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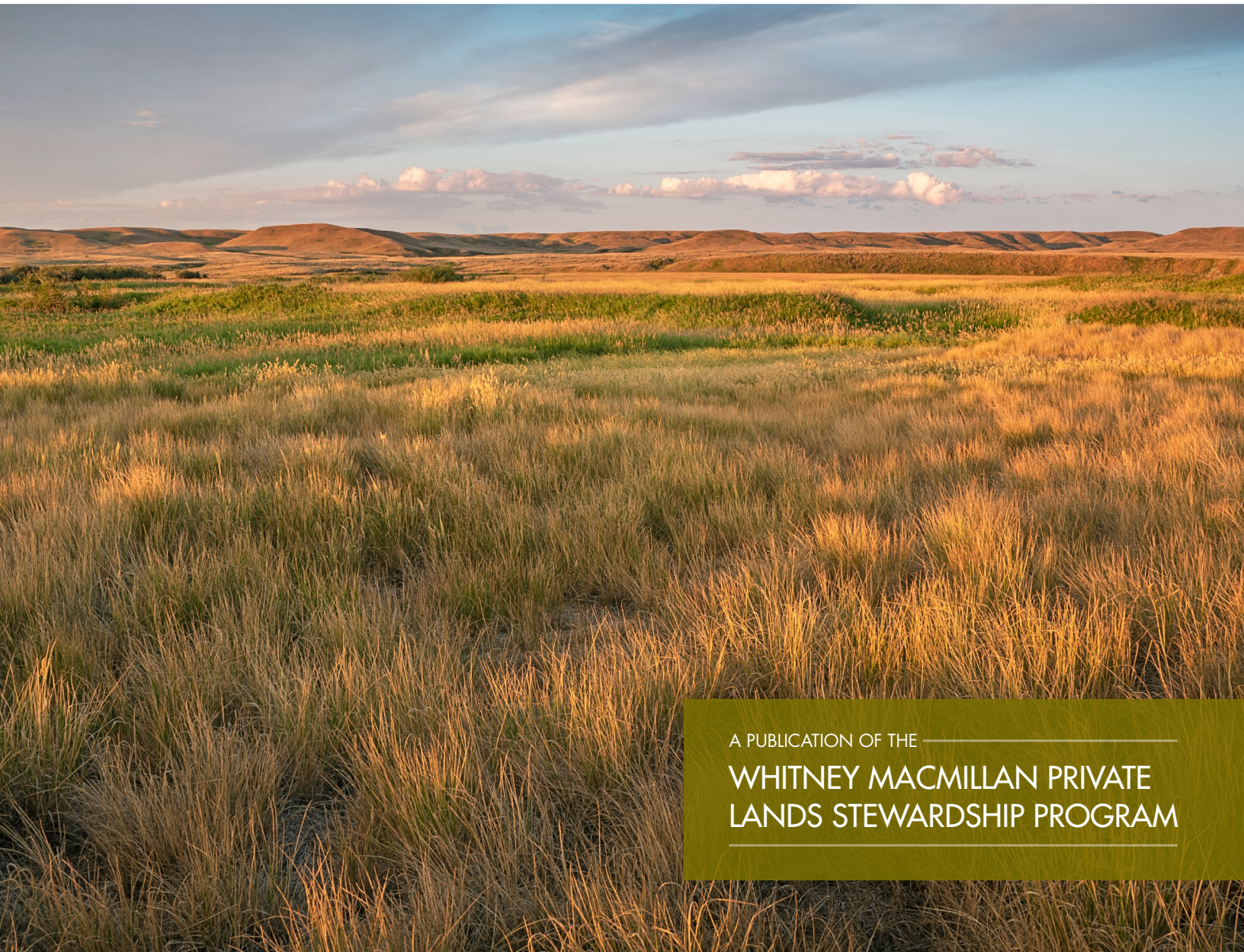
Unpacking the Human Dimensions of North America's Central Grasslands

STAKEHOLDER INSIGHT SCAN WORKSHOP REPORT

Callie Berman[1], Drew Bennett[1], and Jeremy Pittman[2]



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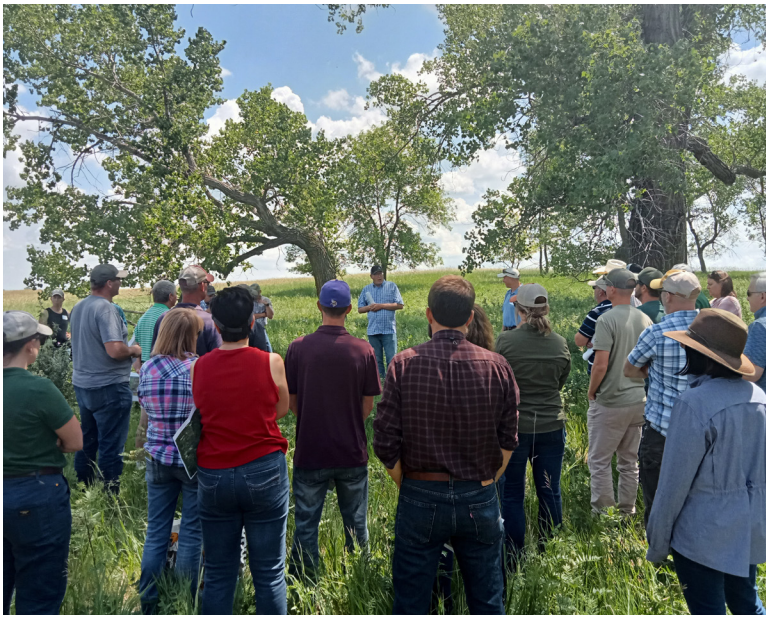
Executive Summary

This study examines the social dynamics underlying grassland conservation efforts to identify enhanced conservation approaches in North America's Central Grasslands. We used an adapted Delphi method to solicit expert perspectives from 29 diverse stakeholders representing the eight sectors identified by the Central Grasslands Roadmap. Through a series of online workshops and SWOT analyses, we mapped stakeholder connections and identified barriers to desired grassland outcomes.



Through this research, we uncovered four main themes. First, siloed organizational structures often lead to cross-purpose policies and decision-making, hindering effective conservation efforts. Second, relationship-building proves crucial for successful conservation, particularly when engaging with tribal nations and diverse landowner types. Third, conservation strategies must connect with non-livestock producers and non-traditional landowners to ensure comprehensive approaches. Finally, conservation efforts must account for the varied local complexities across the grasslands.

While collaborative processes are increasing, significant challenges remain in developing and funding long-term relationship-building capacity. Stakeholder participants emphasized the importance of moving beyond project-based targets to understand diverse perspectives and interests. They highlighted the need for more integrated approaches that bridge siloed agency structures and foster cross-sector collaboration. Participants identified the Central Grasslands Roadmap as a valuable platform for stakeholder connection and starting point for discussing conservation ideas, though they raised concerns about funding and local implementation.

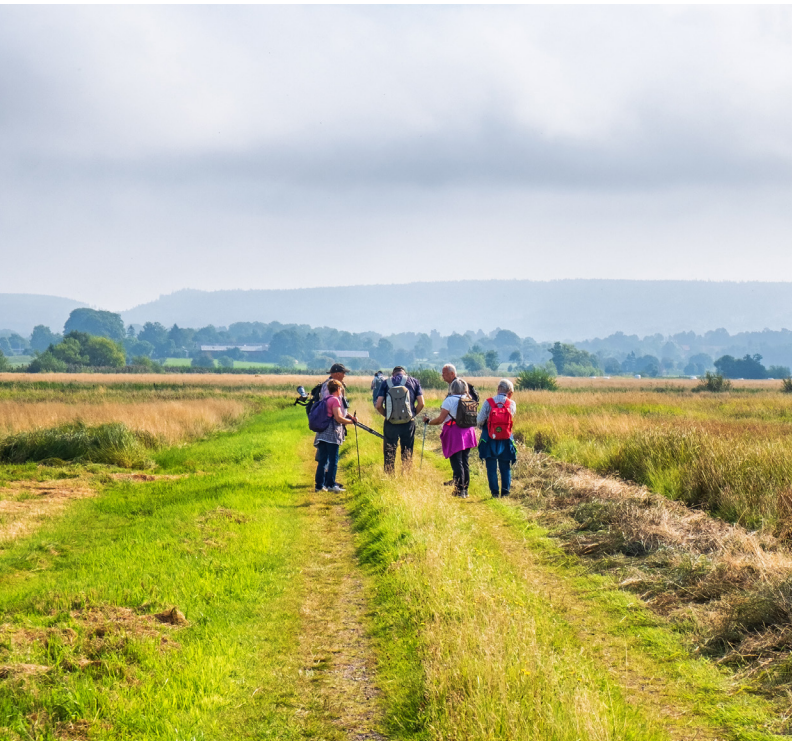
The study underscored the importance of meaningful tribal engagement and the need to expand conservation efforts beyond traditional livestock producers to include diverse landowner types. Stakeholders also stressed the necessity of flexible, locally-adapted conservation strategies that account for on-the-ground complexities. The challenge in devising conservation approaches appropriate for local realities, in large part, is due to a lack of frameworks and metrics which can direct funding appropriately to diverse on-the-ground dynamics.

Looking forward, we identify two key areas for future study: developing frameworks to assess co-benefits between rural community health and grassland ecological integrity, and examining household-level decision-making factors in land-use changes.

This research highlights the critical role of social science in addressing the complexities of grassland conservation. By engaging with the diverse human interactions across the landscape, social science can contribute to frameworks and metrics which quantify the value and conservation benefits derived from social relationships and relationship-building. By understanding and leveraging social dynamics, conservation practitioners can design more inclusive, effective, and resilient efforts in the face of complex social-ecological challenges. The findings provide a foundation for conservation professionals to develop strategies that align with the diverse needs and perspectives of grassland stakeholders.

Introduction

Grasslands historically dominated much of the North America yet today are one of the most threatened ecosystems on the planet (Bardgett et al., 2021; Hoekstra et al., 2005). Despite an established natural sciences knowledge base regarding the importance of grasslands for supporting high levels of biodiversity and maintaining key ecological functions (Bengtsson et al., 2019; Guo et al., 2023; Liang et al., 2021; Squires et al., 2017; Suttie et al., 2005) research also shows that human activities continue to degrade grasslands at an accelerating rate (Gibbs & Salmon, 2015; Lark et al., 2020; World Wildlife Fund, 2022). Although human actions drive many threats to the grasslands, social sciences for investigating the human dimensions of conservation pathways for the biome have received considerably less attention than the ecological and natural sciences. Therefore, sustainable use of the grasslands requires systems of management which attempt to reconcile social, ecological, and economic dimensions.



While there is growing consensus on the need to involve diverse stakeholders in grassland land use practices and conservation management, a major challenge to sustainable and resilient grasslands is designing systems of use which can cope with the complexity originating from different stakeholder positions and values alongside changing environmental conditions. Individual stakeholders across diverse organizations, rural communities, and industries interact in multifaceted ways across sectors (sub-groups in possession of shared resources, interests, perceptions, affiliations, and/or amounts of influence (Carlsson & Berkes, 2005). Stakeholder analysis then allows for assessing how exchanges across inter-sectoral networks of relationships transmit information, generate ideas, reinforce and reshape values, and communicate to reach consensus. From this perspective, social interactions provide empirical insight into the tradeoffs made between multiple actors in the grasslands, as well as how consensus is built through communicating ideas and organizational priorities. By considering the social feedback mechanisms, types of social exchange and reflexive learning processes between stakeholders in the grasslands, social science can highlight areas of strength, missed opportunity, and gaps across stakeholder relationships for achieving sustainable and resilient grasslands.

With this research gap and the need to link social phenomena with ecological changes and concerns in the grasslands, this study drew from the stakeholder sectors identified in the Central Grasslands Roadmap to conduct an adapted Delphi study[1]. Through a series of online discussions, participants were engaged in both semi-structured, focus group-style discussions as well as a SWOT (Strengths-Weaknesses-Opportunities-Threats). Analysis of focus-group discussions and the SWOT activity allowed for complementarities and

[1] The Delphi method is based on soliciting input from stakeholders and experts through multiple rounds of either group discussions or questionnaires. After each round, participants are presented with summaries of previous sessions to adjust their answers according to the group responses. The Delphi approach allows for reaching group consensus and establishing group opinions amongst interested parties on a specific topic or issue (Mengak & Dayer, 2020).

divergences between stakeholder sectors to assess the ways in which stakeholder connections enable more robust grassland protection mechanisms through consensus-building and reflexive learning.

The objective of this study was to map grassland stakeholder connections which enable greater retention of native and resilient grasslands the grasslands, as well as where relationships (or a lack thereof) create barriers to desired grassland outcomes. Because the majority of social science research in the grasslands are more localized case studies, or focus on specific policy, this study employed an inductive, exploratory approach to examine stakeholder relational dynamics at the broader systems level. The aim of this report is to distill these insights to be accessible to conservation practitioners, funding bodies, agencies, and grassland community members. The findings are organized into four main themes in this report.

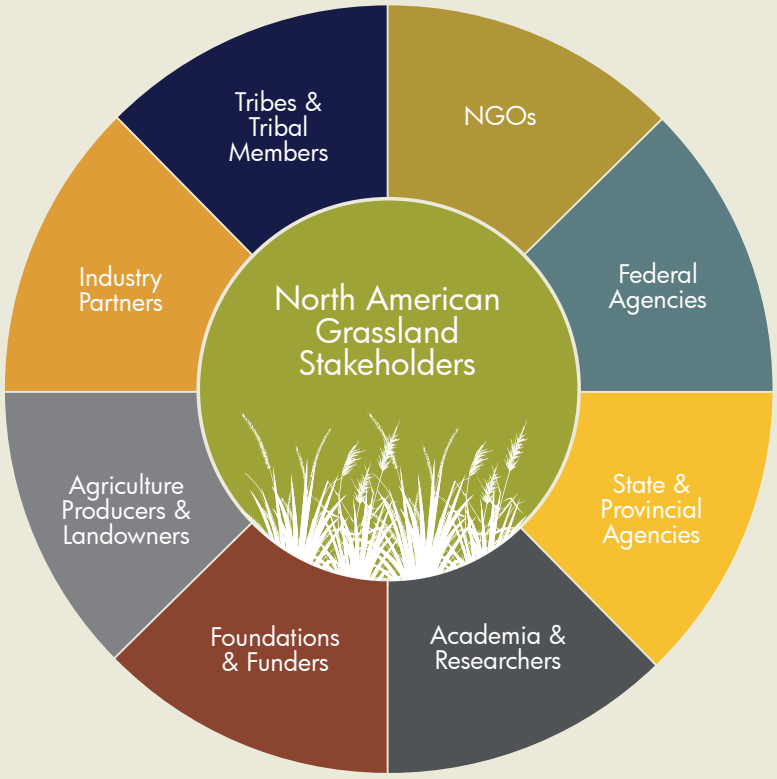


Figure 1: Categories of stakeholders in the North American Grasslands identified by the Central Grasslands Roadmap

Approach

This study was inspired by the Delphi method and adapted this approach to conduct a stakeholder insight scan and iteratively engage experts in the grassland system. While the natural sciences have informed and provided valuable insights into ecological aspects of the biome, better understanding and planning for the diverse potential development trajectories of the grasslands requires engaging with the human components of the system through the social sciences (Manfredo et al., 2021).

Using the Central Grasslands Roadmap, we solicited experts from across each of the eight identified roadmap sectors shown in Figure 1.

By treating stakeholders as experts within their respective sector, participants engaged in a series of sequentially-developed, semi-structured discussions to generate a broad scan of grassland stakeholder relationships (the connections and ways in which individuals from various sectors may or may not communicate, coordinate and collaborate with individuals from other sectors), as well as the factors which make these relationships more robust and productive. Participants convened for a two-phase, online workshop, each lasting roughly 1.5 hours, between February – April, 2024. We recruited individuals via direct email and through the Central Grasslands Roadmap's e-newsletter. A total of 29

STAKEHOLDER SECTOR	NUMBER OF PARTICIPANTS
Industry Partners	3
State & Provincial Agencies	2
Federal Agencies	4
Foundations & Funders	3
Landowners & Agriculture Producers	2
Tribes & Tribal Members	4
Academia & Researchers	4
NGOs & Conservation Organizations	7

Table 1: Stakeholder representation for the workshop from each of the eight Central Grassland Roadmap stakeholder sectors.

individuals participated in the process and represented the sectors shown in Table 1.

We sent registered participants a brief electronic questionnaire to learn what their primary concerns were for the grasslands over the coming year, as well as the next five years (Appendix I). This questionnaire was used to prime discussants during the first session of the workshop, as well as identify the presence of significant sources of change which could be considered in the post-workshop analyses. The first phase of the workshop (Session 1) consisted of eight separate recorded sessions with participants of the same stakeholder sector. Eleven questions, posed individually to the group using semi-structured facilitation methods (see Appendix II), generated responses which were analyzed for recurring themes with the most prominent detailed in the Discussion. These responses from Session 1 were summarized into a two-page report and sent to all participants as a primer for Session 2 of the workshop (Appendix III). Session 1 key themes were used to build a SWOT matrix (Strengths-Weaknesses-Opportunities-Threats) to guide discussions for Session 2.

Three individual meetings for Session 2 were held. Session 2 groups consisted of mixed stakeholders in order to engage participants with other grassland stakeholder perspectives. Findings from Session 1 were presented back to each group in the form of a pre-filled SWOT diagram (Figure 2). Following the SWOT method, stakeholder relationship elements and dynamics identified from Session 1 were framed in terms of strengths and weaknesses insofar as their ability to create resilient outcomes in the grasslands. These strengths and weaknesses were then discussed in terms of resilient outcomes insofar as how they could be leveraged for creating opportunities and minimizing threats. The pre-filled SWOT diagram acted as a prompt for discussants to react to how each element was categorized and whether participants potentially viewed something as a threat or opportunity or vice-versa. Discussions from Session 2 were synthesized with those from Session 1 to capture key features and dynamics of stakeholder relationship dynamics in these grasslands and are presented in Results.

We supplemented findings with a literature review to provide context and additional support for the themes identified. These findings are organized into four sections and are elaborated on in the Discussion section.

University of Wyoming's Institutional Review Board reviewed the study and determined it was not human subjects research requiring an approved ethics protocol.

Results

SWOT Analysis

Participants described a range of ideas and processes shaping grassland stakeholder relationships – both within and across the sectors defined by the Central Grasslands Roadmap. These were broadly categorized as

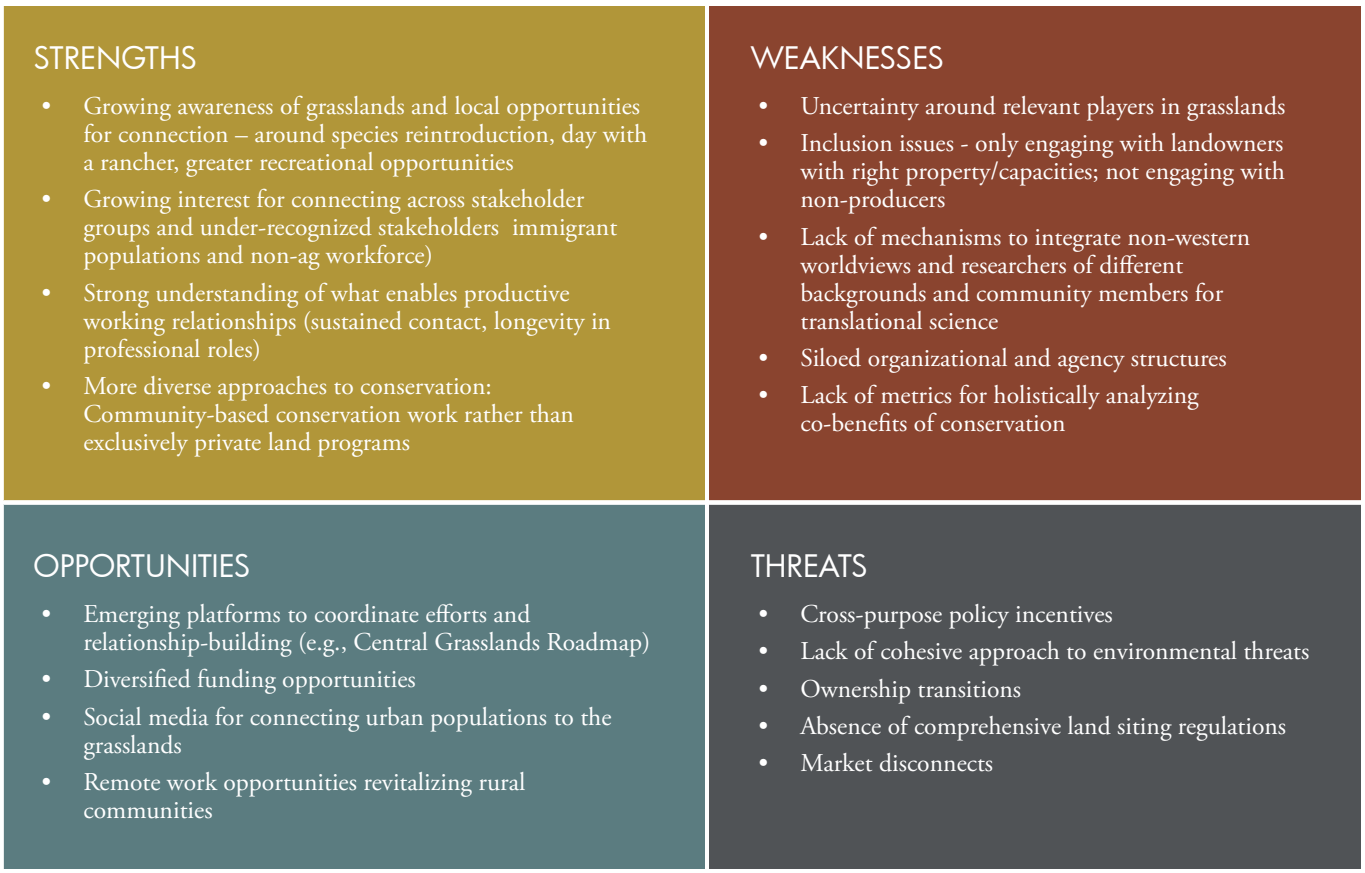
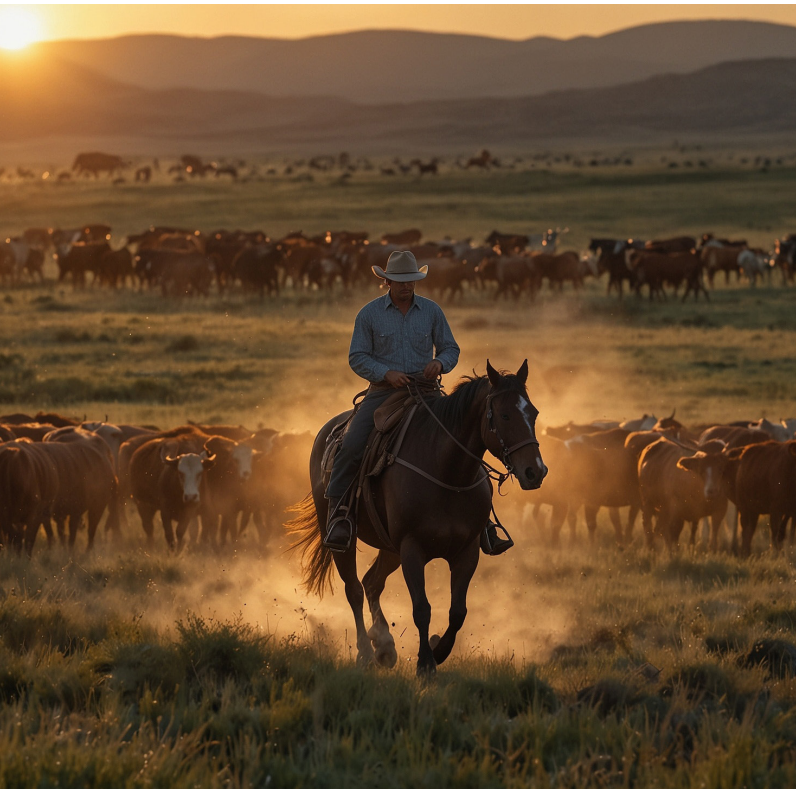


Figure 2: SWOT diagram produced based off key themes which emerged from Session 1 across eight stakeholder group discussions).

strengths, weaknesses, opportunities, and threats to facilitate discussion during Session 2 and are shown in Figure 2.

Strengths

A key strength for grassland resilience was the growing emphasis on collaborative processes and interest in incorporating more diverse stakeholder perspectives. This interest was understood to be a strength, rather than a weakness, for how it disseminated information across more networks, enabled social learning, worked to harmonize management approaches, and promoted cooperation rather than conflict. With the understanding that well-managed grasslands can provide wide-ranging benefits - from provisioning key ecosystem services such as carbon sequestration to wildlife habitat to sustainable ranching operations, achieving these benefits requires cooperation across property boundaries and between different groups. Therefore, processes enabling these outcomes were accorded high value by stakeholder participants. Multiple stakeholders, from NGOs to producers to tribal representatives, emphasized the need for more landscape or watershed-level management approaches which went beyond western scientific worldviews and the role of building partnerships to share knowledge and information to enable this. Similarly, the push for more integrated planning (particularly around renewable energy siting), policy alignment, and market-based incentives which work at larger scales described by participants all point towards the need for building relationships across diverse perspectives and types of expertise. While formal procedures for integrating renewable energy siting and areas of conservation value have not yet been established, participants shared how growing awareness and conversation around this need create a strength which can be leveraged as an opportunity.



Weaknesses

Participants identified the most significant weakness in grassland resilience as the challenge in funding the capacities for long-term relationship-building. Without dedicated resources and longer-term commitments, establishing trust and rapport across various stakeholders and land ownership boundaries becomes challenging. Grassland management often requires long-term commitment, but high turnover in agency and NGO positions disrupts continuity and impedes collaborative efforts. As one NGO stakeholder noted, "It may take ten years to develop relationships with communities, but these are not reflected in metrics you can build into grants, funding applications, and report outputs."

Efforts to broaden participation and ensure equitable engagement necessitate dedicated time and resources for outreach and relationship-building, which participants emphasized are notably lacking. Another significant weakness is the fragmentation of land ownership, management approaches, and policy incentives. Many stakeholders highlighted the difficulties in coordinating across a "complicated mosaic of private, public, and tribal lands" with divergent objectives and constraints. Concerns were also expressed about land transfers leading to increased corporate ownership or conversion to cropland, driven by misaligned economic incentives.

Opportunities and Threats

Sources of strength for stakeholder relationships were offered as a means to harness opportunities for more resilient outcomes in the grasslands. Similarly, participants discussed pathways for addressing weaknesses to minimize threats across the larger grassland system. By and large, collaborative approaches funded over longer timeframes which brought together diverse interests would not only facilitate more comprehensive and effective land management strategies - particularly around invasive species, wildlife migrations and water distribution - but establish metrics reflecting co-benefits of grasslands when managed for wildlife, people, and the environment. The bedrock for tackling primary threats in the grasslands was consistently discussed in terms of relationships which could support more well-informed conservation approaches and provide more convincing evidence for policy aligned with diverse and sustainable use of the grasslands. Another potential for mitigating grassland threats arising from cross-purpose policy was harnessing social media to address gaps in understanding and appreciation. Particularly among urban populations workshop participants discussed the potential of voting populations support representatives who advocate informed decision-making about land use and development in the grasslands. By not adequately funding these relationship-building activities, opportunities for knowledge sharing, conflict resolution, and coordinated action are missed, ultimately weakening the resilience of grassland ecosystems and the communities that depend on them.

Emergent Themes

Four prominent themes emerged from the workshop session discussions.

The overarching findings from this study spoke to the siloed organizational structures reinforcing conservation approaches which do not lead to desired outcomes as

well as an appeal for greater understanding of different stakeholder needs and interests through relationship building work which goes beyond project-based targets. This section organizes these insights into the following four prominent themes which emerged from the stakeholder discussions:

a) siloed structures can result in cross-purpose policy and decision-making

b) the significance of relationship building with a subcomponent on tribal engagement,

c) connecting with non-livestock producers and non-producer landowners to ensure diverse grassland land users are factored into conservation design and strategy, and

d) the need to account for local complexities which vary across the landscape.

Siloed Organizational Structures and the Need for Integrated Approaches

Conservation in the central grasslands is typically implemented in a highly programmatic and siloed manner. Much of this is attributed to the nature of each agency's founding history and evolution which condition particular organizational structures. Study participants conveyed a strong desire for greater understanding of different perspectives and interests through relationship building that goes beyond project-based targets within confined agency or organizational structures.

The U.S. Fish & Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), the Bureau of Land Management (BLM), and U.S. Forest Service (USFS) are the four main federal agencies present on the grasslands working in conservation spheres. However, the origins and evolution of these agencies have created a path dependency to shape the agencies' priorities, expertise, and approaches to conservation and resulted in siloed agency cultures and structures. For example, one of the founding objectives of the USFWS is managing wildlife refuges given its historical roots in game management and their statutory responsibilities under the Endangered Species Act (ESA). In contrast, the NRCS, which administers Farm Bill conservation programs and evolved out of soil conservation service from the Dust Bowl era, works with landowners to implement conservation practices on private agricultural lands.

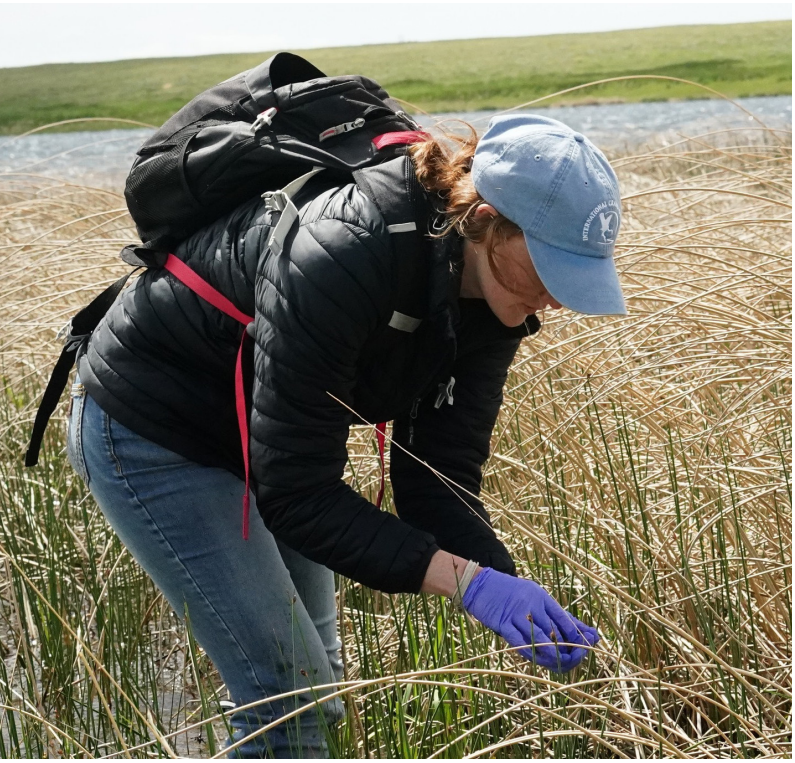
While each agency has a history of demonstrated success, the increasingly dynamic and overlapping interactions between human and environmental elements in grassland conservation work is challenging the compartmentalized agency structures.

Siloing, or the compartmentalization of departments or units with limited cross-functional communication and collaboration (Cilliers & Greyvenstein, 2012), presents significant challenges to conservation work in grasslands and leads to inefficient resource use. This organizational fragmentation creates barriers between agencies responsible for different aspects of grassland conservation, such as wildlife protection, land use planning, and agricultural policy. When agencies responsible for different aspects of grassland management—such as wildlife protection, land use planning, and agricultural policy—work independently, they can duplicate efforts, implement conflicting strategies, and miss opportunities for synergy (Guerrero et al., 2015).

While there may be some high-level discussion between these agencies, they are embedded within different

federal departments and primarily operate according to their own mandates, funding streams, and organizational cultures ((Jacobson et al., 2022; Schweiger et al., 2018). Despite the interconnected nature of grassland ecosystems, species, and human communities that depend on them, this siloed approach constrains strategies which can keep pace with the growing suite of social, ecological and economic developments in the grasslands and reinforces compartmentalized conservation efforts rather than holistic, landscape-scale approaches.

Siloing, or the lack of cooperation and coordination, has been an area of concern between federal and regional institutions (Cilliers & Greyvenstein, 2012; Jacobson et al., 2022), participants across NGO, tribal, industry and academic stakeholder groups expressed a lack of coordinated efforts to keep pace with diverse and multifaceted change in the grasslands. Several participants noted how this overarching siloed approach to conservation in the grasslands stemmed from the institutional evolution and regulatory structures within government agencies. As one federal agency participant noted, "We have all these great programs and dedicated people, but it feels like we're all working in our own little boxes instead of tackling the big picture together." Yet without opportunities to understand policies or organizational realities of other agencies, their decision-making culture or mandates, a state employee stakeholder commented, "many conservation practitioners remain stuck in their one thing." Moreover, with hierarchical leadership styles, rather than leadership based on collective input, many federal and state participants noted how structural reform remains difficult.



De-siloing then, or overcoming the 'silo trap,' aims to break down the barriers that prevent federal, state and local stakeholders/agencies from achieving conservation action in a coordinated and effective way. Participants generally viewed de-siloing in terms of investing in human capacities to foster relationship-building and enable staff to work across traditional boundaries. In the context of discussing these needs for de-siloing to their board members one NGO participant conveyed, "We need to move beyond just counting acres enrolled or species protected and start measuring how well we're working together to create resilient landscapes." Despite widespread recognition for the need to de-silo amongst workshop participants, considerable barriers remain. With high turnover in many agency staff and growing procedural requirements, conservation projects become strained with limited capacity for incorporating interdisciplinary approaches or collaborative solutions. Reflecting on the nature of tribal agency structures, one tribal stakeholder participant remarked,

> *There is very little that ties us together – there is wildlife then there is range, then water. Tribal agencies inherited this agency structure too. We need a kind of restructuring of existing programs to be more integrated to see the larger whole rather than just individual pieces. But for that to happen there needs to be an organizational shift with somebody dedicated to seeing it through. It is a paradigm shift of how structures should be created and maintained.*

The success of de-siloing then depends on a shared commitment among partners to sets of conservation objectives derived from diverse perspectives and sources of information and incorporating them into planning and project design. Addressing dynamics which reinforce limited exchange of information

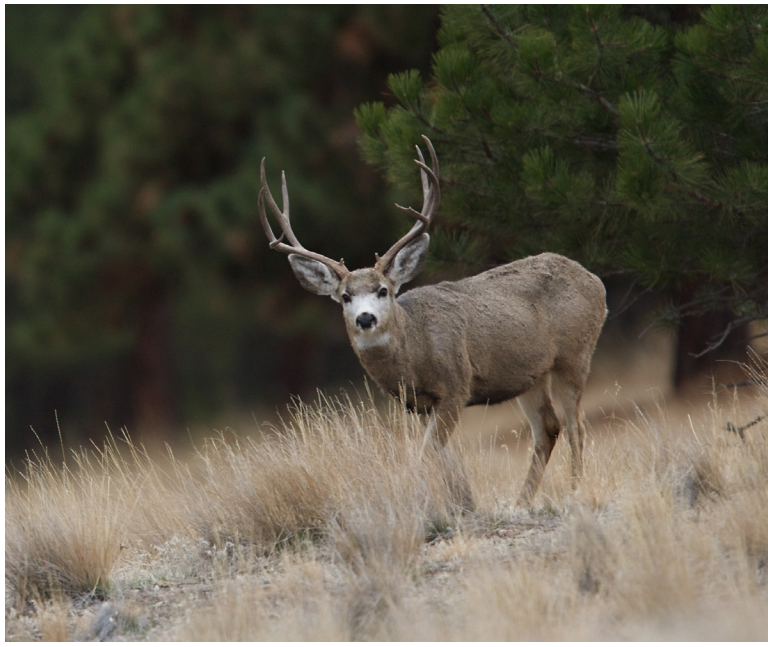
and collaborations across staff in different units or organizations can be supported through more coordinator roles and team-building across broad conservation initiatives. While discussing the potential of coordinating roles a NGO stakeholder participant commented,

> "there are few points for synergy in formal work projects and it is mainly individuals taking personal interest at this point. But these personal efforts only go so far. You need someone really bird-dogging these things along to share the information and supported institutionally for any changes to be made."

By increasing the presence of individuals tasked with staying abreast of ongoing activities and issues to work across agency and stakeholder structural boundaries, it increases opportunities for collaboration and maintaining common understanding across diverse actors in the landscape. While coordinators can initiate and help sustain cross-unit coordination in conservation agencies and across stakeholder groups, it is ultimately a joint responsibility that must be acknowledged by all stakeholders investing in grasslands conservation efforts.

Emerging organizations with visions for greater coordination across stakeholders in the grasslands offer an antidote to the ongoing siloed nature of conservation in the grasslands according to workshop participants. Across all workshop sessions, participants frequently referenced the Central Grasslands Roadmap (Roadmap) as a valuable platform to connect stakeholders around a commonly agreed-upon geography. Given the expansive geography of the grasslands, as well as diversity of voices and interests residing in the biome, the Roadmap is viewed as a welcomed mechanism for relationship-building and creating a neutral ground for connection. Particularly given current challenges of high turnover rates and pressure for many conservation professionals in agencies to deliver short-term results, one participant imparted how the Roadmap created a foundation for co-design, from project targets to visions for the grasslands.

However, while useful for providing a bird's eye view of the grasslands and connecting stakeholders, the issue of funding was raised as an uncertainty for the Roadmap.



By developing its own set of targets and objectives to measure without funding directly tied to them, participants voiced that building on and applying strategies developed through Roadmap collaborations could be challenging. Other participants raised the need for devising ways to pare down the Roadmap to each state so that high-level discussions could be made meaningful locally. Given the presence of diverse conservation organizations on the landscape, the unique structures and make-up of local and regional conservation groups can be leveraged strategically to scale down larger landscape level ideas formulated within the Roadmap. For example, the Joint Ventures (JVs) operating in the grasslands (e.g., Northern Great Plains, Playa Lakes) can help play an important coordinating role and fill capacity gaps of grassroots partners. Despite any concern of scale or trajectory, all workshop participants agreed that the Roadmap is an invaluable resource for developing a shared sense of future.

In spite of the known obstacles of operating within siloed structures, growing local challenges such as drought and wildfire in recent years have driven individuals to try and devise ways to work around institutional barriers. One novel idea proposed by a participant was for training opportunities between city councils, local emergency departments, and landowners in order to increase awareness over the

role of livestock grazing in fire mitigation, as well as the benefits of prescribed burns. Such exchange opportunities not only lend themselves to cultivating and strengthening relationships, they help direct resources to cooperative planning processes and reduce replicating efforts. Ultimately, affording opportunities for inter-stakeholder relationships can better align resources and chip away at limited communication between agencies and conservation professionals to better balance conservation alongside diversifying interests and change in the grasslands.

The Importance of Relationship-building

Conservation and practices that work to balance the needs of people and nature are underpinned by relationships. A guiding theme throughout the stakeholder discussions was the importance of relationship building and partnership as a pathway for ameliorating siloed structures and to remain informed of diverse stakeholder interests and concerns for effective grassland conservation. While the form of these relationships varies (between agency staff to landowners, foundations and industries to NGOs, agency representatives to tribal communities, etc.) they can be treated as a common unit by being connected to the grasslands. By investing in people and human capacities, it creates greater spillover potential for new partnerships and points of exchange to gain wider contextual perspective. Yet resources and funding dedicated specifically for cultivating relationships have not been well-developed or are not clearcut. In large part, this is due to a lack of established frameworks and metrics by which conservation outcomes can be clearly linked to relationships. Without a clear means for linking targeted environmental outcomes to relationships, funders, NGOs, and agencies are limited in justifying spending on relationship-building.

Under the current funding paradigm for conservation, projects prioritize quantifiable outcomes (e.g., acres conserved, species populations) over investments in human relationships and capacities. However, stakeholders argue that this approach fails to capture the complex social dynamics underlying successful conservation efforts. In the context of discussing largescale development proposals in the grasslands and accounting for these in projects one NGO participant shared, "project level work leads to a kind of myopia of what we can actually see and focus on or have the bandwidth to do and we often miss the bigger picture." The challenge then is how to incorporate relationship-building work into funding models and value them as key outcomes. One of largest bottlenecks to this process arises from not having well defined metrics to assess and value relationship building in conservation project work.

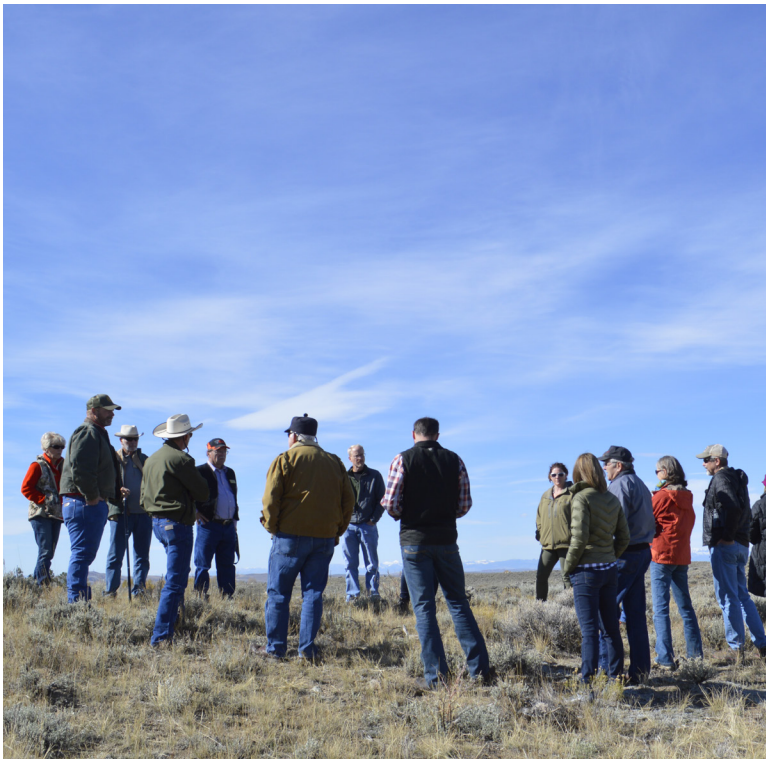
Participants consistently emphasized that successful conservation efforts rely on strong, trusting relationships between diverse stakeholders, including government agencies, NGOs, private landowners, tribal nations, and local communities. Yet the majority of workshop participants revealed little connection with several stakeholder categories, namely industry and tribes & tribal nations. Possessing some mode of connection across all major land users in the grasslands to understand one another's interests and concerns is key for successful conservation design from the view of workshop attendees. Because conservation challenges in the grasslands will continue to require sustained efforts over many years or decades, durable relationships of a commensurate degree must be in place to match the need. Enduring relationships build the seeds of trust between stakeholders, something particularly important for those historically marginalized by the conservation process. One participant reflecting over her twenty-seven-year career in a state agency expressed how the most successful projects they had been involved in were ones "we invested in building relationships with local communities over years. When a new opportunity or challenge comes up, we already have that foundation of trust to work from." Although nurturing relationships requires longer timescales and has less easily quantified effects, these relationships are an important resource to cope with the fast-changing social and ecological realities in the grasslands. By remaining connected across more diverse actors in the landscape, the timing, sequence and type resources can be allocated more effectively.

The most prevalent topic of ecological change in the grasslands raised across all workshop sessions was conversion of grasslands to cropland. With

the grasslands, and particularly the Northern Great Plains region, poised to potentially undergo significant land ownership reconsolidation from new landowner interest, succession, alongside conversion to cropland, several workshop session discussions explored the role of leveraging relationships to contend with these multifaceted change sources in the grasslands. Central to these discussions was the need for not overly investing in one strategy for the grasslands, be that in community development or policy reform. Instead, by investing in relationships, particularly with under-represented stakeholders and producer types not generally seen at the conservation table, individuals and organizations can be networked across a broader range of perspectives and knowledge bases to better plan across future scenarios, whether those changes arise from policy to ecological factors. In effect, through new relationships, more diverse perspectives can be brought to the table to raise the profile of important substantive issues not previously considered.

In the context of relationship building, developing connections with stakeholders while physically in the grasslands and including stakeholders with observational knowledge of the local ecology was given high value. As one foundation representative shared, "when we worked with academics and practitioners who took the time to really get to know the ranchers in our area, not just as 'targets' for our programs but as people with deep knowledge of the land, we were able to co-create much more effective and locally appropriate conservation strategies." Relatedly, several agency representatives described the need to build relationships with landowners across diverse operation types and property sizes. With many producers either leasing large plots of land or not owning large parcels adjacent to high conservation value areas, grassland conservation becomes checkerboarded according to those in possession of property with sufficient conservation value or not.

With relationship building and partnership as a strategy to address siloed institutional structures and barriers to exchange between stakeholders, workshop participants were asked what factors were most significant to enhancing partnerships and relationship-building efforts. Given the geographic extent of the grasslands and the current nature of widespread remote work for many stakeholders, there was considerable consensus for opportunities for more



in-person gatherings and field visits to facilitate personal connections. Large convenings of stakeholders, such as the America's Grassland Conference and Central Grasslands Roadmap Summits, where thoughtful groups of stakeholders were assembled were seen as very productive opportunities to connect by workshop attendees. What's more, many conservation professionals face growing pressure to deliver short-term results, leaving little time for relationship-building. Gatherings of relevant actors as a time for project discussion, as well as informal conversation around meals, help accelerate the relationship-building process.

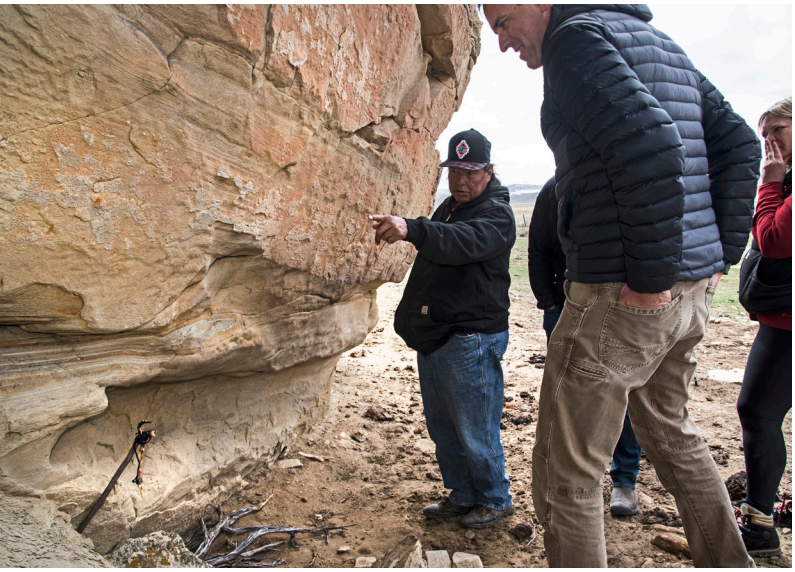
To address the challenges associated with relationship-building work, participants suggested revising funding models as the most important step towards this end. With the current funding model oriented towards funding outcomes, rather than human capacities, stakeholders are not directly supported in their relationship-building efforts. By building on the growing recognition and scientific literature documenting the importance of relationships in conservation, funding should value relationships (new and enhanced) as key targets and outcomes in and of themselves. One action in this direction can be

integrating relationship-building metrics into project evaluation which track the number of relationships cultivated, the extent to which projects connect new and diverse stakeholders, and/or quality of relationships based on input from project collaborators. After lengthy discussion, there was widespread consensus between stakeholder participants that although funding agreements for relationship-building is challenging, but that there is a need for qualitative metrics which carry equal weight to quantitative to go beyond only considering grasslands conservation as a matter of acres conserved or number of species of birds to conservation in terms of the quality of human relationships within it.

Engaging with Tribes

A critical aspect of relationship building for more robust grassland conservation is meaningful engagement with tribal nations, especially since tribes caretake a sizeable portion of the biome and have deep cultural and spiritual connections to its landscapes. Participants emphasized that effective tribal engagement goes beyond mere consultation to true collaboration and recognition of tribal sovereignty. While each tribe has their own governance structures, culture and social characteristics, invitations for productive conversations and equal participation in conservation policy and planning remain limited.

Several participants that are members of grassland tribes expressed how western science continued to view tribal approaches to and connections with the land on unequal footing. For tribal participants, the issue was in grassland partners failing to demonstrate an understanding of tribal sovereignty. The notion of tribal sovereignty entails understanding that tribes not only have a right to be heard and need to be afforded the opportunity to be heard, but also necessitates that federal and state entities recognize their mandate to consult tribes as governments with their own decision-making authorities. Summarized by one of the tribal stakeholder participants, "tribal sovereignty is being able to say state, federal, private landowners and tribes in the same sentence and having tribes in people's vocabularies when they talk about partners. When instances of "us versus them" language arise in conservation discussions, tribal participants stated how this worked against trust-building and the creation of equal partnership.



While tribal stakeholders at the workshop conveyed greater potential for partnership in the grasslands, stakeholders across other groups remarked on the challenges and uncertainties regarding tribal engagement. For many, official pathways for communicating with tribes were unclear. Moreover, non-tribal participants conveyed how they did not want to continue to burden the few tribal members who had become visible leaders in the grasslands with additional relationship-building work.

While expressions of respect and sustained trust-building efforts by ensuring tribal representation within conservation decision-making offer pathways for more equitable partnerships, the issue of tribal engagement is complicated by the current high turnover rates of non-tribal conservation professionals. With constantly shifting leadership and a lack of sustained relationships, it limits the ability to co-create a shared vision and develop trust in the process of working towards common goals.

To improve tribal engagement, stakeholder participants raised several points:

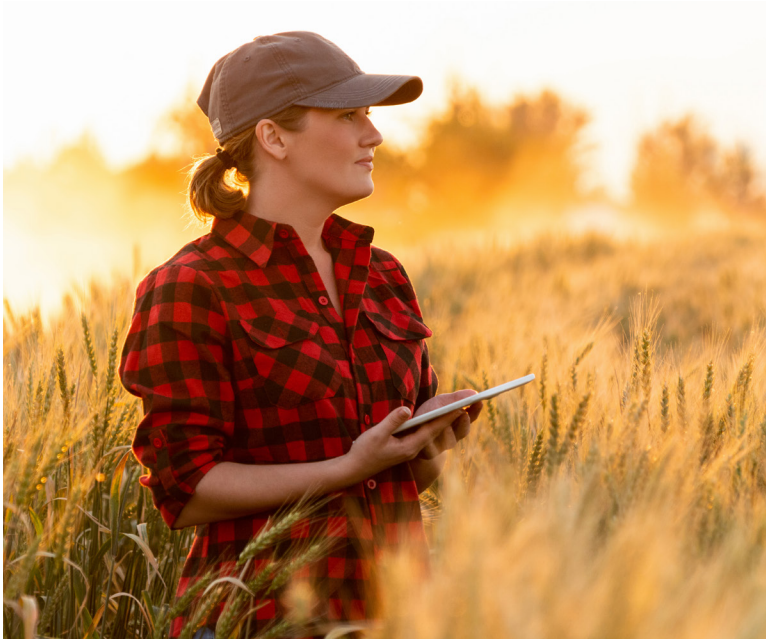
1. Supporting technical assistance and funding capacity building within tribal natural resource departments and to create opportunities for tribal-led conservation initiatives for more equal partnerships in conservation efforts.

2. Valuing and incorporating traditional ecological knowledge (TEK) alongside Western scientific approaches within conservation work. Initiatives which support tribal land repatriation or access for cultural practices allow tribal members to convey principles and evidence of TEK which can then be integrated into broader conservation strategies and co-management practices.

3. Enabling successful integration and application of TEK by providing training for non-tribal stakeholders in cultural competence and the specific histories and cultures of the tribes they work with.

4. Understanding that building trust with tribal nations requires sustained effort and follow-through, not just engagement around specific projects.

Ultimately, by prioritizing relationship building, including meaningful tribal engagement, grassland conservation efforts can become more inclusive, effective, and resilient in the face of complex social-ecological challenges.



Connecting with Non-Livestock Producers and Diverse Landowners

Much of the conservation work in the grasslands has emphasized working with livestock producers. Workshop stakeholders emphasized the importance of engaging a broader range of landowners and land managers to achieve comprehensive conservation outcomes. This includes crop farmers and non-operating or absentee landowners. With the rate of conversion of the grasslands to cropland, expanding engagement beyond livestock producers will be crucial. As one participant noted though, "the trouble lies in how to integrate cropland into our overall assessment of grasslands so they can be treated as areas for environmental quality enhancement, rather than only seen as sacrifice zones." As a potential remedy, workshop attendees recommended conservation project funding for landowners with different property types and operations.

At present, many conservation agencies and organizations favor working with landowners with large acreage and/or those in critical habitat zones. While this approach offers some efficiency, it narrows conservation's connections to a limited subset of landowner perspectives and, as a consequence, reduces the ability of conservation to keep abreast with the multifaceted incentives and interests driving change in the grasslands. One stakeholder representative shared a successful experience of connecting with non-livestock producers in the grasslands. "We worked with a group of crop farmers to demonstrate how integrating patches of native grassland into their operations could improve pollinator habitat and reduce erosion. Once they saw the benefits, several decided to enroll marginal cropland in conservation programs." Another NGO participant emphasized the importance of engaging non-operating landowners: "We've found that many absentee landowners are actually very interested in conservation, they just don't know where to start. By providing them with information and connecting them with local conservation-minded tenants, we've been able to improve management on thousands of acres."

With an increasing proportion of grasslands owned by new and more diverse types of landowners (i.e. absentee, mixed-operations, non-operating), they will inherently have different motivations and information needs than traditional and exclusively livestock producers. To engage these diverse landowners, workshop participants offered tailoring outreach and educational materials across more types of property owners within the grasslands. This could be achieved through publications highlighting conservation success stories where more

diverse landowners could see their properties and interests reflected, as well as educational opportunities relevant to different operational goals and which demonstrate how conservation can work synergistically with diverse land uses. Similarly, supporting and funding peer-to-peer learning and knowledge exchange, such as connecting multigenerational landowners with new or non-operating landowners could enable collaborative land use planning. By bringing together more diverse landowners, conservation can accommodate a wider range of values to help foster a wider shared vision for the grasslands.

Stakeholder participants also stressed the need for policy changes to better support diverse landowner engagement in grassland conservation. This entailed revising Farm Bill programs to provide more equitable support for grassland conservation compared to crop production, developing new incentive programs specifically targeted at non-operating landowners or mixed operations, creating policies that encourage the integration of conservation practices into renewable energy development on grasslands, improving coordination between different agencies and programs to provide more holistic support for landowners managing diverse land uses.

By expanding engagement beyond traditional livestock producers to include a diverse array of landowners and land managers, grassland conservation efforts may achieve more comprehensive and lasting outcomes across the landscape. However, because the notion of conservation itself proceeds according to a particular set of understandings and language derived from a distinct history of ideas, it may not have the capacity to engage with best practices or rural economy development measures emerging in other social arenas. Put by one NGO participant describing how conservation may lose its effectiveness in attempting to be everything, "we need to make sure that it is not a single story being told of the grasslands or one vision of the biome according to only one organization, one industry, or one community."

Accounting for On-the-Ground Complexities

A recurring theme in the stakeholder workshop discussions was the importance of accounting for the diverse and complex on-the-ground realities in the grasslands. While large-scale models and policies are important for guiding overall strategy, participants emphasized that successful conservation efforts must be flexible enough to adapt to local ecological, social, and economic contexts. Described by one NGO participant, "the formal conservation levers are pretty well defined for the biome. We know the science for them, we just need to figure out how to use them best in different geographies and across different grassland contexts."

The growing social and human cultural diversity within the grasslands is arguably the largest source of complexity for the biome. Stakeholders also emphasized that failing to account for these complexities can lead to ineffective or even counterproductive conservation efforts. As one rancher put it when discussing ecological and social variation across the grasslands, "What works great in one part of the state might be completely wrong for us here. We need solutions that fit our specific situation." With rural communities comprised of unique histories and expanding social values and economic uses, land management must develop approaches which are commensurate with this growing diversity. Some participants expressed that narration of the grasslands does not reflect this diversity and how the biome is many things. Moreover, the human dimensions of change in the grasslands are often discussed in terms of largescale economic factors which overlook how individual operations and local priorities affect land use decisions (Rashford et al., 2010).

Through more thoughtful and coordinated messaging, as well as connecting with the multiple realities of life in the grasslands, the story of the biome can be more representative of all the on-the-ground complexities that comprise it.

Policy interactions and unfolding impacts from climate change are other key aspects of on-the-ground complexity in the grasslands. The issue of policy incentives which conflict with conservation goals was a persistent point of discussion. With policy interacting with localized social and cultural factors to play out differently across discrete grassland contexts, conservation design and approaches have struggled to tailor to these distinct realities. The complexity generated by these policy interactions is then amplified by ongoing climate change effects which vary across local contexts. Moreover, the ongoing siloed nature of information exchange across agricultural, energy, and biodiversity and wildlife management professionals reinforce cross-purpose policy and planning and contributes to the complexity of change in the grasslands.

In general, workshop participants conveyed how relationship-building could work as the primary means to ensure that conservation work remained connected to these on the ground complexities across the grasslands. More concrete strategies suggested for better accounting for on-the-ground complexities included:

1. participatory planning to involve local stakeholders in conservation planning from the outset to ensure that strategies are grounded in local realities.

2. devising flexible management approaches which could be adjusted based on monitoring and local feedback.

3. conducting more localized, place-based research to understand the specific ecological, social, and economic dynamics of different areas within the grasslands.

4. providing more decision-making authority to local and state-level offices in implementing conservation programs.

5. creating funding streams for smaller, more experimental conservation projects that can test locally tailored approaches with evaluation metrics that consider local contexts and priorities.

Future Research Directions

This grassland stakeholder insight scan revealed a considerable degree of productive work in the sphere of conservation, as well as research gaps and challenges for effective progress.

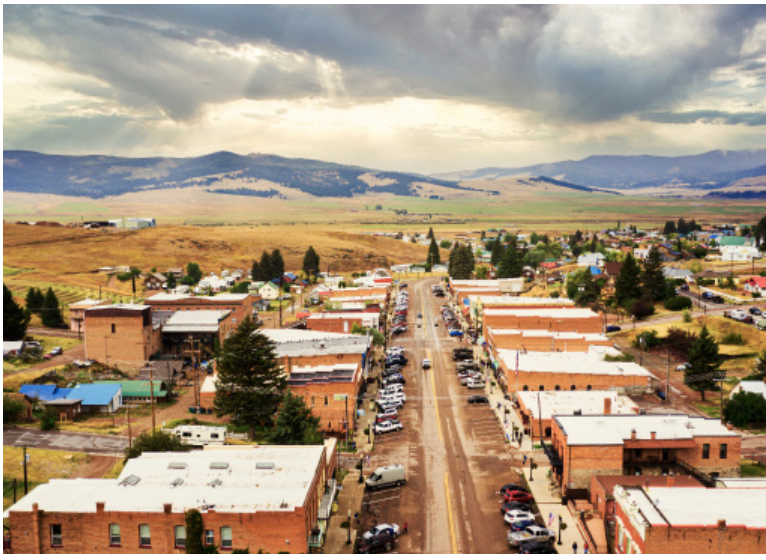
From this multiphase workshop, two key areas for future research emerged for better understanding drivers of change and potential trajectories of the grasslands:

1. Assessing the relationship between rural community health and individual working family operations and their wider impacts on wildlife outcomes and grassland ecological quality by developing a framework of co-benefits.

2. Engaging more closely with household level factors across producers to understand how farm and ranch level decision-making factors play into drivers of change (i.e. crop conversion, land ownership reconsolidation).

Linking rural communities and grassland health within co-benefit frameworks

In large part, participant discussions from diverse stakeholder groups demonstrated a need for diversified funding opportunities not only to enable relationship-building efforts, but for supporting the closely interlinked nature of rural communities and rural



livelihoods, biodiversity conservation, social well-being, and climate change mitigation.

Increasingly, research is identifying how human well-being is fundamentally linked to the state of the environment through the provision of ecological services (Bennett et al., 2015; Leviston et al., 2018; Sandifer et al., 2015), and how investments in environmental conservation lead to an array of social co-benefits (Frumkin et al., 2017). Strategies which integrate social and ecological factors for "win-win" approaches beyond climate mitigation and adaptation measures are known as co-benefits. For example, wetland restoration can lead to better flood prevention and improved filtration for enhanced water quality. Some studies also show how carbon tax incentives result in human health benefits through improvements in air quality from renewable energy replacement of fossil fuels and investments in green building (Aunan et al., 2007; MacNaughton P. et al., 2018). Some studies have documented the absence of coordinated efforts for supporting a common goal can result in trade-offs where benefits are undermined for some stakeholder groups (Choi et al., 2021).

While there are growing efforts to link range management and livestock production practices to desirable wildlife outcomes and social benefits of viewing that wildlife, there is a research gap for considering the co-benefits derived from working family farms and ranches, rural community health and well-being, wildlife outcomes, and the biological integrity of the grasslands. The trouble is when the benefits that people derive from healthy and intact grasslands aren't framed in clear social, economic, or ecological terms, it becomes difficult to communicate those benefits to funders or to those with the ability to impact decision-making. By not having a well-established variable for valuing rural community health - with all of its constitutive elements - important links between individual operations and grassland resilience may be overlooked. Similarly, the relationship between vibrant and economically viable rural communities creating opportunities for the next generation of working family producers and rural business owners to participate economically and culturally can have important bearing on grassland outcomes yet remains underexamined. In effect, there is a research need for demonstrating how, and to what degree, the dynamics of rural communities themselves count as social evidence and can be accounted for as drivers of stability or change in the grasslands.

Examining household and ranch-level dynamics to understand drivers of change

There is great benefit in having large-scale models and representation of change in the grassland system for guiding funding bodies and agencies in their decision-making. Yet these high-level models do not have the capacity or mechanisms to account for on-the-ground complexities and nuances. Engaging with local factors ensures that theories of change in the grasslands are ground-truthed to support informed conservation approaches. Particularly with 70% of land poised to undergo transition in the next 10-15 years, capturing household level decision-making factors and dynamics will be increasingly important to engage with. For example, related grassland researcher and participants in the workshop shared anecdotal evidence for how operational goals and decisions are shaped by a variety of factors. These include: relationships with neighbors (i.e. water usage, chemical fertilizer applications), the role of labor availability and skillsets within a household or to pursue mixed and/or exclusively crop or livestock production and how this factors into household ability to transition back and forth between such operational types, as well as the gender variable within succession considerations of the grasslands future insofar as whether women are mentored and afforded the same opportunities to inherit operations.

Limitations

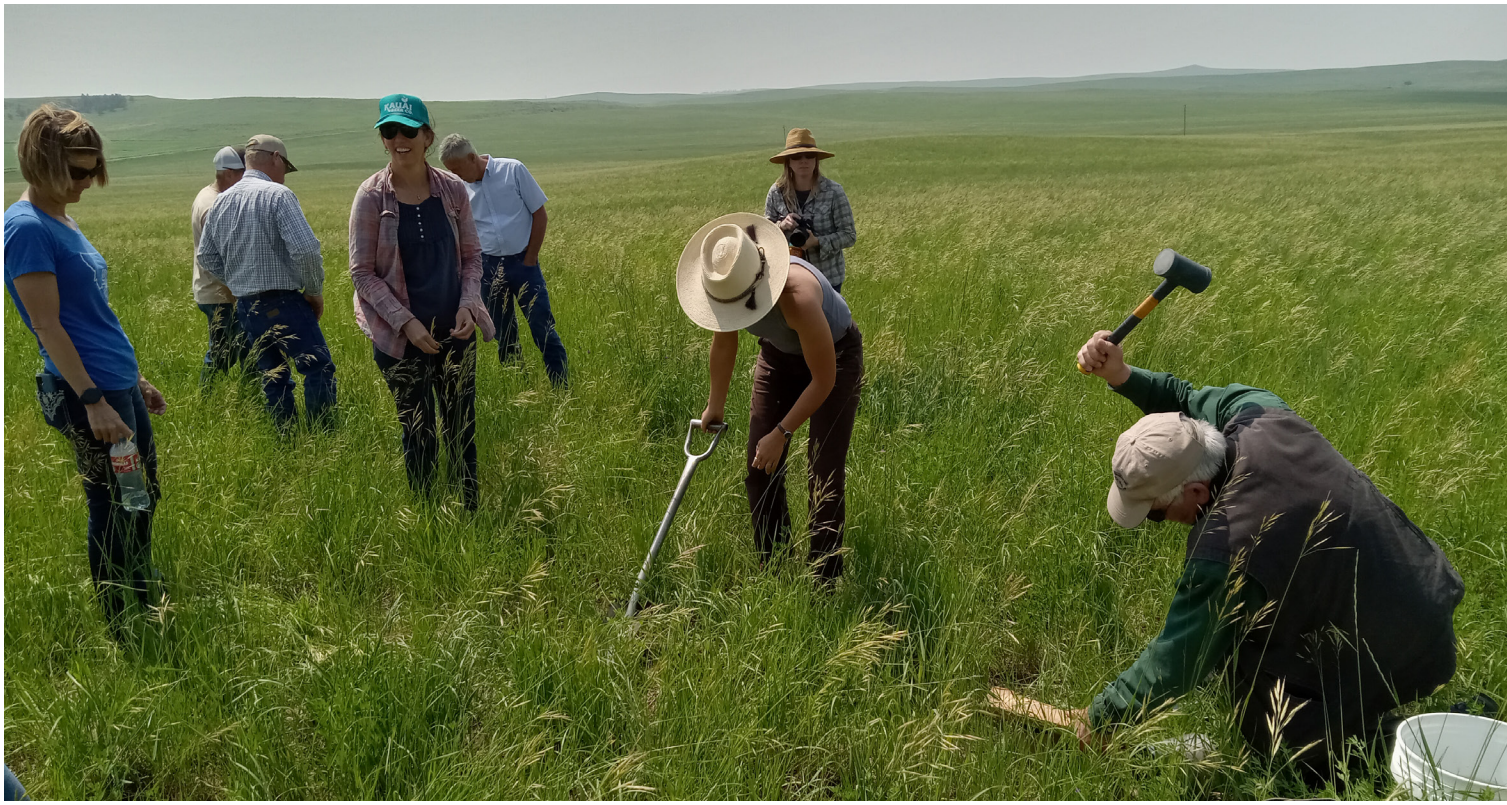
While this study strove to be inclusive of diverse stakeholders and perspectives, it acknowledges several limitations. First, while there are four primary federal and state agencies working in the grasslands, this study recruited participants from the USFWS and NRCS. It did not have representatives from the BLM or USFS. Second, participants were primarily solicited through the Central Grasslands Roadmap via their newsletter. Several participants were recruited directly through personal contacts to ensure representation across all stakeholder sectors (namely industry representatives).

As such, there was some sampling bias by recruiting participants affiliated to some degree with established conservation organizations and networks. To address these limitations, future studies can work to recruit participants who may not be as associated with established conservation organizations by employing more diverse means of sampling. Additional studies would benefit from ensuring representatives across all state and federal agencies working in the grasslands as well.

Conclusion

Findings from the multi-part grassland stakeholder workshop demonstrated how grassland conservation problems are positioned at the interface of complex ecological and human systems. Workshop participants revealed how compartmentalized approaches which do not engage the full spectrum of interests and actors present in the landscape will not have traction across diverse social, economic and political domains in which conservation actions play out. As a result, conservation science teams must adopt multiple disciplinary approaches that bridge not only academic disciplines but also the political and social realms and engage relevant partners.

Social science research is well positioned to attend to the complexities arising from diverse stakeholder interests and positions across inter-sectoral tradeoff processes and exchanges. Looking ahead, there will be important areas to support further research – household factors and relationships across rural community health and individual operations – in order to better understand drivers of change and possible trajectories of the grasslands. With many of these local level dynamics creating the basis of complexity and variation across the grasslands, engaging with these realities will be important for funding bodies and practitioners to ensure appropriate conservation approaches. Stakeholder input from this study strongly emphasized supporting new and existing relationships as a means to navigating this complexity. Future research could contribute in this direction by developing the frameworks and metrics for assessing relationships and relationship-building on enhanced conservation outcomes.



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Appendices

APPENDIX I

Human Dimensions of North American Grasslands Survey:

Dear Participant,

Thank you for taking the time to inform this survey.

Participant Information:

Name	
Affiliation	
Position	
Time at current position	

Please describe the greatest challenge(s) you face in the grasslands, either as a resident or to your work as a part of an organization or industry?

Please rank the top two issues from your list.

Justification (optional). Please provide any additional information or elaborate on your suggestions.

What do you think the most pressing/significant issues affecting your work and/or residence in the grassland in 5 years' time?

Justification (optional). Please provide any additional information or elaborate on your suggestions.

Please check this box if you would like the final report to be sent to you: ☐

Please return by November 1, 2023 to cberman@uwyo.edu/to the link listed below:

APPENDIX II

Session 1 – Individual Stakeholder Group Questions

1. (For tribal session): If you were on a hiring committee as a tribal member for an academic/industry/NGO/ government agency/ agriculture producer position, what would you ask a potential candidate to assess their ability to act as a partner with tribes?

    - (For landowner/producer session): If you were on a hiring committee as a producer for an academic/industry/ NGO/ government agency position, what would you ask a potential candidate?

    - (For state/federal agency, foundations & funders, and academia session): What would you share about you work in the North American Grasslands if you were to present to a graduate-level university class?

2. Of the seven other grassland stakeholder groups, which do you have the most/least connections with? Are these sustained or one-off connections?

3. What factors weaken or enhance partnerships you either have or may have with any other stakeholder groups in the grasslands?

4. Are there any non-traditional or overlooked partners/partnerships outside of the conservation community which may be relevant to the future of the grasslands?

5. What would ideal conditions for the grasslands look like for you and your community/organization/agency/ foundation ten years from now?

6. If funding were not an issue, what would you propose on provincial/state/federal/tribal lands to be of benefit for the wider grasslands? What kind of capacities would you need to achieve this?

7. What does equitable distribution of benefits from grasslands under state/federal/tribal/private management look like?

8. What kind of goal would you have for an outreach program for individuals living in urban areas beyond awareness raising?

9. Are there types of evidence which are not well represented in evaluating health or resilience of the North American Grasslands?

10. How would you propose or incentivize whole watershed or whole ecosystem level management/use plans?

11. (For landowner/producer and tribes & tribal member sessions): How can other grassland stakeholder groups (industry/foundations/academics/NGOs) be incorporated into or support tribal/producer goals on tribal/private land (technical assistance, market access design)?

12. (For foundations/funders & NGO sessions): What kind of collaborative agreements or cooperative funding agreements could further enhance and support organizations already in this space?

13. (For foundations/funders & NGO sessions): How does your foundation/organization experimentation within its grant recipients?

APPENDIX III

Grasslands Workshop Session 1: Summary of Findings

Factors that enhance or weaken partnerships between stakeholders:

- Longevity in relationships – longevity is key for productive work
- Interest in partnering with tribes in appropriate ways without overwhelming yet not knowing how to proceed
- Understanding concept of tribal sovereignty and importance of tribal voice in decision-making rather than articulating all the cultural traits of a tribe
- Geography itself can weaken or disconnect stakeholders given extent of grasslands
- Challenge of knowing with whom to connect given growing players in biome
- Disconnect b/w ag industry and ag producers stymies conversation around links between food production and conservation
- Lack of mechanisms to bring researchers and project partners with diverse backgrounds to enable translational science
- Funding which is at right time and sequence enables good relationships – creating partnerships to have match funding and unlock federal/state dollars
- Being transparent, respectful of people's time, and supportive rather than dictating
- Having interpreters to ensure international and all tribal partners represented
- Platforms like Central Grasslands Roadmap integral for giving big picture view to help organize efforts and build relationships across the landscape

Overlooked communities and stakeholders:

Urban populations	Social media influencers & artists
Recreationalists (including hunters & anglers)	Marginalized, first-generation & non-producer rural residents
Military branches	Regional transmission organizations (RTOs) for transmission lines

What are ideal conditions for the grasslands in 10 years from now?

- Greater protection of the grasslands with all its constituent species derived from larger awareness and perspective of interconnectedness - that human health is tied to the health and resilience of the grasslands through water quality and diverse ecosystem services
- Conservation easements which are strategic and allowed for well-sited energy development and conservation protection
- Have robust incentives which prevented transition of grasslands into commodity crops and land transfer into predominantly corporate ownership
- More equitable decision-making around water allocation b/w urban - rural users

- More broad-level and comprehensive management planning and policy discussions around de-carbonizing efforts and ecosystem conservation with better cultural understanding by the public and decision makers alike of what the grasslands are to support these discussions
- Cultural shift where pastureland has same value as cropland and isn't seen as the poorer ground with restoration of grasslands not suited to cover cropping
- More community-based conservation work rather than relying on private land programs

What does equitable distribution of and on the grasslands look like?

- Compensating people for project time and contributions – addressing funding constraints and misaligned mechanisms to get communities in the research process earlier to co-define research questions and grant applications
- Ensuring all landowners have ability to access programs and not just those who have managers and extra capacity
- Greater protection of the grasslands with all its constituent species derived from larger awareness of interconnectedness - that human health is tied to health and resilience of the grasslands through water quality and diverse ecosystem services
- More equitable representation of counties within a state
- Creating a model combining ag production and conservation for a more holistic economy for all species (human and non)
- More diversity of people working in the grasslands in 10 years
- Normalizing economics where secure carbon credits and established biodiversity credit systems are in place for diverse incentive programs which are accessible to array of producers and landowner types with guiding aim as protecting ecosystem services locally and for populations outside of grasslands

Goals for outreach programs for people in urban areas beyond awareness raising?

- Forming connection with grasslands – hard to give time, energy, or money without connection
    - Showing how grasslands exist in urban areas through habitat connectivity - small urban habitats allow migrating species to survive and gives base for creating appreciation
    - Can aid in developing rubrics and land use planning with better siting of industry, conservation programs and ag production because public will have greater appreciation and vote for representatives who are also more informed about grasslands issues
- Awareness alone doesn't change attitudes and behaviors = engage people in genuine ways by involving families and creating opportunities where they walk away with larger sense of purpose and connection
    - Day with a rancher
    - Expanded recreation opportunities so mountains aren't seen as only place for recreating
- Expanding education of permanent vs. temporary disturbance from renewable energy development to contextualize energy footprint at national and local levels
- Educating urban residents about complexities of ranching and how little money earned on family operations

How would you propose or incentivize whole watershed or ecosystem level management plans?

- Have sustained and open conversations about these decisions in the landscape - Get people involved early, especially city planners, and ensure people see themselves as a part of the vision and it isn't the work of just one agency, community or organization
- policy changes to ensure decision makers not only focusing on immediate needs and can think about larger grasslands issues
    - Governance and organizational restructuring to integrate currently siloed programs and having a body or committee held accountable to this restructuring
- Having metrics which allow for holistic development and conservation strategies and create systems of co-benefits
- Working with landowners to demonstrate benefits of whole watershed management approaches which can stack enterprise on an operation without undermining owner rights yet addresses challenges of private ownership model for conservation and development
    - Ensuring landowners have equal say and access to funding and not only those with larger amounts or the "right kind" of property
    - Making eligibility for grazing leases dependent upon grazing plans and practices which support biodiversity and ecosystem services and have lessees or grazers outside traditional ag

Degree of Connectivity Between Grassland Stakeholders

Poor	Low	Medium	High

NGOs

Industry Partners	State & Provincial Agencies	Federal Agencies	Foundations & Funders	Landowners & Agriculture Producers	Tribes & Tribal Members	Academia & Researchers

State & Provincial Agencies

Industry Partners	NGOs	Federal Agency	Foundations & Funders	Landowners & Agriculture Producers	Tribes & Tribal Members	Academia & Researchers

Foundations & Funders

Industry Partners	State & Provincial Agencies	Federal Agencies	NGOs	Landowners & Agriculture Producers	Tribes & Tribal Members	Academia & Researchers

Industry Partners

Foundations & Funders	State & Provincial Agencies	Federal Agencies	NGOs	Landowners & Agriculture Producers	Tribes & Tribal Members	Academia & Researchers

Federal Agencies

Industry Partners	NGOs	State Agencies	Foundations & Funders	Landowners & Agriculture Producers	Tribes & Tribal Members	Academia & Researchers

Tribes & Tribal Members

Foundations & Funders	State & Provincial Agencies	Federal Agencies	NGOs	Landowners & Agriculture Producers	Industry Partners	Academia & Researchers

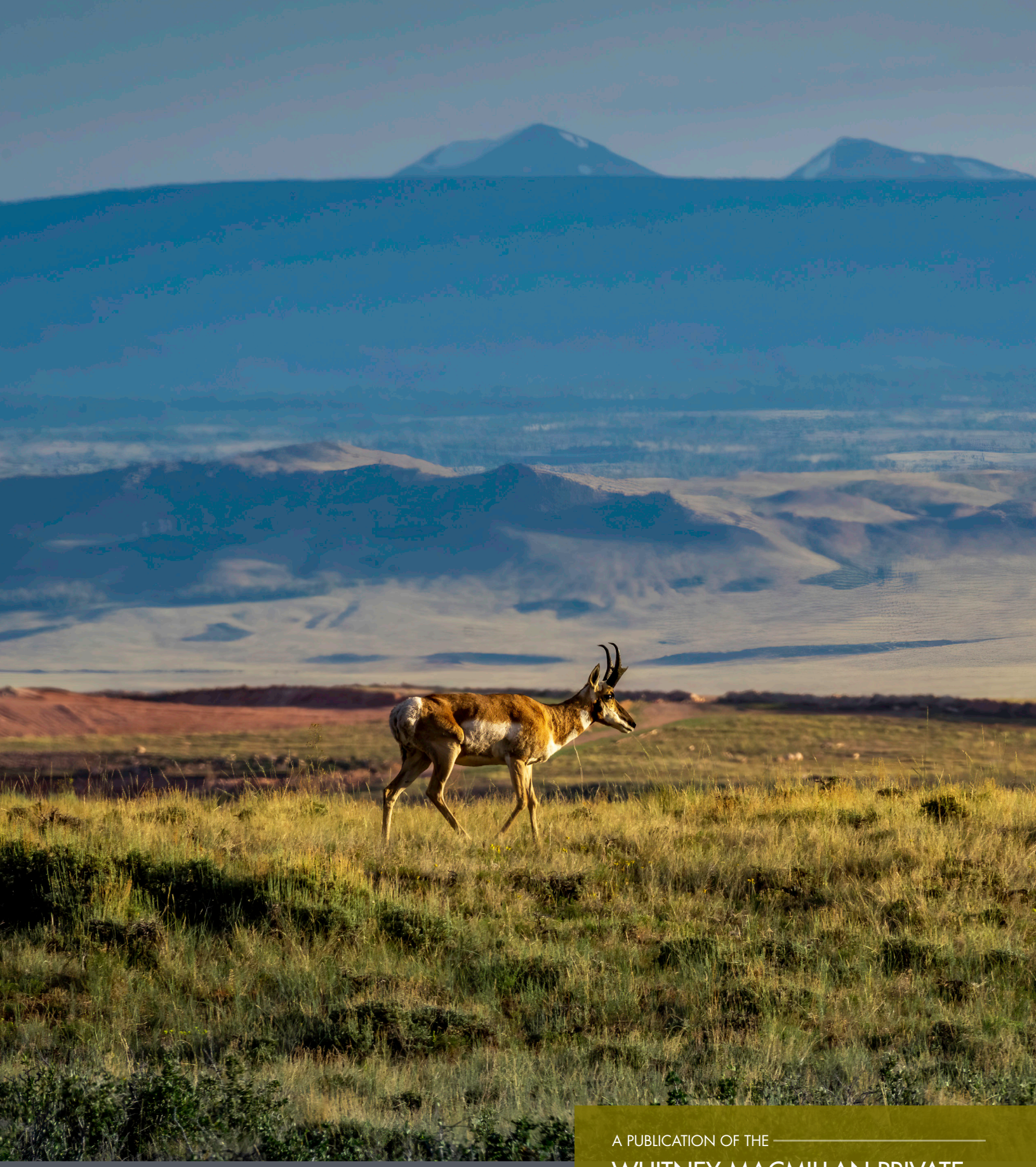
**greatest connection with other tribes*

Agriculture Producers & Landowners

Industry Partners	State & Provincial Agencies	Federal Agencies	NGOs	Foundations & Funders	Tribes & Tribal Members	Academia & Researchers

Academia & Researchers

Industry Partners	State & Provincial Agencies	Federal Agencies	NGOs	Landowners & Agriculture Producers	Tribes & Tribal Members	Foundations & Funders



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