  
 Psychology  
 Sociology

(Miller Hesed & Yocum, 2023)

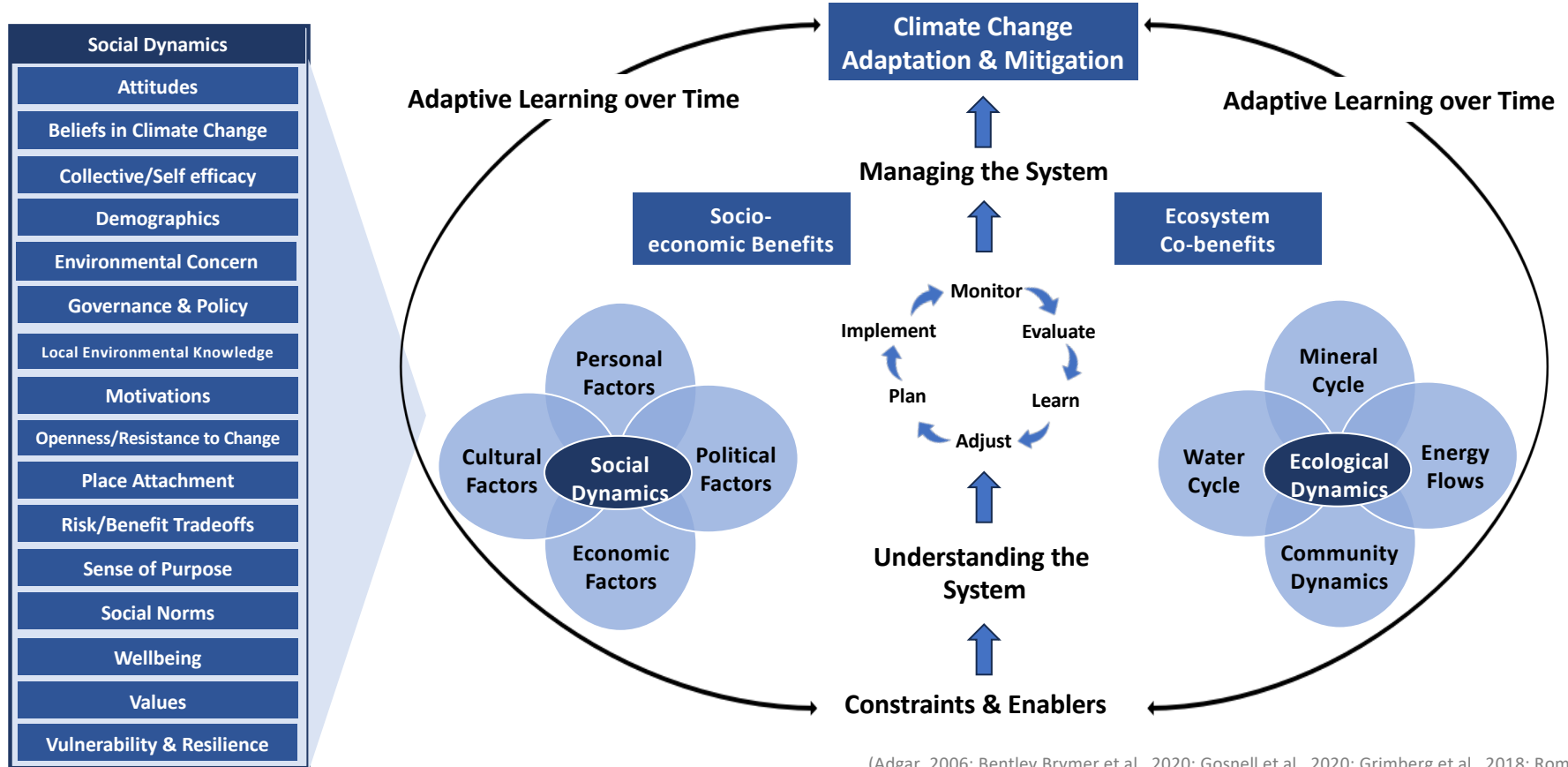


# Stakeholders

- Corporations
- Farmers
- Federal resource managers
- General Public
- Indigenous/Tribal members
- Landowners
- NGO staff
- Pastoralists
- Political Leaders (Mayors, District Court Judges)
- Ranchers
- State resource managers
- Other: Academic or Subject Matter Experts, Conservation Advocates, Recreationists



# Social & Ecological Dimensions of Climate Change Adaptation & Mitigation



(Adgar, 2006; Bentley Brymer et al., 2020; Gosnell et al., 2020; Grimberg et al., 2018; Romsdahl et al., 2019; Sanderson et al., 2018; White & Selfa, 2013; Wilcox et al., 2018)



## Theme #1: Socio-cultural factors related to adaptation and mitigation

### Challenges

- Amenity migration (Abrams et al., 2012)
- Financial sustainability for smaller & intergenerational farmers (Hurst et al., 2017)
- Urbanization (Archer & Lonsdale, 2003)

### Cultural Effects

- Misunderstandings between stakeholders
- Challenges to information sourcing and spread [through trusted networks]
- Political disenfranchisement and concerns with representation
- Transition of land use from production (e.g., farming) to recreation & protection
- Loss of [some] local culture





## Theme #2: Economics

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### Economic Vulnerability

- Vulnerability gap – when optimal well-being is below threshold needed to respond to risks (Adger, 2006)
- In many studies, participants had high **risk perceptions** related to ecological impacts of climate change & their ability to economically bolster against those risks (Hanberry et al., 2019)
- For farmers in particular, reliable income has been a challenge and is being supplemented by other activities, such as hunting.



## Theme #3: Political & Governance Factors

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- **Communication to Citizens.** Mayors in the Great Plains ( $N = 232$ ) who had more positive attitudes towards climate change were more likely to frame climate change adaptation and mitigation strategies as a response to climate change (Romsdahl et al., 2019).
- **Public Concern.** Communication that clearly linked climate change to local response efforts was also higher in towns where citizens were more concerned about climate change (Romsdahl et al., 2019).
- **Land Boundaries.** In Montana, ranchers argued that landowners should have control of their own private properties without government interference on boundaries AND should be able to decide on their own when those boundaries should be blurred to accommodate community goods, like hunting (Yung & Belsky, 2007).
- **Legal Liability.** Prescribed burns can be deterred by liability concerns. In Texas and Oklahoma, District Court judges were surveyed on their attitudes and rulings for prescribed burning. Findings were favorable and judges were more willing to offer simple liability rulings for prescribed burns, over gross negligence (Hinojosa et al., 2020).



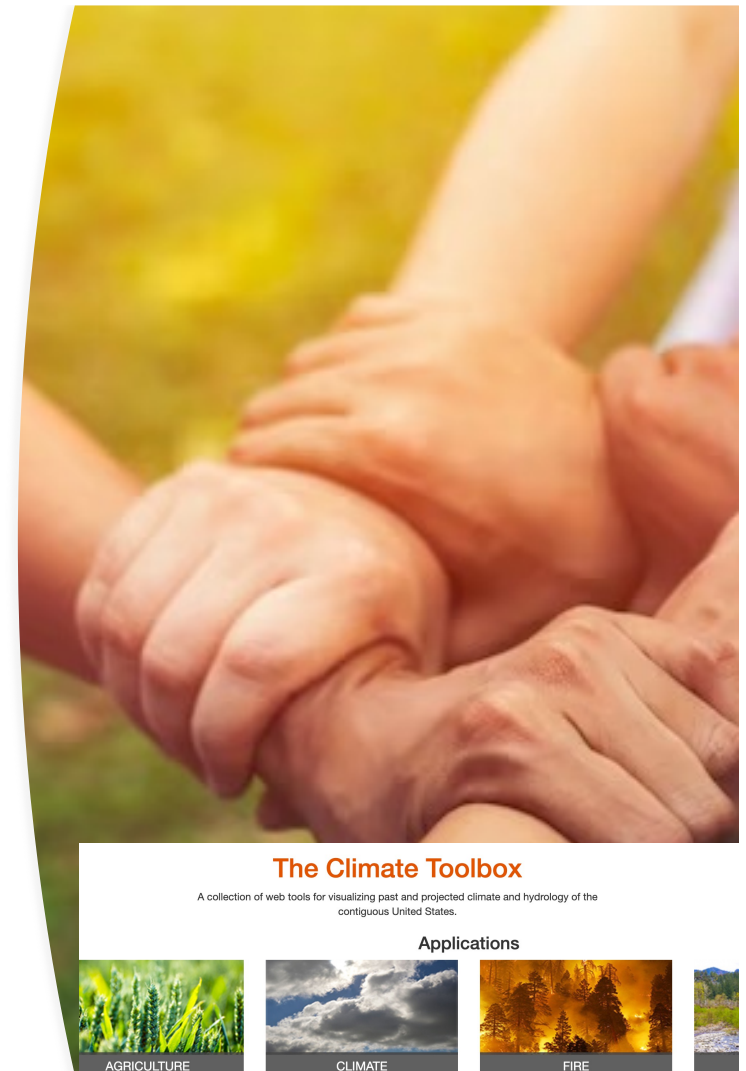
## Theme #4: Broad Solutions & Recommendations

- **Interventions and support to grassland stakeholders will be most effective if they are:**
  - Context-specific
  - Conducted at the local level
  - Acknowledge/emphasize the role of community leaders in setting norms, shaping attitudes, and sharing information
- **Some ways of approaching this might include:**



## Theme #4: Broad Solutions & Recommendations

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  - Acknowledge/emphasize the role of community leaders in setting norms, shaping attitudes, and sharing information
- **Some ways of approaching this might include:**
  - Integrating more community-based research into existing efforts (e.g., existing research findings, ongoing participatory research from the start)
  - Identifying leaders in communities to work with
  - Working at multiple levels of change through avenues such as conservation districts, which are structured at the national, state, district, and county levels
  - Continue to provide stakeholders with information-sharing tools, like the Climate Tool Box, in addition to other efforts
- **Looking forward, we need to:**
  - Broaden research across demographic groups that are underrepresented in both these spaces and the literature itself (e.g., Indigenous knowledge, Latine landowners and workers, women and non-binary farmers/rangers, younger farmers/ranchers)





# Next Steps



NC CASC 2-pager  
**(August 2023)**



Climatic Change

Journal Special Issue  
**(Nov-Dec 2023)**



Initiative on **Climate Adaptation Research and Understanding through the Social Sciences** (ICARUS) Conference  
**(September 2023)**

# Applications



Grassland Managers

Implement social science strategies into management practices



Political Leaders

Adapt community-based solutions,  
add behavioral & structural approaches to ongoing efforts



Community Leaders

Social norms & information sharing  
Grassroots political efforts



Researchers

Fill gaps in literature  
Collaborate across disciplines

Thank you!  
Questions?

