

CONSERVATION POLICY: GETTING INVOLVED, STAYING ENGAGED,
AND HOW TWS CAN HELP



63RD ANNUAL CONFERENCE OF THE MONTANA CHAPTER OF THE WILDLIFE SOCIETY

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THE MONTANA CHAPTER OF THE WILDLIFE SOCIETY
63rd ANNUAL CONFERENCE, 2025

***“Conservation Policy: Getting Involved, Staying Engaged, and How
TWS Can Help”***

March 4 – 7, 2025

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ABOUT THE WILDLIFE SOCIETY AND THE MONTANA CHAPTER

Founded in 1937, The Wildlife Society's mission is "To inspire, empower, and enable wildlife professionals to sustain wildlife populations and habitats through science-based management and conservation." The Society's membership of nearly 10,000 includes research scientists, educators, communications specialists, managers, conservation law enforcement officers, administrators and students in more than 60 countries.

The principal objectives of The Wildlife Society are:

1. To develop and promote sound stewardship of wildlife resources and of the environments upon which wildlife and humans depend;
2. To undertake a role in preventing human-induced environmental degradation;
3. To increase awareness and appreciation of wildlife values; and
4. To seek the highest standards in all activities of the wildlife profession.

The Montana Chapter of The Wildlife Society was chartered in 1962 and formally organized with the election of its first officers in 1963. Adoption of chapter bylaws occurred in 1964. The mission of the Montana Chapter of The Wildlife Society is to encourage and support effective wildlife management in Montana by fostering development of current and future wildlife professionals, providing science-based information for policy and education, and communicating and collaborating with conservation organizations and the public.

Core Values of the Montana Chapter of The Wildlife Society include:

1. Sound stewardship of wildlife and habitat including the North American Model of Wildlife Conservation;
2. Dedicated, passionate, and responsible wildlife professionals;
3. A diversity of perspectives, backgrounds, and individuals unified behind our core mission;
4. Integrity and ethical conduct; and
5. A land ethic influenced by informed public input.

Our chapter is only as strong as our members and participation. We have numerous committees that need active participation from members. We encourage member nominations to fill our elected positions, and presentations from researchers, managers, and students are always needed to continue communication among the various wildlife organizations in the state! Please see the Committees Page to find out more about the various committees in your chapter, as well as chairperson contacts.

The Montana Chapter of the Wildlife Society has been a primary sponsor of the Intermountain Journal of Sciences (ISSN 1081-3519) since its inception in 1995. This is the official publication for the printed proceedings of our annual meetings and submission of multidisciplinary scientific manuscripts for review and publication.

2024 - 2025 MONTANA TWS CHAPTER OFFICERS

President: Katie (Benzel) Phillips
Past-President: Chad Bishop
President-Elect: Rebecca Mowry
Secretary: Brandi Skone
Treasurer: Heather Harris

Montana State University Student Chapter President: Noah Sechrist
University of Montana Student Chapter President: Mattie Budine

2024 - 2025 MONTANA TWS COMMITTEE CHAIRS

Programs: Rebecca Mowry
Awards: Megan O'Reilly
Education/Information: Brent Lonner
Financial Management: Heather Harris
Membership: Heather Harris
Nominating and Elections: Katie Phillips
Conservation Affairs: Chad Bishop, Sonja Andersen, Lance McNew
Scholarships: Dave Willey – MSU
Chad Bishop – UM
Species of Concern Committee (Ad hoc): Dan Bachen
Effects of Recreation (Ad hoc): Bryce Maxell and Liz Bradley
Grants (Ad hoc): Claire Gower
Intermountain Journal of Sciences (Ad Hoc): Terry Lonner and Rick Douglass

THE MONTANA CHAPTER OF THE WILDLIFE SOCIETY PROFESSIONAL CONDUCT DISCLAIMER

Conference attendees are expected to conduct themselves in a safe, appropriate and professional manner. The Montana Chapter of The Wildlife Society (MTTWS) accepts no liability for harm done by individuals that fail to conduct themselves in a such a manner during formal conference activities. MTTWS is dedicated to providing a safe, professional and harassment-free conference experience for everyone. We do not tolerate harassment of conference participants in any form. Conference participants violating these rules may be sanctioned or expelled from the conference, without a refund, at the discretion of the conference organizers.

CONFERENCE WELCOME

THE 63rd ANNUAL CONFERENCE OF THE MONTANA CHAPTER OF THE WILDLIFE SOCIETY

“Conservation Policy: Getting Involved, Staying Engaged, and How TWS Can Help”

Greetings everyone and welcome to Billings! It’s been a while since we were “out east” in Montana, and we’re looking forward to seeing a different part of the state than we’ve been accustomed to for the last decade or so. For many of us—myself included—MTTWS is something we look forward to all year, and I certainly felt the pressure as your president-elect to give you all a memorable, informational conference. Looking back, it probably wasn’t the smartest thing for me to pick conservation policy as the theme, host it far away from Helena during a legislative session, and do so on the heels of a massive federal administration change...but here we are.

Conservation Policy

Despite the aforementioned challenges, I do feel this year’s conference theme couldn’t be more timely. Not only are we watching a slew of wildlife-related bills move through the Montana Legislature, but we are also facing drastic changes to federal programs that have the potential to affect conservation goals for years to come. I think many of us, as we sit at our desks or hike in the field, feel like we don’t have a voice in the issues that will affect our jobs, our research, and our futures. Often, because of who we work for, we aren’t *allowed* to have a voice. But that’s part of what the Wildlife Society does, by supporting wildlife professionals and allowing us to come together as one to *be that voice*, leaning hard on its legacy of science-based wildlife management. Our plenary speakers will help us understand the processes involved in conservation policy, as well as avenues for engagement individually and through TWS.

We are also trying a hybrid panel session this year, for the first time, in order to allow some folks who couldn’t come all the way to Billings to be involved. So we thank you for your patience and understanding for any technical glitches!

Workshops, Papers, Posters, and Banquet

This year we have five workshops on Tuesday and Wednesday of the conference: 1) Path Analysis and Structural Equation Models, 2) Nature Journaling, 3) Science-based Self-care, 4) Montana’s 2025 State Wildlife Action Plan: Partner Input on Threats and Conservation Actions, and, of course 5) Conservation Policy. There are 52 (!!) oral presentations and 18 (!!) posters included in the program, which is an amazing turnout, hence all the exclamation points! Thank you so much for being willing to share your knowledge and expertise with your colleagues.

You may notice that we do not have a banquet speaker this year. Part of that is because I’m an old fogey who gets tired around 9pm, but it’s also because we were just unable to find a speaker who was available for this date and location. We are very much interested in your feedback on this.

MOVIE NIGHT

“Transmission”

I first saw this documentary a couple years ago when it was played during lunch at a virtual WAFWA Wild Sheep symposium. I know many FWP wildlife biologists have also already seen it, but for me, anyway, it's one of those films I could watch again and again and learn something new every time. The documentary details the efforts of managers, scientists and veterinarians trying to save British Columbia's Fraser River bighorn sheep herd after years of population decline due to disease. This topic is especially poignant for me, as I also manage bighorn sheep herds that continue to be affected by pneumonia pathogens transmitted by domestic sheep and goats. This is one of those issues that could be helped immensely by regulation and policy changes to help prevent disease transmission between wild and domestic animals, yet little is being done in the policy arena. Warning: I cry every time I watch this film.

ACKNOWLEDGMENTS

It's long been the job of the president-elect to put together the annual conference—and, I've found, one of the main reasons people are always hesitant to run for president-elect (myself included). I had the advantage of previously serving on the Executive Board as secretary a few years ago, so I knew what to expect—mostly. Even so, as the conference neared and the tasks and deadlines mounted, I wasn't immune to periodic what-if-everything-goes-wrong stress nightmares.

At first, anyway. And then, as they always do, the Board stepped right up, delegated tasks, and took a lot of the burden off my shoulders. The advantage of our 3-year terms is that I was able to tap into almost a decades' worth of institutional knowledge for conference planning right there in the Board, not to mention being able to count on committees and regular members who have been taking on conference tasks annually for a while now. So if anyone reads this who is thinking about running for president-elect, let me assure you—thanks to all this support, planning the conference was not the gargantuan task I was afraid it would be.

I sincerely thank Chad Bishop (Past President), Katie Phillips (President), and Heather Harris (Treasurer) for their invaluable assistance helping make this conference a success. From giving me advice on speakers and workshops and the conference theme itself, to helping with the long list of planning logistics, to handling sponsorships, and not getting frustrated with my many, many e-mails (at least not to my knowledge)...it's hard to imagine working with a more effective, supportive group of people. Chad was our liaison with the TWS Northwest Section and universities and put together the conference program; Katie led board meetings, helped secure plenary speakers and answered my myriad questions about working with the venue; and Heather stayed on top of all our accounting needs, including issuing payments and refunds and scholarships and awards. And Katie and Heather had the added challenge of new federal restrictions on chapter involvement, and ended up working on everything on their personal time.

I also want to dedicate an entire paragraph to Brandi Skone, our outgoing Secretary. I got off pretty lucky when I was secretary as 2 of the 3 conferences during my term were virtual, thanks to COVID. That meant we hired a company to set everything up through a virtual platform, and a lot of my tasks went

out the window. I forgot all about the chores of running the registration website, arranging oral presentations (and we got a lot of them this year!) into a schedule, and the list of stuff in the preceding paragraph that Brandi also helped with. And of course she's also taking notes at our meetings and sending out regular newsletters to membership. Brandi, you are awesome and we will sincerely miss having you on the Board.

I am immensely grateful to Charlie Booher and Hannah Downey for leading our policy workshop AND serving on our plenary panel, all in the midst of a busy legislative session. I sincerely thank our other plenary speakers: Carlson "Duke" Goes Ahead, Ryan Fitzpatrick, Jonathan Karlen, Kelly O'Conner, and Quentin Kujala, for your immense experience and expertise in conservation policy. Thanks also to Rebecca Newton, Anna Rapson, Thomas Riecke, and Kim Szcodronski for leading workshops. I thank Dan Bachen, Allison Begley, and Lisa Bate for leading working groups.

Additional thanks to the following individuals for their work on behalf of the chapter (in no particular order): Kristina Smucker (student paper/poster judging), Torrey Ritter and Kim Szcodronski (trivia night), John Kuntz (art on this year's conference t-shirt and stickers), Brandi Skone (arranging the conference T-shirt), Carly Segal (cover art on the program), Dan Bachen (abstract formatting guru!), Megan O'Reilly (awards), and Claire Gower (small grants). Suzie Fowle, thank you for all of your efforts to keep our social media accounts updated and membership informed on the latest chapter activities.

A big thank you to our sponsors who enable us to host this conference, and for Tanya Critelli and Sara Hillner with the Billings Hotel and Convention Center for being a joy to work with. Thanks to Kari Kingery, Lance McNew, Alissa Anderson, and Kristina Harkins for running for president-elect and secretary—and if you're not elected, please don't let it stop you from running again! (I totally forgot until recently that I ran for treasurer—and lost—before I became secretary.) To all the paper and poster presenters, session moderators, judges, and many other volunteers—none of this would be possible without you. We also greatly value the contributions of student and chapter advisors from universities and colleges across Montana, and the students themselves, who help run the registration desk and silent auction. This is truly a team effort and so many of you go above and beyond to help make the conference a success. To anyone I missed, I apologize, and please set me straight! I value everyone's contribution, big and small.

To all members of the Montana Chapter of The Wildlife Society, thank you, and please keep fighting the good fight.



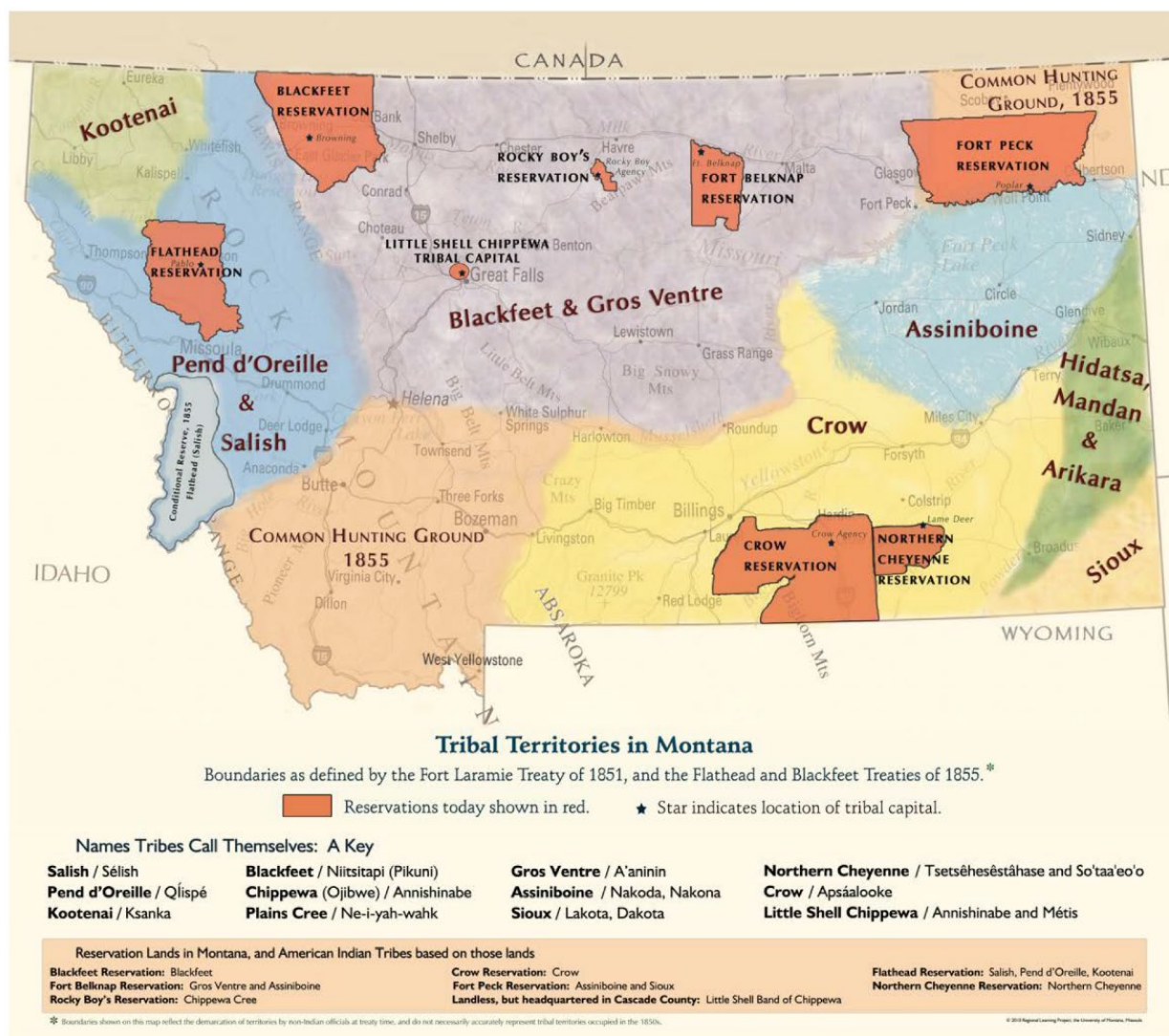
Rebecca Mowry
2024-2025 MTTWS President-Elect

LAND ACKNOWLEDGMENT

Most of us attending the Montana Chapter of TWS annual conference live and work across the land we now call Montana.

Montana is the traditional homeland and common hunting grounds of several tribes, including the Assiniboine, Blackfeet, Chippewa Cree, Crow, Gros Ventre, Kootenai, Little Shell, Northern Cheyenne, Pend d'Oreille, Plains Cree, Salish, Sioux, Hidatsa, Mandan, and Arikara.

Today this land is home to twelve sovereign tribes with tens of thousands of enrolled members. Those of us who are not Indigenous people acknowledge that we are settlers on this land and that we benefit from the colonization and oppression of Indigenous people in the past and present.



2025 NOMINEES FOR EXECUTIVE BOARD OFFICERS

PRESIDENT-ELECT CANDIDATES



Kari Kingery

Kari Kingery is a wildlife biologist, and program manager, for the Confederated Salish & Kootenai Tribes (CSKT) Wildlife Management Program. As a member of the Confederated Salish and Kootenai Tribes, she started her career with CSKT's Wildlife Program as a Biologist Trainee in 2008 while studying terrestrial Wildlife Biology at the University of Montana. Kari earned both her Bachelor of Science Degree (2013) and Masters of Science Degree (2020) from the University of Montana – Missoula. Kari is also an active member of The Wildlife Society, on both a national and state level, receiving her professional certification as a Wildlife Biologist in 2020.

Having been awarded the Alfred P. Sloan's Research Fellowship in 2017, she conducted a master's project on grizzly bear habitat selection and studied the effects of small livestock (chickens, goats, pigs, llamas) on the selection of habitat by grizzly bears in the Mission Valley on the Flathead Indian Reservation. This research was completed while working full-time as a grizzly bear research and conflict management biologist with the CSKT Wildlife Management Program. Upon graduation, Kari continued to work with landowners in reducing carnivore conflicts on the Flathead Reservation until becoming the program manager in 2022.

Wildlife does not exist in a vacuum, nor do they perceive or understand jurisdictional boundary-lines. Because of this, Kari recognizes the importance of coordination and collaboration across all efforts within our fields. Whether it's partnerships with landowners and non-profit organizations; Universities and Colleges; or inter-Agency and Governmental relationships, managing for viable populations of wildlife across all of Montana rests on the incredible collaborative efforts of us all. If elected as TWS president elect, Kari would value the opportunity to continue to expand working on building relationships between our respective agencies and entities, while also highlighting some of the incredible partnerships we have that progress wildlife and habitat conservation today!

PRESIDENT-ELECT CANDIDATES



Lance McNew

Dr. Lance McNew is Associate Professor of Wildlife Habitat Ecology in the Department of Animal & Range Sciences at Montana State University. Lance and his students conduct applied and basic research on the population and spatial ecology of wildlife with special focus on working landscapes. He has worked with collaborators across land and wildlife agencies and NGOs to publish >75 scholarly works, including >50 peer-reviewed journal articles and 7 book chapters. He is editor of the recent (2023) book *Rangeland Wildlife Ecology and Conservation*. Lance's commitment to research has been recognized with two international publication awards from The Wildlife Society (2014, 2016), and as the winner of the MSU's Everyday Research Hero Award in 2023. Dr. McNew is active with the Prairie Grouse Technical Council, Society for Range Management, and The Wildlife Society, having served in officer and committee positions in all three professional societies. He is a Certified Wildlife Biologist®. He is most proud of the 20 undergraduate, graduate, and post-doctoral researchers he has had the privilege to advise and mentor while at MSU, who inspire him almost every day.

Lance has been a member of the faculty at MSU since 2014, where he and his students conduct applied research in wildlife ecology to improve habitat and population management. He also teaches classes in Range & Wildlife Policy and Rangeland Wildlife Ecology & Management. Previously, he has worked as wildlife biologist for both state and federal agencies, including a 3-year stint as statewide big game biologist in Indiana. He has been an active member of TWS for 23 years and has had the privilege to serve six different state chapters (AK, IL, IN, KS, MI, MT) in various capacities. During that time, he has seen a diversity of chapter focus, activity, and effectiveness that he thinks may serve him in a leadership position within Montana TWS. Montana is a special place. Like so many others, the state's unique and abundant natural resources are the reason Lance tried for most of his life to land here. However, he has come to realize that it is the people of Montana that really make this place unique. He has never worked with more progressive, dedicated and motivated wildlife professionals, landowners, and stakeholders than those in Montana. It would be an honor to serve them as President-Elect of Montana TWS.

SECRETARY CANDIDATES



Alissa Anderson

Alissa is running to serve as secretary because Montana TWS has been an important part of her career journey. She has gotten a lot out of attending meetings over the years while a student and an early career professional and would like to give back now that she has the stability and capacity to do so.

In 2012 she received a bachelor's degree from The University of Montana and then worked seasonal gigs for 7 years for the Forest Service, FWP, Glacier Park, Idaho Fish and Game, UM (go griz) and MSU (go cats). She worked on a variety of projects during these years including those focused on nongame critters in NW MT, sharp-tailed grouse habitat, fisher and lynx collaring, seal population dynamics in Antarctica, community science in Glacier, and forestry related wildlife surveys. In 2022 she received a master's degree from Washington State University after studying Canada lynx occupancy and impacts of recreation on wildlife activity in Glacier National Park. She then worked for FWP as the mountain lion monitoring biologist working with many agency partners and houndsmen to study lion populations in the Little Belt and Gallatin mountains. Since February 2024 she has been happily employed in her ultimate dream job, FWP nongame wildlife tech for both regions 1 and 2.

SECRETARY CANDIDATES



Kristina Harkins

Kristina grew up in Carnation, Washington camping, fishing, rock hounding with her family and generally cultivating a passion for wildlife. She was awarded her B.S. in Wildlife Biology from University of Montana, where she was the Student Chapter of TWS secretary and vice president 3 years collectively. She spent a stint of time in Laramie, Wyoming investigating niche partitioning and community ecology dynamics in small mammals throughout sagebrush and prairie grassland ecosystems. She was awarded her PhD in Ecology from the University of Wyoming in 2022. While completing the final few years of her dissertation she lived in a remote community on Prince of Wales Island in Alaska. She moved back to Missoula, Montana in 2022 and began her career in Montana Fish, Wildlife and Parks (FWP) in 2023 as a field coordinator for the Western Montana Sharp-tailed Grouse Reintroduction Project.

Throughout her career in wildlife she's developed an interest in supporting new professionals to keep the conservation and passion for wildlife strong in future generations of wildlife biologists. She's helped organize a grass-roots conference on black-tailed deer in Alaska, overseen the logistics of large TWS events for student chapters as a student and a mentor post-undergrad. Through her career, especially in her current role, she's worked with ranchers, private landowner, FWP peers, federal and NGO biologists, academic partners and the general public. Following these experiences she's developed an interest in community-led, agency-supported conservation to encourage passion for wildlife conservation in the general public. Kristina has been a member of TWS for the past 25 years and has been constantly amazed at the passionate effort towards research and conservation she's seen accomplished through dedicated wildlife professionals.

Kristina would love the opportunity to be further involved at the state chapter level of TWS. Especially in Montana, which has been an un-paralleled community to work in during her career. She enjoys spending her free time hunting and fishing with her friends, hiking with her dogs, and finding all possible wildlife-experience opportunities to do with her daughter.

2025 CONFERENCE DAILY SCHEDULE

Tuesday, March 4

- **Workshops**
 - **Path Analysis/Structural Equation Models:** 9 am–3 pm (Bitterroot)
 - **Nature Journaling:** 10 am–12 pm (Jefferson)
 - **Science-based Self Care:** 3–5 pm (Jefferson)
- **Working Group Meetings**
 - **Harlequin Duck Working Group:** 8:00–9:30 am (Gallatin)
 - **MT Bat Working Group:** 9:30 am–12:00 pm (Gallatin)
 - **MT Bird Conservation Partnership Working Group:** 1–4:30pm (Gallatin)
- **Welcome Reception:** 6–9 pm (Madison)
- **Movie Night:** 9–10:30 pm (Madison)
 - **“Transmission”**

Wednesday, March 5

- **Workshops**
 - **Conservation Policy:** 8 am–12 pm (Bitterroot)
 - **2025 State Wildlife Action Plan:** 9 am–12 pm (Gallatin)
- **Plenary Session:** 1–5 pm (Madison)
 - **Welcome & State of the Chapter Address** (MT Chapter President Katie Phillips)
 - **Plenary Session & Panel Discussion: “Conservation Policy: Getting Involved, Staying Engaged, and How TWS Can Help”** (Introduction by MT Chapter President-Elect Rebecca Mowry)
 - **Panelists:**
 - **Charlie Booher** – Consultant, Watershed Results
 - **Hannah Downey** – Policy Director, Property and Environment Research Center (PERC)
 - **Carlson “Duke” Goes Ahead** – Natural Resource Director, Crow Tribe
 - **Ryan Fitzpatrick** – Fish and Game Department Director, Crow Tribe
 - **Jonathan Karlen** – State Representative and Minority Whip, Montana Legislature
 - **Kelly O’Connor** – Conservation Policy Manager, The Wildlife Society

- **Montana Association of Fish & Wildlife Biologists Meeting**
5–6 pm (Bitterroot)
- **Partners for Americas Meeting:** 5–6 pm (Parlor 1010)
- **Student-Professional Mixer/Trivia Night:** 6–9 pm (Gallatin)

Thursday, March 6

- **Annual Business Meeting for the MT Chapter of TWS**
7:30–9:30 am (Jefferson) = ****ALL ARE ENCOURAGED TO ATTEND****
- **Concurrent Session A:** 8:30 am–12 pm (Gallatin)
- **Concurrent Session B:** 8:30 am–12 pm (Gardiner)
 - **Morning Break:** 9:50–10:20 am
- **Lunch provided by MT TWS:** 12-1:30 pm (Madison)
- **Concurrent Session A:** 1:30–5:00 pm (Gallatin)
- **Concurrent Session B:** 1:30–5:00 pm (Gardiner)
 - **Afternoon Break:** 2:50–3:20 pm
- **Poster Session:** 5–6 pm (West Convention Center Foyer)
- **Awards Banquet & Silent Auction:** 6–9 pm (Madison)

Friday, March 7

- **Concurrent Session A:** 8:30–11:40 am (Gallatin)
- **Concurrent Session B:** 8:30–11:40 am (Gardiner)
 - **Morning Break:** 9:50–10:20 am

CONFERENCE LOGO ARTIST AND WINNER OF THE 2025 STUDENT ARTWORK CONTEST



Carly Segal



Carly Segal has been curious and inspired by the outdoors from a young age exploring trails, creeks, and tide pools in Northern California. She has since worked a number of seasonal outdoor education or wildlife technician positions around the country including several years in Yellowstone National Park as a technician for the Yellowstone Bison office and Yellowstone wolf and cougar projects. She completed her Masters' degree at Montana State University researching biodiversity and community ecology of arthropods, bison, and grasslands. Now she is working on a PhD assessing taxonomic, functional, and phylogenetic diversity of alpine communities in the Rockies. She is an avid trail runner, loves traveling through the backcountry on foot, boat, or skis. Carly finds that incorporating art into her life helps her be a better biologist as she is forced to stop and look closely at her surroundings, she rarely heads into the backcountry without a sketch book and enjoys oil painting in her front country life. She aspires to become a research biologist and hopes to be able to continue to incorporate backcountry work into her studies.

About the cover

This year's conference theme: *Conservation Policy: Getting Involved, Staying Engaged, and How TWS Can Help* challenged me to convey many facets of conservation work. I wanted to show hope, and success, and the hidden unknowns that make this work challenging but worthwhile. I wanted to highlight concrete actions like wildlife overpasses that allow humans and wildlife to share a space, satisfying the goals of a multitude of stakeholders at once. I also wanted to reference the discoveries we continue to make in ecology, such as just which species benefit from something like a wildlife overpass. For me the constant surprises that plants and wildlife still hold for us is part of why I love this work and what keeps me engaged. - Carly

PROFESSIONAL DEVELOPMENT WORKSHOPS

We have five workshops available this year. One workshop covers path analysis/structural equation models for use in wildlife data analyses to better inform conservation decisions. Our second workshop is focused on nature journaling – come rediscover your inner naturalist! Our third workshop draws on science to help us better take care of ourselves in times of stress while finding ways to achieve a healthier life balance. Our fourth workshop focuses on conservation policy; participants will learn strategies to better understand and influence formal and informal policy. Finally, our fifth workshop is tied to Montana’s 2025 State Wildlife Action Plan, where participants will be asked to provide input on species threats and conservation actions.

Path Analysis/Structural Equation Models

Instructor: Thomas Riecke (University of Montana)

Date and Location: Tuesday, March 4, 9 am – 3 pm (Bitterroot)

Cost and participant limits: \$35 for professional, \$15 for student/retiree; Limit 50 participants

Ecological systems are complex and interconnected. This often creates collinearity among covariates, leading to challenges in conservation decision making. As a specific example, peaks in abundance of a harvested species might result in density-dependent effects as well as liberalized harvest regulations, creating confounding between the effects of harvest and density-dependence. Structural equation models are exceptionally useful for resolving this type of uncertainty. SEMs allow researchers to construct models with multiple ‘response’ variables, and estimate direct and indirect effects of covariates on parameters of interest. This workshop will give a broad overview of the foundations of structural equation modelling. In the morning, we’ll outline the theory underlying path analysis (Layton-Matthews et al. [2024] *Journal of Animal Ecology*), latent variables (Grace et al. [2010] *Ecological Monographs*), and cross-lags (Van de Pol & Brouwer [2021] *Journal of Animal Ecology*). We’ll then devote the afternoon to application using packages such as ‘piecewiseSEM’ and ‘lavaan,’ and also provide a brief tutorial on the construction of SEMs using Bayesian software.

***Some experience with R and/or regression will be highly beneficial (necessary) for the afternoon component.*

Nature Journaling

Instructor: Rebecca Newton

Date and Location: Tuesday, March 4, 10 am – 12 pm (Jefferson)

Cost and participant limits: \$35 for professional, \$15 for student/retiree; Limit 30 participants

Nature journaling is a great way to enrich skills of observation, curiosity, and awareness. This practice has been employed for centuries by naturalists, scientists, and artists. Nature journaling is an accessible practice requiring only basic tools and a sense of curiosity. No previous art experience necessary! In this

workshop we will explore several formats for nature journaling, practice approaching subjects with guiding questions, and document observations using combinations of words, symbols, numbers, and pictures. Instruction will cover techniques for sketching and recording observations in the field, and in-class sketching exercises. This will be an interactive class in which attendees will actively participate and carry out real-time exercises. Basic supplies will be provided. Attendees are also welcome to bring their own notebook or sketchbook and wet/dry media if they prefer.

Science-based self-care: How modern neuroscience informs whole-health practices to balance work, life, and relationships that won't burn you out!

Instructor: Anna Rapson (Licensed Clinical Social Worker and Licensed Marriage and Family Therapist)

Date and Location: Tuesday, March 4, 3 – 5 pm (Jefferson)

Cost: \$25 for professional, \$10 for student/retiree; Limit 50 participants

Learning to manage our stress and care for ourselves is essential to staying engaged with what we value and care about. Yet, how do we do so when there's already so much to fit in? Sustaining a work-life balance can be difficult, and managing stress healthily can be even more challenging.

Since we can't always change what's happening around us, we can learn to change how we relate to what's happening inside us. Our thoughts, emotions, and sensations are data for how we respond (or react!) to external circumstances.

Neuroplasticity confirms we can adjust maladaptive patterns and rewire our brains in a way that best serves our physical, emotional, and mental health. Adaptive strategies can replace problematic or unhelpful patterns with repetitive practice. Psychoneuroimmunology and interpersonal neurobiology emphasize the importance of paying mindful attention to the inner workings of how we move through pleasant, neutral and unpleasant experiences.

This workshop will incorporate modern neuroscience and the science of mindfulness to inform practical, evidence-based applications for managing stress, creating time for worthwhile self-care, and improving intra- and interpersonal relating. In it, we will cover:

- “Psychological safety” – what it is, why it's essential, and how to create it for a functional (vs. dysfunctional) workplace
- How to cope in the midst of feeling anxious, or even powerless, over what's outside of your control
- What are mind states and what is essence?
- Renouncing “judging, comparing, and fixing” mind states
- Attending to your well-being from the inside out
- Revisiting imposter syndrome – how to work with self-doubt and/or comparative judgement
- Relational health in tense settings
- Identifying, interrupting, and changing patterns that contribute to frustration or unease

No annoying or awkward icebreakers included! Ultimately, the purpose of this workshop is to empower you to experience greater satisfaction in the interconnection of your professional and personal lives.

Conservation Policy

Instructors: Charlie Booher (Watershed Results) and Hannah Downey (Property and Environment Research Center [PERC])

Date and Location: Wednesday, March 5, 8 am – 12 pm (Bitterroot)

Cost: \$35 for professional, \$15 for student/retiree; Limit 30 participants

Many wildlife students still don't have an opportunity to take a policy class. Those who do have the opportunity typically experience either a recitation of agency structure, enabling legislation, and treaties, or a collection of stories from folks who have worked in the business of wildlife policy for some time. While both are valuable, we aim to offer guidance on how to understand and influence formal and informal policy in all its forms (private, public, local, corporate, state, federal, etc.).

Montana's 2025 State Wildlife Action Plan: Partner Input on Threats and Conservation Actions

Instructors: Kimberly Szcodronski and Kristina Smucker (Montana Fish, Wildlife, and Parks)

Date and Location: Wednesday, March 5, 9 am – 12 pm (Gallatin)

Cost: \$10; Limit 50 participants

Montana Fish, Wildlife and Parks is leading efforts to revise Montana's State Wildlife Action Plan (SWAP), which is due to the U.S. Fish and Wildlife Service in October 2025. SWAPs identify Species of Greatest Conservation Need and their habitats, describe threats that impact those species and habitats, and identify conservation actions to address those threats. We are striving for Montana's SWAP to be a collaborative effort that helps to inform conservation work for all partners who work on wildlife and habitat conservation in Montana. To accomplish that, we are engaging with our conservation partners between December 2024 and August 2025 by providing draft SWAP products that are ready for review and feedback. We would like to use the Montana Chapter of The Wildlife Society conference as an opportunity to meet in-person with our partners. In this workshop, we will: 1) update partners on our progress on the SWAP revision, 2) provide an overview of threats and conservation actions in the SWAP, and 3) form breakout groups to review and update the threats and conservation actions.

PLENARY SESSION ABSTRACT

“Conservation Policy: Getting Involved, Staying Engaged, and How TWS Can Help”

Change is coming fast and furious to the wildlife of Montana, be it from increasing human populations and associated development, to novel diseases and invasive species, to climate change. At the same time, funding and support for nongame wildlife is growing, conservation easements continue to pop up on important habitats across the state, and agencies are partnering to help connect fragmented wildlife populations and reduce the impacts of roads and fences. And the Recovering America’s Wildlife Act continues to languish in legislative limbo in Washington, D.C....it may have failed in 2022, but it’s not dead yet.

When I think about our wildlife and other natural resources, there’s a lot to worry about AND a lot to hope for. Most of us wildlife professionals and students probably go about our daily lives wondering what will happen, and feeling like the fate of our natural world is in somebody else’s hands. But it doesn’t have to be that way. There are numerous organizations out there working on conservation policy; among them is our flagship Wildlife Society, which helps bridge the gap between professionals and politicians in order to effect meaningful policy changes that will preserve the things we’ve dedicated our lives to managing, studying, and protecting. TWS has long been a powerful voice in Washington and has developed tools to help state chapters tackle local policy issues and add our voice to national ones.

My hope in bringing this topic to you for our 2025 conference theme is to help our membership better understand how conservation policy development works across state, tribal, and national levels. And I want to get you fired up about it. Ultimately, I want the Montana Chapter of the Wildlife Society to be more actively engaged with policy—and we need YOU!



PLENARY SESSION SPEAKERS



Charlie Booher



Charlie Booher is a Consultant at Watershed Results who specializes in natural resource conflict resolution. He gathers diverse interests, identifies the source of the problem, and supports the discovery of amicable paths forward. Charlie is dedicated to building a better world for people and for wildlife through coalition building and strategic advocacy at all levels of government. He has the great privilege of representing some of this country's oldest, largest, and most generous conservation organizations in Helena and in Washington, DC. Charlie previously served in communications and government relations roles for The Wildlife Society, the Theodore Roosevelt Conservation Partnership, and Michigan United Conservation Clubs. He worked in the Executive Office of the Texas Parks & Wildlife Department on translating research findings into better governance and was a Boone and Crockett Club Wildlife Conservation Fellow at the University of Montana. Charlie holds undergraduate degrees in fisheries & wildlife conservation and public policy from Michigan State University and graduate degrees in wildlife biology, public administration, and natural resource conflict resolution from the University of Montana. Charlie is an Associate Wildlife Biologist © and a Professional Member of the Boone and Crockett Club. Outside of the office, you can find him hiking in the mountains of Western Montana and re-learning how to hunt and fish in the Northern Rockies.



Hannah Downey



Hannah Downey is the policy director at the Property and Environment Research Center (PERC), leading policy strategy and government affairs efforts to implement key policy reforms based on PERC’s groundbreaking research. She has applied her passion for the outdoors to advance lasting conservation wins since joining PERC in 2015. Hannah has testified before Congress and works closely with policymakers at the federal and state levels on conservation issues, and her work has been featured in media outlets including *The Wall Street Journal* and *The Hill*. Though she grew up in the Midwest, Hannah was lucky enough to spend her summers in Montana and worked as a backpacking guide in the Absaroka-Beartooth Wilderness throughout college. Hannah now calls Bozeman home and fills her spare moments coaching youth mountain biking, volunteering in the local schools, and enjoying the wonderful outdoors every way she can.

Carlson “Duke” Goes Ahead



Since 2021, **Carlson “Duke” Goes Ahead** has been the Natural Resource Director for the Crow Tribe with oversight of the Fish and Game Department, Buffalo Pasture Department, and Apsaalooke Cattle Department. From 2003-2016 he was elected to the Crow Tribal Legislative Branch for the Arrow Creek District, holding positions as Speaker of the House from 2006-2007 and Revenue Committee chairman from 2008-2016. From 2016-2020 he was Vice Chairman of the Crow Tribe Executive Branch.

Ryan Fitzpatrick



Ryan Fitzpatrick has been the Crow Tribe’s Fish and Game Department Director since 2020. He previously served as Buffalo Pasture Director from 2000-2004 and counselor with the Addiction Recovery Program-Seven Hills Treatment Center from 2005-2008.



Jonathan Karlen



Jonathan Karlen is in his second term as a State Representative in Missoula County and serves as Minority Whip. He has served on the Fish, Wildlife and Parks, Natural Resources, and the Environmental Quality Council. He was President of the University of Montana Student Chapter of The Wildlife Society and holds a Wildlife Biology bachelor's from UM with a climate change students minor, as well as a Masters in Public Administration. He works as a Research Fellow with the UM Boone and Crockett Wildlife Conservation Program.



Kelly O'Connor



Kelly O'Connor is the Conservation Policy Manager for The Wildlife Society (TWS). She coordinates TWS' advocacy and policy engagement to ensure it reflects the scientific expertise of TWS' members across North America and beyond. She also manages TWS' Conservation Affairs Network, a grassroots network of wildlife professionals across TWS chapters and sections dedicated to advancing wildlife conservation policy issues. Kelly leads the development of policy engagement resources for TWS members and supports the local and regional advocacy efforts of TWS chapters and sections. Kelly received her Bachelor's and Master's of Science from the University of Connecticut, where she studied the importance of early successional forests to imperiled wildlife in the northeast. She's especially interested in the development and implementation of policy for listed species. Kelly lives in north central Florida and enjoys spending her free time birding and snorkeling Florida's springs with her husband, son, and dog.

SCHEDULE OF ORAL PRESENTATIONS

Thursday Morning, March 6th		
	CONCURRENT SESSION A: Gallatin Moderator: Ray Vinkey	CONCURRENT SESSION B: Gardiner Moderator: Lance McNew
8:30	N. BEALER - Elk Respond to Differential Hunter Access Management and Harvest Regulations in a Mixed Public and Private Landscape	K. HARKINS - Restoring Western Montana's Sharp-tailed Grouse (<i>Tympanuchus phasianellus</i>) - Progress Report
8:50	**D. BIRD – Identifying Migration Routes and Stopover Sites on the Blackfeet Reservation (Montana, USA) and the Surrounding Landscape	**L. DYKSTRA - Dispersal Movements and Habitat Selection of Sharp-tailed Grouse Reintroduced to Western Montana
9:10	**A. STEWART - Using adaptive management to understand elk population dynamics and distributions in northwest Montana	K. PLOURDE - Assessing Sharp-tailed Grouse Occupancy and Abundance Across Eastern Montana
9:30	A. BEERS - Using Machine Learning and Remotely Sensed Data to Improve Models of Elk and Mule Deer Nutritional Landscapes in Western Montana	J. PAYNE - A Decade of Habitat Change on the Spotted Dog Wildlife Management Area
9:50	BREAK Moderator: Sonja Andersen	BREAK Moderator: Erim Gomez
10:20	**A. WINDOW - Intra-seasonal Shifts in Summer Elk Diet Composition	S. HILTY - Summer Colony Count Efforts for Bats in Montana
10:40	**T. WEEKS - Effects of Timber Harvest on Elk Summer Nutrition	A. LITT - Bat homes in the Big Sky – Habitat Characteristics of Northern Myotis (<i>Myotis septentrionalis</i>) in Northeastern Montana
11:00	R. RAUSCHER – Managing Chronic Wasting Disease in Deer Using a Split Hunting Season Structure	D. BACHEN - Insight From Four Years of Structured Acoustic Monitoring of Bat Species
11:20	**C. PADILLA - Disease, Climate, and Abundance Impacts on Bighorn Sheep Lamb:Ewe Ratios in New Mexico	J. ORAM - ValidationExplorer: A Tool for Simulation-based Investigations of Study Design Elements to Estimate Relative Activity Rates and Occurrence Probabilities for Bat Assemblages
11:40	S. WELLS - Evaluating Contact Risk Factors Between Wild and Domestic Sheep in Montana	**B. S. DOMSCHOT - A Framework for Using CORT as a Physiological Biomarker
12:00 PM	LUNCH	LUNCH

** Student Presenter

Thursday Afternoon, March 6th

	CONCURRENT SESSION A: Gallatin Moderator: Emily Mitchell	CONCURRENT SESSION B: Gardiner Moderator: Nicole Hussey
1:30	S. BRADFORD - Why Biological Recovery Has Not Been Enough to Successfully Delist the Grizzly Bear	S. CAPOCCIA - Relative Risk of Waterbird Species on the Berkeley Pit: A Mortality Assessment of 18 Taxa.
1:50	**M. VINKS - Spatio-temporal Response of Grizzly Bear Habitat Selection to Harvested Forests and Fire Disturbance in the Northern Continental Divide Ecosystem	H. SPECHT - Effects of Metal Contamination on Bird Communities in Western Montana
2:10	**E. LOGGERS - Grizzly Bears Change Their Behavior Near Trails in a Protected Area	**M. VENEGAS - Drivers and Impacts of Mining Contaminants in Insectivorous Songbirds at the Mt Haggin Injured Area, Anaconda, MT
2:30	**W. SARMENTO - Drones Outperform Dogs for Hazing Bears: A Comparison of Aversive Conditioning Tools	**B. CREEL - Songbird Telomere Length Reflects Prey Loss More than Metal Exposure from Mine-waste Contamination
2:50	BREAK Moderator: Kelvin Johnson	BREAK Moderator: Alissa Anderson
3:20	N. KLUGE - Canada Lynx Monitoring and the Plan for Conservation in the Western United States	**H. HOLMES - Where are all the Ducks: Predicting Harlequin Duck Occupancy in Western Montana and Northern Idaho
3:40	**N. HELMSTETTER - Confronting Challenges in Distribution Modeling for Marten in Western Montana	**L. HATCH - A Bit of a Brome Problem - Proposed Work Investigating Interactions Between Declining Grassland Songbird Demographics and Invasive Plants in Central Montana
4:00	E. MITCHELL - Montana Swift Fox Occupancy Survey	**C. BRESNAN - Fission-Fusion Movement Dynamics of Semi-Free Roaming Bison in North-central Montana
4:20	C. ANTON - Integrating Multiple Data Sources for Long-Term Black Bear Monitoring, A Hierarchical Modeling Approach	**C. PIPER - Dam it all! Using Remote Sensing Data to Track Persistence of Beaver Dams in Prairie Streams
4:40	D. MCHUGH - Examining Factors Potentially Affecting Spring and Fall Black Bear Harvest Rates, Absaroka/Beartooth Mountains, Montana	O. KANTER - Pygmy Rabbit Occupancy and Habitat Relationships in Southwestern Montana Through Participation in Collaborative Research
5:00 PM	ADJOURN	ADJOURN

**** Student Presenter**

Friday Morning, March 7th

	CONCURRENT SESSION A: Gallatin Moderator: Kristina Harkins	CONCURRENT SESSION B: Gardiner Moderator: Jarrett Payne
8:30	H. SIPE - Evaluating the Performance of Occupancy Models for Wolf Management in Montana Through Simulation	K. DENNY - Measuring Vegetation Characteristics at Greater Sage-grouse Nest Sites One Year After Nest Fate, is it as Effective as Traditional Methods?
8:50	S. SELLS - Evolving Models for Evolving Conditions: Updating Montana's Wolf Group Size Model for iPOM	D. MESSMER - Winter Temperature - Not Grazing, Drought, or Breeding Season Weather - Impacts Dynamics of a Northern Great Plains Greater Sage-grouse Population
9:10	H. SIPE - Management Strategy Evaluation for Informing Decisions About Wolf Management and Conservation	T. HAYNAM - Standardized Broad-Scale Mapping of Sage-Grouse Habitat Suitability Across Montana and the Dakotas
9:30	N. DECESARE - Moose Population Dynamics in Montana	C. BISHOP - Montana Chapter of The Wildlife Society's Efforts to Inform Conservation Policy
9:50	BREAK Moderator: Lindsey Parsons	BREAK Moderator: Kim Szcodronski
10:20	J. DEVOE - Pronghorn Movement and Population Ecology	M. TOSHACK - Montana Bumble Bee Atlas - A Collaborative Effort to Conserve Bumble Bees through Community Scientist Observations
10:40	C. HANSEN - Drivers of Variation in Pronghorn Population Dynamics in Montana	D. BACHEN - Leveraging Conservation Status Assessments to Highlight Threats, Trends, and Information Needs of Montana's Species of Concern
11:00	M. MCDEVITT - Connecting Habitat and Survival Of A Dynamic Species: Exploring Landscape Drivers Of Pronghorn Survival Applying A Novel Metric Of Habitat Quality	K. MARTIN - Climate-Informed Disease Threat Assessment for Montana's Species of Greatest Conservation Need
11:20	K. FRANK - Managing Wild Horse Herds with Limited Resources	W. MOSS - Applying the Resist-Accept-Direct Framework to Wildlife Health Management
11:40 AM	ADJOURN	

LIST OF POSTER PRESENTATIONS

Thursday, March 6
West Convention Center Foyer 5-6 pm
D. ARTHUN - Montana's Hidden Crisis: Nitrates in Rock Creek
**A. BAIZE - A Framework for Prioritizing Attractants to Reduce Black and Grizzly Bear Conflicts
**M. BUDINE - Interspecific Interactions: Exploring the Reproductive Phenology of Feral Horses and Their Interaction with Native Ungulates in Alberta, Canada
**K. DURGLO - Developing a Resource Selection Function Model to Predict Moose Habitat Selection on the Flathead Indian Reservation
E. ENGELHARD - Range Distribution and Occupied Towns of Chimney Swifts in Montana
M. FYLLING - Evaluating Nest Success and Migratory Behavior of Intermountain Grassland Species
**K. GROEN - Ecological Consequences of Selective Logging: Insights from the Chiquibul Forest Reserve
E. GUSTILO - Floral Selection and Value to Bumble Bees in Montana and the Dakotas
D. JOHNSON - On the Search for Lizards: Finding a Cryptic Critter on a Varied Landscape

**L. JOHNSON - Evaluating the Effect of Sensory Misinformation on Mesocarnivore Foraging Activity
**A. KELLER - Long-term Impacts of Elk Browsing on Aspen Recruitment in the Greater Yellowstone Ecosystem
D. KEMP - Exploring Trends in Human-Grizzly Bear Conflicts Amid Occupied Range Expansion
**A. LEAVITT - Assessing Bioacoustic Detection and Monitoring Methods and Habitat use of Nesting Great Gray Owls in Southwest Montana
**E. LOGGERS - Long-term Insights from Stable Isotope Analysis of Foraging Strategies of Grizzly Bears in a Dynamic Ecosystem
**I. NAMIR - Applying Dead-reckoning Techniques to Monitor Movements and Map the Burrow Systems of a Fossorial Species, the Black-tailed Prairie Dog (<i>Cynomys ludovicianus</i>)
**M. SALVO - Avian Radar Track Identification using Machine Learning Models
M. TOSHACK - Montana Bumble Bee Atlas - A Collaborative Effort to Conserve Bumble Bees through Community Scientist Observations
**M. WHITLOCK - Analyzing Grizzly Bear Movement Patterns: Insights for Identifying Females with Newborn Cubs Using Telemetry Data

**** Student Presenter**

ABSTRACTS - ORAL AND POSTER PRESENTATIONS

Alphabetical by Presenter's Name

*Indicates Presenter

**Indicates Student Presentation

(ORAL PRESENTATION) INTEGRATING MULTIPLE DATA SOURCES FOR LONG-TERM BLACK BEAR MONITORING, A HIERARCHICAL MODELING APPROACH

Colby Anton*, Montana Fish, Wildlife & Parks, Missoula
Nathaniel Bowersock, Missouri Department of Conservation,
Kristen Brzeski, Michigan Tech University,
Tonya Chilton-Radandt, Montana Fish, Wildlife & Parks,
Melissa Hogland-Reynolds, Wildlife Research and Education Foundation,
Wayne Kasworm, US Fish and Wildlife Service
Jesse Lewis, Arizona State University
Jerod Merkle, University of Wyoming
Dana Morin, Mississippi State University
Molly Parks, Montana Fish, Wildlife & Parks
Michael Proctor, US Fish and Wildlife Service
Thomas Radandt, US Fish and Wildlife Service
Justin Teisberg, US Fish and Wildlife Service
Brian Wakeling, Montana Fish, Wildlife & Parks, Missoula

Large carnivores can be challenging to manage. In the mid-1990s, early evaluations of black bear life history established the initial management thresholds (based on harvest data) to evaluate the effect of harvest on black bear populations in Montana. These thresholds were applied to management of black bears in Montana beginning in 1996. After a large-scale population density and demography study in the 2000s, Montana Fish, Wildlife & Parks is developing a black bear monitoring program that uses historical and contemporary data from field studies and harvest statistics to advance monitoring methods. Our approach includes 1) using spatial capture-recapture (SCR) with noninvasive genetic sampling (NGS) to estimate population density and abundance, and 2) extrapolate density estimates from local study areas to surrounding bear management units and the larger ecoregions using SCR population estimates and resource selection function models (RSF). This effort will be replicated across 5 ecoregions in the state and each ecoregion will be revisited every 5 years to produce population indices and evaluate harvest effects. Our first 2 years of NGS was successful with nearly 1,500 samples collected across 2 study areas in western Montana. We used GPS locations from 362 black bears (228M, 134F) radiomarked during 2000-2022 from 8 different study areas in Montana, Idaho, and Wyoming to train and validate RSF models. This approach to hierarchical modelling provides insight on the feasibility of monitoring black bears at large spatial scales on mixed use landscapes where managers seek robust tools for regulated harvest.

(POSTER PRESENTATION) MONTANA’S HIDDEN CRISIS: NITRATES IN ROCK CREEK

David Arthun*, Carbon County Resource Council, Red Lodge, Montana USA
George Zaimes, Department of Forest and Natural Environmental Sciences, Democritus University of Thrace, Drama, Greece

Exurban expansion can degrade significantly stream water quality. This study was conducted on Rock Creek of the Clark’s Fork of the Yellowstone River in southcentral Montana, USA. The impact from recent exurban expansion was evaluated by a baseline study measuring total suspended solids (TSS), total phosphorus (TP), total nitrogen (TN) and nitrites (NO₂) and nitrates (NO₃) together. This was part of a larger study by Montana Department of Environmental Quality to assess water quality, identify sources of pollution and develop total maximum daily loads (TMDL). Water samples were measured for these analytes at nine (2022) and 11 (2023) locations with different land-uses over seven periods (both years). Seasonal spikes, corresponding to runoff (2022, late May), occurred in TSS, TP and TN. Data from 2023 showed similar but reduced levels occurring in June for TSS and TP. Total suspended solids, TP, NO₂ and NO₃ concentrations increased by location year over year, 2022 to 2023. The high relative concentrations of NO₂ and NO₃ in Rock Creek are primarily associated with exurban expansion, a significant threat to stream quality and wildlife habitat in Montana. The results will assist county planners in land use decisions.

(ORAL PRESENTATION) LEVERAGING CONSERVATION STATUS ASSESSMENTS TO HIGHLIGHT THREATS, TRENDS, AND INFORMATION NEEDS OF MONTANA’S SPECIES OF CONCERN

Dan Bachen*, Montana State Library Natural Heritage Program, Helena

Since the late 1980s the Montana Natural Heritage Program has maintained a list of Species Of Concern (SOC) to highlight rare and imperiled species within the State. This list is used by management agencies and in project planning and environmental review to mitigate impacts to these species and focus research and conservation. Ranking currently uses a standardized assessment following guidance from NatureServe that scores species on their rarity, threats, and trends. Recently the program has aggregated this information in a relational database framework that allows greater access to these data and comparison of ran factors across species and allows analysis of common threats and negative trends as well as highlighting information needs for highly threatened species or those that are undergoing rapid decline. In this analysis we found that the top three threats of moderate to high severity were impacts of climate change, habitat loss through conversion to agriculture, and impacts of invasive species or disease. Across vertebrate SOC species 46% had trends from slight declines to stable or increasing, 11% were undergoing moderate to significant declines, and 43% had no trend data available. Taxonomic groups with broad structured monitoring programs such as birds and fish had higher numbers of species with current trend data while mammals and reptiles generally lacked such data. Many species with high threats were actively monitored, but the current status of other species remains uncertain as trend data are unavailable. Through this analysis we were able to identify species most at risk of unrecorded declines.

(ORAL PRESENTATION) INSIGHT FROM FOUR YEARS OF STRUCTURED ACOUSTIC MONITORING OF BAT SPECIES

Dan Bachen*, Montana Natural Heritage Program of the Montana State Library, Helena

Shannon Hilty, Montana Fish Wildlife and Parks, Helena

Emily Almberg, Montana Fish Wildlife and Parks, Bozeman

Alexis McEwan, Montana Natural Heritage Program of the Montana State Library, Helena

In 2020, a partnership of state and federal entities initiated annual surveys of bats across the state using acoustic detector-recorders, primarily to assess the impacts of the fungal disease White-Nose Syndrome (WNS). Through 2024 this effort has resulted in the collection of 4,173,501 bat calls from 1,879 sites. Analyses of these data provide insight into the status of many of Montana's species at both the state and federal level. Spotted Bat (*Euderma maculatum*) was once considered among the rarest mammal species in North America. Recordings have confirmed the species' rarity, however, the species is more widely distributed and recorded near potential roost types that differ from typical large cliff roosts. Hoary Bat (*Lasiurus cinereus*) is vulnerable to collisions at wind turbines and analysis of these data demonstrate declining occupancy within Montana. Little Brown Myotis are vulnerable to WNS and have suffered catastrophic declines across central and eastern regions of North America. Occupancy for the species has remained stable across Montana, but roost and capture data support widespread declines in abundance. Previous analysis of acoustic data infer WNS impacts on the number of calls recorded per night on acoustic detectors across *Myotis* species. Acoustic monitoring data collected within the state have been submitted to the North American Bat Monitoring Program and are being used in ongoing assessments of WNS and wind-energy impacts at the continental scale, ensuring Montana's representation in national efforts to understand and mitigate these threats.

**** (POSTER PRESENTATION) A FRAMEWORK FOR PRIORITIZING ATTRACTANTS TO REDUCE BLACK AND GRIZZLY BEAR CONFLICTS**

Anna Baize*, Wildlife Biology Program, Human Dimensions Lab, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula

Brianna Lipp, Wildlife Biology Program, Human Dimensions Lab, University of Montana, Missoula

Alexander Metcalf, Wildlife Biology Program, Human Dimensions Lab, University of Montana, Missoula

Sarah Sells, Wildlife Biology Program, Ecology & Evolution Program, U.S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula

Human-wildlife conflict is a growing challenge worldwide, particularly in regions where species must navigate fragmented landscapes and increasing interactions with people. For grizzly and black bears, unsecured attractants such as food, garbage, and livestock carcasses can bring bears into close proximity to humans, leading to increased conflicts and undesired outcomes for people and bears alike. However, securing attractants often requires significant financial or time investments, leading to gaps in mitigation efforts. This study aims to develop a

prioritization framework to identify attractant reduction efforts with the greatest potential for reducing human-bear conflict at the community level. Drawing from a community-based social marketing model, we adapt a behavior ranking methodology to the context of wildlife management. This adapted framework will help communities identify priority attractants to target by considering the likelihood of behavior change among residents, current rates of securement, and the extent to which each attractant contributes to overall human-bear conflict. To test this framework, we focus on the Bitterroot Valley in Western Montana, a region currently home to black bears but without an established grizzly bear population. This will allow us to evaluate the framework in managing black bear conflicts while preparing for the potential recovery of grizzly bears in the area. Ultimately, this framework is designed to inform mitigation efforts in regions facing conflicts with black or grizzly bears, offering a guide for resource allocation among agencies and organizations.

(ORAL PRESENTATION) ELK RESPOND TO DIFFERENTIAL HUNTER ACCESS MANAGEMENT AND HARVEST REGULATIONS IN A MIXED PUBLIC AND PRIVATE LANDSCAPE

Nicole Bealer*, Research Unit, Montana Fish, Wildlife & Parks, Bozeman, Montana
Shane Petch, Wildlife Division, Montana Fish, Wildlife & Parks, Stanford, Montana
Jay Rotella, Department of Ecology, Montana State University, Bozeman, Montana
Jesse DeVoe, Research Unit, Montana Fish, Wildlife & Parks, Bozeman, Montana
Cory Loecker, Wildlife Division, Montana Fish, Wildlife & Parks, Great Falls, Montana
Kelly Proffitt, Research Unit, Montana Fish, Wildlife & Parks, Bozeman, Montana

Wildlife managers across the western U.S. are increasingly tasked with managing elk populations that exceed population goals and strain public and landowner tolerance with problematic distributions. Reducing these populations through hunter harvest and achieving desirable distributions can be challenging on mixed landscapes of public and private lands where hunter access management decisions vary among landowners. We used GPS data from 58 female elk in the Devil's Kitchen elk population in central Montana, USA to evaluate how hunter access management, harvest regulation, and other landscape factors influence elk movements and habitat selection during hunting season. We fit Bayesian multistate models to evaluate factors influencing the daily probability of an elk transitioning between hunter access strategies, then constructed resource selection functions describing female elk habitat selection in relation to hunter access management, harvest regulation, and other landscape factors in four distinct periods during the hunting season. Our results indicate that female elk generally selected for less hunter access and more restrictive harvest regulations. Female elk were almost always more likely to remain in areas with the same hunter access strategy, but movements between different hunter access strategies were most likely during the general rifle season. During the early shoulder and archery seasons, hunter access management appeared to primarily drive female elk habitat selection and elk were more likely to transition from open access lands to less accessible private lands. During the general and late shoulder seasons, harvest regulation appeared to primarily drive female elk habitat selection and movements between hunter access strategies.

(ORAL PRESENTATION) USING MACHINE LEARNING AND REMOTELY SENSED DATA TO IMPROVE MODELS OF ELK AND MULE DEER NUTRITIONAL LANDSCAPES IN WESTERN MONTANA

Aidan Beers*, Wildlife Biology Program, University of Montana, Missoula
Kelly Proffitt, Montana Fish, Wildlife, and Parks, Bozeman
Nick DeCesare, Montana Fish, Wildlife and Parks, Missoula
Chad Bishop, Wildlife Biology Program, University of Montana, Missoula

The availability of nutritional resources for elk and mule deer is one of the defining characteristics of their habitat in Montana, representing a key bottom-up factor that drives individual- and population-level responses. Elk and mule deer conservation and management decision-making is therefore improved by quantifying the environmental characteristics that drive spatial and temporal heterogeneity in nutritional abundance and quality at landscape scales. Much of the existing work modeling nutritional landscapes has relied on intensive field surveys. While those efforts have yielded useful insight, it is not clear how well they can be used to generalize over larger scales and across time. Further, while many studies have incorporated remotely sensed data products to improve predictions of forage quality, direct vegetation indices (e.g., NDVI) may not accurately reflect biologically relevant changes, especially where dense forest cover occludes accessible forage. Instead, it is likely that the best nutritional landscape models will couple directly observable phenomena with ancillary environmental characteristics. In this study, we modeled elk and mule deer forage quality using on-the-ground measurements of forage quality from multiple studies across western Montana as training data predicted by a combination of metrics of land cover, topography, weather, soil chemistry and texture, climatic water balance, and disturbance by fire and timber harvest. We report on the data acquisition and spatial modeling techniques that have contributed to model accuracy across the region, including maps of interannual variability that may improve our understanding of dynamic nutritional landscapes and inform further efforts in elk and mule deer management.

**** (ORAL PRESENTATION) IDENTIFYING MIGRATION ROUTES AND STOPOVER SITES ON THE BLACKFEET RESERVATION (MONTANA, USA) AND THE SURROUNDING LANDSCAPE**

Daniel Bird*, Wildlife Biology, University of Montana, Missoula
Gerald Cobell, Blackfeet Nation, Fish & Wildlife Department, Browning, Montana
Jedediah Brodie, Ecology & Evolution, University of Montana, Missoula
Joshua Millspaugh, Wildlife Biology, University of Montana, Missoula

Elk (*Cervus canadensis*) are important economically, culturally, and provide an important source of sustenance for many communities. Studies of elk migrations during spring and fall improve our understanding of elk ecology and provide managers with valuable information, however there is limited published literature about how both traditional ecological knowledge (TEK) and western science are used to identify migration routes. We used global positioning system (GPS) telemetry-collar data collected on adult female elk around the Blackfeet Nation Indian Reservation in northwestern Montana, USA, to identify migration routes and stopover sites using Migration Mapper. In addition, we include maps of known elk migration routes based on Blackfeet traditional ecological knowledge. Both methods of identifying migration routes for elk

are consistent in our results. Our results could help managers identify locations in and around the Blackfeet reservation where anthropogenic activities may conflict with elk during migration to and from critical winter range.

(ORAL PRESENTATION) MONTANA CHAPTER OF THE WILDLIFE SOCIETY'S EFFORTS TO INFORM CONSERVATION POLICY

Chad Bishop*, Wildlife Biology, University of Montana, Missoula, Montana

Sonja Andersen, Montana Fish, Wildlife and Parks, Lewistown, Montana

Lance McNew, Department of Animal and Range Sciences, Montana State University, Bozeman, Montana

The Conservation Affairs Committee (CAC) of Montana TWS works to: 1) review and comment on conservation-related legislative proposals and regulations, 2) prepare white papers, 3) coordinate/review proposed position statements from MT TWS membership, and 4) interface with TWS Governmental Affairs leadership. Montana TWS frequently contracts with a conservation partner during Montana legislative sessions to assist the Chapter with legislative bill tracking, review and comment. During 2024, we (MT TWS CAC and Executive Board) worked collaboratively with TWS and western US chapters/sections to review and comment on: 1) BLM's Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Development and 2) BLM's Draft Resource Management Plan Amendment and EIS for Greater Sage-Grouse Range-wide Planning. We additionally advanced Montana-specific policy priorities to TWS as they constructed a list of policy priorities that were subsequently sent to all TWS member units for input/ranking. We then facilitated a process for Montana Chapter members to provide input on TWS Policy Priorities to inform national policy strategy. During 2025, we have been tracking draft bills during the Montana legislative session and providing comments in coordination with conservation partners. At time of this writing, we opposed a bill to set hunting seasons in statute and supported a bill expanding legal protections for wildlife relative to the unlawful use of aircraft for hunting. We welcome your involvement as we strengthen Montana TWS policy efforts.

(ORAL PRESENTATION) WHY BIOLOGICAL RECOVERY HAS NOT BEEN ENOUGH TO SUCCESSFULLY DELIST THE GRIZZLY BEAR

Sabrina Bradford*, Graduated with PhD from the University of Colorado in December 2024, Bozeman, MT

Many institutionally driven wildlife recovery programs around the world struggle as a result of a disconnect between ecological definitions of recovery and social realities surrounding conservation. In North America's Greater Yellowstone Ecosystem, tensions have erupted due to the Yellowstone grizzly bear remaining a federally protected population despite meeting scientific recovery targets for over twenty years. In order to explore the similarities and differences between the biological criteria and the social constructs of recovery, I interviewed both local stakeholders and federal and state wildlife agency representatives within the Greater Yellowstone Ecosystem. In addition, I analyzed the public response to the 2017 removal of federal protection from the Greater Yellowstone Ecosystem grizzly bear. Results of this research indicate that there is tension between the biological and social aspects of endangered species

recovery and that policy marketing rather than biological monitoring largely shapes the development of the recovery discourse. In other words, the judicial rulings which have reinstated federal protection for the Greater Yellowstone Ecosystem grizzly bear population have had a transformative effect on the way the public understands the criteria necessary for a species to be considered recovered, a key component of the delisting process. As countries around the world develop policies and programs to support the recovery of large carnivore species, it is critical that programs identify both biological and social components in order for a species to be identified as recovered.

**** (ORAL PRESENTATION) FISSION-FUSION MOVEMENT DYNAMICS OF SEMI-FREE ROAMING BISON IN NORTH-CENTRAL MONTANA**

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Scott Creel, Ecology Department, Montana State University, Bozeman, Montana

Plains bison (*Bison bison bison*), a keystone species in North American grasslands, exhibit fission-fusion dynamics in which they break into smaller groups and coalesce into bigger groups over time. However, it is unclear what social and environmental factors drive these dynamics. We used both fine-scale behavioral observations and movement data from GPS ear tags to construct social networks and examine fission and fusion events for two bison herds over multiple years at American Prairie in northcentral Montana. These bison herds are semi-free roaming and graze year-round in 32.4 and 111.6 km² fenced pastures with minimal internal fencing. While the bison in our study did exhibit fission-fusion behavior, we did not observe stable sub-groups in time-aggregated social networks at the scales of months or growing seasons (eigenvector modularity ranged from -0.008 to 0.027). We used Mantel tests to assess the relationships between association strength and relatedness, age, and place of origin. We found that only first-order relatives were more likely to associate with one another, and there was no significant impact of shared age or place of origin. The observed lack of stable sub-groups challenges prevailing assumptions and highlights the need for future research into the mechanisms of fission-fusion dynamics in bison under different management conditions.

**** (POSTER PRESENTATION) INTERSPECIFIC INTERACTIONS: EXPLORING THE REPRODUCTIVE PHENOLOGY OF FERAL HORSES AND THEIR INTERACTION WITH NATIVE UNGULATES IN ALBERTA, CANADA**

Mattie Budine*, Wildlife Biology, University of Montana, Missoula

Feral horses (*Equus ferus caballus*) are a prolific species in western North America. Due to their history of domestication, it is believed they have an extended foaling period compared to native ungulates, such as elk (*Cervus canadensis*) and mule deer (*Odocoileus hemionus*), yet there are few (or no) studies examining this assumption. I will examine this assumption using photos from one year of a multi-species oriented camera trap grid, using a subset of a ~65 camera trap array located in Alberta, Canada where the feral horse population is abundant and growing. I will examine overlap in the presence of offspring to compare the feral horse foaling season to the native species. Depending on the overlap of birthing seasons, I will be able to generate hypotheses regarding potential species interactions between feral horses and other

ungulates. This will hopefully help inform future studies and add to our understanding of feral horses in the west.

(ORAL PRESENTATION) RELATIVE RISK OF WATERBIRD SPECIES ON THE BERKELEY PIT: A MORTALITY ASSESSMENT OF 18 TAXA

Stella Capoccia*, Biology, Montana Technological University, Butte

Brian Balmer, US FWS, Helena

Dan Autenrieth, Safety, Health, and Industrial Hygiene, Montana Technological University, Butte

Kaleb Starr, Student, Montana Technological University, Butte

Acute and chronic health effects of various chemical contaminants to wildlife are well-documented across numerous laboratory and in-field studies. For waterbird species, the impacts of acid metalliferous water (AMW) are a particular focus in which dermal exposure and ingestion have been identified to cause direct mortality and may reduce long-term fitness (Isanhart et al. 2011). Acid mine waterbodies, known as 'pit lakes,' are a result of historical and ongoing open-pit mining that can be hot spots for exposure to metals and other contaminants, especially for waterbird species that may use these waterbodies as stop-overs or staging areas along migration routes. The Berkeley Pit, in Butte, Montana, is likely one of the most intensively monitored pit lakes on the planet, especially for waterbird activity. The unique, geochemistry and extensive size of the Pit, in addition to its geographic location along the eastern edge of the Pacific Flyway, make this acid mine waterbody a novel, in-field laboratory for scientists and resource managers to quantify waterbird populations and evaluate risks and mitigation strategies. As a result of systematic waterbird observations on the Pit over a six-year period (2018 – 2023), we identified 54 taxa, 18 of which have at least species had at least one known mortality on the Pit. This study examined the annual distribution of the different species and assessed which ones were most at risk of mortality when exposed to AMW. These results provide baseline information essential for effective management and conservation of species exposed to anthropogenic landscapes and associated contaminants.

**** (ORAL PRESENTATION) SONGBIRD TELOMERE LENGTH REFLECTS PREY LOSS MORE THAN METAL EXPOSURE FROM MINE-WASTE CONTAMINATION**

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Benjamin Colman, W.A. Franke College of Forestry and Conservation, University of Montana, Missoula, Montana

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Megan Fyiling, University of Montana Bird Ecology Lab, Missoula, Montana

Mining contamination is a widespread ecological disturbance with disproportionate effects on riparian ecosystems that host diverse breeding songbird populations. Riparian songbirds rely heavily on insects to fuel energetically expensive breeding activities and emergent aquatic insects are superior fuel due to their high polyunsaturated fatty acid content. Elevated metals

cause mortality during insect metamorphosis which can limit prey availability, especially aquatic insects. However, surviving adult insects, larval terrestrial insects and spiders pose a threat of toxic metal exposure. Thus, in mine-waste contaminated habitats, birds are at risk of metal exposure and nutritional stress but the relative importance of these two stressors is not well understood. Telomeres (protective DNA capping chromosomes) can shorten in response to metals and nutritional stress and telomere length during development predicts lifespan in songbirds, making telomeres a good biomarker of health and fitness in nestling songbirds. We assessed body condition, telomere length (qPCR), diet (DNA metabarcoding), and blood metals (Pb, As, Cd, Cu, Zn, Se; ICP-MS) in nestlings from six songbird species in the heavily contaminated Upper Clark Fork watershed. We find significant elevation in blood concentrations of lead, arsenic, cadmium and selenium at the most contaminated sites, but diet is a much stronger predictor of body condition and telomere length than any direct relationships with metals. A higher proportion of aquatic insects in diet correlates with better body condition and longer telomeres, underscoring the critical importance of aquatic prey for breeding songbirds and the complex mechanisms by which songbirds are affected by mine-waste contamination.

(ORAL PRESENTATION) MOOSE POPULATION DYNAMICS IN MONTANA

Nick DeCesare*, Montana FWP, Missoula
Collin Peterson, National Wildlife Federation
Jesse Newby, Montana FWP, Dillon

In 2013, Montana Fish, Wildlife, & Parks (MFWP) began a 10-year moose study that included a detailed assessment of population growth rates, vital rates, and limiting factors in three focal study areas. We will discuss the results of this study, including detailed assessment of adult female survival, calf survival, recruitment (pregnancy * litter size), what drives these vital rates (and doesn't), and their relative roles in ultimate rates of population growth.

(ORAL PRESENTATION) MEASURING VEGETATION CHARACTERISTICS AT GREATER SAGE-GROUSE NEST SITES ONE YEAR AFTER NEST FATE, IS IT AS EFFECTIVE AS TRADITIONAL METHODS?

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Karen Launchbaugh, College of Natural Resources, University of Idaho, Moscow, ID
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Mitigating the impacts of research activities on wildlife leads to challenges in sampling vegetation during relevant breeding stages. Consequently, many avian field studies quantify the effects of habitat features on nest-site selection and nest survival with vegetation sampled at the end of the nesting cycle, which may not represent habitat characteristics at the time nest sites were selected or during incubation. We evaluated an alternative method for sampling

vegetation by comparing vegetation sampled at two different times: 1) within 3 weeks of the actual or projected hatch date for successful and failed nests, respectively; and 2) a year later but during the typical timeframe of nest-site selection (Mar-Apr). We collected data at greater sage-grouse (*Centrocercus urophasianus*) nests during the two timeframes from 2017-2023 at five study sites across southern Idaho. We used resource selection functions and daily nest survival analyses to evaluate whether pre-nesting measurements better represented vegetation encountered during nest-site selection and the efficacy of quantifying nest survival with pre-nesting measurements. We found few meaningful differences between the two measurement timeframes for quantifying nest-site selection and habitat effects on nest survival, suggesting use of pre-nesting measurements has promise for future studies seeking to measure nesting habitat in tandem with (or as an alternative to) traditional methods for sampling vegetation at nests. Our results suggest that nest concealment, but not grass height, influences nest-site selection in sage-grouse. This method may be useful for easing logistical constraints for field research and may provide a more meaningful habitat objective for land managers.

(ORAL PRESENTATION) PRONGHORN MOVEMENT AND POPULATION ECOLOGY

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Kelly Proffitt, Montana Fish, Wildlife and Parks, Bozeman

Christopher Hansen, Wildlife Biology Program, University of Montana, Missoula

Joshua Millspaugh, Wildlife Biology (& Department of Environmental Biology), University of Montana (& State University of New York), Syracuse, NY

The Montana Pronghorn Movement and Population Ecology Project was initiated in 2019 to collect information on pronghorn movements, seasonal habitat use, and demographics in 8 study areas that included the Big Hole, Paradise, Madison, Musselshell, Fergus-Petroleum, South Philips, Garfield-Rosebud, and Powder River-Carter areas. The primary objectives of the project were to: 1) create and distribute maps of pronghorn seasonal range and movement areas; 2) use fence mapping and pronghorn movement data to identify potential barriers to movements, inform management decisions, and prioritize locations for habitat improvement projects; and 3) develop population models to identify important vital rates affecting population growth rates. During winters 2019 - 2022, we captured and collared 702 adult female pronghorn. A total of 373 pronghorn died during the monitoring period, and the leading cause of mortality was predation. Movement patterns of individuals were diverse, with the majority of animals demonstrating non-migratory behaviors. To facilitate the identification of potential barriers to pronghorn movements, we developed 2 tools including an ArcGIS Online project and interactive maps displaying fence permeabilities. Conservation organizations have used these tools to inform efforts to remediate movement barriers. In total, 30 projects have been completed totaling 70 miles of fence remediation, 5 projects totaling 22 miles are ongoing, and 12 projects totaling 33 miles are in development. We developed integrated population models for each of the 8 populations in this study, which will provide information towards developing more focused investigations into ecological and/or anthropogenic factors influencing pronghorn populations in Montana.

**** (ORAL PRESENTATION) A FRAMEWORK FOR USING CORT AS A PHYSIOLOGICAL BIOMARKER**

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Corticosterone (CORT) is an increasingly utilized biomarker in wildlife conservation yet debates over the most relevant measures often cloud its utility. This study employs structural equation modeling (SEM) to evaluate relationships between CORT physiology, energetic variables, and environmental factors within the total hormone, free hormone, and corticosteroid-binding globulin (CBG) profile hypotheses using a 14-year dataset on mountain white-crowned sparrows. The Total Hormone model showed limited power in correlating environmental and energetic variables with CORT levels. In contrast, the Free Hormone model demonstrated strong relationships between free CORT and the El Niño-Southern Oscillation (ENSO), suggesting that sparrows modulate hormone availability contextually. The CBG Profile model provided the most nuanced understanding, uncovering sex-specific strategies in hormone regulation, with males and females exhibiting different mechanisms for altering free CORT. While sex-specific patterns are complex, higher energy stores generally lower baseline and total CORT, but also lower CBG, so free CORT levels increase with increasing energy stores. Additionally, wetter years (higher ENSO values) either lower baseline CORT or increase CBG (depending on the sex), so wetter years lower free CORT in both sexes. This research offers a framework for more accurate interpretations of physiological responses to environmental changes and demonstrates the importance of selecting appropriate CORT measures. These insights can improve wildlife health assessments and inform conservation strategies, advancing the integration of physiological tools into conservation practice.

**** (POSTER PRESENTATION) DEVELOPING A RESOURCE SELECTION FUNCTION MODEL TO PREDICT MOOSE HABITAT SELECTION ON THE FLATHEAD INDIAN RESERVATION**

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Sarah Sells, Wildlife Biology Program, Ecology & Evolution Program, U.S. Geological Survey, Montana Cooperative Wildlife Research Unit, Missoula

Nicholas DeCesare, Research Wildlife Biologist, Montana Fish, Wildlife and Parks, Missoula

Moose (*Alces alces*) are central to the cultural and ecological fabric of the Confederated Salish and Kootenai Tribes (CSKT) of the Flathead Indian Reservation (FIR). Moose play a key role in maintaining ecosystem health and food sovereignty for the Tribes. However, the spatial ecology of moose across the landscape is not fully understood, presenting a challenge for effective management and conservation. We aim to develop habitat models to predict moose habitat selection and distribution within the FIR, using data from 34 female moose collared by Montana Fish, Wildlife and Parks in the nearby Cabinet-Salish Mountain Range from 2013 – 2022. Our study will identify environmental factors influencing moose habitat selection, predict moose distribution across the study area, and assess the model's accuracy through validation with cameras. The outcomes of this research will provide the CSKT with valuable tools to inform

conservation strategies that help mitigate threats to moose populations due to land-use changes, habitat fragmentation, and climate shifts. Ultimately, this study will contribute to the long-term sustainability of moose populations and conservation of the Tribes' natural resources.

**** (ORAL PRESENTATION) DISPERSAL MOVEMENTS AND HABITAT SELECTION OF SHARP-TAILED GROUSE REINTRODUCED TO WESTERN MONTANA**

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Beau Larkin, MPG Ranch, Missoula, MT

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Sharp-tailed grouse (*Tympanuchus phasianellus*) historically occupied intermountain grasslands west of the Continental Divide in Montana but were likely extirpated by the early 2000s. Montana Fish, Wildlife and Parks began reintroducing sharp-tailed grouse to western Montana in fall 2021. We monitored the movements of 94 female sharp-tailed grouse captured in east-central Montana, fitted with GPS transmitters, and translocated to the Blackfoot and Bitterroot Valleys in April – May 2023 and 2024. Of the female grouse released with GPS transmitters, 38% in the Bitterroot and 55% in the Blackfoot eventually settled and established a home range. Dispersal movements differed between the 2 sites: grouse in the Bitterroot traveled an average of 130.5 km over 27 days and settled 29.4 km from the release site, while grouse in the Blackfoot traveled an average of 55.2 km over 16.9 days and settled 12.2 km from the release site. Despite increased lek sizes near some release sites in 2024, dispersal movement patterns did not differ between the 2 years of the study. Dispersing grouse selected areas with intermediate elevations, lower slopes, less tree cover, and more shrub cover. Grouse were more likely to transition from the exploratory to the encamped behavioral state when in an area with high topographic position index and greater perennial grass and forb cover. Most mortalities for translocated grouse occurred during the month following release, when grouse were dispersing, so understanding the factors motivating dispersal movements may aid in the release site selection for ongoing sharp-tailed grouse translocations in western Montana.

(POSTER PRESENTATION) RANGE DISTRIBUTION AND OCCUPIED TOWNS OF CHIMNEY SWIFTS IN MONTANA

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Brandi Skone, Montana Fish, Wildlife, and Parks, Great Falls

Hannah Specht, Montana Fish, Wildlife, and Parks, Missoula

Nicole Hussey, Montana Fish, Wildlife, and Parks, Havre

Megan O'Reilly, Montana Fish, Wildlife, and Parks, Billings

Chimney swifts (*Chaetura pelagica*) are aerial insectivores and a Species of Greatest Inventory Need in Montana. Historically, they inhabited hollow mature trees and cave walls. With European settlement beginning in the 1600s, they shifted predominantly to man-made structures, expanding their range west with the growing availability of suitable nesting habitat,

such as chimneys. Prior to 2017, the Montana Natural Heritage Program database contained just 23 breeding records for chimney swifts in eastern Montana. Four of which dated back to the 1800s. In 2017, Montana Fish, Wildlife, and Parks (FWP) and the Montana Audubon Society developed a survey protocol to define their breeding range and create a baseline for occupied towns in Montana. Between 2017 and 2024, FWP, MT Audubon, and citizen scientists surveyed 67 towns across central and eastern Montana. Twenty-three towns were confirmed occupied by breeding chimney swifts, with Harlowton observed as the furthest west. These data reveal a much broader distribution of chimney swifts in Montana than previously recognized. Currently, FWP is using these data to help identify potential threats and conservation actions for chimney swifts in the State Wildlife Action Plan where the species listing will change to a Species of Greatest Conservation Need, which is scheduled to be completed by October 2025.

(ORAL PRESENTATION) MANAGING WILD HORSE HERDS WITH LIMITED RESOURCES

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Kayla Grams, The Science and Conservation Center, Billings

Melissa Esser, The Science and Conservation Center, Billings

One of the challenges of controlling a wild horse (*Equus caballus*) herd, on public and private lands, is the lack of resources whether it be personnel, time, or budget. Wild horses can be found on lands managed by the Bureau of Land Management (BLM), Forest Service (USFS), National Park Service (NPS) and State-owned public lands or a mixture of those listed. Wild horses can also be found on private land owned or managed by a non-profit organization. A form of fertility management is PZP (porcine zona pellucida) immunocontraception which when injected into mares causes antibodies which interfere with fertilization and prevents pregnancy. The vaccine can be delivered remotely by a dart once it is mixed with an adjuvant. This process is done by trained government personnel or trained volunteers. We present here successful partnerships between volunteers from non-governmental organizations (NGOs) working collaboratively with federal and state governmental agencies. NGOs are often non-profit groups already advocating for a herd in the area and a few examples are Little Book Cliffs Wild Horse Range, Colorado; McCullough Peaks Wild Horse Range, Wyoming; Pryor Mountain Wild Horse Range, Montana; Sand Wash Basin, Colorado; Spring Creek Basin, Colorado; Onaqui Mountain, Utah; and Salt River Herd, Arizona. These collaborations are successful because local groups have a strong interest in wild horses, the wildlife, and/or the health of the rangeland.

(POSTER PRESENTATION) EVALUATING NEST SUCCESS AND MIGRATORY BEHAVIOR OF INTERMOUNTAIN GRASSLAND SPECIES

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Maggie Blake, University of Montana Bird Ecology Lab, Missoula, MT

Anna Noson, University of Montana Bird Ecology Lab, Missoula, MT

Grassland bird populations in North America, particularly those dependent on intermountain grasslands in the Rocky Mountain region, are rapidly declining due to habitat loss, climate shifts, and invasive species. Nest success and migratory behavior are vital indicators of habitat quality and species health, yet little research has focused on these factors in intermountain grasslands. This study aims to evaluate the nest success and migratory patterns of three

grassland bird species—Western Meadowlark (*Sturnella neglecta*), Vesper Sparrow (*Poocetes gramineus*), and Grasshopper Sparrow (*Ammodramus savannarum*)—in western Montana’s Bitterroot Valley. We monitored 386 nests across three breeding seasons, estimating daily survival rates and overall nest success using logistic exposure models. Preliminary results indicated that daily survival rates overall decreased throughout the season, with Western Meadowlarks exhibiting the highest nest success and lowest variability. Migratory behavior was tracked using Motus-compatible tags, with 50 Western Meadowlarks, 41 Grasshopper Sparrows, and 30 Vesper Sparrows tagged. Western Meadowlarks were detected during migration and wintering across four states, utilizing the Pacific Flyway and wintering in central California, diverging from the typical Central Flyway. Grasshopper and Vesper sparrows were not detected outside the study area. These findings underscore the influence of nesting timing on success and highlight the need for further research on migratory routes and habitat use across the full life cycle of these species. Understanding these patterns is critical for developing targeted conservation strategies to preserve intermountain grassland ecosystems and the birds that rely on them.

**** (POSTER PRESENTATION) ECOLOGICAL CONSEQUENCES OF SELECTIVE LOGGING: INSIGHTS FROM THE CHIQUIBUL FOREST RESERVE**

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Selective logging is a forestry practice designed to extract timber while maintaining biodiversity and ecosystem function. However, there is still much to learn about its impacts on surrounding ecosystem structure and composition, particularly in tropical regions. In this study, we investigated how changes to vegetation structure at logged and unlogged sites impact wildlife abundance in the Chiquibul Forest Reserve (CFR) in southwestern Belize. Using data collected from remote camera traps deployed at 9 unlogged sites and 13 logged sites (i.e., one-year post-harvest), we employed random effects Poisson modeling to analyze the relationship between logging status and wildlife abundance. We found there was a significant difference in wildlife abundance between logged and unlogged areas, with a mean abundance of 53.9 individuals in logged regions compared to 28.1 individuals in unlogged areas ($p < 0.00046$). Some species, such as Baird’s tapir (*Tapirus bairdii*) were more abundant at logged sites, while others, including the common paraque, were less abundant. These results underscore the complex dynamics between logging practices and wildlife species composition, highlighting the ecological implications for wildlife management and conservation strategies. We recommend examining the long-term impacts of logging on vegetation structure and associated impacts on wildlife abundance and diversity to better understand the ecological implications of sustainable logging practices on tropical wildlife.

(POSTER PRESENTATION) FLORAL SELECTION AND VALUE TO BUMBLE BEES IN MONTANA AND THE DAKOTAS

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Rebecca Newton, Bureau of Land Management, Billings, MT
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As conservation efforts to create and manage pollinator habitat escalate to address widespread pollinator declines, identifying regionally appropriate plants that adequately support imperiled pollinators is important to ensure effective conservation action. Anecdotal evidence and traditional pollinator visitation counts do not necessarily reflect floral value; thus, more objective measures of valuable floral resources are needed. We conducted bumble bee and flowering plant surveys in Montana, North Dakota, and South Dakota. We implement an objective, repeatable approach to quantify the relative value of floral resources to bumble bees across the study area, which we call flower value scores. Flower value scores reflect a flower's relative contribution to bee nutrition by integrating bumble bee use, selection, and richness, as well as bloom duration. We evaluated overall selection and also considered ecoregion, sex, and season to support the regional needs of land managers. Selections for plant species were consistent across subset datasets, suggesting overall bumble bee preferences were consistent across this multi-state study area. Floral use varied by bumble bee species, however, implying that diverse plantings are needed to support the forage needs of diverse pollinators. Selection did not correlate with traditional visitation counts. We identify *Chamerion angustifolium*, *Geranium viscosissimum*, and *Penstemon confertus* as important species for bumble bees in early- and mid-season, *Monarda fistulosa* in mid-season, and *Lupinus sp.* and *Campanula rotundifolia* in early-, mid-, and late-season. Nonnative *Centaurea stoebe* and *Melilotus officinalis* also had high flower value scores, suggesting pollinator support requires pairing nonnative plant removal with native plant revegetation.

(ORAL PRESENTATION) DRIVERS OF VARIATION IN PRONGHORN POPULATION DYNAMICS IN MONTANA

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Kelly Proffitt, Montana Department of Fish, Wildlife and Parks, Bozeman, MT
Joshua Nowak, Speedgoat Wildlife Solutions, Missoula, MT
Jessica Krohner, Idaho Fish and Game, Coeur d'Alene, ID
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Joshua Millspaugh, Wildlife Biology (& Department of Environmental Biology), University of Montana, Missoula MT (& State University of New York), Syracuse, NY

Conserving pronghorn populations is a high management priority in Montana, given the important ecosystem functions they perform and recreational opportunities they provide. Pronghorn populations in the early 2000s were generally at or above objective across Montana; however, population declines in recent decades have left many populations below objective. Our goal was to identify the vital rates most associated with pronghorn population change to

inform management decisions and facilitate recovery of pronghorn across the state. We developed integrated population models (IPMs) for each of 9 hunting districts to estimate pronghorn abundance and vital rates, and to identify the vital rates most associated with population change from 2004 - 2022. Variability in 4-month recruitment explained the most variation in pronghorn population growth; however, adult female survival had the largest proportional impacts. Populations usually increased when adult female survival was >0.75 and 4-month recruitment was >0.72 , but these associations were largely mediated by one another. There was considerable uncertainty in the factors affecting vital rates; however, increased snow depth was associated with reduced adult survival, and increased NPP was associated with increases in adult survival and 4-month recruitment in some hunting districts. Our results suggest pronghorn management should prioritize manipulation of adult female survival rates to achieve population objectives. IPM results were highly sensitive to assumptions regarding knowledge and confidence in aerial counts and harvest; thus, we recommend assessing the survey and inventory program to assess confidence in aerial counts and reduce uncertainties in results.

**(ORAL PRESENTATION) RESTORING WESTERN MONTANA'S SHARP-TAILED GROUSE
(*TYMPANUCHUS PHASIANELLUS*) - PROGRESS REPORT**

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Sharp-tailed grouse have been a Montana Fish, Wildlife and Parks priority for 35 years. Through the second half of the 1900s, sharp-tailed grouse populations west of the Continental Divide were considered isolated and extremely small and became essentially extirpated by the early 2000s. FWP's State Wildlife Action Plan and the Wildlife Mitigation Program identified "increase abundance and distribution of sharp-tailed grouse with a reintroduction program to western Montana" as a conservation action for sharp-tailed grouse. Sharp-tailed grouse translocations from eastern Montana to the Bitterroot, Blackfoot and Drummond Valleys began in the fall of 2021 with 75 males. The following spring our efforts were shortened due to avian influenza with 22 birds translocated. In 2023 and 2024, 144 and 212 birds were translocated respectively. Translocated females were fitted with GPS or VHF transmitters and monitored during the summer nesting season to assess demography and population viability of the reintroduced populations. Most female mortalities occurred in the first 3–4 weeks following release, and survival during the 120 days following translocation was 0.33 (95% CI = 0.22 – 0.50) in the Bitterroot and 0.45 (0.36 – 0.56) in the Blackfoot. Nest survival (0.40, 95% CI = 0.27 – 0.53) and brood success at 14 days post-hatch (74%) at both sites were similar to resident sharp-tailed grouse populations. In 2024, we observed 4 newly established leks at reintroduction sites attended by 64 sharp-tailed grouse. Translocations will occur through 2026 with monitoring continuing 5-years post-translocation.

**** (ORAL PRESENTATION) A BIT OF A BROME PROBLEM - PROPOSED WORK INVESTIGATING INTERACTIONS BETWEEN DECLINING GRASSLAND SONGBIRD DEMOGRAPHICS AND INVASIVE PLANTS IN CENTRAL MONTANA**

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Scott Somershoe, U.S. Fish and Wildlife Service, Lakewood, CO

Grassland birds are the fastest-declining avian guild in North America, having declined by over 50% since 1970 (Rosenburg et al. 2019, Sauer et al. 2017). Among this guild are Chestnut-collared and Thick-billed Longspur (CCLO and TBLO hereafter), two species of grassland songbird that have experienced long-term population declines of 87% and 94% respectively since 1970 (Sauer et al. 2017). A primary driver of this decline is habitat degradation (Somershoe 2018) through mechanisms like fragmentation of existing grassland, unsustainable grazing practices, and the spread of invasive plants such as Smooth Brome and Kentucky Bluegrass. To better understand these declines and develop effective conservation strategies, research is needed to understand how current landscape attributes, such as invasive plants, are impacting demographics of these two longspur species. We propose a study in central Montana, a relatively understudied area in the CCLO and TBLO breeding ranges, to investigate how invasive plant abundance affects longspur demographics (abundance and nesting metrics). This work will be conducted over the next two years in Wheatland and Golden Valley Counties, MT. Our goal is to determine the tolerance CCLO and TBLO have to exotic plants on their breeding grounds and identify landscape attributes that maximize longspur abundance. These findings will help prioritize conservation actions in the region aimed at supporting these imperiled species.

(ORAL PRESENTATION) STANDARDIZED BROAD-SCALE MAPPING OF SAGE-GROUSE HABITAT SUITABILITY ACROSS MONTANA AND THE DAKOTAS

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Efforts to conserve imperiled sagebrush (*Artemisia spp.*) ecosystems and associated organisms often prioritize population characteristics of landscape species like the greater sage-grouse

(*Centrocercus urophasianus*). Distribution, and spatial juxtaposition of environments supporting remaining sage-grouse populations are key to delineating habitats to inform management decisions. Sage-grouse exhibit seasonal movements and use habitats that are heterogeneously distributed across 11 states, so standardized sage-grouse habitat maps are needed across large extents for multiple phenological stages. Our primary goal was to map seasonal habitats of sage-grouse relevant to management across Montana and the Dakotas using methods complementary to past and current efforts. We compiled a dataset from 16 sage-grouse research projects collected from 2001–2021, ranging from single-season VHF studies to year-round GPS studies. We fitted patch-scale resource selection functions based on correspondence between heavy use areas and 8 coarse-scale landscape conditions. We generated habitat suitability maps for conventional sage-grouse seasons for comparison to models of more detailed behavior-seasons. We frame our preliminary results in context of other mapping projects including local studies that evaluate habitat relationships at finer scales and a range-wide project that includes Montana and the Dakotas.

**** (ORAL PRESENTATION) CONFRONTING CHALLENGES IN DISTRIBUTION MODELING FOR MARTEN IN WESTERN MONTANA**

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Species distribution models are a popular tool for wildlife management and can be used to identify habitat, guide survey efforts, and predict range shifts under future conditions. Their popularity stems from increased access to occurrence data from public repositories and citizen science platforms. These data present challenges, however, because we often lack information about sampling design and accessible areas are oversampled, potentially leading to biased insights. Mitigating these challenges is rarely straightforward, causing researchers to rely on black-box algorithms that can lead to complex models with poor predictive ability. We incorporated several techniques to address these challenges into distribution models designed to predict habitat for marten (*Martes spp.*) in western Montana. Marten are a charismatic forest carnivore and an important furbearer species, yet knowledge gaps exist regarding their status and distribution in Montana. We used lasso regression to compare environmental covariates at occurrence records with those at available points. We explored two techniques to address sampling biases: down-weighting occurrence records in regions with high sampling intensity and selecting available locations to reflect the sampling bias in the occurrence records (hereafter, targeted background). Additionally, we used spatially explicit cross-validation to evaluate the model's predictive performance. The model with down-weighted occurrence records had higher out-of-sample predictive ability than the targeted background approach and predicted values of relative probability of use showed a strong correlation with occurrences. With their growing use for guiding management actions, distribution models require careful consideration of objectives and data limitations to ensure they are effective for wildlife managers.

(ORAL PRESENTATION) SUMMER COLONY COUNT EFFORTS FOR BATS IN MONTANA

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White-nose syndrome (WNS), the disease caused by the cold-adapted fungus, *Pseudogymnoascus destructans* (Pd), has killed millions of North American bats since its detection in New York in 2006. To assess spread and impact on Montana's bat populations, partners in Montana began collaborating on a project in 2019 involving annual, statewide surveillance for Pd and WNS to estimate the distribution of the fungus and disease, coupled with annual acoustic monitoring and colony counts to assess bat occupancy and activity. Although winter colony counts allow us to monitor population trends in relation to WNS, they are not feasible at a statewide scale in Montana due to logistical constraints around identifying and accessing hibernacula. Therefore, FWP expanded a pilot project in 2023 to conduct summer colony counts at maternity roosts, including bat boxes, buildings, and bridges. This effort involved agency staff, partners, and volunteers who were asked to conduct at least two colony counts during each sampling period at a given roost. Over 60 people participated at 22 maternity roosts across the state. Results from 2023 and 2024 provide baseline data on accessible maternity roosts in Montana and will be used to bolster existing models. Summer colony count data will be used in tandem with those collected via acoustic and disease monitoring to identify areas of highest conservation value for bat management efforts in the state. Future efforts include identifying maternity roosts in eastern Montana, where known bat roosts are sparse, and using DNA metabarcoding to confirm species present at each roost.

**** (ORAL PRESENTATION) WHERE ARE ALL THE DUCKS: PREDICTING HARLEQUIN DUCK OCCUPANCY IN WESTERN MONTANA AND NORTHERN IDAHO**

Holli Holmes*, Wildlife Biology, University of Montana, Missoula

Hannah Specht, Montana Fish, Wildlife and Parks, Missoula

Josh Millspaugh, Wildlife Biology, University of Montana, Missoula

Thomas Riecke, Wildlife Biology, University of Montana, Missoula

Lisa Bate, Glacier National Park, Kalispell

The Harlequin Duck (HADU), a sea duck that breeds on whitewater streams in the mountains, is listed as imperiled in Montana due to low and potentially declining population numbers. Biologists and land managers across the Northern Rockies (Montana, Idaho, Wyoming, and Alberta) have collaborated to identify information needs pertaining to HADU. One objective is to identify important breeding streams for HADU to better estimate population status and trends. To address this objective, we are building a predictive occupancy model across western Montana and northern Idaho using an integrated spatial distribution model which allows us to combine data from the last 15 years of structured surveys, incidental sightings, environmental DNA, and citizen science. We will consider several habitat covariates representing stream characteristics and surrounding landscape features. This model will provide a predictive map of

spatial distribution which can be used as a tool to help managers identify streams to survey for HADU to most efficiently use limited resources and better estimate population trends.

(POSTER PRESENTATION) ON THE SEARCH FOR LIZARDS: FINDING A CRYPTIC CRITTER ON A VARIED LANDSCAPE

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Megan O'Reilly, Wildlife, Montana Fish, Wildlife, and Parks, Billings, MT
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Greater short-horned lizards (*Phrynosoma hernandesi*) are a Species of Greatest Inventory Need (SGIN) in Montana. Since 2016, Montana Fish, Wildlife, and Parks (MTFWP) has conducted structured surveys and public outreach campaigns seeking to fill an information need for this species. Prior to this effort, the Montana Natural Heritage Program (MNHP) database included 1669 records for the species, however, about 80% (1341) came from a single study conducted in Carbon and Stillwater Counties from 2004 – 2013. These study sites are in unique habitats in Montana which do not represent the species range throughout the rest of the state.

Understanding where lizards are found and how they utilize their habitat throughout the rest of their range in Montana is important for assessing threats to the species and observing population trends. MTFWP's efforts have met mixed success. Detectability has been low during structured surveys, though incidental observations reported by members of the public have proven valuable in increasing observations statewide. Here we discuss our efforts to refine structured survey methodology to increase detectability, report on successes with our public outreach campaigns, and discuss future directions for research.

**** (POSTER PRESENTATION) EVALUATING THE EFFECT OF SENSORY MISINFORMATION ON MESOCARNIVORE FORAGING ACTIVITY**

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Lance McNew, Department of Animal and Range Sciences, Montana State University, Bozeman, MT

The variable effectiveness and ethical concerns of using predator removal to support ground-nesting birds have motivated increased interest in less-invasive alternatives for predator management. One promising avenue is the manipulation of predator foraging habits by using misleading sensory information (e.g., sense of taste, smell). To assess the potential utility of this style of technique for reducing predation on game birds, we evaluated the response of mesocarnivores (e.g., badgers, coyotes, raccoons, and red foxes) to repeated exposure to galliform odors in a northern mixed-grass prairie ecosystem in north-central Montana, during May–July 2024. We quantified the response of mesopredators to 4 treatment types: 1) domestic chicken preen-oil, 2) domestic turkey preen-oil, 3) a commercial trapping lure, and 4) unscented petroleum jelly as a control odor. Odor treatments were monitored using motion-activated camera-traps at 669 sites (72–264 sites per odor type), for a total of 4,625 trap-days. We hypothesized that bird odor treatments would be more attractive to predators than commercial or control treatments, and that mesocarnivores would become habituated to the

odors and show decreasing interest during the study period. We found that the mesocarnivore response to odor treatments was similar between types and did not wane during the study. The proportion of mesocarnivore detections per trap-day (0.033) may not have been high enough to influence foraging behavior. Overall, the response to odor treatments and the lack of habituation effect suggest that this style of predator manipulation may not be effective in this ecosystem.

(ORAL PRESENTATION) PYGMY RABBIT OCCUPANCY AND HABITAT RELATIONSHIPS IN SOUTHWESTERN MONTANA THROUGH PARTICIPATION IN COLLABORATIVE RESEARCH

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Fiona McKibben, Department of Fish & Wildlife Sciences, University of Idaho, Moscow, Idaho
Kristina Smucker, Wildlife Department, Montana Fish, Wildlife and Parks, Helena, Montana
Claire Gower, Wildlife Department, Montana Fish, Wildlife and Parks, Bozeman, Montana

Pygmy rabbits are the smallest leporid in North America and are tied to sagebrush steppe ecosystems. Sagebrush comprises most of their diet throughout the year and offers concealment from predators. In Montana their range is limited to the southwestern corner of the state where they depend on relatively contiguous stretches of sagebrush, leading to their status as a species of greatest conservation need. Montana Fish, Wildlife and Parks (FWP) has joined a multi-partner project led by University of Idaho (U of I) researchers that are studying pygmy rabbit occupancy and habitat requirements across their range in Idaho and Montana. The U of I led project is incorporating genetic analysis of scat to improve certainty of species ID and a winter-based survey method to improve efficiency. Current pygmy rabbit research in Montana expands on prior work completed by FWP, Montana Natural Heritage Program, and U of I, and it aims to develop a well distributed set of study sites to allow for surveys to be repeated in future years to detect changes in occupancy and distribution. Developing a better understanding of the current distribution and habitat use of pygmy rabbits in Montana will improve FWP's ability to manage for the species. Contributing to a project that involves multiple agencies and partners increases the potential for project results to inform management at broader scales. This research will yield information that FWP and partners will use to formulate clear objectives for managing a sagebrush specialist.

**** (POSTER PRESENTATION) LONG-TERM IMPACTS OF ELK BROWSING ON ASPEN RECRUITMENT IN THE GREATER YELLOWSTONE ECOSYSTEM**

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Quaking aspen (*Populus tremuloides*) stands are vital to ecosystem health and have a diversity of age and structural classes to provide wildlife habitat and natural fuel breaks. Rocky Mountain elk (*Cervus canadensis*) are the primary species that browse aspen suckers in the winter

because they are palatable and available above the snow. The Northern Yellowstone Winter Range, hereafter referred to as the northern range, is the wintering ground for the largest elk herd in Yellowstone National Park (YNP) and extends outside YNP onto the Custer Gallatin National Forest (CGNF). The northern range elk population held approximately 19,000 individuals in 1994. During this time, aspen coverage on the northern range was reduced to 1% due to elk browsing and other environmental factors. As of 2024, the northern range elk herd has been reduced to approximately 6,000 individuals. St. John (1995) surveyed 341 aspen plots on the northern range outside YNP in 1990 to determine the relationship between elk browsing and aspen stand recruitment. In 2005, Kimble et al. (2011) surveyed 315 of the same aspen plots to determine if aspen recruitment had changed since 1990. St. John (1995) and Kimble et al. (2011) found that aspen stem recruitment was decreasing on a landscape scale. The objective of this study is to resurvey those 303 aspen plots to challenge earlier interpretations about aspen stand survival over time on the northern range. Using this information, we can identify aspen plots that would benefit from Forest Service management to insure aspen presence long-term in the GYE.

(POSTER PRESENTATION) EXPLORING TRENDS IN HUMAN-GRIZZLY BEAR CONFLICTS AMID OCCUPIED RANGE EXPANSION

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Morgan McHale, Montana Fish, Wildlife & Parks, Conrad, MT

As grizzly bear populations expand across their historical range in Montana Fish, Wildlife & Parks Region 4, human-grizzly bear conflicts continue to be a concern. This project examines trends and correlations in grizzly bear range expansion and conflicts using Conrad bear management office data from 2018 to 2024. We analyzed our data using a principal components analysis. We found the number of reported conflicts in our study area remained near constant, increasing 0.5 percent on average, while grizzly bear range expansion was increasing yearly by 4 percent. We did not find that grizzly bear range expansion was strongly correlated with all types of conflicts. The number of complaints received related to grizzly bears rose 4.6 percent during that same period, strongly correlated to grizzly bear range expansion. We found negative correlations among depredation conflicts, unnatural food conflicts, and average monthly precipitation (PC1 β 0.257, 0.375, and 0.357, respectively). We also found the number of carcasses we removed to be positively correlated with the percent change of the grizzly bear estimated range expansion area, and negatively correlated with depredation and unnatural food conflicts (PC1 β -0.492, -0.329, 0.257, and 0.375 respectively). Our carcass removal program coincides with a downward moving average trend in confirmed livestock depredations. Our results suggest that grizzly bear range expansion interacts with conflicts both spatially and temporally.

(ORAL PRESENTATION) CANADA LYNX MONITORING AND THE PLAN FOR CONSERVATION IN THE WESTERN UNITED STATES

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Canada lynx (*Lynx canadensis*) monitoring and conservation has been an ongoing challenge for forestry and wildlife managers throughout the western United States. There have been many independent efforts to monitor this cryptic species but in 2022, Montana Fish, Wildlife and Parks (FWP) initiated plans for a multi-state lynx monitoring program. From 1 December 2022 through 30 April 2023, FWP deployed 40 lynx monitoring stations as part of a pilot project to estimate lynx occupancy in high-quality modeled habitat versus marginal habitat in Montana. Lynx occupancy in the high-quality habitat of northwestern Montana was estimated at 0.77 (SE = 0.17) with a detection probability of 0.30 (SE = 0.077) while occupancy in marginal habitat, in the Greater Yellowstone Ecosystem (GYE) was functionally 0. This effort helped inform the U.S. Fish and Wildlife Services' redesignation of lynx critical habitat (CH) which resulted in a proposed elimination of the CH in the GYE in response to a lack of detections from the 2022–2023 occupancy pilot in that area. These pilot results also informed the multi-state occupancy survey conducted over the winter of 2023–2024 in Montana, Idaho, and Wyoming. From 1 December 2023 through 30 April 2024, biologists collectively deployed 123 lynx monitoring stations (10 in Idaho, 90 in Montana, and 23 in Wyoming) throughout areas modeled as high-quality lynx habitat to estimate lynx occupancy across a major part of the West. Montana FWP detected lynx at 26 of the 90 stations deployed in Montana while no lynx were detected in Wyoming or Idaho. The analysis from this study is ongoing but will provide detailed guidance to the USFWS during the implementation of their lynx recovery plan and future lynx monitoring and conservation efforts in the West.

**** (POSTER PRESENTATION) ASSESSING BIOACOUSTIC DETECTION AND MONITORING METHODS AND HABITAT USE OF NESTING GREAT GRAY OWLS IN SOUTHWEST MONTANA**

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Claire Gower, Montana Fish, Wildlife & Parks, Bozeman

Great Gray Owls (*Strix nebulosa*), the largest owl species in North America, are one of the most understudied raptors on the continent. In 2015, the Montana State Wildlife Action Plan designated Great Gray Owls as a species of greatest inventory need, prompting Montana Fish, Wildlife & Parks (FWP) to conduct a survey effort spanning FWP Regions 1-4 from 2019 to 2022. Using a combination of callback and autonomous recording unit (ARU) surveys in the pre-nesting period, FWP evaluated occupancy throughout the species range in Montana. Though research in other parts of the species' range has demonstrated that ARUs are an effective tool for assessing occupancy, there remains a need to evaluate how ARUs can be used to locate and monitor Great Gray Owls beyond the pre-nesting period. Additionally, their habitat associations in Montana have not been empirically evaluated. This research aims to develop our understanding of Great Gray Owls in Montana and improve our ability to locate, manage, and

conserve this elusive species. The objectives of this research are to assess methods to detect and monitor active nests using ARUs and to evaluate the habitat characteristics of Great Gray Owl nest sites in southwest Montana. A pilot season was conducted in 2024, and full field season is planned for 2025.

(ORAL PRESENTATION) BAT HOMES IN THE BIG SKY – HABITAT CHARACTERISTICS OF NORTHERN MYOTIS (*MYOTIS SEPTENTRIONALIS*) IN NORTHEASTERN MONTANA

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The northern myotis (*Myotis septentrionalis*) is one of 9 endangered species of bats in the United States but the only one to inhabit Montana. This species was initially documented in Montana in 1978, but not again until 2016. Identifying appropriate conservation efforts is hampered by the large gaps in our understanding about northern myotis in Montana. We sought to build our knowledge base by characterizing summer daytime roosts, which provide refuge for bats while they give birth, raise young, and prepare for hibernation or migration. We mist-netted for bats from May-August in 2022 and 2023 and attached transmitters to 36 northern myotis. We located 76 roosts from 33 tagged individuals. We quantified characteristics of the roost trees and the surrounding patch and compared these with random locations. Bats roosted primarily in eastern cottonwood trees (*Populus deltoides*) (97% of roosts), which was the most available tree species on the landscape. Bats showed strong preferences for tall trees in patches with a relatively high basal area that also contained multiple trees similar to the roost tree. Bats also selected cottonwoods that were in early stages of decay with somewhat lower canopy cover. Most consecutive roosts were relatively close to previous roosts (range = 2-881 m) and each roost was used for 1.7 days on average. Our work supports the notion that northern myotis select areas that provide multiple possible roosts and facilitate social interactions. Improving our understanding of habitat preferences of northern myotis in Montana will inform strategies to conserve roosts and surrounding habitat.

**** (POSTER PRESENTATION) LONG-TERM INSIGHTS FROM STABLE ISOTOPE ANALYSIS OF FORAGING STRATEGIES OF GRIZZLY BEARS IN A DYNAMIC ECOSYSTEM**

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Justine Becker, Ecology, Montana State University, Bozeman, MT

Kerry Gunther, Yellowstone Center for Resources, National Park Service, Mammoth, WY

Mark Haroldson, Interagency Grizzly Bear Study Team, U.S. Geological Survey, Bozeman, MT

Frank van Manen, Interagency Grizzly Bear Study Team, Bozeman, MT

As opportunistic omnivores, grizzly bears (*Ursus arctos*) persist in a wide range of environments and alter their diet in response to differences in food availability. Diverse foraging strategies among individuals can buffer a population from environmental variation, yet what foraging strategies individuals deploy and the environmental factors that influence these strategies

remain largely unknown. Many landscape changes have occurred over the past 40 years in Yellowstone National Park, yet the annual rate at which bears gain body fat for hibernation has remained consistent. This outcome provides an opportunity to explore how individual bears change their foraging behavior in response to variation in the environment. We are using samples of grizzly bear hair collected during 1998–2022 by the Interagency Grizzly Bear Study Team and stable isotope analysis (^{15}N , ^{13}C) to estimate assimilated diet of bears. We are assessing how changes in resources influence the 1) degree of specialization of individual grizzly bears and 2) diet composition of bears across the decades. We will integrate these findings with movement models to understand energetic tradeoffs bears make when responding to environmental change. Characterizing how bears alter their niche breadth and diet composition as a function of changing food resources will provide a more mechanistic understanding of how a long-lived, behaviorally plastic and individualistic species may respond to future changes in the environment.

**** (ORAL PRESENTATION) GRIZZLY BEARS CHANGE THEIR BEHAVIOR NEAR TRAILS IN A PROTECTED AREA**

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Outdoor recreation has grown in popularity, increasing the need to understand how animals respond to these activities. In Yellowstone National Park, areas identified as important to grizzly bears (*Ursus arctos*) have additional restrictions on human recreation for 2–7 months every year. These Bear Management Areas comprise about 21% of the national park and were established to protect bears and people. Using these seasonally restricted areas, we tested how low-intensity backcountry recreation (i.e., hiking) influenced the behavior of grizzly bears. We quantified how bears changed their speed and selection near trails based on restrictions to human access and time of day. We used GPS locations of 19 male and 16 female grizzly bears to develop integrated step-selection models to test our hypotheses. Males moved faster near trails during all times and selected for trails during night and crepuscular hours. Females moved faster near trails in unrestricted areas and slower in restricted areas during night and crepuscular hours. Females avoided trails in restricted areas at night. Although individual bears differed in their responses, bears changed their speed and selection in response to low-intensity recreation, even within a protected area. Restricting recreation likely reduces human-bear conflict in areas with higher densities of bears and reduces displacement of bears from important food resources. Restricting trail use during certain times (i.e., crepuscular hours) would likely further reduce human-bear interactions.

(ORAL PRESENTATION) CLIMATE-INFORMED DISEASE THREAT ASSESSMENT FOR MONTANA'S SPECIES OF GREATEST CONSERVATION NEED

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State Wildlife Action Plans (SWAPs) identify threats and conservation actions for a state's species of greatest conservation need (SGCN). Revised every 10 years, SWAPs are instrumental for guiding management decisions and directing project funding. Historically, wildlife disease threats and influences from climate change have been minimally integrated in SWAPs. The 2025 revision of Montana's SWAP provides a timely opportunity to deliver actionable, locally relevant science on high-priority wildlife diseases, their relationship to climate change, and adaptation strategies. Our objective was to conduct a science synthesis assessing climate sensitivities and relative risks of diseases affecting Montana's SGCN for integration into the 2025 SWAP. We identified a list of high-priority candidate diseases (n=20) and conducted a targeted literature review and synthesis for each one. Literature synthesis focused on: (1) the relevance of each disease to Montana (2) the magnitude of potential impacts on wildlife (3) the sensitivity of each disease to climate, and (4) conservation actions for mitigating the disease. Additionally, we developed a database for project partners describing the estimated scope, severity, and timing of disease threats for Montana SGCN. Results from this effort will be integrated into Montana's revised SWAP and provides a potential framework for other states to investigate emerging disease threats.

(ORAL PRESENTATION) CONNECTING HABITAT AND SURVIVAL OF A DYNAMIC SPECIES: EXPLORING LANDSCAPE DRIVERS OF PRONGHORN SURVIVAL APPLYING A NOVEL METRIC OF HABITAT QUALITY

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Andrew Lindbloom, South Dakota Game, Fish and Parks, Rapid City, SD

Kelly Proffitt, Montana Fish, Wildlife and Parks, Bozeman, MT

Anna Moeller, Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, OK

Joshua Millspaugh, Department of Environmental Biology, State University of New York College of Environmental Science and Forestry, Syracuse, NY, and University of Montana, Wildlife Biology Program, Missoula, MT

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Pronghorn are a widely distributed and demographically dynamic species whose habitats are increasingly threatened by extreme winter weather and habitat conversion. Understanding demographic parameters (e.g., survival) and the mechanisms driving their variation is critical for wildlife conservation and population management. In this study, we use GPS location and

survival data from over 1,100 GPS-collared pronghorn across Montana and South Dakota to evaluate pronghorn survival in the context of other North American ungulates and assess habitat quality by directly linking habitat use to survival outcomes. We apply the newly developed Survival Habitat Quality (SHQ) model, an analytical framework that quantifies the cumulative impact of habitat characteristics (e.g., nutritional availability, drought conditions, and shrubland cover) on pronghorn survival. Our findings indicate that habitat quality varies across years and environmental conditions, particularly between perennial versus annual forbs and grasses. Notably, we found that annual forbs and grasses provide poor habitat quality for pronghorn in some regions. By leveraging the SHQ model and a large-scale dataset of pronghorn habitat use and survival, we developed a tool that can inform data-driven habitat management and conservation strategies.

(ORAL PRESENTATION) EXAMINING FACTORS POTENTIALLY AFFECTING SPRING AND FALL BLACK BEAR HARVEST RATES, ABSAROKA/BEARTOOTH MOUNTAINS, MONTANA

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Oliver Thomi, Wildlife Division, MT Fish, Wildlife & Parks, Absarokee, MT

Shawn Stewart, Wildlife Division, MT Fish, Wildlife & Parks, Red Lodge, MT

Black bear harvest rates are highly variable between years. Here we examine factors influencing variability. Winter/spring weather could be a driver of black bear (*Ursus americanus*) harvest rates, yet we found no significant relationship between spring temperatures or winter/spring snowpack and spring bear harvest rates. Spring body condition, as influenced by food availability during the previous fall, could influence harvest. However, we found no significant relationship between whitebark pine (*Pinus albicaulis*) cone crops and bear harvest rate the following spring. There was a significant relationship between estimated male bear population size and spring harvest rate for male bears but not for females. Fall black bear harvest rates were marginally related to population size. More importantly fall harvest rates were strongly related to whitebark pine cone production. During years of good cone production, defined as trees averaging 20+ cones per tree, the rate of fall harvest averaged 0.36 bears harvested/day. During years when transect trees average less than 20 cones/tree the average fall bear harvest rate quadrupled to 1.42 bears/day. Further, in good cone production years the percent of females in the fall harvest averaged 35%, while in poor cone production years the average percent females in the fall harvest increased to 46%. It appears that in good cone production years many bears are utilizing highly secure high elevation whitebark stands where there is little effective hunting pressure. Alternatively, in poor whitebark cone production years bears remain at lower elevations where they are more vulnerable to harvest with potential for overharvest.

(ORAL PRESENTATION) WINTER TEMPERATURE – NOT GRAZING, DROUGHT, OR BREEDING SEASON WEATHER - IMPACTS DYNAMICS OF A NORTHERN GREAT PLAINS GREATER SAGE-GROUSE POPULATION

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Lorelle Berkeley, SWCA Environmental Consultants, Spokane
Jennifer Helm, US Forest Service, Missoula
Victoria Dreitz, University of Montana, Missoula
Justin Gude, Montana Fish, Wildlife & Parks, Helena

High annual climatic variability and livestock grazing are ubiquitous across Greater sage-grouse range and may help shape population dynamics of this imperiled rangeland species. We investigated the role of annual variability in climate, vegetation productivity, grazing intensity, and conservation grazing program enrollment on the dynamics of a greater sage-grouse population occurring over a relatively intact a 1,500-km² rangeland landscape in central Montana (2002-2022). We modeled annual population growth in a Gompertz density-dependent and found that annual dynamics were positively associated with winter temperatures, which explained 18% of the variation in annual dynamics. We did not detect evidence that annual dynamics were related to variation in the previous year's breeding season weather, drought indices, or remotely-sensed rangeland productivity metrics as has been documented in other parts of sage-grouse range (e.g., Great Basin). We found no compelling evidence that variation in grazing intensity or conservation grazing program enrollment impacted populations. Our results suggest that within relatively intact rangeland systems of the northern great plains, drought-sensitivity and grazing management may not be limiting factors and the potential to mitigate winter severity impacts by protecting or improving winter habitat quality should be further evaluated.

(ORAL PRESENTATION) MONTANA SWIFT FOX OCCUPANCY SURVEY

Emily Mitchell*, Montana Fish, Wildlife & Parks, Miles City

Swift fox (*Vulpes velox*) distribution and population viability is currently not well understood in much of central and eastern Montana. Montana Fish, Wildlife, and Parks is conducting a range wide camera survey to determine the distribution and connectivity of swift fox populations across Montana. This is a roving survey across four administrative regions in central and eastern Montana. Camera surveys are conducted on a rotational basis with surveys conducted in Region 7 in 2023/24, Region 6 in 2024/25, and Regions 4 and 5 in 2025/26. From October 2023 through March 2024, staff surveyed portions of moderate and high-quality swift fox habitat in Region 7, southeastern Montana using a systematic camera survey. Data from two previous pilot studies was used to determine the best protocol: including lure type, number of cameras, and number of deployment days. Each survey grid had 4 cameras baited with a sent lure, one in each quadrant of the survey grid and were deployed for 14 days. A total of 656 cameras, equaling 164 survey grids, were set. Surveying a, roughly, proportionate amount of high-quality (44%) and moderate-quality (56%) habitat sample grids. This survey effort produced a total of 1,219,157 photos. These photos are currently being cataloged. So far there have been 18

cameras, equaling 13 survey grids, that have confirmed swift fox presence. By the time of this conference there should be more data to discuss!

(ORAL PRESENTATION) APPLYING THE RESIST-ACCEPT-DIRECT FRAMEWORK TO WILDLIFE HEALTH MANAGEMENT

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Anne Hubbs, Alberta Environment & Parks, Rocky Mountain House, Alberta, Canada
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Wildlife diseases can have substantial impacts on wildlife health as well as human and domestic animal health and well-being. As a result, many agencies share a goal of reducing wildlife disease spread and impacts. In practice, however, reducing wildlife disease burden is complicated by a scarcity of effective interventions, competition for funds, and conflicting priorities. Agencies are unlikely to successfully avoid the impacts of wildlife disease in all contexts and instead need to evaluate where resisting disease is most feasible and beneficial. The resist-accept-direct (RAD) framework is a tool that assists natural resource managers in exploring and communicating about management interventions, including in situations where resisting ecological changes may not be possible. The RAD framework has gained traction in climate adaptation planning but has not yet been applied to wildlife health management issues. Here, we illustrate how the RAD framework could be adapted to wildlife disease contexts to address several outstanding challenges in wildlife health management.

**** (ORAL PRESENTATION) APPLYING DEAD-RECKONING TECHNIQUES TO MONITOR MOVEMENTS AND MAP THE BURROW SYSTEMS OF A FOSSORIAL SPECIES, THE BLACK-TAILED PRAIRIE DOG (*CYNOMYS LUDOVICIANUS*)**

Itai Namir*, Ecology, Montana State University, Bozeman
James Redcliffe, Biosciences, Swansea University, Swansea, Wales
Jesse Boulterice, Great Plains Science, Smithsonian Institution
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Justine Becker, Ecology, Montana State University, Bozeman
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The black-tailed prairie dog is a keystone species that promotes grassland biodiversity through its foraging and burrowing behaviors. However, prairie dogs face significant threats from the sylvatic plague (*Yersinia pestis*). Plague can disrupt prairie dog behavior, movement patterns, and burrow system dynamics, ultimately compromising colony health and resilience. Understanding the movements and burrow systems of semi-fossorial animals, such as BTPD,

poses significant challenges due to the difficulty of direct observation and the limitations of most tracking systems, which cannot collect location underground. This study explores the potential of combining 'Daily-Diary' tags with dead-reckoning techniques to map underground movement. The tags are equipped with accelerometers and magnetometers and collect data in 3 axes at a rate of 40 times per second. We deployed 12 tags on prairie dogs in northeast Montana to test the efficacy of dead-reckoning for tracking underground activity. To validate dead-reckoning trajectory estimation, we conducted controlled trials in artificial burrows constructed from plastic tubing with known dimensions and layouts. This allowed us to test the accuracy of movement reconstructions against a known reference. The 2D dead-reckoning process captured all turns in our plastic tunnel system with a mean error of 15.38 cm across tunnel lengths of up to 4 m. These findings offer a promising avenue for studying fossorial species where traditional tracking methods are not feasible. Building on this work, we are now applying tags to prairie dog colonies under different plague management schemes to evaluate how these practices influence prairie dog movement and burrow system complexity.

(ORAL PRESENTATION) VALIDATIONEXPLORER: A TOOL FOR SIMULATION-BASED INVESTIGATIONS OF STUDY DESIGN ELEMENTS TO ESTIMATE RELATIVE ACTIVITY RATES AND OCCURRENCE PROBABILITIES FOR BAT ASSEMBLAGES

Jacob Oram*, Department of Mathematical Sciences, Montana State University, Bozeman
Katharine Banner, Department of Mathematical Sciences, Montana State University, Bozeman
Christian Stratton, Mathematics and Statistics, Middlebury College, Middlebury
Kathryn Irvine, U.S. Geological Survey, Northern Rocky Mountain Science Center, Bozeman

Bats in North America face emerging threats due to the spread of the bat disease white-nose-syndrome (WNS), the expanding footprint of the wind energy industry, and the effects of global change on suitable bat habitats. One goal of the North American Bat Monitoring Program (NABat) is to monitor status and trend indicators for bat species assemblages at varying spatial extents. Autonomous recording units can efficiently gather data from bats but also necessitate the use of auto-classifiers to assign species labels to large numbers of observations, which introduces misclassification error. Statistical models that account for misclassification error require additional information to estimate misclassification rates. For bat acoustic data, providing this information through human verification of a subset of observed machine-generated species labels can result in credible intervals for relative activity and occurrence that are more precise than those resulting from using auxiliary data or informative priors. We define a validation design as a mechanism for probabilistic selection of recordings from the population of observed recordings (i.e., the design type), together with the level of validation effort (e.g., validation sample size, percentage of recordings). We present a statistical framework and associated software tool, ValidationExplorer, that — given a predetermined set of measurable objectives — affords comparisons of validation designs (and other study design elements) to provide insight into balancing validation costs with programmatic goals.

**** (ORAL PRESENTATION) DISEASE, CLIMATE, AND ABUNDANCE IMPACTS ON BIGHORN SHEEP LAMB:EWE RATIOS IN NEW MEXICO**

Colton Padilla*, Montana Cooperative Wildlife Research Unit, Missoula, MT

Caitlin Ruhl, New Mexico Department of Game and Fish, Santa Fe, NM

James Cain III, New Mexico Cooperative Fish and Wildlife Research Unit, United States Geological Survey, Las Cruces, NM

Matthew Gompper, Fish, Wildlife and Conservation Ecology, New Mexico State University, Las Cruces, NM

Understanding the impacts of *Mycoplasma ovipneumoniae* on bighorn sheep populations is paramount to ensuring population persistence. In New Mexico, most bighorn sheep (*Ovis canadensis*) populations were thought to be free of this pathogen prior to 2017; however, infections in multiple herds since that time have raised concerns surrounding impacts to population size and lamb survival. We evaluated the impacts of *M. ovipneumoniae* infection, abundance, climate, and predation on bighorn sheep lamb:ewe ratios across New Mexican populations. We characterized these relationships using lamb:ewe ratios from aerial and ground surveys from 2000 to 2022 and *M. ovipneumoniae* testing data from 2007 to 2022 (n = 466 individuals) for both Rocky Mountain (*O.c. canadensis*) and desert bighorn sheep (*O.c. mexicana*). From 2007 to 2022, we sampled n = 466 bighorn sheep across 19 populations in New Mexico for *M. ovipneumoniae* exposure. While timing of initial herd infections varied across populations, one population sustained active infections for over 15 years. We found reduced juvenile:female ratios post *M. ovipneumoniae* exposure for both desert and Rocky Mountain bighorn sheep populations. Evaluation of the effects of population size and environmental conditions on lamb:ewe ratios indicated varying impacts for each subspecies. Notably, population size was negatively related to lamb:ewe ratios for Rocky Mountain bighorn only after populations were exposed to *M. ovipneumoniae*. Additionally, climatic conditions in the previous lambing season and pre-parturition timeframe were associated with lamb:ewe ratios for Rocky Mountain populations while lamb:ewe ratios of desert bighorn appeared to only be affected by pre-parturition climatic conditions.

(ORAL PRESENTATION) A DECADE OF HABITAT CHANGE ON THE SPOTTED DOG WILDLIFE MANAGEMENT AREA

Jarrett Payne*, Wildlife Division, Montana Fish, Wildlife & Parks, Dillon, MT

The Spotted Dog Wildlife Management Area (WMA) is a 38,000-acre property northeast of Deer Lodge, MT. Lentic, lotic, and upland habitat conditions were evaluated across the WMA in 2011 and 2014 using the Ecological Health Assessment (EHA) methodologies developed by Ecological Solutions Group. The 2011 and 2014 EHAs determined that many habitats were degraded from current and historical grazing practices, recent timber harvest, and noxious weeds. In 2014, grazing was removed from the WMA to allow recovery from habitat degradation. In 2018, Montana Fish, Wildlife and Parks started an exchange-of-use grazing system on a small portion of the WMA to evaluate the use of targeted grazing to enhance rough fescue grasslands for wildlife. Following five years of this grazing system and ten years from the last EHA, a subset of the 2011/2014 EHAs were assessed in 2023 to determine habitat trend and conditions. The results from the 2023 assessment determined that ecological health had significantly improved

across all sampled habitats. Most notable was a 26% improvement in overall ecological health scores of riparian habitats. Wetland, forest, shrubland, and grassland habitat health scores improved by 6%, 23%, 12%, and 18%, respectively. Grazed and ungrazed rough fescue grasslands involved with the exchange-of-use grazing program on the WMA also significantly improved in ecological health. However, no difference in overall ecological health scores were detected between grazed and ungrazed grasslands. This talk will present further details of these habitat improvements related to vegetation and soil stability, and management implications.

**** (ORAL PRESENTATION) DAM IT ALL! USING REMOTE SENSING DATA TO TRACK PERSISTENCE OF BEAVER DAMS IN PRAIRIE STREAMS**

Colleen Piper*, Wildlife Biology, University of Montana, Missoula

Blake Hossack, USGS Northern Rocky Mountain Science Center, Missoula

Lisa Eby, Wildlife Biology, University of Montana, Missoula

Numerous studies highlight the critical role of beaver dams in providing important habitat for many species and mitigating the impacts of drought and floods. As climate change intensifies the frequency and severity of hydrological disturbances, beaver-based restoration efforts, such as translocations of beaver and construction of beaver dam analogs (BDAs), have become increasingly common. However, the longevity and effectiveness of restoration projects likely depend on their placement within a tributary, making identifying environmental factors that influence dam persistence essential for prioritizing restoration efforts and maximizing their benefits. To address this need, we used NAIP satellite imagery to identify, geolocate, and track beaver dams across 10 watersheds (~11,214 km²) in northeastern Montana, with observations taken every two years from 2017 to 2023. We identified 2,432 unique beaver dams (1,064 in 2017, 443 in 2019, 675 in 2021, and 250 in 2023), with only 146 (~6%) persisting from 2017 to 2023. Hazard rates, or the risk of failure for a dam during a specified period, were 62% in 2017–2019, 39% in 2019–2021, and 73% in 2021–2023. Future analysis will focus on the relative influence of flow-altering factors, including slope, catchment area, peak flow events, and upstream dam density, as well as availability of nearby woody vegetation on dam persistence. These findings will help refine expectations for long-term restoration success by improving predictions of dam persistence in these dynamic landscapes.

(ORAL PRESENTATION) ASSESSING SHARP-TAILED GROUSE OCCUPANCY AND ABUNDANCE ACROSS EASTERN MONTANA

Kenneth Plourde*, Montana Fish, Wildlife and Parks, Flaxville

Lance McNew, Department of Animal & Range Sciences, Montana State University, Bozeman

Sharp-tailed grouse (*Tympanuchus phasianellus*) are widely distributed across eastern Montana and are the most harvested native upland game bird in the state. The species was extirpated in Montana west of the continental divide in the early 2000s. While annual harvest suggests stable populations in eastern Montana, more information is needed to improve long-term management of the species in the state. The status of sharp-tailed grouse populations is generally based on annual lek surveys, but lek survey effort in Montana is non-random and spatial coverage is limited. Our objective was to develop and evaluate a survey method to estimate regional sharp-tailed grouse abundance and distribution, and investigate habitat-

abundance relationships across their range in eastern Montana. In 2024 we conducted a pilot season survey using a distance sampling protocol for sharp-tailed grouse. Surveyors walked a U-shaped transect within a stratified-random selection of 2.56 km² (1 mi²) Public Land Survey System sections and recorded all detections of lekking sharp-tailed grouse, the location of detected leks, and the number of grouse with visual and flush counts. Results of 47 completed surveys include detection of 26 sharp-tailed grouse leks with successful distance calculations and counts for 19 leks. Sample size for distance sampling is small but the probability of detecting a lek within 600 meters was high, suggesting the method is suitable for use in occurrence models at the section scale with a single survey visit. Preliminary analysis remains underway and additional findings will be presented along with plans for a future full-scale survey effort.

(ORAL PRESENTATION) MANAGING CHRONIC WASTING DISEASE IN DEER USING A SPLIT HUNTING SEASON STRUCTURE

Ryan Rauscher*, Montana Fish, Wildlife and Parks, Conrad

Chronic Wasting Disease (CWD) is a slow-moving, always fatal prion disease of cervids. Management of CWD focuses on several strategies including removal of those animals with a greater probability of infection. Among deer in Montana, bucks of both species have higher prevalence. CWD was first documented in north-central Montana in mule deer (*Odocoileus hemionus*) in 2017 and in white-tailed deer (*Odocoileus virginianus*) in 2018. In 2020, a split deer season, three weeks of a general deer season followed by two weeks of limited antlered buck permits, was implemented in four hunting districts in an effort to maintain low prevalence rates and reduce the potential for spread of the disease. Permit quotas were adjusted with the intent that permit harvest comprised 10 percent of the total buck harvest. For the five seasons since implementation, permit success averaged 53% and 47% for buck mule deer and buck white-tailed deer respectively. For the same period, permit harvest averaged 12% of the total buck mule deer harvest and 8% of the buck white-tailed deer harvest. Observed three-year CWD prevalence ranges from 0.06 to 0.03 for mule deer and 0.08 to 0.00 for white-tailed deer. Permit quotas have been increased where prevalence is above 0.05 for the 2025 season. Of those permit holders with an opinion, 76% approve or strongly approve of the season structure.

**** (POSTER PRESENTATION) AVIAN RADAR TRACK IDENTIFICATION USING MACHINE LEARNING MODELS**

Marco Salvo*, Boone and Crockett Wildlife Conservation Program, University of Montana, Missoula, MT

Michael Clawson, Boone and Crockett Wildlife Conservation Program, University of Montana, Missoula, MT

Jon McRoberts, Boone and Crockett Wildlife Conservation Program, University of Montana, Missoula, MT

Joshua Millspaugh, Boone and Crockett Wildlife Conservation Program, University of Montana, Missoula, MT

Avian radar systems are increasingly used to understand bird movement and migration and prevent bird mortality from aircraft, wind turbines, and other anthropogenic sources. One

limitation of avian radar systems is they do not automatically identify bird attributes, such as bird species or flock size, which would be useful for understanding spatial and temporal patterns of bird activity. Instead, radar collects information about tracked targets (i.e. shape, size, speed), which may allow identification of targets to different levels of classification based on bird morphology or flock size. Using machine learning, we classified tracks recorded by MERLIN DeTect radar systems at Ellsworth Air Force Base to different levels of bird type and quantity. Through field observations, we created a dataset of 4,225 ground truthed tracks by identifying radar tracks to bird species and quantity, then assessed the accuracy of track classification from tracked target covariates. Initial results indicate we can classify radar tracks well of some bird groups (e.g., songbirds and columbids), and model structure is important to the accuracy of our predictions.

**** (ORAL PRESENTATION) DRONES OUTPERFORM DOGS FOR HAZING BEARS: A COMPARISON OF AVERSIVE CONDITIONING TOOLS**

Wesley Sarmiento*, University of Montana, Valier, MT

Human-wildlife conflict can result in harm to people and their livelihoods, and frequently ends in reduced tolerance for species and/or removal of animals. Resolving and preventing conflict is essential for conserving carnivore populations. Here I conducted a six-year study of the efficacy of non-lethal hazing tools to deter grizzly bears (*Ursus arctos*) away from people on the prairies of North-Central Montana. I tested a new technology, drones, and traditional methods of hazing bears including dogs, projectiles, and vehicular pursuit. These various hazing techniques were successful at stopping undesirable bear behaviors and caused a significant increase in avoidance behavior and distance to human infrastructure. Results from these 163 hazing events suggest aversive conditioning may have occurred over longer time scales as older bears required less hazing and hazing events decreased over each calendar year. Drones outperformed other hazing techniques where the odds of a pursuit of a bear being possible increased 127% relative to vehicular chasing due to accessibility issues. Relative to vehicular pursuit, dogs required high maintenance and had an 86% reduction in the odds a hazing event would be successful relative to vehicular pursuit. Grizzlies fled to locations that were farther from roads and human development. Hazing tools were effective for immediately resolving complaints and preventing further conflicts.

(ORAL PRESENTATION) EVOLVING MODELS FOR EVOLVING CONDITIONS: UPDATING MONTANA'S WOLF GROUP SIZE MODEL FOR IPOM

Sarah Sells*, Wildlife Biology Program & Ecology and Evolution Program, U. S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, Montana

Hannah Sipe, Montana Cooperative Wildlife Research Unit, Wildlife Biology Program, University of Montana, Missoula, Montana

Justin Gude, Montana Fish, Wildlife and Parks, Helena, Montana

Kevin Podruzny, Montana Fish, Wildlife and Parks, Helena, Montana

Molly Parks, Montana Fish, Wildlife and Parks, Missoula, Montana

Montana Fish, Wildlife and Parks uses iPOM (Integrated Patch Occupancy Model) to estimate wolf abundance in the state. This method involves several submodels, including a group size model that was developed in 2019 based on data from 2005–2018. However, substantial changes have occurred since 2018, including liberalized harvest regulations, additional covariate data, and five years of new pack size observations from monitoring efforts. These changes provided the opportunity to revisit the model, therefore we developed and tested a revised group size model. The new model integrates data on harvest regulations, mortalities, pup presence, and environmental features to better account for temporal and spatial variability in group sizes. The model provides good accuracy in predicted versus observed group sizes, regardless of count quality classifications from field observations, and appears to help correct for undercounts that are probable in poor quality observations. This updated approach provides a more robust understanding of wolf group size dynamics and their environmental and anthropogenic drivers, offering insights for adaptive management of wolf populations under evolving ecological and regulatory conditions.

(ORAL PRESENTATION) EVALUATING THE PERFORMANCE OF OCCUPANCY MODELS FOR WOLF MANAGEMENT IN MONTANA THROUGH SIMULATION

Hannah Sipe*, Montana Cooperative Wildlife Research Unit, Wildlife Biology Program, University of Montana, Missoula, Montana

Sarah Sells, Wildlife Biology Program & Ecology and Evolution Program, U. S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, Montana

Justin Gude, Montana Fish, Wildlife and Parks, Helena

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Daniel Walsh, U.S. Geological Survey, University of Montana, Montana Cooperative Wildlife Research Unit, Wildlife Biology Program, Missoula

Sarah Bassing, Department of Ecology, Montana State University, Bozeman

Anna Moeller; Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, Oklahoma

David Miller, Department of Ecosystem Science and Management, Pennsylvania State University, University Park, Pennsylvania

Occupancy models are a popular tool for understanding species distributions, providing insight into species ecology, and are often used to inform management decisions. In Montana, decisions about wolf harvest are based, in part, on the results from a false positive occupancy model that uses observation data from hunter surveys and FWP wolf specialists. We completed a simulation study to better understand performance of the occupancy model currently being used. Simulations tested model behavior under various scenarios, including: (1) performance across a distribution of parameter values, (2) performance when latent occupancy model parameters are based on previous occupancy estimates with variable detection probabilities, and (3) performance when the ‘true’ observation generating process differs from that which is being modeled. Resulting parameter estimates were examined using relative bias and root mean squared error across simulation scenarios. The outcome of this work provides rigorous information about the strengths and weaknesses of occupancy analysis for wolves in Montana, using currently available data. Broadly, we aim to show the benefits of using simulation to

understand the ability of modeling tools and available data to provide unbiased and accurate parameter estimates that inform decisions.

(ORAL PRESENTATION) MANAGEMENT STRATEGY EVALUATION FOR INFORMING DECISIONS ABOUT WOLF MANAGEMENT AND CONSERVATION

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Sarah Sells, Wildlife Biology Program & Ecology and Evolution Program, U. S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, Montana

Justin Gude, Montana Fish, Wildlife and Parks, Helena

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Alexander Metcalf, Wildlife Biology Program, Department of Society and Conservation, WA Franke College of Forestry and Conservation, University of Montana, Missoula

Elizabeth C. Metcalf, Wildlife Biology Program, Department of Society and Conservation, WA Franke College of Forestry and Conservation, University of Montana, Missoula

Decisions about wildlife conservation and management are often challenged by limited information about how potential actions will likely impact management goals. Adaptive management can reduce this uncertainty and lead to better outcomes by iteratively applying management, monitoring outcomes, updating models, and making management decisions based on the updated information. Management strategy evaluation (MSE) is a simulation approach for evaluating the efficacy of various management actions under different states of the world within an adaptive framework. This flexible approach can incorporate common features for wildlife management decisions that are challenging and complex (e.g., competing interests among stakeholder groups and various forms of uncertainty). Although fisheries management frequently uses MSE to inform adaptive management, there are few terrestrial wildlife applications. We discuss the mechanics behind MSE and how it can be adapted to inform wildlife conservation decisions using a case study of the controversial and complex decision problem of wolf harvest and management in Montana. Our application shows how incorporating social and ecological aspects into a MSE framework, along with all relevant forms of uncertainty, can offer useful predictions about how management goals are likely to be influenced by various management actions over long time scales.

(ORAL PRESENTATION) EFFECTS OF METAL CONTAMINATION ON BIRD COMMUNITIES IN WESTERN MONTANA

Hannah Specht*, Montana Fish, Wildlife & Parks, Missoula

Megan Fyiling, UM Bird Ecology Lab, University of Montana, Missoula

Vanna Boccadori, Montana Fish, Wildlife & Parks, Butte

Bridger Creel, University of Montana, Missoula

Kristina Smucker, Montana Fish, Wildlife & Parks, Helena

Josh Millspaugh, Wildlife Biology Program, University of Montana, Missoula

A century of mining by milling and smelting in western Montana's Upper Clark Fork River Basin shaped the region economically, socially and politically, but also disturbed and contaminated riparian and uplands areas. Remedy for contamination of EPA designated superfund areas has been pursued to meet human health standards for clean air and water. We analyzed a decade of bird banding data collected from riparian sites both within and outside of the affected areas in effort to understand how these efforts have met needs of the songbird community and where they have fallen short. We found that songbird communities from a riparian area in the Mt. Haggin WMA exhibited poorer body condition and lower reproductive success, while songbird communities along the Upper Clark Fork were similar to reference sites, except during immediate post-restoration years. Differences observed plausibly result from either ingestion of metal(oid)s or impacts on invertebrate prey. However, as vegetation gradually matures in the areas impacted by remediation and restoration actions, there is evidence of songbird community changes reflective of the change in habitat, emphasizing the importance of work that continues to enhance riparian habitat.

**** (ORAL PRESENTATION) USING ADAPTIVE MANAGEMENT TO UNDERSTAND ELK POPULATION DYNAMICS AND DISTRIBUTIONS IN NORTHWEST MONTANA**

Andi Stewart*, Wildlife Biology, University of Montana, Missoula

Kelly Proffitt, Montana Fish, Wildlife and Parks, Bozeman

Nicole Bealer, Montana Fish, Wildlife and Parks, Bozeman

Jesse DeVoe, Montana Fish, Wildlife and Parks, Bozeman

Christopher Hansen, Wildlife Biology, University of Montana, Missoula

Zachary Farley, Montana Fish, Wildlife and Parks, Thompson Falls

Joshua Millspaugh, Wildlife Biology, University of Montana, Missoula

State agencies and wildlife commissions manage wildlife populations using the best available information; however, efficacy of management prescriptions to meet goals can be hampered by uncertainty regarding drivers of population dynamics. In hunting district 121, declines in bull harvest since 2012 and uncertainties about population vital rates and distributions have led to concerns regarding the status of this elk population and potential effects of predators. To address these concerns, Fish, Wildlife & Parks developed the Integrated Elk, Carnivore, and Habitat Adaptive Management Project. To date, we have collared 101 adult elk and 111 calves (i.e., neonates and 6-month-olds). Based on elk survival estimates through 2024, adult female survival was 0.891 (95% CI = 0.832 – 0.954) and adult male survival was 0.571 (95% CI = 0.301 – 0.1) with leading causes of all adult mortality including harvest ($n = 5/15$) and mountain lions ($n = 3/15$). Calf survival was 0.537 (95% CI = 0.377 – 0.764) with leading causes of mortality including mountain lions ($n = 10/27$) and black bears ($n = 6/27$). Additionally, during the 2023 rifle season, collared adults ($n = 68$) had a lower proportion of locations on public lands, compared to other seasons, however, 67% of females and 100% of males spent the majority of time on public lands. While initial results provide information about vital rates and distributions, data collection is ongoing with captures scheduled through 2025. Ultimately, our goal is to better understand factors driving elk population dynamics and develop tools to facilitate elk and carnivore management.

(ORAL & POSTER PRESENTATION) MONTANA BUMBLE BEE ATLAS - A COLLABORATIVE EFFORT TO CONSERVE BUMBLE BEES THROUGH COMMUNITY SCIENTIST OBSERVATIONS

Michelle Toshack*, The Xerces Society, Livingston, MT

Rich Hatfield, The Xerces Society, Portland, OR

The Montana Bumble Bee Atlas mobilizes hundreds of community scientists to help track and conserve the state's bumble bees. In its inaugural field season in 2024, participants submitted 2,412 observations, documenting 21 species across diverse landscapes. This effort is part of a broader initiative, with Bumble Bee Atlases currently active in 20 states. Each regional or statewide Atlas generates data on bumble bee distribution, phenology, and habitat associations. Participants are trained through workshops that provide foundational knowledge on bumble bee ecology, conservation strategies, and standardized sampling protocols. By engaging volunteers and addressing data gaps, the Atlas can supplement data in areas where recent survey effort is lacking. The standardized methodology ensures consistent data collection on habitat characteristics, land management, and non-detection, providing information for status assessments and conservation decision-making. The data can also inform best management practices, guide conservation practitioners and policy makers, and foster public awareness of pollinator conservation. This presentation will highlight the project's inception, design, and outcomes to date, while providing information on the upcoming field season.

**** (ORAL PRESENTATION) DRIVERS AND IMPACTS OF MINING CONTAMINANTS IN INSECTIVOROUS SONGBIRDS AT THE MT HAGGIN INJURED AREA, ANACONDA, MT**

Maria Venegas*, Wildlife Biology, University of Montana Bird Ecology Lab, Missoula, MT

Mining for precious metals contributes to habitat degradation and is a major driver of avian population declines. Mining yields a mosaic of waste products (unwanted heavy metals, metalloids, and minerals) that often remain unchecked in the environment. Exposure to these contaminants can severely impact organismal health and cascade through food webs, highlighting the complexity of contaminant transfer in polluted ecosystems. As avian populations across North America continue to decline, understanding how metal pollutants move through avian food webs and influence species persistence is critical. Western Montana is home to the nation's largest Environmental Protection Agency Superfund complex, a legacy of Anaconda's extensive copper production. In 2012, Montana Fish, Wildlife, and Parks partnered with the University of Montana Bird Ecology Lab (UMBEL) to monitor songbird population trends at Anaconda's Mt Haggin Injured Area (MHIA). Data from >1,300 individuals across 50 species indicate that survival, diversity, and productivity have declined over the past decade. Understanding the role of mining contamination is essential to explain these patterns in MHIA bird populations. This project addresses two questions: (1) How do soil metal concentrations and diet composition near the Anaconda smelter influence blood metal concentrations in songbird nestlings? (2) Does blood metal concentration predict breeding success? This presentation will share preliminary data from soil metal samples across four study sites, summarize songbird nesting and blood metal data collected during the 2024 field season, and provide an outlook for the 2025 field season.

**** (ORAL PRESENTATION) SPATIO-TEMPORAL RESPONSE OF GRIZZLY BEAR HABITAT SELECTION TO HARVESTED FORESTS AND FIRE DISTURBANCE IN THE NORTHERN CONTINENTAL DIVIDE ECOSYSTEM**

Milan A. Vinks*, Montana Fish, Wildlife and Parks, Montana Cooperative Wildlife Research Unit, Wildlife Biology Program, University of Montana, Missoula, MT

Sarah Sells, Wildlife Biology Program & Ecology and Evolution Program, U. S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT

Cecily M. Costello, Montana Fish, Wildlife & Parks, Bozeman, MT

Lori L. Roberts, Montana Fish, Wildlife and Parks, Kalispell, MT

Forest disturbance can reinstate early successional vegetation, often providing abundant grizzly bear foods. However, uncertainty remains in factors influencing how grizzly bears respond to forest disturbance. We used GPS collar data from 91 individual grizzly bears between 2000 and 2022 to evaluate how disturbance from timber harvest and fire influenced habitat selection by grizzly bears in the Northern Continental Divide Ecosystem of northwest Montana. We hypothesized that grizzly bears select disturbance because it can provide important foods, but that selection would be influenced by season, anthropogenic factors, and the type, severity, age, and availability of disturbance sites because of their impacts on forage availability, vegetation regeneration, and human-caused mortality risk. We used resource selection analyses to examine whether spatio-temporal disturbance characteristics explained seasonal patterns of grizzly bear selection of disturbance. Grizzly bears generally selected unburned residual patches within burns and areas burned by low severity fire. When only sites with forest harvest were available, grizzly bears selected regenerative harvests in summer. Grizzly bears with both burns and harvest available generally avoided moderate harvest sites. Fine-scale sites within harvests and burns that experienced silvicultural treatments prior to and after the dominant disturbance source were generally avoided. Our findings have important management implications related to configuration of disturbance patches. Our results also support the prevailing hypothesis that grizzly bears show stronger selection for natural disturbance sources and that selection of harvested forests is influenced by availability of recent natural disturbance.

**** (ORAL PRESENTATION) EFFECTS OF TIMBER HARVEST ON ELK SUMMER NUTRITION**

Trevor Weeks*, Wildlife Biology Program, University of Montana, Missoula

Kelly Proffitt, Montana Fish, Wildlife & Parks, Bozeman

Chad Bishop, Wildlife Biology Program, University of Montana, Missoula

As disturbance regimes change, it is vital that wildlife managers understand how different disturbances affect habitats and the wildlife that live in them. We conducted research in northwestern Montana to understand the role of timber harvest in altering the summer nutritional landscape available to elk (*Cervus canadensis*). We performed sampling during May-August of 2023 and 2024, which involved three main efforts. First, we performed vegetation surveys at random plots stratified across a heterogenous landscape of landcover type and, for forested landcover, timber harvest strategy and time-since-harvest. We estimated ground cover and phenological stage proportions of all understory plants at intervals along a 40m

transect and clipped and dried herbaceous biomass to estimate forage biomass (kg/ha) at each plot. Second, we collected elk fecal pellets and used DNA metabarcoding to develop a comprehensive summer forage species list. Lastly, we collected samples of each forage species in each phenological stage and used sequential fiber analysis to estimate digestible energy (kcal/g). Using these data, we created nutritional landscape models predicting forage biomass and digestible energy. We found that harvested sites had higher digestible energy than unharvested sites, and under certain conditions provided some of the highest levels of forage biomass on the landscape. We found that combinations of landcover type and time-since-harvest informed predictions of both forage biomass and digestible energy. Harvest strategy informed predictions of forage biomass, but not digestible energy. Our research provides new insights into elk nutrition in an understudied region of Montana with implications for habitat manipulation and management.

(ORAL PRESENTATION) EVALUATING CONTACT RISK FACTORS BETWEEN WILD AND DOMESTIC SHEEP IN MONTANA

Smith Wells*, Animal and Range Sciences, Montana State University, Bozeman

Emily AlMBERG, Research Unit, Montana Fish, Wildlife and Parks, Bozeman

Jared Beaver, Extension Wildlife Program, Animal and Range Sciences, Montana State University, Bozeman

Brent Roeder, Extension Sheep & Wool Program, Animal and Range Sciences, Montana State University, Bozeman

Respiratory disease, specifically pneumonia caused by *Mycoplasma ovipneumoniae* (*M. ovi*), remains a limitation to bighorn sheep conservation success in Montana. *M. ovi* can be transmitted among all members of the Caprinae family, including domestic sheep and goats. This study aims to identify individual, herd-level, and environmental factors that contribute to a higher risk of contact, allowing managers to better predict when and where wild sheep are likely to interact with domestic sheep and goats and to focus effective separation efforts. To date, 125 domestic sheep and/or goat producers have been identified near 6 bighorn sheep study herds where 142 bighorn ewes and 56 rams are GPS-collared. In addition, GPS collars are deployed on 291 domestic sheep and 30 livestock guardian dogs across 5 operations near 3 bighorn study herds. During 2024, 132 close proximity events (<200 meters) were identified through GPS data and involved 18 individual bighorn sheep and 6 producers across 3 study herds. The close proximity rate was 0.06 events/sheep/month across all collared individuals and varied from 0–2.9 events/sheep/month. Proximity events occurred throughout the year, ranging from <2 hours–7 days, with a minimum distance to domestic sheep averaging 92 meters. Data collection will continue for 2 more years. The products of this study and future work will be developed collaboratively among producers, woolgrowers, sportspeople, and wild sheep managers with a goal of optimizing separation tools that work for both production agriculture and wildlife conservation.

**** (POSTER PRESENTATION) ANALYZING GRIZZLY BEAR MOVEMENT PATTERNS: INSIGHTS FOR IDENTIFYING FEMALES WITH NEWBORN CUBS USING TELEMETRY DATA**

Mayson Whitlock*, Wildlife Biology, University of Montana, Missoula, MT

Sarah Sells, Wildlife Biology Program & Ecology and Evolution Program, U. S. Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT

Milan A. Vinks, Montana Cooperative Wildlife Research Unit, Wildlife Biology Program, University of Montana, Missoula, MT, and Montana Fish, Wildlife and Parks, Kalispell, MT

Wayne F. Kasworm, US Fish and Wildlife Service, Libby, MT

Thomas G. Radandt, US Fish and Wildlife Service, Libby, MT

Justin E. Teisberg, US Fish and Wildlife Service, Libby, MT

Grizzly bears (*Ursus arctos horribilis*) generally den in rugged, remote terrain during winter months. Females give birth to cubs in the den in mid to late winter and emerge in spring with highly vulnerable cubs. Detection of cub presence to date has generally relied on aerial surveys, which are costly and challenging, particularly in denning terrain. An understanding of the presence and survival of grizzly bear cubs after den emergence is thus generally limited. This information gap impedes an accurate assessment of reproductive rates, an understanding of which is particularly important in the Cabinet-Yaak and Selkirk Recovery Ecosystems, where small populations can be particularly impacted by cub recruitment. Using post-den location data from 39 GPS-collared female grizzly bears in these populations, we aim to compare movement patterns using cumulative net displacement in an effort to differentiate females with newborn cubs, older young (1–2 years of age), and no offspring. We hypothesize that females with cubs will exhibit lower cumulative net displacement (a metric to quantify the total distance moved over a period of time) and reduced movements compared to females with older young or no offspring, because more females who localize their space use can conserve energy and improve survival of their cubs. This ongoing research will improve an understanding of grizzly bear ecology in the Cabinet-Yaak and Selkirk Recovery Ecosystems.

**** (ORAL PRESENTATION) INTRA-SEASONAL SHIFTS IN SUMMER ELK DIET COMPOSITION**

Ava Window*, Wildlife Biology Program, University of Montana, Missoula, MT

Trevor Weeks, Wildlife Biology Program, University of Montana, Missoula, MT

Dr. Meredith Zettlemoyer, Division of Biological Sciences Department, University of Montana, Missoula, MT

Dr. Mark Hebblewhite, Wildlife Biology Program, University of Montana, Missoula, MT

Dr. Josh Millspaugh, Wildlife Biology Program (& Department of Environmental Biology), University of Montana, Missoula MT (& State University of New York), Syracuse, NY

Dr. Chad Bishop, Wildlife Biology Program, University of Montana, Missoula, MT

Elk (*Cervus canadensis*) require adequate forage to fulfill their seasonal nutritional requirements. Elk undergo their highest nutritional demands during summer to support critical life functions such as late gestation, lactation, and juvenile growth. During this period, variations in plant phenology significantly influence the quality and quantity of forage on the landscape. Recent literature has concentrated on late summer due to its limiting nature. Yet,

growing evidence suggests that both early and late summer forage often fail to meet the nutritional demands of lactating and reproducing female elk. Further, there is limited knowledge surrounding the intra-seasonal dynamics of elk diet composition during summer. To address this, we utilized data from two elk populations in Montana, (i.e. Noxon and Blackfoot) and to examine the changes in elk diet composition between early and late summer. We determined diet composition using DNA metabarcoding of fecal samples, then used Principle Component Analyses (PCA) to examine the changes in elk diet over time. Our initial results indicate that late summer diets were more restricted than early summer diets in both study areas. In Noxon, elk primarily consumed shrubs, with forage species changing as summer progressed. Conversely, elk in the Blackfoot had diets comprised of forbs and showed little variation between early and late summer. Our findings enhance the understanding of elk forage use through summer and can help inform habitat management approaches for elk in summer habitat.

THE MONTANA CHAPTER OF THE WILDLIFE SOCIETY IS HERE TO SERVE YOU AS WILDLIFE PROFESSIONALS

To be effective and influence circumstances for Montana's wildlife resources, we must have an active and committed membership. Please consider volunteering and becoming an active member of any of the following committees or ad hoc committees. Your participation is always appreciated and needed. Refer to Bylaws for duties and composition of standing committees (Article VIII).

STANDING COMMITTEES 2024-2025

NOMINATING AND ELECTIONS

A three-member Nominating and Elections Committee shall be selected by the President of the Montana Chapter not later than October 1 of each year and shall submit to the Secretary on or before October 15, the names of two candidates for each of the elective positions; namely the President-Elect, and every third year the Secretary or Treasurer, depending on the position coming open.

Committee Chair: current MT TWS President (Katie Phillips, mttws.president@gmail.com)

MEMBERSHIP

This committee shall encourage the maximum number of qualified persons working or residing within the Chapter's organizational area to become members of The Wildlife Society, the Northwest Section, and the Montana Chapter. The Committee shall also recommend Honorary Membership for deserving individuals in accordance with Article IV, Section 4.

Committee Chair: current MT TWS Treasurer (Heather Harris, mttws.treasurer@gmail.com)

PROGRAMS

This committee shall arrange programs of all regular and annual meetings and provide the President with a proposed agenda for the Annual Meeting at least two months prior to the meeting date. The President-Elect shall serve as Chair of the Program Committee.

Committee Chair: current President-Elect (Rebecca Mowry, mttws.preselect@gmail.com)

FINANCIAL MANAGEMENT

This committee shall consist of a Chair and at least two other members, serving staggered three-year terms. The Financial Management Committee shall review the financial records and supporting documents of the Treasurer at least annually. The Committee also shall review these records and documents prior to any change in the office of the Treasurer. The Committee shall prepare an annual financial management plan for approval by the membership at the annual meeting.

Committee Chair: current MT TWS Treasurer (Heather Harris, mttws.treasurer@gmail.com)

EDUCATION AND INFORMATION

This committee shall seek and employ methods of informing the public of basic wildlife management concepts and of Chapter and Wildlife Society activity and interests.

Committee Chair: Brent Lonner (blonner@mt.gov)

CONSERVATION AFFAIRS

This committee shall: review legislative proposals, administrative regulations, environmental assessments and impact statements, and other subjects or issues affecting wildlife or wildlife habitat within the organizational area of the Montana Chapter and make recommendations to the Executive Board for any action that should be taken by the Montana Chapter; Prepare white papers on critical wildlife issues, and other issues affecting wildlife or wildlife habitat within the organizational area of the Montana Chapter; Receive proposed position statement, resolutions, and public statements from two or more members at any time, and shall prepare, submit, and recommend action on such items to the Executive Board in accordance with Article VII, Section 4; Communication with The Wildlife Society's Director of Government Affairs to elevate local or regional issues that may have national or international significance or precedent setting.

Committee Chair: current MT TWS Past President (Chad Bishop, chad.bishop@umontana.edu)

Committee Members: Sonja Anderson
Lance McNew

SCHOLARSHIPS

Each year, one instructor from the University of Montana and one from Montana State University, and a member-at large from the Chapter membership will select scholarship recipients for the Dr. Richard Mackie Award. The committee chairmanship will alternate every other year between the two universities. Each of the committee co-chairs also works with the faculty at their respective institution to select a recipient of the Wynn Freeman Award.

Committee Co-Chairs: Dave Willey (MSU, willey@montana.edu)
Chad Bishop (UM, chad.bishop@umontana.edu)

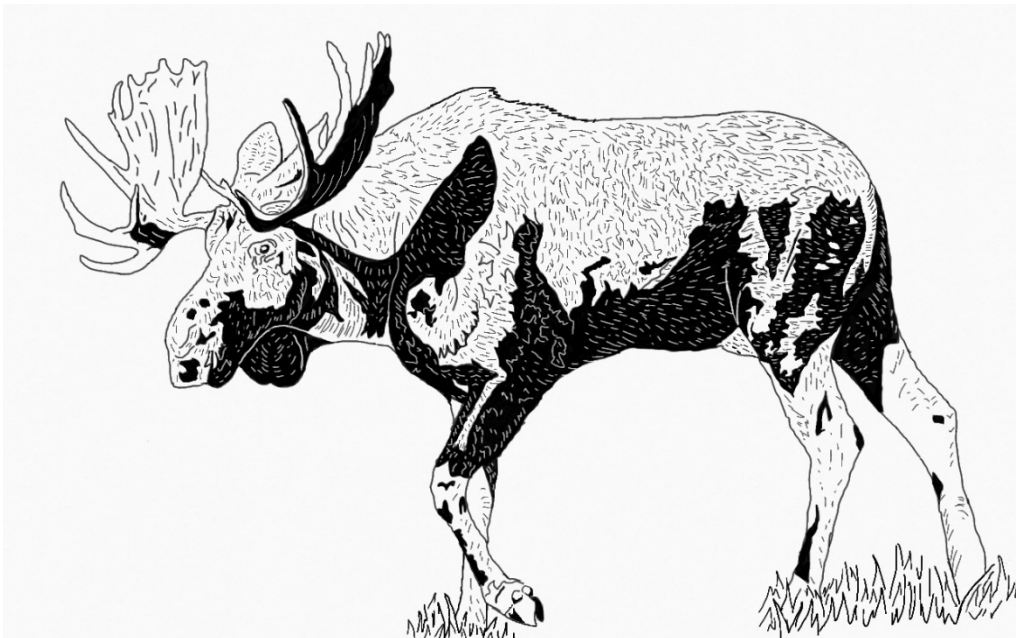


AWARDS

The Chapter annually seeks nominations for awards to be presented at the annual Conference.

1. The ***Distinguished Service Award*** is presented annually for cumulative, past, current and/or continuing achievements in wildlife conservation.
2. The ***Biologist of the Year Award*** is presented annually for significant achievements in wildlife conservation anytime during the five years immediately preceding the award presentation.
3. The ***Bob Watts Communication Award*** is presented for significant communication in media such as professional publications, popular wildlife articles, books, movies or videos that have a relatively wide audience.
4. The ***Wildlife Conservation Award*** is given to an individual or non-governmental organization for past, present or ongoing efforts that enhance wildlife conservation in Montana.
5. The ***Rising Professional Award*** recognizes emerging professionals and rising leaders in the wildlife field who are drivers of professional progress in Montana.
6. The ***Western Meadowlark Award*** recognizes an outstanding wildlife student enrolled at one of the 4-year wildlife university/college (excluding the main UM or MSU campuses).

Committee Chair: Megan O'Reilly (moreilly@mt.gov)



AD HOC COMMITTEES

GRANTS

This ad hoc committee shall receive and review applications for Montana Chapter Grants and make recommendations to the Board. Grants may or may not be distributed annually depending on the financial status of the Chapter. See GRANTS page on website.

Committee Chair: Claire Gower (cgower@mt.gov)

EFFECTS ON RECREATION

This ad hoc committee oversees distribution and updates of the Montana Chapter report entitled, Effects of Recreation on Rocky Mountain Wildlife - A Review for Montana. See Recreation in Wildlife Habitat: <https://mtws.org/recreational-effects-on-montanas-wildlife/>

Committee Chairs: Bryce Maxell (bmaxell@mt.gov) and Liz Bradley (lbradley@mt.gov)

SPECIES OF CONCERN

This ad hoc committee oversees the review of the status of terrestrial animal species in Montana through;

1. Development of a status paper which summarizes all relevant information on the biology and status of the species in Montana, and
2. Completion of the NatureServe status model which evaluates population size, range extent or area of occupancy, short and long-term population trends, intrinsic vulnerability, environmental specificity, and scope, severity, and immediacy of threats.

Status papers and status scores are reviewed, revised if necessary, and voted on by committee members. Approved status papers and status recommendations are forwarded to the joint Montana Natural Heritage Program and Montana Department of Fish, Wildlife and Parks Species of Concern Committee. Portions of status papers are posted on the online Montana Animal Field Guide and status recommendations are used to update the Montana Animal Species of Concern Report. The Montana Animal Species of Concern Report provides a basis for resource managers and decision-makers to direct limited resources to priority data collection needs and address conservation needs proactively.

Committee Chair: Dan Bachen (dbachen@mt.gov)

MEMBERSHIP IN THE MONTANA CHAPTER OF THE WILDLIFE SOCIETY

Membership in the Montana Chapter of The Wildlife Society is open to all individuals interested in perpetuating Montana's wildlife resources. Voting is available to all paid regular, retired and student members. Governing board members must be current members of TWS. Membership activities continue to be a priority for our Chapter. We also encourage our members to join our parent organization, The Wildlife Society, and the Northwest Section of TWS.

Membership Benefits

Becoming a member of the Montana Chapter of The Wildlife Society has many benefits to professionals and students including:

1. Close association with a group dedicated to wise use of our state's wildlife resources. Members come from universities, colleges, high schools, environmental consulting firms, state and federal agencies, private organizations, and business.
2. Reduced registration fee for participation in the Annual Conference, where timely resource topics are explored.
3. Workshops that permit exploration of selected wildlife topics and activities.
4. The Newsletters, containing items of interest to wildlife professionals in Montana.
5. The opportunity to influence state and federal policy through an organization capable of providing a unified professional opinion on Montana's wildlife issues.
6. Providing support for the Intermountain Journal of Sciences.

Information Updates

Our chapter newsletter is distributed periodically with information about upcoming events as well as opportunities to get involved with our working committees.

Networking

Develop your network by attending annual meetings of the Montana chapter, NW section, and The Wildlife Society. These conferences allow you to interact with people who represent the diversity of the profession. Students can take advantage of unique opportunities to meet and learn from seasoned professionals and potentially meet future employers.

Continuing Education

Gain in-depth exposure to timely wildlife management concerns by attending chapter meetings. National membership also allows you to demonstrate your dedication to professional development by achieving and maintaining the status of a Certified Wildlife Biologist®.

Professional Growth

Students can obtain leadership skills and enhance their professional growth by serving as an officer, on a committee, or giving a presentation at a chapter meeting. We welcome you to join the Montana Chapter of The Wildlife Society. There is a role in the Chapter for everyone!

Becoming a Montana Chapter Member

To become a member, log onto <https://mttws.org/membership/>



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- *IJS has been published since 1995 to enhance the educational outreach goals of the sponsoring organizations.*

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- *Any regional submissions of manuscripts dealing with the sciences are welcome.*
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- *IJS has a world-wide presence through its website, Montana State University's Open Journal Systems (archival home of IJS) & Search Engines.*
- *All published manuscripts or written presentations and poster abstracts from the sponsoring organizations can be found as individual PDFs as conversion for internet access progresses.*

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