University of Wyoming | Ruckelshaus Institute

MacMillan Private Lands Stewardship Program

FALL 2023–SUMMER 2024 PROGRAM UPDATE

A PUBLICATION OF THE

WHITNEY MACMILLAN PRIVATE LANDS STEWARDSHIP PROGRAM

Dear partners and friends of the program,

As I reflect on another year of the MacMillan Private Lands Stewardship Program, I'm reminded that the best part of this job is undoubtedly working with students. The close working relationship developed with graduate students is particularly rewarding, though it comes with the bittersweet reality of seeing these amazing individuals graduate and move on to the next steps in their careers. This past year was a milestone for graduate students in the program, marked by the successful and outstanding thesis defenses of Gracie Carr, Katie Doyle, Max Lewis, Nita Tallent, and Lucas Thorsness.

Due to their hard work and commitment to the field, several MacMillan Program alumni are on exciting new stages in their career paths:

- Tessa Wittman, a former undergraduate research assistant who spent four years as a research scientist with the MacMillan program following her graduation, started a new position with the BLM in Alaska's Glennallen Field Office this summer and is currently on detail as the office's wildlife biologist.
- Gracie Carr has accepted a position as an environmental professional at Absaroka Energy and Environmental Solutions.
- Max Lewis started as a conservation project manager with the Jackson Hole Land Trust.
- Lucas Thorsness began a research scientist position shared between the Merkle Lab and the MacMillan Program, continuing his work on working lands conservation research.

While we bid farewell to departing team members who have contributed so much to our program, we're also excited to welcome two new graduate students, Jocelyn Wulf and Siobhan Lally, to the MacMillan team. Their fresh perspectives and enthusiasm promise to invigorate our ongoing projects and initiatives.

On a personal note, I will be spending the first half of 2025 in Canberra, Australia, as a Fulbright Scholar at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science agency. This opportunity will allow me to study Australian approaches to investing in natural capital that sustain both people and the environment. As part of this emerging collaboration with CSIRO, I recently had the pleasure of hosting CSIRO postdoctoral fellow Nikki Dumbrell here in Wyoming. We spent several productive days visiting stakeholders and field sites, witnessing firsthand the exciting restoration and conservation work that supports natural capital in our region.

I look forward to staying in touch with all of you and sharing news from "Down Under" while continuing to engage with the exciting efforts underway in Wyoming and the American West. Your ongoing support and collaboration are invaluable to the success of our program and the broader mission of land stewardship and conservation.

Thank you for your continued partnership,

Drew Bennett

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Huge thanks to our partners, collaborators, and supporters that make this work possible!

Philosophy and Approach

Research is most valuable when it informs decisions. It is more likely to be used if those who can use the research play a role in shaping the questions, are part of the process, and understand the implications. The research and outreach of the MacMillan Program is focused on generating knowledge and information that is useable for making decisions related to conserving and managing natural resources. We do this by facilitating collaborations and expertise from across the natural and social sciences and applied fields like finance and law. Through these collaborations, end users play a role in identifying research needs and are often engaged throughout the research process so that results are relevant to their situations.

DECISION ORIENTED

Working with partners to identify knowledge gaps and apply new information

INTERDISCIPLINARY

Integrating diverse perspectives, skillsets, and insights to address complex environmental challenges

ENGAGED

Building relationships to increase credibility, transparency, and relevance

Meet the Team

Research Scientists and Post Doctoral Research Associates

DR. HILARY BYERLY FLINT, Senior Research Scientist

Hilary is trained as a behavioral scientist and uses tools from economics and conservation social science to understand how people manage and value the natural environment, especially providing public benefits, like biodiversity and risk mitigation, from private lands. She is currently leading a multi-year USDA-funded program evaluation, which focuses on habitat conservation on private lands in the Greater Yellowstone Ecosystem. She has a PhD in Natural Resources (University of Vermont), an MS in Applied Economics (Cornell University), and a BA in Environmental Studies & International Affairs (University of Colorado, Boulder). Hilary is based in Jackson, WY, where she gets to share the mountains and rivers with her husband, two young kids and dog, Wilma.

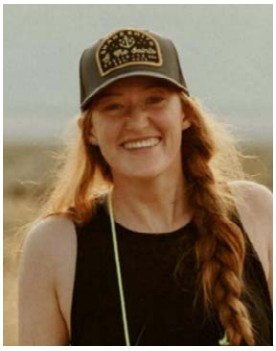
CALLIE BERMAN, Post Doctoral Research Associate

Callie is an alumna of the Haub School and graduated from the University of Wyoming in 2015 with a BS in Geology and a BA in International Studies. Callie completed her PhD in Development Studies at the University of Cambridge where she researched the role of culture and historical land use relationships in management practices of sturgeon fisheries in the Caspian Sea. She has worked extensively across the Central Asian region developing the first university Sustainability program in Uzbekistan, conducting research on regional food security strategies, and facilitating diverse exchange opportunities to Central Asia for both young and senior professionals. Callie's passion for global exchange in order to support new ways of thinking and innovative conservation design stems from her diverse international experiences and her work on numerous ranches across the Rocky Mountains and Australia. Working on ranches fostered a deep commitment to the role of place-making for Callie and continues to be an important source of inspiration for her research interests. Callie will be working with the MacMillan Private Lands Stewardship Program to explore how human dimensions come to shape grasslands conservation outcomes across the Great Plains region. In her off time, she hopes to continue riding, running, working the range and learning more about Wyoming, the place she loves most.

LUCAS THORSNESS, Research Scientist

Lucas developed a love for wide open spaces and natural ecosystems growing up in southeastern Wyoming. He landed at Montana State University where he got a degree in environmental studies with a minor in GIS, followed by a graduate certificate in GIS from the University of Wyoming. After time spent working in wildland conservation and restoration, a stint with a land trust in Colorado's Front Range led him to a passion for private land conservation. After graduating from the Haub School's ENRS master's program in 2024, he now works in a joint position between the MacMillan Program and the Merkle Research Group creating geospatial tools and workflows to improve conservation for migrating big game species across private lands in Wyoming, Montana, and Idaho. In his free time, Lucas enjoys cycling, hiking, fishing, and skiing in the beautiful public lands around Laramie.

Graduate Research Assistants



KATIE DOYLE, Graduate Research Assistant

Katie graduated from Texas Tech University in 2018 with a BS in Natural Resources Management; Wildlife Biology concentration. After graduation, Katie headed West and spent 4 years working for state wildlife agencies in Montana, Idaho, and Texas before returning to school in 2022. Katie is currently pursuing a master's degree in Environment, Natural Resources and Society with UW and is working on a project with the MacMillan Program studying the social dimensions of migration corridor conservation in Wyoming. In her free time, and when Wyoming holds back the wind, Katie enjoys exploring the area through fishing, biking, and snowshoeing.

JOCELYN WULF, Graduate Research Assistant

Jocelyn first became interested in the intersection between natural resources and environmental challenges at Dartmouth College, where she received a BA degree in Anthropology and Environmental Studies in 2020. While in New Hampshire, Jocelyn worked with the Natural Resources Defense Council to facilitate dialogue between paper companies and First Nations peoples to increase sustainable logging practices in the Canadian boreal forest. Following graduation, she returned to her home city of Washington, DC to work for The Nature Conservancy, focusing on the administration of national and international conservation grants. After 3 years at TNC, she left to become the Duck Watch Lead for City Wildlife– educating DC residents about urban waterfowl, safely relocating duck families, and rehabbing injured and abandoned ducklings. Jocelyn is excited to begin her graduate studies in Environment, Natural Resources, and Society in the Fall of 2024, where she will focus on natural capital approaches to conservation and ESG incentivization.

SIOBHÁN LALLY, Graduate Research Assistant

Growing up on the Ladder Ranch in Southern Wyoming helped shaped Siobhan's love for landscapes across the state and private land stewardship. She finished her bachelor's degrees in Agricultural Business and Political Science at the University of Wyoming in May. She is now on track to complete her master's certificate in GIS. Since graduating, Siobhan has been working with the Headwaters of the Colorado Initiative in the Medicine Bow-Routt National Forests to connect public and private stakeholders with local, state, and federal agencies. In her free time, Siobhan enjoys camping, hiking, and skiing across the West.

Undergraduate Research Assistants

JEREMY CHAPPELL, Undergraduate Research Assistant

Growing up amidst the rich landscapes of Wyoming, Jeremy found himself drawn to the convergence of technology and conservation. Despite enjoying modest success in engineering and earning associate degrees in both engineering and mathematics from Northwest College, his passion for environmentalism eventually led him to the University of Wyoming. There, he joined the McNair Scholars Program and conducted a summer research project on emerging technologies in conservation. He is now pursuing a bachelor's degree in environmental systems science, with research interests that include biodiversity and land conservation, climate adaptation, and the intersection of environment and technology. In his free time, Jeremy enjoys gaming, physical training, and going for hikes with friends.

LEILA JOHNSON, Undergraduate Research Assistant

Leila is an undergraduate student studying Environmental Systems Science and Environment and Natural Resources at the University of Wyoming. Leila works on the Pilot Hill Project as a lab and field research assistant and has a passion for learning about the intersections of human and ecological systems. She is originally from Laramie and enjoys knitting and travelling around the region.

OLIVIA POORE, Undergraduate Research Assistant

Olivia is studying Environmental Systems Science, Environment and Natural Resources, and Wildlife Biology and Management. She is originally from Douglassville, PA, but has greatly enjoyed her time in Wyoming. Olivia works on the Pilot Hill Project as a lab and field research assistant and is interested in understanding human/wildlife interactions. In her free time, Olivia enjoys hiking, running, climbing, skiing, and watching movies.

SKYLER TYSON, Undergraduate Research Assistant

Skyler is studying Environmental Systems Science, and Environment and Natural Resources. She is from Loveland Colorado and is in her second year studying at UW. Skyler works for the Pilot Hill Project as a research and lab assistant and worked for the Wyoming Conservation Corps this summer. She is passionate about conservation, stewardship, and wildlife. In her free time, she enjoys skiing, hiking, and going on road trips.

CADY WOOD, Undergraduate Research Assistant

Cady is a sophomore at UW studying Environmental System Sciences and Rangeland Ecology. She is from Greeley, CO. She loves the outdoors and enjoys hiking, swimming and rock climbing.

Featured Supported Student Experience

COLTON GOLDFARB, 2024 Wyoming Stock Growers Land Trust Stewardship Intern

Colton interned with WSGLT this past summer. Over the course of the summer, Colton monitored ranches with conservation easements across the state of Wyoming. His duties were to review deeds of conservation easements, monitor properties for violations, and to help create deeds for new conservation easements. WSGLT provided Colton with the "best of both worlds" by combining natural resources and conservation experiences with legal property work. Colton enjoyed his time exploring Wyoming's amazing landscapes and helping to conserve them for future generations!

Featured Projects

2024 AGRICULTURAL LAND EASEMENT WORKSHOP – RISING TO THE CHALLENGE

Building on the success of the 2023 ACEP-ALE workshop, the Intermountain West Joint Venture (IWJV) and the University of Wyoming's Ruckelshaus Institute jointly hosted the 2024 Agricultural Land Easement Workshop in January. This collaborative forum brought together key stakeholders to identify specific strategies for increasing the pace and scale of implementation for two crucial USDA Natural Resources Conservation Service programs: the Agricultural Conservation Easement Program – Agricultural Land Easements (ACEP-ALE) and the Regional Conservation Partnership Program (RCPP). The workshop output made the following recommendations to enhance the effectiveness and reach of these vital conservation programs:

- Enhance opportunities with historically underserved landowners by: maximizing the federal share that will contribute to the fair market value of an easement, identifying funding sources to fund due diligence costs, and providing enhanced technical assistance funding on RCPP easement projects for support to land trusts working with historically underserved producers.
- Create consistency in payment rates and deed terms for easements under ACEP-ALE, RCPP, and RCPP Alternate Funding Arrangements (AFA).
- Expand the scope of ACEP-ALE technical assistance funds to strategically build land trust capacity to facilitate high-quality applications that reduce NRCS administrative workload and increase implementation efficiency.
- Allow IRA-funded easements to follow the existing ACEP-ALE acquisition processes at the state level.
- Use a Job Approval Authority-style approach to allow states with proven skills and experience to administer easements and perform basic administrative actions.
- Identify NRCS funds that can support due diligence costs.
- Allow entity certification under ACEP-ALE to extend to easement projects under RCPP. (DONE!)
- Ensure Buy Protect Sell (BPS) works as intended

Key Partners: Joy Morris, David Smith, and Emily Downing – Intermountain West Joint Venture

Read the report: https://iwjv.org/wp-content/uploads/2024/06/ACEP-workshop-final-report.pdf

INCENTIVES, BARRIERS, AND THE SOCIO-ECOLOGICAL FIT OF VOLUNTARY WATER CONSERVATION IN THE COLORADO RIVER BASIN

The Colorado River is facing unprecedented challenges during a period of diminishing supply. With more people and industries relying on its water than the river can support, finding solutions has become urgent. Farmers and ranchers use the largest share of the river's water, making them essential to addressing this crisis.

This study examined one of the main programs provided with funds from the Inflation Reduction Act designed to address this water shortage - the System Conservation Pilot Program (SCPP). This program pays farmers and ranchers to temporarily use less water in their operations. We focused on two areas: Wyoming's Upper Green River Basin and Colorado's Yampa River Basin. Through in-depth interviews with farmers and ranchers and agency staff, we discovered three main findings:

1. **Environmental Challenges:** Temporarily stopping irrigation (called fallowing) can harm soil health and wildlife habitat in both river basins.
2. **Trust Makes a Difference:** The program has benefited numerous enrollees in Wyoming's Upper Green River Basin thanks in part to the role of trusted local organizations. These organizations have built strong relationships in the community over many years.
3. **Different Community Responses:** In the Yampa River Basin, many farmers and ranchers were skeptical of the program. Individuals interviewed didn't have strong relationships with the local conservation professionals and NGOs, and did not have sufficient information about the program to make an informed decision on enrollment.

The key to success wasn't just about money - trust was a critically important factor. When farmers and ranchers had existing relationships with local organizations they trusted, they were more likely to participate in the water conservation program.

What This Means for the Future

To improve water conservation efforts in the Colorado River Basin, we recommend:

- Offering more flexible options for saving water beyond temporary fallowing
- Including local communities in program planning from the start
- Working through trusted local organizations who understand community needs

This research shows that solving the Colorado River crisis isn't just about finding technical solutions - it's about building trust and creating programs that work for local communities and their environment.

Project Lead: Max Lewis

Project Webinar: Watch a webinar hosted by the North Central Climate Adaption Science Center featuring Max's research and a related project: https://www.youtube.com/watch?v=_cU4w_5u-yY

THE CONSERVATION EASEMENT PIPELINE AND DEMAND FOR PROJECTS IN WYOMING

Project Motivation

Conservation easements are a crucial tool for landscape scale conservation efforts across the western United States. In the wake of rising development pressure in parts of Wyoming and increased funding for conservation easement programs, we wanted to get a better grasp of the stages that landowners and land trusts go through to create conservation easements and to assess the number of conservation easements at these stages (i.e., the "pipeline"). To answer these questions, we interviewed conservation practitioners from Wyoming's five major land trusts to learn about their organizations' easement pipelines and the demand that they experience for projects.

Key Takeaways

- Donated conservation easements typically move through the pipeline in 6-18 months, while purchased easements take 2-5 years to complete.
- There are roughly 77 active conservation easement projects in Wyoming and if each is successfully completed it would result in an estimated 7-9% in total number of conservation easements in the state.
- Approximately 75% of active projects in the state are purchased easements.
- Most active projects in the state are in the middle stages of the pipeline, including organizational review, funding, and due diligence.

Figure 1. Stages and common timeliness for purchased conservation easements. Note that timeframes can vary and that projects can be in multiple stages at once (ex., grant writing and due diligence).

Figure 2. Estimates of number of projects at various stages of the "easement pipeline".

- The most time-consuming stages in the easement pipeline are funding and due diligence tasks such as completing appraisals, negotiating deeds, and title review.
- Demand for conservation easements among landowners is generally high across Wyoming and has been increasing in recent years.
- Land trust staff agree that while demand is increasing, landowners are generally unaware of new funding opportunities for purchased easements in the state.
- Easements remain a popular tool for landowners to conserve their properties, and increased funding and awareness will continue to boost their prevalence in the state.

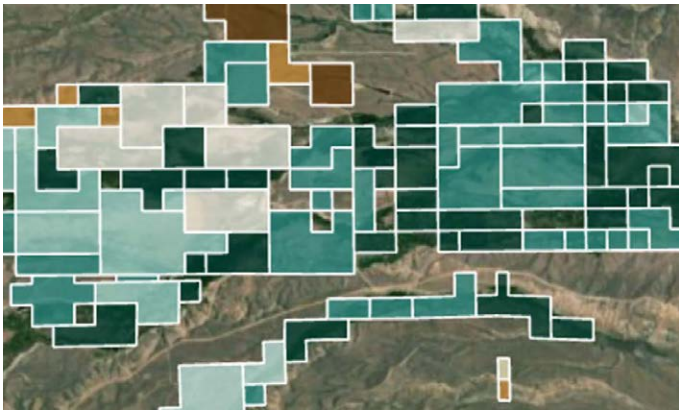
Project Lead: Lucas Thorsness

Key Partners: Beyond Yellowstone Living Lab

Read the report: https://www.uwyo.edu/haub/_files/_docs/ruckelshaus/outreach/wy-easment-pipeline.pdf

INSTITUTIONAL AND ENVIRONMENTAL ANALYSES OF WATER RIGHTS IN SUBLETTE COUNTY, WYOMING

In the American West, water use on farms and ranches is controlled by privately held water rights - legal permissions that determine who can use water, how much they can use, and when they can use it. These rights are especially important in Wyoming's Upper Green River Basin, where ranchers rely on flood irrigation to water their hay meadows and pastures for livestock. The Upper Green River Basin, located in Sublette County, sits at the northernmost part of the Colorado River system. With the Colorado River facing severe drought, understanding how water rights work in this region has become crucial for both ranchers and water managers.



What We Did

We created detailed maps of water rights and used satellite imagery of the Upper Green River Basin to understand:

- How different aspects of water rights affect plant health and moisture on irrigated lands
- How irrigation affects nearby natural wetlands that don't receive direct irrigation
- What might happen to local water rights if the Colorado River Basin states need to curtail water use

What We Found

1. **Irrigation and Natural Wetlands:** We discovered that healthy irrigated lands often mean healthy nearby wetlands, even when those wetlands aren't directly irrigated. This suggests that traditional flood irrigation practices help support natural wetland ecosystems.
2. **Water Rights Characteristics:** Surprisingly, factors like how old a water right is, how far water travels in ditches before irrigating fields, and past regulation history didn't show strong connections to vegetation condition on irrigated lands.
3. **Future Challenges:** If the Colorado River Basin states need to reduce water use, many water rights in the region could be affected, potentially impacting both agricultural operations and the natural environment they support.

This research helps us understand how traditional ranching practices in Wyoming's Upper Green River Basin not only shape agricultural production but also contribute to the health of the broader landscape. As water becomes scarcer in the Colorado River Basin, this understanding will be crucial for making informed decisions about water management that consider both agricultural needs and environmental benefits.

Project Lead: Lucas Thorsness

Key Partners: Jackson Hole Land Trust

Funding Partner: Land Trust Alliance's Land and Climate Program Grant through an award to the Jackson Hole Land Trust.

Access the Dataset: This project created a new dataset on agricultural water rights in Sublette County that is available for download: https://www.uwyo.edu/haub/_files/_docs/sublettecountysurfacewaterrights.pdf

UNPACKING THE HUMAN DIMENSIONS OF CONSERVATION IN NORTH AMERICA'S CENTRAL GRASSLANDS

This study examines the social dynamics underlying grassland conservation efforts to identify enhanced conservation approaches in North America's Central Grasslands. We solicited expert perspectives from 29 diverse stakeholders representing the eight sectors identified. 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. Participants shared the need for more integrated approaches which bridge siloed agency and organizational structures. A commonly discussed pathway to remedy siloed agencies and build human capacity through expanded relationships is by promoting greater cross-sector collaborations. As frequently cited resource by participants, the Central Grasslands Roadmap is seen as a valuable platform for stakeholder connection and starting point for discussing such collaborative conservation opportunities.

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. 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.

Project Lead: Callie Berman

Key Collaborators: Jeremy Pittman – University of Waterloo

Funding Partners: Northern Great Plains Joint Venture, Knobloch Family Foundation

Read the report: https://www.uwyo.edu/haub/_files/_docs/ruckelshaus/outreach/human-grasslands-report.pdf

SOCIAL DIMENSIONS OF BIG GAME UNGULATE MIGRATION CORRIDOR CONSERVATION IN WYOMING

Ungulate migration is a phenomenon observed and documented worldwide. As seasonal movements take animals outside of protected areas and across physical and jurisdictional boundaries, they seek resources in areas with varying land uses and protections. Cross-boundary collaboration among wildlife managers, property owners, non-governmental organizations, tribal members, and those with agricultural and industrial leases is essential to ensure that moving animals have adequate resources across their seasonal ranges.. In 2022, the U.S. Department of Agriculture and Wyoming created a partnership to prioritize the conservation of big game ungulate migration corridors in Wyoming, prompting local discussions that brought socio-economic factors into the picture of this wildlife conservation initiative.

We conducted 45 semi-structured interviews with federal and state agency representatives, Eastern Shoshone and Northern Arapahoe tribal members, non-government organization personnel, and private landowners in 5 priority areas established through the USDA-Wyoming partnership program to examine their experience with the program's creation and early implementation.

- Using cross-boundary collaboration literature, we identified key elements of large-scale collaboration and examined the way these elements were implemented into the program's creation and early implementation
- Based on interviews with private landowners, we examined the factors that landowners consider when deciding to enroll in conservation programs

The results of this in-depth case study emphasize key factors in collaborative projects across physical and jurisdictional scales, highlight the importance of considering social factors in wildlife management research and decision making, and explore the compatibility of current conservation programs for private lands conservation.

Project Lead: Katie Doyle

Funding Partner: U.S. Department of Agriculture under agreement number FSA22CPT0012500

Photo credit: Gregory Nickerson/ Wyoming Migration Initiative

UNDERSTANDING SOCIAL PROCESSES TO ACHIEVE LANDSCAPE SCALE CONSERVATION IN COLORADO

Landscape-scale conservation efforts face significant challenges due to the complex mix of private and working lands across the state. To better understand these dynamics, we partnered with the Bird Conservancy of the Rockies (BCR) to conduct four focus groups with diverse landowners in areas in Colorado where BCR's Wildlife Habitat Biologists partner with the Natural Resources Conservation Service and Colorado Parks and Wildlife. The study revealed that landowners view conservation primarily through the lens of stewardship and heritage rather than ecosystem protection, emphasizing how their land management practices aim to balance economic viability with environmental stewardship while preserving land for future generations. Social relationships and information exchange networks proved crucial for landowners, who rely heavily on community connections to share knowledge about seasonal changes, property management strategies, and experiences with conservation programs. However, some landowners expressed frustration with agency interactions and complex program requirements, indicating a growing hesitation to engage in conservation initiatives in some instances. We identified several opportunities for improving conservation outcomes, including developing more participatory processes that recognize landowners as full partners, supporting landowner advocacy on resource management issues like water policy, fostering community connections through facilitated social gatherings, creating youth education partnerships in rural communities, and providing better support for navigating program enrollment challenges to achieve meaningful landscape-scale conservation goals.

Project Lead: Callie Berman

Key Partner: Bird Conservancy of the Rockies

Read the report: https://www.uwyo.edu/haub/_files/_docs/social-processes-landscape-scale-conservation.pdf

Ongoing Research, Outreach, and Engagement Efforts

CATTLE AND CONSERVATION: THE FUTURE OF VIRTUAL FENCING WORKSHOP

In June 2024, the MacMIllan program, in collaboration with several partners, hosted "The Future of Virtual Fencing: Cattle and Conservation" workshop to examine how virtual fencing technology in ranching operations could advance wildlife conservation goals. The workshop identified several specific functions that virtual fencing provides to enable conservation outcomes. Following the workshop, organizers are developing two key outputs: a comprehensive research agenda and a blueprint for advancing the application of virtual fencing technology. We look forward to sharing the outputs from this exciting emerging technology! As part of the research agenda, we will be completing a series of case studies to examine the diverse stakeholders and expertise needed to make virtual fencing projects successful and identify pathways for greater uptake for conservation and ranching communities (see below).

Key Partners: Property and Environment Research Center, Beyond Yellowstone Living Lab, Greater Yellowstone Coalition, World Wildlife Fund

Funding Partner: Alumbra Innovations Foundation

EVALUATING PILOT APPLICATIONS AND POLICIES TO ADVANCE VIRTUAL FENCING IN CONSERVATION

Recent advances in virtual fencing technology have opened new frontiers for wildlife conservation, prompting research to evaluate its potential impact and implementation challenges. This research encompasses both practical applications and policy dimensions, examining enabling and constraining factors for deploying virtual fences across public and private lands. We are synthesizing lessons from pilot applications and identifying approaches to overcome policy barriers, ultimately facilitating the broader adoption of virtual fencing as a conservation tool.

Key Partners: Property and Environment Research Center

Funding Partner: Alumbra Innovations Foundation

INVESTING IN NATURAL CAPITAL: RURAL LIVELIHOODS AND RESOURCE CONSERVATION IN THE U.S. AND AUSTRALIA

This project examines innovative approaches to environmental conservation through natural capital approaches including investments across rangeland carbon sequestration, water conservation, and forest restoration initiatives. Through in-depth interviews with experts involved in these initiatives, we are examining the structure, partnerships, and outcomes of selected investments. By understanding investment models and their potential benefits to conservation, the project seeks to facilitate knowledge transfer and inform practical applications of natural capital investments in landscape-scale restoration efforts.

Key Partners: Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science agency

Funding Partner: U.S. Department of State Fulbright Scholar Award, Alumbra Innovations Foundation

WILDLIFE AND RECREATION ON PILOT HILL

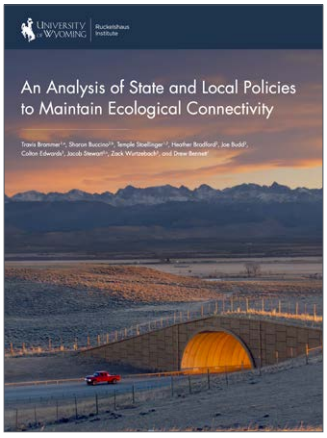
This project explores how outdoor activities like hiking and mountain biking interact with wildlife on the 5,500-acre property near Laramie, Wyoming. As recreation has increased with the opening of new public trails, we are conducting a unique long-term study to understand how recreational activities affect various animals, including elk, moose, black bears, and mountain lions. What makes this study special is the ability to compare wildlife behavior before and after the trails open, using motion-triggered cameras to track wildlife use on the property. This project aims to provide valuable insights not just for Pilot Hill, but for other areas across the Western United States facing similar challenges as outdoor recreation continues to grow in popularity.

Project Leads: Leila Johnson, Olivia Poore, Skyler Kyson, and Cady Wood.

Key Partners: Pilot Hill, Inc

Featured Pulications

AN ANALYSIS OF STATE AND LOCAL POLICIES TO MAINTAIN ECOLOGICAL CONNECTIVITY

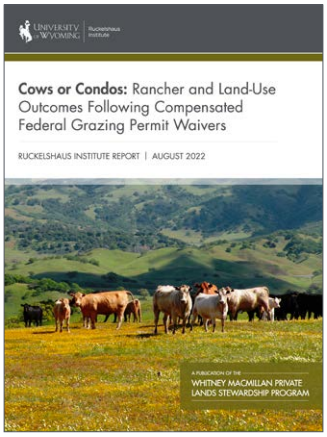


This report analyzes the challenges, the implementation and the durability of a broad array of state and local policies designed to conserve wildlife corridors and enhance habitat connectivity. The authors examined 37 state and 10 local policies and found that, while many jurisdictions are taking steps to address wildlife connectivity, significant gaps remain with funding implementation. The report also highlights the critical role that municipalities and county governments can play in conserving habitat through the development of connectivity policies.

Watch the webinar highlighting key findings: https://youtu.be/YlcPFgS5GcE?si=nxybhLkhJIecrM0Z

Report featured in the Bozeman Daily Chronicle: https://www.bozemandailychronicle.com/news/state/yellowstone-safe-passages-wildlife-crossing-overpass-paradise-valley-haub-school-university-of-wyoming/article_fc0c4da5-2a62-5841-bfd1-95c78fa5a1ac.html

COWS OR CONDOS: RANCHER AND LAND-USE OUTCOMES FOLLOWING COMPENSATED FEDERAL GRAZING PERMIT WAIVER



Some people worry that when ranchers stop using public lands for cattle grazing, they'll turn their private ranchland into housing developments - a concern often called "cows or condos." This study looked at what actually happened when ranchers were paid to give up their public grazing permits. We interviewed ranchers who had given up their grazing permits since 1999 and tracked what happened to their private lands. They found that none of the ranchers turned their land into housing developments. Instead, most ranchers only gave up their permits because they were facing serious challenges, like conflicts with wildlife or strict government rules. While they would have preferred to keep grazing their cattle on public lands if these problems could be solved, they were grateful for the compensation they received.

For some ranchers, giving up their permit was difficult. For others, it actually helped them expand their ranching operation in other ways. What really concerned these ranchers wasn't the loss of public grazing permits, but rather the rapid development happening across the West that's breaking up large areas of ranchland.

In short, paying ranchers to stop grazing on public lands isn't causing them to build houses on their private property. Instead, broader economic pressures and development across the West pose the bigger threat to ranching communities.

Tessa Wittman and Drew Bennett. 2024. Rangeland Ecology & Management 93: 62-71

Available as an open access publication: https://www.sciencedirect.com/science/article/pii/S1550742423001380#section-cited-by

Other Program News

TESTIFYING IN THE COLORADO SENATE FINANCE COMMITTEE

Drew Bennett testified to the Colorado Senate Finance Committee on a bill considering expansion of the state's conservation easement tax credit program. With previous experience working in the land trust community in Colorado and as an author of "Public returns to private lands conservation in Colorado: The Conservation Easement Tax Credit Program," Drew was in a unique position to talk about the economic benefits of land conservation to Colorado. Notably, the bill passed through the Committee with a unanimous vote!

WATER RESEARCH IN THE NEWS

MacMillan Program research on water conservation in the Colorado River Basin was featured in the Aspen Times and on air across western NPR stations: https://www.wyomingpublicmedia.org/2024-05-30/using-less-of-the-colorado-river-takes-a-willing-farmer-and-45-million-in-federal-funds

BENNETT RECEIVES FULBRIGHT SCHOLAR AWARD

Drew Bennett received a Fulbright Scholar Award to support his work in Australia in collaboration with CSIRO, Australia's national science agency, on the co-benefits of investments in natural capital to communities and biodiversity. Read more about the award: https://www.uwyo.edu/news/2024/03/uw-professor-receives-fulbright-award-to-study-natural-capital-investment-in-australia.html

MACMILLAN PROGRAM HOSTS AUSTRALIAN SCHOLAR NIKKI DUMBRELL

The MacMillan Program hosted Nikki Dumbrell, a CSIRO Research Scientist, during her visit to Wyoming in September 2024. Dumbrell met with key partners and stakeholders across the state and toured a ranch in the Little Snake River Valley to learn about the benefits of conservation efforts to local communities across the region.

Graduate Student Thesis Defenses

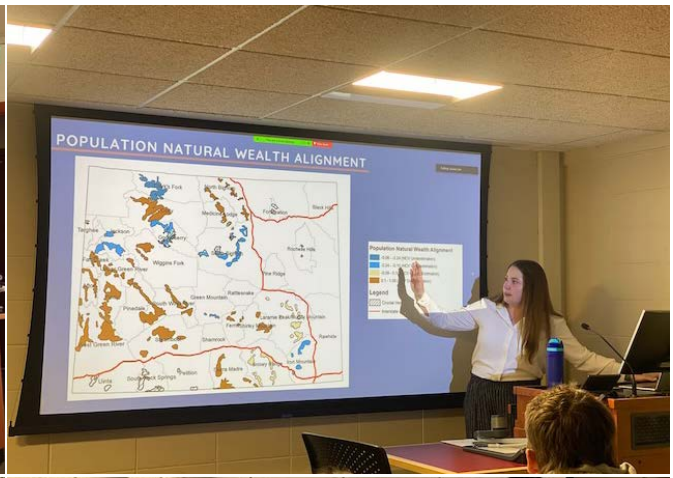
Recent graduate student thesis defense presentations are available online:

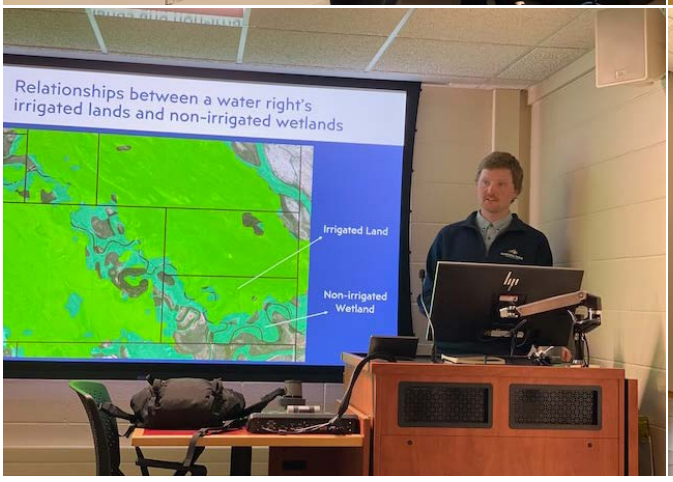
Max Lewis, "Incentives, Barriers, and the Socio-Ecological Fit of Water Conservation"
https://youtu.be/yG0ec-KbG3A?si=VkpfgFaLychkhPr9

Lucas Thornsess, "Geospatial Mapping and Analysis of Water Rights in the Upper Green Basin, WY"
https://youtu.be/DxEON6nWGuc?si=9v-ka2T46ZrEssDr

Grace Carr, "Wyoming Elk and Natural Wealth Composition on Private and Public Lands"
https://youtu.be/skVgeXtAPco?si=n-fjqXMtKrNb7Ceq

Nita Tallent, "A Tale of Two Trails" https://youtu.be/dIZbH1QdSO4?si=m2HE6AbzsbLxkhkX





Recent Publications

Bennett, D. E., T. Brammer, and **H. Byerly Flint**. 2024. "Innovation and collaboration on private lands along Wyoming's Absaroka Front" Chapter 14 in R. Frodeman, E. Brister, and L. Propst, eds. *A Watershed Moment: Facing Limits Across the American West*. University of Utah Press: Salt Lake City, USA.

Berman, C. 2024. Navigating risk in Caspian sturgeon conservation: mapping manager risk perceptions with species conservation measures. *International Journal of Water Resources Development*.

Berman, C., D. Bennett, and Jeremy Pittman. 2024. Unpacking the human dimensions of North America's Central Grasslands. University of Wyoming, Laramie, WY: Ruckelshaus Institute of Environmental and Natural Resources. https://www.uwyo.edu/haub/_files/_docs/ruckelshaus/outreach/human-grasslands-report.pdf

Berman, C. and **D. Bennett**. 2024. *Understanding social processes to achieve landscape scale conservation in Colorado*. University of Wyoming, Laramie, WY: Ruckelshaus Institute of Environmental and Natural Resources.

Brammer, T., S. Buccino, T. Stoellinger, H. Bradford, J. Budd, C. Edwards, J. Stewart, Z. Wurtzebach, and **D. Bennett**. 2024. *An analysis of state and local policies to maintain ecological connectivity*. University of Wyoming, Laramie, WY: Ruckelshaus Institute of Environmental and Natural Resources.

Byerly Flint H. 2024. "Fair Game: Who should pay for wildlife management?" *Western Confluence*, 13. https://westernconfluence.org/fair-game/

Hansen, K., R. Coupal, E. Yeatman, and **D. Bennett**. 2024. Regional economic impacts of water conservation in a Colorado River Basin headwaters state. *Journal of Regional Analysis & Policy* 54(1): 57-76.

Paolini, K., A. Sisneros-Kidd, N. Gautier, R. Bonnie, K. E. Wallen, and **D. E. Bennett**. 2023. Perpetuating corridor conservation: Using public perception to advance big game management. *Wildlife Society Bulletin*. 47:e1496.

Tallent, N. 2024. "Ascending to the challenge" *Western Confluence*, 13. https://westernconfluence.org/ascending-to-the-challenge/

Thorsness, L., and **D. Bennett**. 2024. *The conservation easement pipeline and demand for projects in Wyoming*. University of Wyoming, Laramie, WY: Ruckelshaus Institute of Environmental and Natural Resources. https://www.uwyo.edu/haub/_files/_docs/ruckelshaus/outreach/wy-easment-pipeline.pdf

Thorsness, L. 2024. *Surface water irrigation rights dataset: Green River Basin in Sublette County, Wyoming*. University of Wyoming, Laramie, WY: Ruckelshaus Institute of Environmental and Natural Resources. https://www.uwyo.edu/haub/_files/_docs/sublettecountysurfacewaterrights.pdf

Verissimo D., Blake K., **Byerly Flint H.**, Espelosin D., Doughty H., Gregg E., Kubo T., Mann J., Perry L., Selinske M., Shreedhar G., Thomas-Walters L. 2024. Changing human behavior to conserve biodiversity. *Annual Review of Environment and Resources*, 49. https://doi.org/10.1146/annurev-environ-111522-103028

Whittman, T., and **D. E. Bennett**. 2024. Cows or condos: Rancher and land-use outcomes following compensated federal grazing permit waivers. *Rangeland Ecology and Management.* 93:62-71.

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