2025 SDTWS Annual Conference Brookings Inn Hotel & Conference Center at Brookings, South Dakota

February 26-28, 2025

WEDNESDAY, 26 February

11:00 – 1:00 Registration

1:00 – 1:15 **Welcome and Introductions**

Special Session: "*Partnerships in Conservation*"

1:15 – 1:45 **In South Dakota, almost half of our grasslands have been lost!** South Dakota has abundant organizations, what was needed was a way to connect these grassland partners**. – Laura Kahler, director of the South Dakota Grasslands Initiative**

1:45 – 2:15 **"Collaborative Conservation to Guide Listed Species Conservation in South Dakota" The role of Ecological Services (ES) within the U.S. Fish and Wildlife Service (USFWS) protecting and restoring healthy populations of fish, wildlife, and plants through collaborative partnerships that advance species recovery under the Endangered Species Act (ESA).** Using the best available science, we work with federal, state, Tribal, local, and non-profit stakeholders, as well as private landowners, to avoid, minimize, and mitigate threats to our nation's natural resources. Most conservation groups have partnered with an ES biologist to inform species listing reviews, advance species recovery on the ground, and/or consult with our office to make sure projects are following compliance with the ESA. **Christopher Swanson, Field Supervisor, U.S. Fish and Wildlife Service, North and South Dakota Ecological Services Offices.**

2:15 – 2:45 **In 2023, the South Dakota Private Lands Biologist Forum was established to encourage relationship building and cross-agency communication among South Dakota's private lands biologists, specialists, and field staff.** This effort, led by the Northern Great Plains Joint Venture and supported by many partners, provides an opportunity for staff across the state to network, learn together, and catalyze more collaborative conservation action**. Krista Erdman, Northern Great Plains Joint Venture and John Mayrose SD GFP Private Lands Biologist.**

2:45 – 3:00 Break

3:00 – 3:30 **CREP (Conservation Reserve Enhancement Program) partnership.** The South Dakota Department of Game, Fish and Parks has partnered with USDA on two CREP projects, the James River Watershed, and the Big Sioux River Watershed. – **Mark Norton – South Dakota Department of Game, Fish & Parks**

3:30 – 4:00 **Wildlife, Habitat, and Heritage: How SCHF Is Bringing South Dakota's Grasslands Back to Life:** South Dakota's grasslands and woody habitats are vital for sustaining wildlife populations and preserving the state's outdoor heritage. The Second Century Habitat Fund (SCHF) is at the forefront of restoring these essential landscapes, ensuring that wildlife and hunting traditions continue to thrive. This presentation will highlight SCHF's latest habitat restoration initiatives, with a focus on the recently secured $11.3 Million Regional Conservation Partnership Program (RCPP) Grant. This grant provides vital funding to enhance grassland and woody habitat conservation across the region, giving landowners the resources needed to adopt sustainable land management practices. By prioritizing habitat restoration today, SCHF is safeguarding South Dakota's wildlife and outdoor legacy for generations to come.
Elysabeth Kierl, Executive Director, Second Century Habitat Fund, Inc.

4:00 – 4:30 **Pete Bauman considers himself fortunate to have been able to collaborate extensively with partners within South Dakota and across the Great Plains throughout his career**. This presentation will focus on leveraging multi-state partnerships and relationships for the betterment of South Dakota's land stewardship over time including brief history and stories resulting from wildland fire, great plains wind and wildlife projects, Fire Learning Network, Grassfed Exchange, Great Plains Fire Science Exchange, The Society for Range Management, land restoration networks, and the most recent Great Plains Grassland Extension Partnership. ***SDSU Extension Natural Resources and Wildlife Field Specialist***.

4:30-5:00 The Lower Brule Reservation has been managing for black-footed ferrets since 2006 and continues to monitor their population. The following presentation will expand on specific challenges faced on both a local scale when managing ferret and prairie dog populations, monitoring black-footed ferret populations, and mitigating sylvatic plague. **Isaac Johnson is the wildlife biologist for the Lower Brule Dept. of Wildlife, Fish, and Recreation. Isaac serves as the Black-Footed Ferret Site Manager and a member of the BFF Executive Committee.**

5:00 – 6:00 **Social**
6:00 – 7:00 **Supper** (Free with registration)
7:00 – 10:00 Silent auction items, raffles, social continues.

THURSDAY, 27 February

8:00 – 9:00	**Committee Meetings**
8:00 – 9:00	**Agency, Organization, & Sponsor Updates**
9:00 – 12:00	**Annual Chapter Business Meeting** *(Rolls and coffee provided)*
12:00 – 1:00	**Luncheon**
1:00 – 1:20	**CO Notes from the Field, East River** – Christopher Schiera, Lake Preston Conservation Officer – South Dakota Game, Fish and Parks (SDGFP)
1:20 – 1:40	**CO Notes from the Field, West River** – Ryan Pearson, Sturgis Conservation Officer – SDGFP
1:40 – 2:00	**Bighorn Sheep Disease in South Dakota's Badlands –** Bill Severud – South Dakota State University (SDSU), Department of Natural Resource Management
2:00 – 2:20	**Predictive Models of Breeding-Site Suitability of Pinyon Jays in South-Central Colorado –** Emily Macklin – SDSU, NRM, MS student
2:20 – 2:40	**An Assessment of Avian and Vegetation Communities on Agricultural Conservation Easement Wetlands in Eastern South Dakota –** Katherine Millman – SDSU, NRM, MS student
2:40 – 3:00	**Bison Studies Update** – Philip Urso – SDSU, Department of Animal Science
3:00 – 3:20	Break
3:20 – 3:40	**Tracing North American Weasel Distributions Through a Century of Climate and Land Use Change –** Amanda Cheeseman – SDSU, NRM
3:40 – 4:00	**Tracking the Interior Least Tern: insights into foraging behavior and productivity on the Missouri National Recreational River** – Kyle Jorgensen – University of South Dakota, Department of Biology, MS student.
4:00 – 4:20	**Bird use of early successional sandbar vegetation for nesting: What do we lose by managing sandbars for plovers and terns?** – Stephanie Nefas – University of South Dakota, Department of Biology, PhD student
5:00 – 6:00	Social and Poster Session
6:00 – 7:00	**SDTWS Award Ceremony** and Supper

7:00 – 8:00 **KEYNOTE: Carter Johnson – A Tale of Two Rivers**
Dr. Carter Johnson, Distinguished Professor Emeritus of South Dakota State University's Department of Natural Resource Management, will share highlights from his long-term studies of the Missouri and Platte rivers—how they differ and their importance to the region. Dr. Johnson is also the author of *Ecology of Dakota Landscapes: Past, Present, and Future*, which will be available for purchase at the conference venue.

8:00 – 8:30 Silent Auction winners announced (Social continued)

FRIDAY, 28 February

9:30 – 9:50 **Effects of Mineral Supplementation on Circulating Minerals, Herd Performance, and Reproductive Success in American Plains Bison** – Bailey M. Rodriguez – SDSU, Department of Animal Science, MS student

9:50 – 10:10 **Influence of Tigers and Human-Environmental Factors on Sympatric Leopards** – Karma Choki – SDSU, NRM, MS student

10:10 – 10:30 **Assessing Conservation Planning in South Dakota: Challenges and Opportunities in Collaboration, Public Participation, and Climate Information** – Vivian Hulugh – SDSU, NRM, MS student

10:30 – 10:50 **A comparison of Western Painted Turtle (*Chrysemys picta bellii*) early and late season captures in two sites in Marshall Co. SD** – Michael Grebner – Northern State University, undergraduate student.

10:50 – 11:10 **Molecular Detection of Haemosporidians from Some South Dakota Upland Game Birds** – Zoe Boughton – Northern State University, undergraduate student

11:10 – 11:30 **Addressing Knowledge Gaps for Bats of Conservation Need in South Dakota** – Maya Pendleton– SDSU, NRM, PhD student.

11:30 – 11:45 Present Student and Open Presentation Awards

11:45 – 1:00 Lunch Break – We encourage you to enjoy lunch out in Brookings

1:00 – 3:00 South Dakota Bat Working Group Meeting

THE WILDLIFE SOCIETY

Founded in 1937 as The Society of Wildlife Specialists, The Wildlife Society has evolved into an international nonprofit organization of professional wildlife ecologists and managers. Members number over 10,000 from 40 different countries, and include administrators, biologists, conservation officers, educators, managers, and researchers.

The objectives of TWS are to:

1. Promote sound stewardship of wildlife resources and the environments upon which wildlife and humans depend.
2. Undertake an active role in preventing human-induced environmental degradation.
3. Increase awareness and appreciation of wildlife values; and
4. To seek the highest standards in all activities of the wildlife profession.

SOUTH DAKOTA CHAPTER OF THE WILDLIFE SOCIETY

The South Dakota Chapter of TWS (SDTWS) was initiated on February 19, 1966, with 56 charter members. SDTWS is affiliated with the Central Mountains and Plains Section, one of eight subdivisions of TWS. The full membership of SDTWS meets annually in the spring to exchange scientific information through presented papers, debate current issues in wildlife management and land use, and conduct chapter business. The chapter's Executive Board of Directors, consisting of President, Past President, President-Elect, Secretary-Treasurer, and two standing board members meet at least 4 times each year to discuss issues that don not require full chapter approval. The chapter also communicates with its members through a newsletter, The Prairie Voice, published within 30 days of Executive Board meetings. SDTWS has a current membership of 171 people interested in the welfare of South Dakota wildlife.

The Wildlife Society
South Dakota Chapter

The Wildlife Society
CENTRAL MOUNTAINS and PLAINS SECTION
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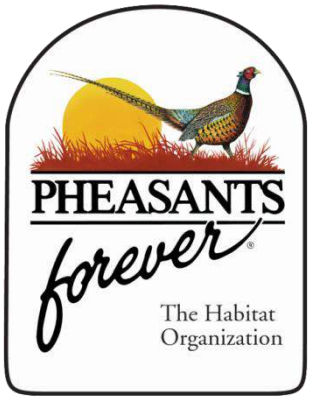
We Greatly Appreciate Your Continued Support!!!



South Dakota Grasslands Initiative: A partner-driven collaborative network.

Abstract: In South Dakota, almost half of our grasslands have been lost. Grassland loss affects things important to South Dakota, such as the livestock industry, wildlife habitat, soil health, clean water, and the tourism industry. South Dakota has abundant organizations, entities, and individuals supporting our grasslands through education, programs, outreach, and on-the-ground efforts. One piece that needed to be added was a way to connect these grassland partners. Inspired by the Central Grasslands Roadmap, the South Dakota Grasslands Initiative emerged as a hub to provide a grasslands-focused space for collaboration and communication among partners.

The South Dakota Grasslands Initiative development efforts that have been created through the collaboration of partners within the Grasslands Initiative, and opportunities that exist for attendees to support the grasslands of South Dakota through participation in the Grasslands Initiative.

Laura Kahler: Director, South Dakota Grasslands Initiative

Collaborative Conservation to Guide Listed Species Conservation in South Dakota

Christopher Swanson, Field Supervisor, U.S. Fish and Wildlife Service, North and South Dakota Ecological Services Offices.

Abstract: The role of Ecological Services (ES) within the U.S. Fish and Wildlife Service (USFWS) is to protect and restore healthy populations of fish, wildlife, and plants through collaborative partnerships that advance species recovery under the Endangered Species Act (ESA). Using the best available science, we work with federal, state, Tribal, local, and non-profit stakeholders, as well as private landowners, to avoid, minimize, and mitigate threats to our nation's natural resources. Most conservation groups have partnered with an ES biologist to inform species listing reviews, advance species recovery on the ground, and/or consult with our office to make sure projects follow the ESA. I will give a brief overview of what the Ecological Services program does, highlight outline opportunities to collaborate, and provide examples of collaborative partnerships that are making a difference within South Dakota.

Chris earned his bachelor's degree in B.S., M.S., and PhD in Wildlife and Fisheries Sciences from South Dakota State University. Chris has worked with USFWS for 20 years including prior roles as a Project Leader at the most important National Wildlife Refuge Complex for wintering waterfowl in the southern United States and as the State Supervisor of the USFWS Idaho Ecological Services Office.

Strengthening Partnerships through the South Dakota Private Lands Biologist Forum

Presenters: Krista Erdman, Northern Great Plains Joint Venture and John Mayrose SD GFP Private Lands Habitat Biologist.

In 2023, the South Dakota Private Lands Biologist Forum was established to encourage relationship building and cross-agency communication among South Dakota's private lands biologists, specialists, and field staff. This effort, led by the Northern Great Plains Joint Venture and supported by many partners, provides an opportunity for staff across the state to network, learn together, and catalyze more collaborative conservation action. Following successful statewide and regional events, the South Dakota Private Lands Biologist Forum intends to continue supporting the needs and interests of our state's private lands practitioners.

Presenters: Krista Erdman, Northern Great Plains Joint Venture and Cassie Auxt, Ducks Unlimited Inc

The Conservation Reserve Enhancement Program (CREP):
CREP is a partnership between USDA's Farm Service Agency (FSA) and another entity to create a unique Conservation Reserve Program (CRP) initiative to target and address recognized high priority conservation objectives in a cost-effective manner. The South Dakota Department of Game, Fish and Parks (GFP) has partnered with USDA on two CREP projects, the James River Watershed CREP and the Big Sioux River Watershed CREP. Both CREPs have similar goals of restoring grassland and wetland wildlife habitat that increases wildlife populations, improves water quality, and provides additional public hunting and fishing opportunities. Other partnerships that are critical to making these CREP projects successful include those within USDA between the FSA and the Natural Resources Conservation Service (NRCS), the partnership between Pheasants Forever, GFP, & NRCS, to hire Farm Bill Biologists who work closely to create the partnership between all of these entities and the private landowners who voluntarily enroll their land in CREP.
Mark Norton | *Hunting Access & Farm Bill Coordinator* South Dakota Game, Fish and Parks

Wildlife, Habitat, and Heritage: How SCHF Is Bringing South Dakota's Grasslands Back to Life
South Dakota's grasslands and woody habitats are vital for sustaining wildlife populations and preserving the state's outdoor heritage. The Second Century Habitat Fund (SCHF) is at the forefront of restoring these essential landscapes, ensuring that wildlife and hunting traditions continue to thrive. This presentation will highlight SCHF's latest habitat restoration initiatives, with a focus on the recently secured $11.3 Million Regional Conservation Partnership Program (RCPP) Grant. This grant provides vital funding to enhance grassland and woody habitat conservation across the region, giving landowners the resources needed to adopt sustainable land management practices. By prioritizing habitat restoration today, SCHF is safeguarding South Dakota's wildlife and outdoor legacy for generations to come.
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Challenges Presented While Managing the Endangered Black-Footed Ferret
Black-footed ferrets (*Mustela nigripes*) are a federally endangered species that were declared extinct in 1979. However, in 1981, a remnant population was found near Meeteetse WY. Captive breeding efforts prevented their extinction and re-introduction efforts have been successful. As

these efforts continue to increase at local and large scale, black-footed ferret populations continue to be variable. This is related to the fact that black-footed ferrets rely exclusively on prairie dog species (*Cynomys spp*.) for their survival. Prairie dogs develop burrows that ferrets use for cover and are 75% of a ferret's diet (Brickner 2013). However, prairie dog species are presented with a few challenges on their own. Their populations continue to fluctuate in response to changes in land use practices, sylvatic plague, and habitat loss. We have been managing black-footed ferrets since 2006 on The Lower Brule Sioux Reservation and continue to monitor their population. The following presentation will expand on specific challenges faced on both a local scale when managing ferret and prairie dog populations, monitoring black-footed ferret populations, and mitigating sylvatic plague.
Isaac has BS degree in Wildlife and Fisheries Sciences from South Dakota State University. He worked for 3 years for the Big Stone Soil and Water Conservation District, as Noxious Weed Manager, and then Field Technician in Ortonville MN. He has worked for 3 seasons as the wildlife biologist for Lower Brule, is the Black-Footed Ferret Site Manager, and is now a member of the Black-Footed Ferret Executive Committee.
Isaac Johnson, Wildlife Biologist for Lower Brule Department of Wildlife, Fish and Recreation, Lower Brule, SD

Open Presentation Abstracts

CO Notes from the Field, East River
Christopher Schiera
Lake Preston Conservation Officer
South Dakota Game, Fish and Parks

A discussion on conservation law enforcement efforts, focusing on the diverse roles and responsibilities of conservation officers in Eastern South Dakota. The conversation will also delve into several cases, highlighting the essential role these officers play in protecting the state's natural resources.

CO Notes from the Field, West River
Ryan Pearson
Sturgis Conservation Officer
South Dakota Game, Fish and Parks

An in-depth look at a mountain lion poaching case in the Black Hills of South Dakota. What began with a single, vague TIPs (Turn in Poachers) call evolved into a five-year investigation, involving multiple agencies, countless hours of work, and relentless dedication.

Bighorn Sheep Disease in South Dakota's Badlands: Project update
Bill Severud*, Department of Natural Resource Management, South Dakota State University
Michele Lovara, Department of Natural Resource Management, South Dakota State University and Working Dogs for Conservation
Sean Ryder, Department of Natural Resource Management, South Dakota State University
Jeffrey Tillery, Department of Natural Resource Management, South Dakota State University

Eddie Childers, Badlands National Park, National Park Service
Nathan Galloway, Biological Resources Division, National Park Service
Chad Lehman, South Dakota Game, Fish, and Parks
Paul Roghair, Badlands National Park, National Park Service
Michael Thompson, Wildlife Division, Oglala Sioux Parks, and Recreation Authority

In summer 2021, 2-3 young male bighorn sheep (*Ovis canadensis*) from Badlands National Park, SD, USA, left park boundaries and commingled with domestic sheep north of the park. Subsequently, ~75% of the bighorn sheep in the park died after exposure to *Mycoplasma ovipneumoniae*, a bacterium commonly found in domestic sheep, which often causes fatal pneumonia in bighorn sheep. In fall 2022, a collaboration of South Dakota State University, National Park Service, Oglala Sioux Parks and Recreation Authority, Working Dogs for Conservation, and South Dakota Game, Fish, and Parks embarked on an ambitious effort to capture, collar, test for disease, and monitor all remaining sheep in the Badlands system, including bighorn sheep in Pine Ridge Indian Reservation. We are training conservation detection dogs to signal on bighorn sheep nasal swabs and feces from *M. ovipneumoniae* positive individuals. Through a combination of helicopter captures and roadside darting, we have serially sampled bighorn sheep for 2 years (1-3 samples/individual) and monitored adult survival, lamb survival, adult cause-specific mortality, and movement between subherds. We have collared XX sheep (47 in north unit, 43 in south unit), and 7 of those sheep have died. There is still a ~25% prevalence of *M. ovipneumoniae* in the population, but prevalence is concentrated in the north unit of the park (~40%). We have observed substantial ram movement between subherds, and documented clinical signs and symptoms of M. ovipneumoniae that can be assigned to both chronic and intermittent ram carriers. This builds upon prior work by SDGFP highlighting the significance of ewes as chronic carriers, and showcases the need to manage the pathogen in both sexes .Dogs were able to differentiate infected from uninfected swabs and scats with 80% accuracy Upcoming management actions include removing infectious chronic and intermittent shedders from the population followed by ELISA testing of 2025 lambs to confirm pathogen eradication. Trained dogs will be deployed at 2025 captures to assess the capability of dogs as an in-field diagnostic tool to directly compare to the efficacy of other in-field tests like the Biomeme. The ultimate goal of this multi-agency collaboration is to recover the population of bighorn sheep in the Badlands ecosystem of South Dakota.

Predictive Models of Breeding-Site Suitability of Pinyon Jays in South-Central Colorado

Emily Macklin*[1] (presenter – M.S. student), David McNitt[2] , Scott Somershoe[3] , Amanda E. Cheeseman[1]
Affiliations: [1] Department of Natural Resource Management, South Dakota State University, Brookings, SD [2] Bureau of Land Management, Royal Gorge Field Office, Canon City, CO [3] U.S. Fish and Wildlife Service Migratory Birds Program, Lakewood, CO

The Pinyon Jay (*Gymnorhinus cyanocephalus*), a highly social corvid native to the Intermountain West, has experienced significant population declines over the past fifty years. This decline has led to their consideration for listing under the Endangered Species Act and recognition as a species of concern by numerous federal and state agencies. Pinyon Jays inhabit piñon-juniper woodlands, which vary widely in vegetative composition and geophysical characteristics across

their range. These woodlands are frequently treated for management objectives such as wildfire mitigation, restoring ecological function, and habitat improvement for other species. However, such woodland treatments may adversely impact declining species like the Pinyon Jay, which nest colonially and demonstrate strong site fidelity across years. Thus, regionally specific predictive maps of breeding site suitability are essential for identifying key habitat features and informing pre-treatment survey efforts to minimize potential negative impacts on breeding Pinyon Jays. We conducted a two-year study in piñon-juniper woodlands managed by the Bureau of Land Management in the understudied area of South-Central Colorado to locate and map active nesting colonies, termed breeding sites. We then incorporated these data and randomly drawn pseudoabsences into random forest models to identify influential covariates associated with Pinyon Jay breeding sites and generate predictive models of breeding-site suitability for South-Central Colorado. The results of this study serve to inform sustainable management practices and provide guidance to aid in vital recovery efforts for Pinyon Jays.

An Assessment of Avian and Vegetation Communities on Agricultural Conservation Easement Wetlands in Eastern South Dakota

Katherine Millman, Mercedes Batalla, Steve R. Chipps[1], and Joshua D. Stafford[1]
South Dakota State University, Department of Natural Resource Management, Brookings, South Dakota 57006
[1]U.S. Geological Survey, South Dakota Cooperative Fish & Wildlife Research Unit, Brookings, South Dakota 57006

The USDA-NRCS Agricultural Conservation Easement Program (ACEP) collaborates with private landowners to conserve and restore wetlands to provide ecosystem services, including wildlife habitats. We selected 50 wetlands in southeastern South Dakota to survey and quantify avian and vegetation characteristics during 2023 and 2024. Of these sites, 30 were enrolled in ACEP, and the remainder were federal and state properties that served as minimally-disturbed comparative sites (n = 10), and sites heavily influenced by nearby agriculture (n = 10). At each site we sampled herbaceous vegetation, trees, and avifauna. Vegetation was sampled by measuring species richness and cover in 15 quadrats (1 m^2) sampled across three vegetation zones (wet meadow, marsh, and open water). We recorded the number, species, and diameter at breast height (cm) of all tree species within 100 m of wetland bank-full boundaries. We used point counts to quantify avian abundance and diversity during four time periods, spring migration (mid-May), summer breeding season (June/July), fall migration (late-August/ mid-September), and winter (early October). Point counts included 3 10-minute surveys at each wetland, with points spaced ≥200 m apart. Vegetation diversity was generally low (e.g., species richness <20 on average in 2023), and invasive and aggressive species (e.g., *Typha* spp., *Phalaris arundinaceae*, *Cirsium arvense*, *Sonchus arvensis*, *Bromus inermis*, and *Teucrium canadense*) were the most commonly observed plants across all sites. Bird abundances ranged widely among sites, from single individuals of few species to hundreds of individuals of many species. Variation in avian abundance and diversity was likely related to the time of year of the survey, water depth, tree presence, and other biotic and abiotic factors. By monitoring the linkage of vegetation and avian diversity, this research will allow conservation partners to better monitor and restore wetlands to maximize vegetation quality and bird habitat in the future.

Bison Studies Update

Philip M. Urso
Department of Animal Science, South Dakota State University, Brookings, SD

American Bison (*Bison bison*) enjoy a rich history in the United States and have been the national mammal since 2016. As a major keystone species, they are a symbol of the North American Plains but currently lack established curriculum within academia. South Dakota State University has been addressing this issue with the Center of Excellence in Bison Studies (CoE). Through development with stakeholders, the CoE has provided funding for a grant program, provided extension/outreach for producers, and now is developing curriculum in the field of Bison Studies. This presentation will focus on the proposed certificate and minor that, pending BOR approval, will be implemented in Fall 2025. There have been two courses taught in Bison Studies to date, and both offer blends of animal science and natural resource management to fit this unique species. The proposed minor and certificate also reflect this, focusing heavily on range management, animal production, and ecological studies. Students have been invested in the courses thus far and come from a variety of majors. While South Dakota leads the United States in Bison Production, with the addition of these courses and program, South Dakota State University will lead the front in bison education as well.

Tracing North American weasel distributions through a century of climate and land use change

Amanda E. Cheeseman[1], David S. Jachowski[2], Roland Kays[3]
[1]Department of Natural Resource Management, South Dakota State University, Brookings, SD 57006
[2] Department of Forestry and Environmental Conservation, Clemson University, Clemson, SC 29634
[3]North Carolina Museum of Natural Sciences, North Carolina State University, Raleigh, NC

We investigated historical drivers of environmental niche change for three North American weasel species (American ermine, least weasel, and long-tailed weasel) to understand their response to environmental change. Using species occurrence records and corresponding environmental data, we developed species-specific environmental niche models for the contiguous United States (1938-2021). We generated annual hindcasted predictions of the species' environmental niche, assessing changes in distribution, area, and fragmentation in response to environmental change. We identified a 53.96% decline in suitable habitat alongside high levels of fragmentation for least weasels and region-specific trends for American ermine and long-tailed weasels; declines in the West and increased suitability in the East. Climate and land use were important predictors of the environmental niche for all species. Changes in habitat amount and distribution reflected widespread land use changes over the past century while declines in southern and low-elevation areas are consistent with impacts from climatic change. Our models uncovered land use and climatic change as potential historic drivers of population change for North American weasels and provide a basis for management recommendations and targeted survey efforts. We identified potentially at-risk populations and a need for landscape-level planning to support weasel populations amid ongoing environmental changes.

Tracking the Interior Least Tern: insights into foraging behavior and productivity on the Missouri National Recreational River

Kyle Jorgensen, Hannah Slattery, Zoe Donelan, and David Swanson, Department of Biology, University of South Dakota

The Interior Least Tern (*Sterna antillarum athalassos*) has achieved significant conservation success, leading to its removal from the federal endangered species list in 2021. Despite this milestone, the species remains state-endangered in South Dakota and is listed as a Species of Greatest Conservation Need in the South Dakota Wildlife Action Plan. The Missouri National Recreational River (MNRR) provides critical habitat for these terns, particularly the unvegetated sandbars used for nesting and the shallow water habitats essential for foraging. Historically, standardized population surveys and habitat assessments have concentrated on nesting sites along the MNRR, with limited understanding of foraging habitats. Our study aims to fill these knowledge gaps by conducting standardized surveys of Least Terns at on-river and off-river wetland locations within a 30-km radius of the MNRR in Yankton, Clay, and Union counties during the 2023 and 2024 breeding seasons. We also used radio telemetry in 2024 to track the movements of adult Least Terns (n = 15) from their nesting sites to various foraging locations to better understand the relative importance of on-river versus off-river foraging habitats. Least terns were always substantially more abundant at on-river than at off-river sites, but also occurred regularly at off-river sites, including at seven of the 11 sampled sites and up to 22 km from the river. Terns occurred at flooded fields along the Vermillion River in Clay County in mid-summer 2024 after a flooding event, demonstrating opportunistic use of off-river habitats for foraging. In addition, timing of off-river wetland use differed between years, with tern numbers increasing in late summer in 2023 but decreasing later in the summer in 2024, following inundation of nesting colonies. We detected radio-tagged birds only at on-river locations, ranging from nesting colonies to 53.9 km from the nesting colony. Longer movements from nesting colonies occurred after a heavy rain event on 20-24 June that resulted in flooding that inundated many nest colonies, suggesting that these were exploratory movements to find new foraging or nesting sites. Future studies will use Motus stations and nanotags to continuously monitor individual birds to better define on-river versus off-river foraging events and to estimate the impacts of these foraging events on time and energy budgets of nesting terns.

Bird use of early successional sandbar vegetation for nesting: What do we lose by managing sandbars for plovers and terns?

Stephanie Nefas, Mark Dixon, and David Swanson
Department of Biology
University of South Dakota

In the Missouri National Recreational River (MNRR), riverine sandbars created by periodic floods are initially used by a federally listed bird species the Piping Plover (*Charadrius melodus*) and the Interior Least Tern (*Sterna antillarum athalassos*). These sandbars then provide opportunities for recruitment and establishment of early successional cottonwood-willow forest, which supply habitat for a wide array of birds, as they become vegetated and unsuitable for Terns and Plovers to nest on. While nesting habitat for listed species can be maintained by vegetation removal, the biodiversity associated with an establishing riparian forest is relinquished. An understanding of

the current status trajectories and biological tradeoffs is necessary for a balanced ecosystem-based approach to sandbar management. We are assessing conditions and dynamics of riparian vegetation and land bird diversity during both breeding and migration seasons. My objective is to determine the degree that set-aside sandbars support diverse native plants, land birds, and cottonwood forest establishment as they need to be actively contributing to the MNRR "Outstandingly Remarkable Values" as part of the Wild and Scenic rivers Act. We have observed some changes in nest survival and species that may be due to high water levels. Overall nesting success appears to be similar to other habitat types and may have benefited from high water levels increasing separation of sandbar habitat from mainland potentially reducing predation.

A Social-Ecological Systems Approach to Understanding Recreation-Wildlife Interactions in Utah's Wildlife Management Areas

Lane J. Arthur (1) Anna B. Miller (2), Austin M. Green (3)
Affiliations
(1) Quinney College of Natural Resources, Department of Environment and Society, Utah State University, Logan, UT
(2) Quinney College of Natural Resources, Department of Environment and Society, Utah State University, Logan, UT
(3) Office of Undergraduate Research, School of Biological Sciences, The University of Utah, Salt Lake City, UT

Parks and protected areas are essential spaces for biodiversity conservation and recreational opportunities, especially as urbanization expands. Wildlife Management Areas (WMAs) are dedicated to wildlife conservation but are increasingly used for non-wildlife-based recreation, posing challenges for wildlife preservation. Studies suggest that recreationists, such as hikers and mountain bikers, are more likely to engage in stewardship behaviors within these landscapes. However, time constraints and limited access to suitable sites can impede these intentions, affecting conservation outcomes. Through visitor intercept surveys in a high-use Utah WMA, this study examines how recreation identity, wildlife value orientations, and access constraints shape stewardship intention. Additionally, we use camera traps to assess wildlife activity patterns under recreational pressures, providing insights regarding the impacts of human presence on wildlife. By integrating social and ecological perspectives, this research aims to inform management strategies that balance conservation goals with recreational use, promoting responsible recreation to minimize ecological impacts. This interdisciplinary approach is crucial for sustainable outcomes and long-term conservation in WMAs.

Effects of Mineral Supplementation on Circulating Minerals, Herd Performance, and Reproductive Success in American Plains Bison

Bailey M. Rodriguez[1], Chad A. Kremer[2], and Philip M. Urso[1]
[1]Department of Animal Science, South Dakota State University, Brookings, SD
[2]Custer State Park, Custer, SD

Bison nutrition, a key aspect of the growing food animal industry, lacks species-specific guidelines, as current practices rely heavily on cattle data. This study addresses this gap by analyzing mineral intake and output in two South Dakota bison herds with differing management

strategies. The privately managed herd received mineral supplementation (Redmond 90 and Multimin®), while the Custer State Park herd subsisted on natural forage. Blood, fecal, forage, and hay samples were analyzed for mineral content alongside performance metrics such as age, body weight and pregnancy status. Results revealed significant differences in mineral levels between the two herds. Supplemented bison had higher circulating levels of cobalt, manganese, and zinc, with cobalt and manganese($P>0.01$). It was also shown, in the pregnancy results compared to both ranches that the private herd with mineral supplantation had higher % bred cows at time of roundup ($P>0.01$). Forage analysis highlighted that natural forage alone may not provide adequate levels of certain minerals, underscoring the benefits of supplementation in managed herds. These findings provide essential data for developing bison-specific nutritional management strategies. As the bison industry grows, reliance on cattle-derived guidelines risks inadequate feeding practices, potentially hindering growth, reproduction, and herd vitality. Sustainable practices balancing forage and supplements will minimize environmental impacts and support economic viability, particularly for small-scale producers. This study represents a vital step toward advancing bison management through science-based nutrition practices.

Influence of Tigers and Human-Environmental Factors on Sympatric Leopards

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Large carnivores play a pivotal role in ecosystem dynamics, regulating herbivore populations through predation and influencing mesocarnivores via intraguild competition. Human-induced habitat loss and fragmentation have led to declines in global apex predator populations. Bhutan, with its exceptional ecological diversity and intact ecosystems, stands as one of the remaining refuges for these species in the eastern Himalayas. However, ongoing socioeconomic development and climate change pose potential threats to its wildlife. Bhutan has made commendable strides in wildlife conservation, particularly in studying elusive species like tigers (*Panthera tigris*) and snow leopards (*Panthera uncia*), yet common leopards (*Panthera pardus*) have been relatively overlooked despite being listed as protected species in Bhutan. In addition, tiger numbers in Bhutan have increased from 103 in 2015 to 130 in 2022, and the potential impacts of tiger recovery on other sympatric carnivores, especially leopards, remain understudied. We addressed this gap by leveraging the Bhutan national tiger survey database, a comprehensive camera trapping survey conducted in 2021-2022. Surveys included 1,214 stations stratified across a 5 × 5 km grid of Bhutan (38,394 km^2 total) and contained at least two paired cameras per station. Photos were reviewed and leopards identified to individuals based on spotting patterns, resulting in 243 unique leopard individuals from 11,075 leopard images. We used spatially explicit mark-recapture (SECR) to estimate the abundance and density of leopards

and identified how the recent increase in tiger population, habitat characteristics, and human disturbance affect local leopard density. These results provide the first reliable estimate of leopard numbers in Bhutan and elucidate the factors regulating populations in the eastern Himalayas, ultimately informing future conservation efforts.

Assessing Conservation Planning in South Dakota: Challenges and Opportunities in Collaboration, Public Participation, and Climate Information

Vivian Hulugh[1], Jennifer Zavaleta Cheek[1], Lauren Redmore[2]
[1]South Dakota State University
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Conservation planning is important to promote biodiversity and other natural values. Natural resource managers are increasingly being called to manage lands in concert with others and respond to public values in an increasingly complex climate context, yet they face challenges related to effective collaboration, equitable public participation, and the application of climate information. This study described these challenges in South Dakota where endangered prairie ecosystems provide critical habitat for a variety of endemic and migratory species. I identified and analyzed collaboration challenges, examined public engagement methods used by agencies, and assessed the use of climate data in decision-making. I used an inductive, qualitative research approach, with semi-structured interviews and qualitative content analysis of conservation plans. I conducted a purposeful sampling of 35 experts from federal, state, and nonprofit organizations, along with the analysis of 53 conservation plans to understand collaboration, public participation, and the use of climate information in conservation planning. The results showed that the absence of a shared vision between federal, state, and nonprofit organizations led to duplicated efforts and missed opportunities for joint actions. Managers shared concern that current methods of public engagement are inadequate and often result in inequitable representation. Limited understanding and application of climate data were prevalent among managers, which led to reactive decision-making. The findings indicated that although managers in South Dakota face multiple, complex demands in planning, conservation outcomes can be more sustainable when collaborators adopt a shared vision, views of the public are incorporated, and there is clear guidance on using climate data and models. The insights will inform policy and practice, guide actions in the development of frameworks and policies that prioritize collaboration and representation and enhance the use of scientific data in decision-making to improve conservation planning and meet future challenges.

A comparison of Western Painted Turtle (*Chrysemys picta bellii*) early and late season captures in two sites in Marshall Co. SD

Michael Grebner (Northern State University, presenter), Dr. Amy Dolan (Northern State University), Dr. Heather Waye (University of Minnesota Morris) and Dr. Peter Dolan (University of Minnesota Morris)

Turtles are long-lived and are sensitive to human disturbances. Long-term demographic studies that accurately sample populations are important for species management. However, studies that sample only a single location or are confined to short time frames may yield misleading results, as population dynamics can vary between sites or change within a single season. Here we report the results of a population study on Western Painted Turtles after the addition of a second, earlier sampling period at two distinct sites on Clear Lake in Marshall Co, SD. Turtles were sampled in mid-May and mid-June using several trapping methods. Captured turtles were measured, marked and their demographic characteristics recorded. Sites differed in the total number of individuals captured. More individuals as well as proportionally more female and juvenile turtles were captured in site 1, whereas fewer individuals overall and a higher proportion of males were captured at site 2. Temporally, more males and juvenile turtles were captured in the May sampling period while more females were captured in the June sampling period. Our results highlight the influence of site and timing on the demographics of captured turtles, underscoring the importance of thoughtful sample design for accurate population surveys.

Molecular Detection of Haemosporidians from Some South Dakota Upland Game Birds

Zoe Boughton and Eric Pulis
Northern State University

Avian haemosporidian parasites (Apicomplexa) are a diverse group of blood parasites that infect many bird species. Haemosporidians are vectored by blood feeding insects and use vertebrates as the intermediate host. Upland game birds are an economically and ecologically important group that have not been extensively studied on the northern plains for haemosporidian parasites. To better understand the prevalence and diversity of these parasites we screened tissue samples from greater prairie chickens (*Tympanuchus cupido*), sharp-tailed grouse (*Tympanuchus phasianellus*), and ring-necked pheasants (*Phasianus colchicus*) that were donated by hunters. qPCR was utilized to screen samples for the presence parasite nuclear DNA. Extracts that indicated the presence of parasite DNA were amplified using a nested PCR protocol with primers primer sets specific for *Leucocytozoon* and *Haemoproteus/Plasmodium*. Results suggest that haemosporidians may be common in phasianids in South Dakota. Sequences generated from these samples will be compared with accessioned sequences in GenBank and the MalAvi database to identify lineages. Data generated from this study will be useful in understanding the diversity and ecology of blood parasites in South Dakota gamebird populations.

Addressing Knowledge Gaps for Bats of Conservation Need in South Dakota

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Bats (order Chiroptera) are globally important organisms that play a critical role in maintaining ecosystem health and delivering valuable ecosystem services. In the United States alone, bats contribute an estimated $27 billion annually in pest control, particularly benefiting agriculture by reducing the need for pesticides. North American bat populations have suffered severe declines due to threats such as White-nose Syndrome, expansion of wind-energy facilities, and habitat loss. Some species, like the Northern Long-eared Bat (*Myotis septentrionalis*), have experienced dramatic population reductions exceeding 95%, leading to their listing under the Endangered Species Act. South Dakota hosts 13 bat species, including the Northern Long-eared Bat and several other sensitive species, yet contemporary bat research in the state has been largely restricted to the Black Hills region. Thus, significant knowledge gaps exist regarding statewide bat distributions, habitat preferences, resource requirements, and effects of land management practices on bat populations. To address these gaps, we initiated the first statewide survey of bats in South Dakota to evaluate occupancy and habitat use, focusing on endangered and sensitive species. During the summer of 2024, we surveyed 172 sites using acoustic detectors, collecting over 6 TB of data. We recorded all 13 South Dakota bat species during this study, including the Northern Long-eared Bat and other rarely recorded species in the state. We also conducted follow-up mist-netting to verify the presence of sensitive species acoustically detected at multiple sites. Our study provides critical data for bat conservation efforts in South Dakota by identifying current species distributions and key habitat features in a previously understudied region. Results will inform management practices aimed at protecting these bats and their habitats.

Poster abstracts

Effects of Mineral Supplementation on Circulating Minerals, Herd Performance, and Reproductive Success in American Plains Bison.

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Bison nutrition, a key aspect of the growing food animal industry, lacks species-specific guidelines, as current practices rely heavily on cattle data. This study addresses this gap by analyzing mineral intake and output in two South Dakota bison herds with differing management strategies. The privately managed herd received mineral supplementation (Redmond 90 and Multimin®), while the Custer State Park herd subsisted on natural forage. Blood, fecal, forage, and hay samples were analyzed for mineral content alongside performance metrics such as age, body weight and pregnancy status. Results revealed significant differences in mineral levels between the two herds. Supplemented bison had higher circulating levels of cobalt, manganese, and zinc, with cobalt and manganese($P>0.01$). It was also shown, in the pregnancy results compared to both ranches that the private herd with mineral supplantation had higher % bred cows at time of roundup ($P>0.01$). Forage analysis highlighted that natural forage alone may not provide adequate levels of certain minerals, underscoring the benefits of supplementation in managed herds. These findings provide essential data for developing bison-specific nutritional

management strategies. As the bison industry grows, reliance on cattle-derived guidelines risks inadequate feeding practices, potentially hindering growth, reproduction, and herd vitality. Sustainable practices balancing forage and supplements will minimize environmental impacts and support economic viability, particularly for small-scale producers. This study represents a vital step toward advancing bison management through science-based nutrition practices.

Activity Patterns of Sympatric Pronghorn, White-Tailed Deer, and Mule Deer

Charles Whalen (poster presentation, undergraduate, presenter) and Amanda E. Cheeseman. Department of Natural Resource Management, South Dakota State University

Sympatric species often compete for critical resources such as forage and space, potentially driving temporal niche partitioning. Here we investigated how the presence of white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) influenced the daily activity patterns of pronghorn antelope (*Antilocapra americana*) within overlapping habitats. We hypothesized that pronghorn and deer maintain distinct activity patterns potentially avoiding interspecific competition. Data were collected from camera traps each fall from 2019-2023 as part of the Snapshot USA Project. We limited all data to sites with confirmed pronghorn detections and visualized activity patterns and assessed interspecies temporal overlap using the Activity package in Program R. The results revealed distinct temporal behavior between pronghorn and deer. White-tailed and mule deer exhibited crepuscular activity, peaking around 6 a.m. and 6 p.m. CST. In contrast, pronghorn showed a single diurnal activity peak occurring later in the morning, after the deer's primary activity period. This behavior aligns with pronghorn adaptations, including exceptional daytime vision, efficient thermoregulation, and rapid mobility, which enables them to exploit daylight hours in open landscapes. These findings suggest that pronghorn may mitigate competition with deer by occupying a diurnal niche, distinct from the crepuscular patterns of deer. Understanding these temporal patterns gives important insights into how sympatric ungulates share resources and coexist, highlighting the ecological significance of their temporal adaptations.

Efficiency of a non-invasive modified camera trap design for surveying small mammal response to fire

Allison Krull (undergraduate, speaker) and Amanda E. Cheeseman, South Dakota State University, Department of Natural Resource Management, Brookings, SD 57007

Human caused environmental change threatens biodiversity. Land management practices can help mitigate these impacts but can also have unintended impacts on nontarget species. This may be particularly true for small mammals with limited vagility-species that are also often cryptic and understudied. Prescribed fire is one commonly employed land management tool to maintain healthy prairie ecosystems. Fires can have a variety of effects on small mammals from altering habitat structure, food availability, and community composition, but the impacts of prescribed fires on small mammal populations remains poorly studied. This highlights a need to assess the status and responses of these small mammals to management actions. Small mammals are traditionally surveyed by using pitfall and box traps, however there can be setbacks in these traditional methods, as they can be expensive and time consuming, as well as invasive. Further developments in camera trapping for small mammals can offer new opportunities for

monitoring these cryptic species in challenging ecosystems like tallgrass prairies. The AHDriFT system is a modified camera trap that is placed within buckets, and it is proposed to be effective for weasels and other small mammals. However, it has not been evaluated across larger scales and has not been implemented in the Northern Great Plains. Here we evaluated the use of this camera trap system for surveying small mammal responses to prescribed burns and compared these systems to traditional trapping methods. We specifically evaluated species richness and species diversity between camera traps and Sherman traps within experimental burn plots that differ in burn frequency and season at SDSU's Oak Lake field station in eastern South Dakota.

Beyond the Cough: Elucidating the Factors Associated with Mycoplasma ovipneumoniae Infection in Bighorn Sheep on the Pine Ridge Reservation
Jeff Tillery, Michael Thompson, Sean Ryder, Patricia Brewster, Paul Roghair, Nathan Galloway, Brady Neiles, Eddie Childers, William Severud

Across western North America, pneumonia initiated by the primary bacterial pathogen *Mycoplasma ovipneumonia*e has had long-term population-limiting effects on bighorn sheep (BHS, *Ovis canadensis*) herds through sustained poor lamb recruitment post initial die-off. Between 2021-2023 *M. ovipneumoniae* spread across the Badlands, SD, USA BHS metapopulation causing a 70-80% decline. An ongoing collaborative project was initiated, focused on implementing a "test and remove" methodology, which has shown prior success in BHS herds and metapopulations across western North America. Samples were collected from five BHS subherds on the Pine Ridge Reservation in March 2023 and 2024. We assessed the acute status *M. ovipneumoniae* infection and prior exposure. We aim to predict PCR status of *M. ovipneumoniae* in BHS from the Pine Ridge Reservation using multinomial logistic regression with observed respiratory symptoms, microbiome composition, and sex as predictor variables. An indicator species analysis will be used to identify microbes associated with *M. ovipneumoniae* infection by examining differences in abundance and frequency of occurrence between infected and uninfected BHS subherds and positive, indeterminate, and negative individuals. We anticipate nasal discharge, open mouth breathing, and particular bacterial species will be associated with present and prior *M. ovipneumoniae* infection, providing insights into the potential roles these species may play in maintenance, latency, or clearance of *M. ovipneumoniae* infection. By analyzing these data prior to management, we aim to further understanding of the impact of bacterial species on infected and uninfected BHS subherds, and their potential role in disease dynamics within the Badlands BHS metapopulation.

Managing Respiratory Disease in Badlands Bighorns
Sean Ryder, Jeff Tillery, Paul Roghair, Eddie Childers, Nathan Galloway, William Severud

Respiratory disease has historically had long-term negative effects on bighorn sheep (*Ovis canadensis,* BHS) herds across western North America. Recently, pneumonia associated with the bacterium *Mycoplasma ovipneumoniae* (*M. ovi*) has caused rapid die-offs of adult BHS and poor lamb recruitment in herds throughout western South Dakota. BHS in Badlands National Park (BADL) contracted epizootic pneumonia in July 2021 after a spillover event with domestic livestock, linked to *M. ovi*. The BADL meta-population has since suffered an estimated 80% decline from a minimum population estimate of 262 individuals to 53 individuals by March 2023

and 49 individuals by March 2024. We estimated disease status of BHS in the North Unit of BADL by testing nasal and oropharyngeal swabs for the presence and shedding patterns of *M. ovi* using Polymerase Chain Reaction (PCR). Prevalence of *M. ovi* in captured BHS was 24% in 2023 and 33% in 2024. This information will allow park managers to take informed management actions to eradicate *M. ovi* from the meta-population by selectively removing individuals that are determined to be chronic *M. ovi* shedders. This "test and remove" method has been successfully implemented in various bighorn sheep herds throughout South Dakota and the West. This project will further examine vital demographic rates pre- and post-removal to provide valuable information on the implications of managing *M. ovi* in wide-ranging BHS populations, as well as analyzing spatial data and population dynamics associated with *M. ovi* infection to provide managers with the "risk-of-contact" of BHS with nearby domestic pathogen reservoirs.

Tracking Coyote Activity in Rural and Urban Landscapes
Emily Macklin, Tammie Collins, Aubrey Hagen, Preston Stueve, William Severud
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Co-occurrence of red fox (*Vulpes vulpes*) and coyote (*Canis latrans*) in the United States
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Activity Pattern Overlap of Mountain Lion (*Puma concolor*) and mule deer (*Odocoileus hemionus*)
Allison Fischer, Micah Hunter, Michael Little Eagle, Sean Ryder, Erin Thomas, William Severud
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Deer Habitat Use in the USA
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Comparing Daily Temporal Activity Patterns of White-tailed Deer and Coyotes within Eastern South Dakota
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