2024 ACTWS & CSTWS CONFERENCE
WILDLIFE RESEARCH IN ACTION
JASPER, AB
March 8-10

Alberta Chapter
THE WILDLIFE SOCIETY

ACTWS & CSTWS CONFERENCE

WILDLIFE RESEARCH IN ACTION

8-10 MARCH, 2024
FOREST PARK HOTEL
JASPER, AB

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CONFERENCE SPONSORS

The ACTWS extends a sincere thank you to all our conference sponsors! You all make this conference possible!

CONFERENCE PLANNING COMMITTEE

Welcome to Wildlife Research in Action - a joint conference of the Alberta Chapter of The Wildlife Society and the Canadian Section of The Wildlife Society. We are excited about the overwhelming interest in this year's conference and the opportunity for participants to see the many examples of how research is translated into action. There is no better time and place than Jasper in March to learn some new things, connect with diverse wildlife professionals, meet interesting people, spend some money on the silent auction for a good cause, and have fun. Conferences of this nature can only happen with the incredible support of and planning by the conference organizers, award reviewers, numerous volunteers, sponsors, and the executive boards and directors of both the ACTWS and CSTWS. Thank you for all your incredible efforts. The success of the conference also depends on you, and I know you won't disappoint. See you soon.

- Dr. Stan Boutin (ACTWS President-elect) & Dr. Glynnis Hood (CSTWS President-elect)

Conference Chair: Stan Boutin & Glynnis Hood
General Planning Committee: Samantha Stamler, Shantel Carels, Sarah Hatt, Stan Boutin, John Paczkowski, Glynnis Hood, Karin Snyder, Kara MacAulay, Remington Bracher, Emily Herman, Robb Stavne, Corey Scobie, Courtney Hughes
Open Paper Program: Emily Herdman, Shantel Carels, Stan Boutin, Marcus Becker, Robb Stavne, Evelyn Merrill, Susan Lingle, Bill Harrower, Laurence Roy, Courtney Hughes
Plenary/Symposium (Expert Panel Discussions): Stan Boutin, Shantel Carels
Public Talk: Niki Wilson, Karin Snyder, Kara MacAulay, Glynnis Hood
Student Event: Education & Information Committee: Remington Bracher
Equity, Diversity, and Inclusion Plenary and Keynote: Aditya Gandhi, R North, Peter Hettinga, Brook Skagen, Julia Sunga, Ashley Shaw, Ayesha Singh, Ednna Stobschinski, Everett Hanna, Jennifer Foca, Janet Ng, Michelle Hoang, Nick Yarmey, Remington Bracher
Field Trips/Workshops: Tracy McKay, Brenda Shepherd, Geoff Skinner, Chris Watson, Lalenia Neufeld, Claire Edwards, Maddie Trottier
Professional Awards: Samantha Morris-Yaskinski, Evelyn Merrill, Margo Pybus, Elston Dzus, John Paczkowski, Glynnis Hood, Dragomir Vujnovic, Nick Parayko, Phil Walker
Student Presentation Awards: Samantha Stamler, Marcus Becker, Lionel Leston, Dan Farr, Shantel Carels
Scholarships and Grants: Corey Scobie, Shantel Carels, Samantha Stamler, Robb Stavne, Courtney Hughes, Brook Skagen, Aditya Gandhi, Michelle Hoang
Auction: Shantel Carels, Corey Scobie
Sponsorship: Shantel Carels, Karin Snyder, Samantha Stamler
Registration/budget: Samantha Stamler
Conference Swag: Samantha Stamler, Karin Snyder
Website: Shantel Carels
Program: Emily Herdman, Stan Boutin, Shantel Carels

CONFERENCE AT A GLANCE

Thursday, March 7	1900 – 2100: Nerd Nite featuring guest speakers Dr. Glynnis Hood, Dr. John Wilmshurst, and Eve Smeltzer. Location: The STAND EASY, Jasper Royal Canadian Legion (400 Geikie Street Jasper, AB T0E 1E0)
Friday, March 8	1000 – 1400: Walk in the park: Behind the scenes with Jasper National Park ecologists 1430 – 1630: Rooted in Wisdom: Deer Aging Techniques 1430 – 1700: Mastering Science Communications: Navigating Media Challenges and Amplifying Your Message 1430 – 1530: Turning Sound into Discovery: Using Wildlife Audio Recorders as Research Tools 1630 – 1800: Equity, Diversity, and Inclusion Plenary 1800 – 1900: ACTWS Annual General Meeting 1900 – 2030: Student Conclave 1900 – 2200: Mixer
Saturday, March 9	0800 – 0805: Opening Remarks 0805 – 0830: Presentation by Edward Arnett, Chief Executive Officer, The Wildlife Society 0830 – 0915: Keynote speaker, Lorne Fitch, *Research – Does It Make a Difference for Wildlife?* 0915 – 1000: Keynote speaker, William Snow, *The Bison Cultural Study, From Reintroduction to Reconciliation* 1000 – 1600: Concurrent presentations & poster session 1730 – 1815: Cocktails & poster session 1815 – 0030: Banquet, student scholarships, professional awards, auction, and live music
Sunday, March 10	0800 – 0930: Wildfire Plenary 0930 – 1200: Concurrent presentations & poster session 1205 – 1230: Student presentation awards 1330 – 1430: CSTWS Annual General Meeting

NERD NITE JASPER

When: Thursday, March 7, 7:00 – 9:00 pm (doors open at 6:15 pm)

Where: The STAND EASY, Jasper Royal Canadian Legion (400 Geikie Street Jasper, AB T0E 1E0)

Join us at Jasper's first Nerd Nite, for an evening of wildlife talks from wildlife nerds. Guest speakers include:

Dr. Glynnis Hood – Beavers, more than just a great set of teeth.

Dr. John Wilmshurst – Humboldt's Legacy and our disappearing grassland wilderness.

Eve Smeltzer – Primate politics: A story of dominance, coalitions, and coups

BEHIND THE SCENES WITH JASPER NATIONAL PARK ECOLOGISTS

When: Friday, March 8, 10:00 am – 2:00 pm

Where: Meet at the Old Fort Point parking lot near Jasper.

This field trip will include a short walking tour of some locations of note near the Jasper townsite with Jasper National Park (JNP) ecologists from Aquatics, Wildlife Management, Ecological Integrity Monitoring, and Landscape Ecology. Our tour will include informal presentations and discussions of local wildlife topics and current wildlife issues within JNP.

Total walking distance is 5km along mostly flat terrain. Participants should dress for the weather and wear appropriate footwear for walking in winter conditions.

Participants will meet at the Old Fort Point parking lot, and after a stop by the Athabasca River to discuss fish species in JNP, the group will walk a trail towards Jasper Park Lodge, stopping again at Lac Beauvert to discuss wildfire, mountain pine beetle, prescribed burning in JNP, changes to vegetation and wildlife habitat, and issues around human-wildlife conflict situations resulting from wildlife viewing and photographers in the park. The group will continue to Jasper Park Lodge, stopping near the golf course to discuss wildlife attractants and additional human-wildlife conflict issues.

Around noon, the group will have a buffet lunch and warm up at Jasper Park Lodge.

After lunch, the group will walk back to the trailhead at Old Fort Point, with discussions of ongoing ecological integrity monitoring projects in JNP.

Facilitated by Parks Canada, Jasper National Park

WORKSHOPS

1. Rooted In Wisdom: Deer Aging Techniques

Facilitated by the Wildlife Analytics Lab, Lethbridge College

When: Friday, March 8th, 2:30 – 4:30 pm; **Where:** Sawridge Ballroom A

Embark on a journey of precision and insight with the Lethbridge College Wildlife Analytics Lab (WAL) at the ACTWS Conference in Jasper! Join our workshop, 'Rooted in Wisdom: Deer Aging Techniques', to explore the secrets hidden within wildlife teeth. Explore both the field technique of 'tooth eruption and wear' and the laboratory marvel of 'cementum analysis' – both dedicated to unraveling the mysteries of ungulate ages. Delve into the heart of these techniques, comparing their accuracy and precision, with a revelation of the superior accuracy of cementum analysis. Learn the art of tooth extraction and witness the seamless process of submitting your own wildlife teeth to the WAL for aging through cementum analysis. Elevate your understanding of deer populations and contribute to the advancement of wildlife knowledge and bolster your resume with applied experience. Participants will gain hands-on familiarity with the field technique of jaw aging, and the lab process of tooth extraction, inspection, preparation, and cementum analysis. Join us in Jasper for a transformative experience at the intersection of field expertise and cutting-edge laboratory analysis!

2. Mastering Science Communications: Navigating Media Challenges and Amplifying Your Message

Facilitated by Niki Wilson, a journalist, science communicator, and the winner of the 2023 ACTWS Outreach Award.

When: Friday, March 8th, 2:30 – 5:00 pm; **Where:** Sawridge Ballroom B

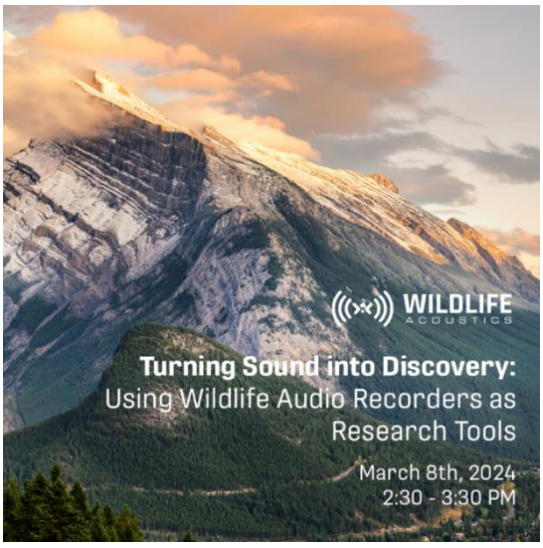
Are you ready to level-up your media chops? Even amid recent declines in public support for both science and science journalism, there are still many things we can do to make it more likely our science stories are told. In this 2.5 hour, interactive science communications workshop, we'll discuss the current state of the media, and why talking to media matters. We'll learn about current norms in the journalism process, and how to prepare so that your media interviews are accurate and memorable. We'll practice personalizing our science stories to capture attention in a noisy, polarized media landscape.

3. Turning Sound into Discovery: Using Wildlife Audio Recorders as Research Tools

Facilitated by Wildlife Acoustics

When: Friday, March 8th, 2:30 – 3:30 pm; **Where:** Sawridge Ballroom C

Sound analysis is becoming an increasingly valuable tool for biologists, environmental scientists, and land managers to survey and monitor wildlife populations. It is currently used for resource management, habitat health assessment, regulatory compliance goals, animal behavior studies, and documenting the effects of climate change worldwide. Wildlife audio recorders provide a reliable, noninvasive, cost-effective, and unbiased means to meet these objectives. At this one-hour hands-on workshop, learn how to set up and use a Song Meter Micro passive acoustic recorder to gain critical insights into your area of focus. By the end, you'll see why biologists have deployed 150,000 Song Meter recorders in over 90 countries.



EQUITY, DIVERSITY, AND INCLUSION PLENARY

When: Friday, March 8th, 4:30 – 6:00 pm; **Where:** Sawridge Ballroom C

Meet Our Panelists:

Ashlyn Herron (she/her) is a first-year Master of Science student at the University of North Dakota, where she is advised by Dr. Susan Felege (UND), and Dr. Andy Boyce, with the Smithsonian's National Zoo and Conservation Biology Institution. She received her Bachelor of Ecosystem Management Degree from Lethbridge College in 2022. Ashlyn's passion for conserving grassland ecosystems has led her from her home in Alberta to the plains of North Dakota where she has been working to understand how birds respond to grassland restoration. As an international student, Ashlyn has been able to create a sense of place within North Dakota through her connection with The Wildlife Society at both UND Chapter and the North Dakota State Chapter level and continues to advocate to increase inclusivity and bolster community.

Ashley Shaw (she/her) is a first-generation Canadian currently residing on Treaty 6 territory in Edmonton, Alberta. Her parents are immigrants from Guyana, a country located in the Caribbean, and they have been fortunate to call Canada their home for over 30 years. Ashley is a blossoming outdoor adventurer, accompanied by her wonderful partner. Both are highly motivated by food, and he supports her in her various endeavors. Ashley is an ecologist working in Indigenous rights and consultation, economic reconciliation, climate research, and environmental science. As her research takes her across the beautiful country of Canada, she has been consistently learning how to meaningfully incorporate diverse perspectives and knowledges into her work for the past 9 years. While her field of work may often be considered niche, Ashley is passionate about expanding the collective understanding of the practical implications of transdisciplinary research and multiple knowledge systems into effective decision-making processes for the general public and governing bodies.

Remington Bracher (he/him) is a Cree scholar and is currently finishing his undergraduate Conservation Biology program at the University of Alberta; upon finishing his degree, he is continuing his studies as a graduate student at UBCO, where he plans on braiding Indigenous perspectives and knowledge into his research projects. Remington's research focuses on wildlife harvest, treaty rights, food sovereignty, and the sociocultural benefits wildlife provides to Indigenous communities. Professionally, Remington works as a wildlife biologist for the Canadian Wildlife Service and is part of the priority species team as an Indigenous engagement specialist. For the past two years, Remington has served as the Student Director for ACTWS and is now the Education and Information Committee Chair. Throughout his tenure on the board, Remington took the lead in establishing the ACTWS Hunting Mentorship Program, which he hopes to integrate an Indigenous branch into the hunting program, aiming to assist Indigenous students in re-establishing connections with the land and culture through wildlife. Remington also serves as a coordinator for the Native Student Professional Development Program for TWS through the Native Peoples' Wildlife Management Working Group. This program plays a crucial role in guiding Indigenous students in their early careers within the field of wildlife management by paying for 10-15 Indigenous students from across North America to attend the international TWS conference while providing a community for mentorship and development made up of Indigenous wildlife biologists, researchers, and policy experts from across North America.

Jane Park (she/her) has been the Fire and Vegetation Specialist in Banff National Park located on the traditional territories of the Treaty 6, 7 and 8 First Nations and the Metis Nation homeland, since 2011. She started her career with Parks Canada in 2002 as a park warden for Banff National Park and has worked in various parks from Vuntut National Park (traditional territory of the Vuntut Gwitchin First Nation) in the Yukon to Gwaii Haanas National Park Reserve (traditional territory of the Haida Nation) on the northwest coast of BC. Her work in Banff focuses on the reintroduction of fire onto the landscape through prescribed fire, wildfire and fuel management, non-native and invasive vegetation management, and ecosystem restoration. She is also an Incident Commander on one of 5 Parks Canada National Incident Management teams. Her recent work also includes raising awareness of gender and diversity issues within Parks Canada and the broader wildland fire community in collaboration with colleagues in various other fire agencies.

Brook Skagen (they/he) is a passionate bird and plant nerd with a decade of experience in the environment field, working with industry, government, academia, and non-profit sectors throughout western Canada, with a particular focus on species at risk conservation. They are currently a Faculty Member with the School of Environmental Sciences at Lethbridge College, instructing courses in conservation biology, wildlife habitat management, and wildlife field techniques. Growing up amidst the golden grasslands of southeastern Alberta sparked a keen interest in prairie ecosystems, shaping Brook's dedication to grassland preservation throughout their career. They have made significant contributions to Alberta's MULTISAR (MULTIple Species At Risk) program as both a wildlife biologist and member of the agrology team, working with landholders to protect these at-risk landscapes. Beyond their technical roles, Brook has formerly assumed the role of Acting Editor for Nature Alberta Magazine, highlighting their commitment to disseminating environmental knowledge and story-writing to invoke a love for nature. Outside of their professional pursuits, Brook is a creator of art, music, and poetic writings, with the natural world as their muse.

ANNUAL GENERAL MEETINGS

ACTWS Annual General Meeting

When: Friday, March 8th, 6:00 – 7:00 pm; **Where:** Sawridge Ballroom A

CSTWS Annual General Meeting

When: Sunday, March 10th, 1:30 – 2:30 pm; **Where:** Sawridge Ballroom

Join us for an engaging discussion on the ACTWS & CSTWS activities over the past year and discover exciting plans for the upcoming year. We encourage all members to attend and actively participate in shaping the future of our organizations. Your insights and contributions are essential as we reflect on our achievements and set the course for the year ahead.

STUDENT CONCLAVE

When: Friday, March 8th, 7:00 – 8:30 pm

Where: Sawridge Ballroom BC

Student Conclave activities offer an opportunity to engage with professionals in the wildlife field, discussing careers, seeking advice, sharing stories, or any topic of your choice. Following this, students will participate in a mixer, joining other conference attendees in a casual environment for networking and socializing. A cash bar will be available for refreshments.

MIXER

When: Friday, March 8th, 7:00 – 10:00 pm

Where: Champs Lounge & Lower Lobby

Join us for an evening of networking at our Wildlife Mixer! This event is a perfect opportunity for professionals in the wildlife field to come together, share experiences, and catch up with colleagues. Whether you're a seasoned expert or just starting in the field, connect with like-minded individuals, exchange insights, and build valuable connections. Enjoy a relaxed atmosphere, good conversation, and perhaps discover new collaborations. Don't miss this chance to mingle with fellow wildlife enthusiasts in a welcoming and enjoyable setting! There will be a cash bar for refreshments.

GUEST SPEAKER

Edward B. Arnett, Chief Executive Officer of The Wildlife Society

When: Saturday, March 9th, 8:05 – 8:30 am

Where: Sawridge Ballroom

Presenter Bio: Ed Arnett joined The Wildlife Society (TWS) staff as the CEO in November 2021. He also is an Adjunct Professor in the Department of Fish, Wildlife and Conservation Biology at Colorado State University and host of the public television conservation series This American Land. He holds an Associate in Applied Science degree in natural resources

management from Colorado Mountain College, a B.S. in fish and wildlife management from Montana State University, an M.S. in zoology and physiology from the University of Wyoming, and a Ph.D. in forest science from Oregon State University. Prior to joining TWS, Ed served as chief scientist for the Theodore Roosevelt Conservation Partnership for nearly a decade, and worked for the US Forest Service, US Fish and Wildlife Service, Weyerhaeuser Company, and Bat Conservation International as a field and research biologist earlier in his career. He has worked with numerous species of wildlife and studied bats for more than 20 years, including research on these unique mammals for his doctorate degree. He is a professional member of the Boone and Crockett Club and as part of his personal time, he serves as President of the Fort Collins Retriever Club and is an AKC hunt test judge. An avid upland and waterfowl hunter, outdoor recreationist, angler, and dog trainer, Ed lives in Colorado with his wife Glenda and their three dogs.

KEYNOTE SPEAKERS

Research— Does It Make a Difference for Wildlife?

Presented by Lorne Fitch

When: Saturday, March 9th, 8:30 – 9:15 am; **Where:** Sawridge Ballroom

Research is the unravelling, sometimes the solving of wildlife mysteries. We undertake research to discern how many critters are there, how many were there, what's the trend, what are the connections and associations, how do things make a living, how do our human footprints and actions affect them and how do we bring them back from the brink.

As the theme of this conference is "Wildlife Research in Action" this address will spend some time discussing the "So What?" question. Bluntly put, does the additional knowledge created by research aid in biodiversity conservation?

Addressed will be the traction of research—how it is regarded, used to facilitate and inform changes to the way we manage wildlife and their habitats. Using examples and experience from several researchers, how long does it take to institute the results of research in conservation efforts and policy. What are some of the major impediments to research efforts being accepted and acted upon.

To what extent has research made or will make a difference in conservation efforts. What are some of the factors to consider ensuring research efforts net better traction and have a

demonstrable effect on wildlife conservation. How could practitioners and users of research results better position themselves for effective conservation efforts.

Presenter Bio: Lorne has been a biologist for over 50 years, working on many issues related to use of land and water. Lorne is a professional biologist, a retired provincial Fish and Wildlife biologist, was one of the co-founders of the stewardship initiative Cows and Fish and a former Adjunct Professor with the University of Calgary. Lethbridge is home, where he pens articles and essays on issues related to Alberta's landscape and critters. This includes a recent book, Streams of Consequence- Dispatches from the Conservation World.

The Bison Cultural Study, From Reintroduction to Reconciliation

Presented by William (Bill) Snow

When: Saturday, March 9th, 9:15 – 10:30 am; Where: Sawridge Ballroom

The Bison Cultural Study is about returning a culturally important species to a culturally important landscape. The Plains Bison, or Tatanga, is a part of our origin stories, our ceremonies, our understanding of the world; including its past, present and future. The Bison Cultural study utilizes an Indigenous methodology, "Biculturalism" and an Indigenous process, "Cultural Monitoring" to combine Western Science and Traditional Knowledge, to bring forward knowledge that will add to our current understanding Bison history, cultural significance, and management. In this time of climate change, we hope to reconnect a keystone species to its landscape, while restoring a fractured relationship between Indigenous and non-Indigenous groups, in a process that may lead to meaningful reconciliation.

Presenter Bio: William (Bill) Snow is a member of the Goodstoney First Nation of the Stoney Nakoda Nations, and is the Acting Director of Consultation at Stoney Tribal Administration. This work involves the assessment of industrial resource projects within Stoney Nakoda Traditional Territory, of Southern Alberta, that involve consultations with government and industry. Bill is a graduate of the University of Lethbridge – Business Administration, and since 2012, Bill has been an advisor & presenter for the University of Alberta "Thinking Mountains" Conference, the "Mountains 101" online program, and Canadian Mountain Network initiative. In 2018, Bill became a "Director at Large" with Canadian Wildlife Federation, and is currently the Chair of the Indigenous Relations Committee. In 2022, Bill helped to complete the "Bison Cultural Study" that offers Traditional Knowledge regarding the Bison Reintroduction to Banff National Park, as well as the Bison Cultural Study video that was completed in 2023.

WILDFIRE PLENARY

When: Sunday, March 10th, 8:00 – 9:30 pm

Where: Sawridge Ballroom

Meet Our Panelists:

Dr. Jen Beverly is an Associate Professor at the University of Alberta. Her research team currently focuses on various aspects of wildfire risk assessment – with the overarching goal of providing decision makers with tools to ensure social and ecological systems thrive in fire-prone environments. She is a fire behaviour specialist and former helitack crew leader with firefighting experience obtained in multiple Canadian provinces, as well as Montana and Oregon.

Bob Mason is a registered professional forester with more than 35 years of experience in sustainable forest management in Alberta, including senior roles in both forest management planning and woodlands operations.

Bob is Chief Forester for Canfor in Alberta where he oversees the Company's corporate forestry activities in support of its Grande Prairie, Fox Creek and Whitecourt Divisions. He is responsible for ensuring long-term forest sustainability and maintenance of biological diversity across the company's

forest tenures, as well as providing direction on the company's engagement and relationship building with Indigenous communities, environmental certification programs and woodlands research initiatives. Bob also represents the company in joint industry-government work on legislation, policy, wildlife management and species at risk.

Bob holds a Bachelor of Science in Forestry from the University of Alberta. His extensive contributions to industry advancement include his current service on the board of directors of fRI Research, on committees of the Forest Products Association of Canada, the Alberta Forest Products Association, the National Council for Stream and Air Improvement, and fRI Research, and as Canfor's representative on research and programming initiatives conducted in partnership with Ducks Unlimited Canada.

Jane Park has been the Fire and Vegetation Specialist in Banff National Park located on the traditional territories of the Treaty 6, 7 and 8 First Nations and the Metis Nation homeland, since 2011. She started her career with Parks Canada in 2002 as a park warden for Banff National Park and has worked in various parks from Vuntut National Park (traditional territory of the Vuntut Gwitchin First Nation) in the Yukon to Gwaii Haanas National Park Reserve (traditional territory of the Haida Nation) on the northwest coast of BC. Her work in Banff focuses on the reintroduction of fire onto the landscape through prescribed fire, wildfire and fuel management, non-native and invasive vegetation management, and ecosystem restoration. She is also an Incident Commander on one of 5 Parks Canada National Incident Management teams. Her recent work also includes raising awareness of gender and diversity issues within Parks Canada and the broader wildland fire community in collaboration with colleagues in various other fire agencies.

Ken Greenway following his Ph.D., dedicated approximately eight years of his career to applied research silviculture at the then Alberta Research Council. During this period, his primary focus revolved around examining aspen tree regeneration post-forest harvesting and the growth of aspen-white spruce mixedwood.

In 2003, Ken transitioned to the provincial government as a research scientist, specializing in reforestation and regeneration systems. He played a pivotal role in overhauling provincial reforestation standards, shifting from a system assessing tree site occupancy to one connecting growth assumptions in forest management plans with evaluations of tree species occupancy, density, and growth. By 2007, Ken assumed a management role in reforestation, navigating through various areas of forest management responsibility, including roles in cross-ministry initiatives and a brief stint in rural development.

In November 2021, Ken assumed the acting role of Executive Director of the Forest Stewardship and Trade branch, securing the position permanently in 2022. His branch shoulders a wide range of responsibilities, spanning trade files such as the softwood lumber dispute with the US, timber dues rate setting and collection, forest tenure issuance, timber production auditing, and compliance monitoring. This involves ensuring harvesting rates align with approved amounts. Ken is actively involved in addressing forest health and adaptation, covering aspects like mountain pine beetle management and tree genetics standards. His role extends to forest management planning, contributing to regional and sub-regional land planning initiatives, as well as forestry data management.

SATURDAY SCHEDULE

0800-0805: Opening Remarks – *Sawridge Ballroom*	
0805-0830: Guest Speaker Edward Arnett, Chief Executive Officer of The Wildlife Society	
0830-0915: Research — Does It Make a Difference for Wildlife? Lorne Fitch	
0915-1000: The Bison Cultural Study, From Reintroduction to Reconciliation William Snow	
1000-1030: Coffee Break, Lorne Fitch Book Signing, & Posters	
Session 1A – *Sawridge Ballroom A*	Session 1B - *Sawridge Ballroom BC*
Habitat	Human-wildlife Interactions
1030-1045: Mapping the Global Distribution of Terrestrial Microplastics C. Lauren Mills, University of British Columbia Okanagan	1030-1045: Predictors of Coyote Reporting Behaviour Among Residents of Edmonton, Alberta Abby Keller, University of Alberta
1045-1100: Tracking Woodland Caribou Habitat Change Over Time Melanie Dickie, Alberta Biodiversity Monitoring Institute / University of British Columbia Okanagan	1045-1100: Aversive conditioning of grizzly bears produces high probabilities of retreat from human-bear conflict locations. Claire Edwards, University of Alberta/Parks Canada
1100-1115: Effects of seismic lines and subsequent mounding restoration treatments on wolf spider (Lycosidae) functional traits in Alberta peatlands Norbert Nguyen, University of Alberta / NRCan	1100-1115: The efficacy of fear-based management for ungulates on crop fields Kate Rutherford, University of Alberta
1115-1130: Edge effects of boreal peatland seismic lines on wolf spider (Lycosidae) functional traits in Alberta Sydney Harvey, University of Alberta	1115-1130: Differential impacts of human recreation on large carnivores uncovered by camera traps Peter Thompson, University of Alberta
1130-1145: Wildfires disproportionately affected jaguars and their habitats in the Pantanal Alan Eduardo de Barros, University of Sao Paulo / University of Alberta	1130-1145: Evidence of mutually detrimental interactions between urban coyotes and people experiencing homelessness Sage Raymond, University of Alberta
1145-1200: Impact of Small Retention Patches in Regenerating Harvests on Boreal Birds Isabelle Lebeuf-Taylor, University of Alberta	1145-1200: Wildlife management implications of the Volterra Principle Mark Boyce, University of Alberta
1200-1300: Lunch - *Hearthstone Lounge & Walter's Dining Room*	

Session 2A - *Sawridge Ballroom A*	Session 2B - *Sawridge Ballroom BC*
Methods	**Nutrition**
1300-1305: Camera traps for density estimation: an eye to improving the science that guides management **Jamie Clarke, University of Victoria**	1300-1305: Diet Analysis of Prairie Amphibians **Jordan Vos, University of Lethbridge**
1305-1310: Comparing Acoustic Data Quality between Generalized and Specialized Bat ARUs **Kiana Weed, Lethbridge College**	1305-1310: Winter diet of five sympatric ungulates in west-central Alberta. **Suzanne Stevenson, fRI Research**
1310-1325: Individual identification in acoustic recordings: applications and opportunities in ecological research **Elly Knight, Alberta Biodiversity Monitoring Institute**	1310-1325: Endangered deep-snow mountain caribou have a distinct gut microbiome that may be altered by maternal penning **Scott Sugden, University of Alberta**
	Population Monitoring
1325-1340: Chirps and Checklists; Comparing Avian Species Richness through Standardized and Citizen Science Methodology **Madison Pusch and Emelie Dykstra, University of Alberta**	1325-1340: Snakes of the Plain: Monitoring Snake Populations in Southern Alberta **Alina Couch, AJM Environmental Inc.**
1340-1355: Remote cameras sample mountain ungulate population demography as compared to aerial surveys in an Indigenous-led community-based monitoring program **Sydney Goward, University of Victoria**	1340-1355: Combining multiple data sources to model population dynamics of Eastern Canada-West Greenland bowhead whales **Brooke Biddlecombe, Fisheries and Oceans Canada**
Disease	
1355-1410: Phylodynamics of H5N1 avian influenza viruses in North American wildlife reveal the emergence of reassortants with increased fitness **Anthony Signore, National Centre for Foreign Animal Disease**	1355-1410: The Use of Drones to Survey Urban Ungulates **Kira Weddell, Red Deer Polytechnic**
	Behaviour
1410-1425: A Bioeconomic Tool to Assess Harvest Strategies for Chronic Wasting Disease Management in Alberta **Evelyn Merrill, University of Alberta**	1410-1425: Using snowshoe hares to test predictions around animal home range size and population density **Juliana Balluffi-Fry, University of Alberta**

1425-1440: Evaluating spatial and temporal trends in winter tick burdens on moose in Alberta using images from remote camera traps **Marcus Becker, Alberta Biodiversity Monitoring Institute**	1425-1440: Partial migration driven by wildfire influences reproductive success of a generalist herbivore **Lisa Koetke, University of Northern British Columbia**
Recreation	
1440-1455: Collective action for ecologically informed recreational land use: a case study of Alberta's northeastern Rocky Mountain slopes **Courtney Hughes, Alberta Forestry and Parks**	1440-1455: Sharing is caring: The evolution of communal roosting behaviour in birds **Sandra Cuadros, University of British Columbia Okanagan**
1455-1500: Redesigning a campground to reduce human wildlife conflicts in Kananaskis Country, Alberta **John Paczkowski, Alberta Forestry and Parks**	1455-1500: Comparing the avoidance behavior of birds in response to UV absorbent and reflective vest colour. **Paige Asplund, Lethbridge College**
	Wildlife Trade
1500-1505: Assessing factors influencing off-highway vehicle activity across linear features in Alberta **Apoorv Saini, University of Alberta**	1500-1505: Sizing them up? Sure, but how? Lack of consistency in how body size is measured leads to different predictions of the use of mammals in the wildlife trade **Ivana Schoepf, University of Alberta**
1505-1535: Coffee Break & Posters	
1600-1730: Free Time	
1730-1815: Cocktails and Posters	
1815-0030: Banquet	

Read presenter abstracts in Appendix A & B.

SUNDAY SCHEDULE

0800-0930: Wildfire Plenary – *Sawridge Ballroom*	
0930-1000: Coffee Break & Posters	
Session 4A – *Sawridge Ballroom A*	Session 4B - *Sawridge Ballroom BC*
Habitat Use	**Management**
1000-1015: Impact of placer gold mining on Wolverines (Nätra), Lynx (Ninju), and Marten (Tsŭk) in the Klondike Gold Fields, Yukon **Zachary Fogel, University of Alberta**	**1000-1015:** Integrating science with stakeholder and agency values: Insights from structured decision-making in wildlife management **Anne Hubbs, Environment and Protected Areas**
1015-1030: Predation and forage affect the competition potential between reintroduced Bison and ungulates in Banff National Park **Jonathan Farr, University of Montana**	**1015-1030:** Conservation Breeding to Enable Recovery of Caribou in Jasper National Park **Lalenia Neufeld, Parks Canada - Jasper National Park**
1030-1045: Using autonomous recording units to determine the habitat use and migration phenology of Alberta's nesting Sandhill Cranes. **Wyatt Villetard, University of Alberta**	**1030-1045:** Looking at the big picture: Assessing the impacts of landscape development disturbance in and outside of the Canadian Mountain National Parks on wildlife **Rebecca Smith, University of Victoria**
1045-1100: Owls Well That Ends Well, Housing the Barred Owl (Strix varia) in Alberta, Canada **Lisa Takats Priestley, STRIX Ecological Consulting**	**1045-1100:** How Best to Proceed with Western North American Woodland Caribou: Get Back to Basics? **Bob Stewart, Independent Researcher**
	Community Ecology
1100-1115: Disturbance-driven spatiotemporal trends of a threatened songbird in Alberta **Taylor Hart, University of Alberta**	**1100-1115:** Simulated impacts of black bear predation on neonatal loss in boreal caribou **Liam Horne, University of Alberta**
1115-1130: Effects of temperature on mammals' movement and habitat selection in British Columbia, Canada **Stefano Mezzini, University of British Columbia Okanagan**	**1115-1120:** Factors that affect the genetic diversity and population structure of coastal wolves in Northern British Columbia **Michelle Hoang, University of Alberta**
	1120-1125: Maximum Entropy (MaxEnt) Model for Milkweed (Asclepias spp.) in the Mixedgrass Natural Subregion of Alberta **Ednna Stobschinski, Lethbridge College**

	1125-1130: Evolving prey behavioural responses to predators: Using individual based artificial neural network genetic algorithms to investigate caribou-wolf interactions **Andrew Barnas, University of Victoria**
1130-1135: Rapid-Fire Response Needed: An Analysis of the Columbian Fisher Population in British Columbia **Alexia Constantinou, University of Victoria**	1130-1135: Indigenous-led research on Traditional Territories highlights the impacts of forestry harvest practices on culturally important plants **Kathleen Carroll, University of Victoria**
1135-1050: White-tailed deer response to forest harvesting in west-central Alberta **Laura Finnegan, fRI Research**	1135-1150: Connecting Plant, Insect, and Bird Biodiversity on Native Grasslands in Saskatchewan **John Wilmshurst, Canadian Wildlife Federation**
1150-1205: Long-term Variability and Drivers of Ungulate Winter Range Grassland Productivity **Sarah Straughan, University of Montana**	1150-1205: Dracula's Ménagerie-Understanding carnivore community ecology in the Romanian Carpathians **Marissa Dyck, University of Victoria**
	1205-1230: Student Presentation Awards
1230-1330: Free Time	
1330-1430: CSTWS Annual General Meeting – *Sawridge Ballroom*	

Read presenter abstracts in Appendix C.

POSTER SESSION

When: Saturday, March 9th: 1000-1030, 1505-1530, 1730-1815
Sunday, March 10th: 0930-1000

Where: Champ's Lounge & Lower Lobby. Posters will be exhibited beneath their designated numbers.

1. Examining the Response of Mountain Goats to COVID-19 Induced Reductions in Helicopter Traffic in Cathedral Provincial Park
   Aimee Chhen, University of British Columbia, Okanagan

2. What camera traps tell us about small mammal response to linear feature disturbance in Northeastern Alberta?
   Alessandro Franceschini, University of Alberta

3. Best bird for buck? Evaluating the influence of a grassland restoration program on bird diversity in North Dakota.
   Ashlyn Herron, University of North Dakota / Smithsonian Institution

4. Harvesting for Habitat: Evaluating the dynamics of avian communities under different forest management practices
   Bijaya Dhami, University of Alberta

5. Assessing the ecological and social dimensions of conservation of hog deer (Axis porcinus) in Shuklaphanta National Park, Nepal
   Bipana Maiya Sadadev, University of Northern British Columbia

6. Assessing the Potential for Competition Between Feral Horses and Native Ungulates in the Upper Foothills of Alberta
   Birch Gano, University of Montana

7. Declining population of Harlequin Duck on the Bow River, Alberta, Canada: 25 years of monitoring
   Brenda Shepherd, Jasper National Park

8. Impacts of passive placer mine revegetation on songbird communities in central Yukon
   Clara Reid, Wildlife Conservation Society Canada

9. Cougar spatiotemporal response to human activities in a temperate rainforest recreational multi-use landscape
   Emerald Arthurs, University of Victoria

10. Evaluating the Use of Remote-Sensing Approaches to Assess Landscape Reclamation Criteria
    Emily Herdman, InnoTech Alberta

11. Leave it, burn it, or cut it down? Best management practices for birds in post-mountain pine beetle-attacked forests
    Emily Swerdfager, University of Alberta

12. Understanding the Effects of Human Intervention on Wild Boar Ecology in Alberta
    Hannah Bordin, University of Alberta

13. Bighorn ram movement ecology and disease risk
    Ian Gazeley, University of Alberta

14. Effects of reproduction and immigration on the short-term population dynamics of urban black-tailed deer (Odocoileus hemionus columbianus).
    Isabel Deutsch, University of Victoria

15. Does habitat quality predict reproductive investment in a population of declining tree swallows (Tachycineta bicolor) in Alberta?
    Jinxuan Cui, University of Alberta

16. Spatially predicting annual ungulate forage biomass from 2001 to 2022 in the Canadian Rocky Mountains
    Jonathan Farr, University of Montana

17. Reading the Sign: a call for wildlife track and sign identification training for wildlife professionals
    Joseph Litke, Fiera Biological Consulting Ltd.

18. Effects of Winter Severity and Hunting on White-tailed and Mule Deer Populations
    Kathryn Vaughan, University of Alberta

19. Hatchery Effectiveness in Olive Ridley (Lepidochelys olivacea) Sea Turtle Conservation; Comparing Nest Success of Hatchery Relocated Nests to Beach Relocated Nests
    Kira Weddell, Red Deer Polytechnic

20. The association between wildfire smoke and reproductive success in a population of declining tree swallows (Tachycineta bicolor) in Alberta
    Lucille Wang, University of Alberta

21. Evaluating lead exposure in scavenging species linked to big-game hunting in Saskatchewan, Canada.
    Lynsey Bent, University of Saskatchewan

22. Monitoring changes in deer abundance in Jasper National Park as a component of the Southern Mountain Caribou Recovery Strategy
    Madeline Trottier, Parks Canada

23. Lack of consistency in black bear response to oil sands disturbance features: what pieces are missing?
    Megan Braun, University of Victoria

24. Habitat Selection of Feral Horses and Domestic Cattle in Alberta's Foothills: Implications for Biodiversity?
    Sejer Meyhoff, University of Alberta

25. Estimating the effect of browse subsidy on seismic lines in Alberta's boreal forest
    Spencer Quayle, University of Alberta

26. Black Bear Habitat Use in Response to the Construction and Operation of a Wind Power Plant
    Tawnee Dupuis, University of Alberta

Read presenter abstracts in Appendix D.

APPENDIX A: SATURDAY AM

Session 1A

Habitat

1030-1045: Mapping the Global Distribution of Terrestrial Microplastics
C. Lauren Mills, University of British Columbia Okanagan
Co-authors: Joy Savanagouder, Michael J. Noonan
Abstract: Microplastic (MP) pollution has become an area of concern over recent decades as MPs continue to be detected in even the most remote locations on Earth. Yet, despite the potential for MPs to cause adverse effects on soil ecosystems, our understanding of the distribution and effects of MPs in soil remains limited. This is due in large part to the fact that the overwhelming majority of MP research is centered around aquatic environments, while terrestrial ecosystems have remained understudied. The goal of this work is to provide the first assessment of the drivers behind terrestrial MP concentrations globally. To determine common trends and drivers of MP pollution, we compiled data from twenty-five peer-reviewed studies describing the concentrations of MPs at 1142 unique locations around the world. Using a geostatistical technique known as regression-kriging we then modelled how the human footprint index (HFI), elevation, and soil depth influence the distribution and abundance of MPs. Our modelling revealed positive, non-linear relationships between HFI and MP abundance, displaying greater MP concentrations at higher HFI indices. Additionally, there are negative, non-linear relationships with both elevation and soil depth; MP abundance decreases with a rise in elevation, as well as at greater soil depths. These findings provide insight into the factors that drive MP accumulation in soils. This work represents an important first step in mitigating the detrimental impacts of terrestrial MP pollution and will be essential for informing policy towards effective mitigation measures throughout the current plastic pollution crisis.
Biosketch: Lauren Mills is a graduate student at the University of British Columbia, Okanagan, and is working in the Quantitative Ecology Lab. She is interested in anthropogenic effects on ecosystems, conservation, and climate change.

1045-1100: Tracking Woodland Caribou Habitat Change Over Time
Melanie Dickie, Alberta Biodiversity Monitoring Institute / University of British Columbia Okanagan
Coauthors: Craig DeMars, John Simms, Branko Hricko, Stephanie Andrews, Victor Tran, Edmund Burke, Cynthia McClain, Robert Serrouya
Abstract: Given the link between habitat alteration and species declines, habitat protection and restoration have been identified as key management interventions for many species at risk. Effective habitat management requires tracking and reporting on habitat and landscape changes over time. In Canada, habitat alteration resulting from human land-use and wildfires has been identified as a primary mechanism contributing to declines of woodland caribou. Recent work has set the stage for effective habitat management by quantifying changes in caribou habitat over time across caribou ranges in Alberta; however, transparent and rigorously derived annual updates to metrics of habitat alteration and recovery will be essential moving forward. To this end, we are quantifying and tracking gross, net and annual changes in several aspects that contribute to an understanding of critical habitat for woodland caribou using updated human footprint mapping paired with high-resolution, remotely sensed vegetation data across all of Alberta's caribou ranges. The culmination of this

program will support transparent and effective inventorying, tracking, and management of caribou habitat across Alberta.

Biosketch: Melanie works closely with multi-stakeholder groups to design and implement collaborative landscape-level mensurative experiments. Melanie is interested in understanding the mechanisms in which human habitat-alteration and climate interact to influence the predator and prey community related to caribou declines in western Canada. Melanie has recently begun to explore the world of remote sensing to support habitat inventories and management. Melanie is also pursuing a PhD at the University of British Columbia-Okanagan.

1100-1115: Effects of seismic lines and subsequent mounding restoration treatments on wolf spider (Lycosidae) functional traits in Alberta peatlands

Norbert Nguyen, University of Alberta / NRCan

Coauthors: Sydney Harvey, Carol Frost, Jaime Pinzon

Abstract: Exploration for oil and gas resources creates seismic lines across the Alberta oilsands, fragmenting the boreal peatlands. As disturbed peatlands often see delayed natural regeneration of tree cover for long periods, some species may experience changes in their morphological characteristics and thereby, ecosystem function. Soil mounding is a common restoration practice in Alberta, where peat is dug and piled in mounds to create topographic heterogeneity. Despite promotion as a solution for seismic line restoration, mounding is a prominent topic of debate regarding its effectiveness. Wolf spiders (Lycosidae) are common peatland ground-dwelling predators and therefore a good candidate group to assess the restoration impact through their functional traits, both at the family and species level. Spiders were collected in June of 2023 using pitfall traps in mounded and untreated seismic lines as well as undisturbed peatland habitats near Brazeau Dam in SW Alberta. Wolf spider functional traits (carapace, chelicerae and leg sizes) were measured to investigate the effect of habitat on their potential predatory role. ANOVAs tested whether the mean trait values and functional diversity indices differed at the species and family-level by treatment. Preliminary results indicate dramatically greater sizes along the seismic lines treatments, while sizes were significantly reduced in the undisturbed forest. As the open linear corridors cause shifts in insect prey availability, the Lycosidae have seemingly shifted their ecological role through achieving increased sizes. However, homogenous results across the mounded and untreated disturbed sites suggest that the mounding has been unable to restore natural spider community function.

Biosketch: Norbert Nguyen is an undergraduate student at the University of Alberta studying Conservation Biology. Through Natural Resources Canada, he is researching the effects of seismic lines on spider functional traits. Along with other experiences throughout Canada, the Sonoran desert and Peruvian Amazon, Norbert seeks to continue cultivating his entomological passion.

1115-1130: Edge effects of boreal peatland seismic lines on wolf spider (Lycosidae) functional traits in Alberta

Sydney Harvey, University of Alberta

Coauthors: Norbert Nguyen, Carol Frost, Jaime Pinzon

Abstract: Seismic lines are linear clearings through forestlands created during oil and gas exploration and are prominent features in Alberta, contributing to forest fragmentation. Seismic lines dissecting peatlands are especially problematic as natural tree regeneration is poor, influencing the local species assemblage and associated ecosystem functions. Wolf spiders (Lycosidae) are prominent peatland arthropods playing a critical role in ecosystem function through predation pressures. This study assessed size changes in wolf spider functional traits with increasing distance from seismic line edges. Spiders were collected in June 2023 using pitfall traps placed 0m, 25m, and 75m from seismic

line edges at five sites near Cristina Lake in NE Alberta. The length and width of each spider carapace, chelicerae and right anterior femur were measured, as these functional traits relate to predation abilities. Mean femur length and width across the family increased with distance into the interior forest. However, this trend did not hold for the two most common species, Pardosa moesta and Pirata insularis, as there were no significant differences in mean femur size. Femur size is related to travel distance and prey capture ability and is affected by the amount of prey consumed during spider development. These species-level results suggest prey availability does not shift significantly with distance from the seismic line edge. However, family-level results suggest shifts in wolf spider community taxonomic and trait composition with distance from the edge, such that predation pressure exerted by this community shifts as a function of distance from the edge.
Biosketch: Sydney is a fourth-year Conservation Biology student at the University of Alberta. Sydney's work experience with the Canadian Forest Service has sparked a passion for biodiversity and arthropod research, especially relating to Alberta's oil and gas activities.

1130-1145: Wildfires disproportionately affected jaguars and their habitats in the Pantanal
Alan Eduardo de Barros, University of Sao Paulo / University of Alberta
Coauthors: Paulo Inácio Prado, Ronaldo Gonçalves Morato
Abstract: The Pantanal wetland harbours the second largest population of jaguars in the world. Alongside climate and land-use changes, the recent mega-fires in the Pantanal may pose a threat to the jaguars' long-term survival. To put these growing threats into perspective, we addressed the reach and intensity of fires that have affected jaguar conservation in the Pantanal ecoregion over the last 16 years. The 2020 fires were the most severe in the annual series, burned 31% of the Pantanal and affected 45% of the estimated jaguar population (87% of these in Brazil); 79% of the home range areas, and 54% of the protected areas within home ranges. Fires consumed core habitats and injured several jaguars, the Pantanal's apex predator. Displacement, hunger, dehydration, territorial defence, and lower fecundity are among the impacts that may affect the abundance of the species. These impacts are likely to affect other less mobile species and, therefore, the ecological stability of the region. A solution to prevent the recurrence of mega-fires lies in combating the anthropogenic causes that intensify drought conditions, such as implementing actions to protect springs, increasing the number and area of protected areas, regulating fire use, and allocating fire brigades before dry seasons.
Biosketch: Alan Eduardo de Barros is a Brazilian PhD student and biologist specialized in Ecology and Conservation. His PhD thesis focuses on the analyses of jaguar movement data, and how movement and habitat selection behaviour relate to the species ecology and conservation.

1145-1200: Impact of Small Retention Patches in Regenerating Harvests on Boreal Birds
Isabelle Lebeuf-Taylor, University of Alberta
Coauthors: Erin Bayne
Abstract: Since the turn of the century, foresters in western Canada have followed habitat conservation guidelines by leaving behind live trees in harvest areas. These patches of live trees in a logged forest can be as small as a single tree, and patches of 0.1 to 2 ha in size are frequent on the landscape. Whether these retained patches of trees provide benefit to forest songbirds as the logged forest regrows, like their larger counterparts often provide, is mostly unknown. We evaluated species-specific abundance and changes in community metrics in harvests in which there are variably sized – albeit small – retention patches across 22 years of logging.
In a species-specific lens, we show that 5 of the 6 tested forest songbirds increase in relative abundance when regenerating harvests contain small retention patches, compared to those without

patches. The size of the patch was only relevant to one species. To isolate the marginal benefits of retention in the heterogeneous forested and logged landscape, we applied amplitude-derived distance truncation to isolate the signal of interest. From a community perspective, we show that these small retention patches provide limited advantage to birds in regenerating harvests.
Our findings highlight the weak evidence that small retention patches provide functional relevance to birds, as individuals and species recolonize regenerating harvests.
Biosketch: Isabelle is a Masters student in the Bayne Lab at the University of Alberta developing amplitude-related methods to isolate responses of boreal birds to specific harvest features.

Session 1B

Human-wildlife Interactions

1030-1045: Predictors of Coyote Reporting Behaviour Among Residents of Edmonton, Alberta
Abby Keller, University of Alberta
Coauthors: Colleen Cassady St. Clair, Carly C. Sponarski
Abstract: Conflicts between humans and coyotes have increased in cities across North America. Many municipalities use citizen-provided reports to monitor conflicts and guide management actions, but high volumes of reports of coyotes exhibiting benign behaviours can strain limited resources, making it difficult for officials to focus on reports that describe conflict-prone coyotes. Consequently, understanding factors that predict different types of coyote reports by members of the public could help municipalities target education initiatives that increase actionable reports of bold coyote behaviour and reduce uninformative reports. Using data from a survey of residents (n = 5,926) in Edmonton, Alberta, we built path models to explore the influence of situational factors, cognitive factors, and previous reporting behaviour on tendencies to report either coyotes in conflict-prone situations vs. coyotes exhibiting benign behaviour. Individuals who lived adjacent to greenspaces were more likely to have had a severe interaction with a coyote, and those who had a more negative interaction were more likely to perceive coyotes as conveying risk to human safety. Experiencing past conflict with coyotes increased the likelihood of prior coyote reporting and the relative likelihood of reporting benign behaviour. By contrast, the relative likelihood of reporting conflict behaviour increased if respondents had more knowledge of the consequences of coyotes accessing anthropogenic resources, associated more risks with coyotes, and who had previously reported a coyote. Future public education might provide feedback to respondents about conflict-prone vs. benign coyote behaviour, encourage emphasis on informative reports, and provide tips for preventing conflict-prone behaviour in coyotes.
Biosketch: Abby Keller grew up in Minnesota and earned a B.Sc. in Fisheries and Wildlife Biology from the University of North Dakota in 2019. Now an M.Sc. student at the University of Alberta, she is studying human perceptions of coyotes and the attraction to birdseed by urban coyotes and their prey.

1045-1100: Aversive conditioning of grizzly bears produces high probabilities of retreat from human-bear conflict locations.
Claire Edwards, University of Alberta/Parks Canada
Coauthors: John Paczkowski, Colleen Cassady St. Clair

Abstract: Protected areas provide important refugia for populations of grizzly bears (Ursus arctos), which are threatened in Alberta. Many protected areas address human-bear conflict with a suite of non-lethal tools including aversive conditioning and hazing. These tools apply negative stimuli to bears with the goal of increasing wariness and reducing proximity to people. In Kananaskis Country from 2000-2019, teams of technicians conducted aversive conditioning on 48 marked grizzly bears in 6,539 conditioning events. Bears were conditioned using 20 different stimuli, grouped by modality into: approach (vehicle or foot), noise (vehicles or humans), projectiles (contact or non-contact), and pursuit (with or without Karelian bear dogs). When bear identity was known, conditioning was over 50 times more likely to target adult females than adult males, and in 99% of events where females were accompanied by cubs, cubs were young of year or yearlings. Frequency of conditioning events significantly declined with bear age. When a bear response to technician arrival was recorded, the average likelihood of retreat was 32%. Retreat probability increased with the number of actions in the previous event, the number of conditioning events in the preceding two weeks, and presence of cubs. When a response to conditioning was recorded, bears almost always retreated from conditioning technicians (93%) and rarely approached, either upon technician arrival (1%) or after conditioning commenced (<0.001%). Bears were more likely to retreat from entire conditioning events when pursuit tools were used, when there were more actions in the event and with increasing distance to cover. These results suggest that bears in Kananaskis Country learned to retreat from aversive conditioning and that this tool can help to reduce conflict-associated behaviour, supporting long-term residency by bears in this protected area.
Biosketch: Claire is a Resource Management Supervisor with Parks Canada Human Wildlife Conflict team in Jasper National Park. She recently graduated from the University of Alberta with an MSc. where she studied human-bear conflict management, trying to better understand correlates for success of hazing and aversive conditioning programs for bears. Before starting her MSc., Claire worked as a human-bear conflict manager with government agencies in BC, AB and YT.

1100-1115: The efficacy of fear-based management for ungulates on crop fields

Kate Rutherford, University of Alberta
Coauthors: Colleen Cassady St. Clair, Darcy Visscher, Graeme Fowler

Abstract: A growing body of literature has investigated the efficacy of broadcasting acoustic predator cues to induce fear and thereby alter the behaviour and distribution of conflict-prone species, including ungulates. The efficacy of these deterrents may be increased with evolutionarily relevant stimuli that engage multiple senses to lessen habituation and reduce human-wildlife conflict. In this study, we investigated the anti-predator reactions of Roosevelt elk and black-tailed deer to acoustic and visual stimuli on crop fields in the Cowichan Valley, British Columbia. We contrasted behavioural responses (i.e. flight, vigilance, feeding) to acoustic recordings of (i) human voices, (ii) natural predator vocalizations (wolf and cougar), (iii) dog barks, and (iv) local bird vocalizations (control) by presenting each with and without flashing LED lights and using a before-after-control-impact design. When exposed to the human stimulus, elk ran in 21% of the events, but not significantly more often than when exposed to natural predators (15%), dogs (13%), or birds (16%). Deer ran in 56% of events when exposed to the human stimulus, significantly more often than from birds (32%) and dogs (37%), but not natural predators (44%). Across acoustic stimuli types, adding flashing light significantly increased the likelihood of running by a factor of 1.96 for elk and 1.69 for deer. However, elk became significantly less likely to run over the 45 day study period, indicating rapid habituation. Further development of deterrent technology that engages multiple senses may help mitigate the increasing rates of human-ungulate conflict associated with crop damage in agricultural areas.

Biosketch: Kate Rutherford is a Master's student at the University of Alberta in the department of Biological Sciences and a member of the St. Clair Lab. Kate holds a BSc in Wildlife Biology and Conservation from the University of Guelph. Her research interests include behaviour ecology and human-wildlife interactions.

1115-1130: Differential impacts of human recreation on large carnivores uncovered by camera traps

Peter Thompson, University of Alberta
Coauthors: John Paczkowski, Jesse Whittington, Colleen Cassady St. Clair

Abstract: Many animals are wary of humans and may be less likely to use areas that humans frequently visit. Consequently, human use can decrease functional landscape connectivity and may have further consequences for the viability of sensitive populations. This problem can be mitigated by establishing wildlife corridors; limited areas of habitat that link larger habitat patches to support wildlife movement. Ideally, these corridors have limited human use, but they are often located adjacent to high human use areas. The Bow River Valley of Alberta, Canada provides extensive montane habitat that facilitates connectivity for large, wide-ranging mammal species, but much of the valley is now populated by humans. Our work seeks to identify the zone of influence (ZOI) over which human recreation impedes use by wary species, especially grizzly bears (Ursus arctos) and gray wolves (Canis lupus). Such information will help determine how wide corridors need to be to support use by wildlife and safety for people. We estimated the ZOI for grizzly bears and gray wolves in the Bow Valley using an array of camera traps that passively detected bears, wolves, and humans using the same landscape. Our results suggest that both bears and wolves are detected less frequently near hotspots for human recreation, even when these areas are hundreds of meters away. Our models estimated a higher ZOI for wolves than for bears. We also generated forecasts of wolf and bear space use under hypothetical changes to the landscape, such as the opening or closing of trails. Our modelling efforts explicitly quantify the effects of different levels of human use on different animal species and can be used to inform trail design and management in environmentally sensitive areas.

Biosketch: Peter is a postdoctoral fellow in the Department of Biological Sciences at the University of Alberta. He is a statistical ecologist interested in developing and applying models that can elucidate important information about human-wildlife interactions. Most of his research interests lie in applied problems that incorporate spatial data.

1130-1145: Evidence of mutually detrimental interactions between urban coyotes and people experiencing homelessness

Sage Raymond, University of Alberta
Coauthors: Colleen Cassady St. Clair

Abstract: Cities across North America exhibit increasing rates of both human-coyote conflict and people experiencing homelessness, but potential relationships between these phenomena have received no peer-reviewed study to date. We synthesize personal observations from a long-term study of urban coyotes in Edmonton, Canada, with evidence from the literature to describe, and then make recommendations for reducing, three types of human-coyote conflict in the context of homelessness. First, people and coyotes seek similar habitat, often in dense vegetation, for encampments and denning, respectively. These sites minimize interactions with recreating people and their dogs but increase spatial overlap between coyotes and the encampments that house people. A second type of conflict, food conditioning, results from shared space and the opportunities it necessarily creates for habituation. Habituated coyotes are more likely to access human sources

of food near encampments, which reduces wariness towards people in other contexts. Third, attraction to people caused by both spatial overlap and food conditioning may increase human exposure to zoonotic diseases carried by coyotes, especially a novel tapeworm to which people experiencing homelessness may be especially susceptible. These sources of conflict may be reduced with directed research about the three types of conflict we propose, direct support and targeted health care for people experiencing homelessness, and education for health care professionals and others who support people experiencing homelessness. Ideally, these actions would embrace a socio-ecological approach, recognize the social complexities and inequities that lead to homelessness, address other urban wildlife species, and encourage reconciliatory actions for marginalized groups.

Biosketch: Sage is a graduate student at the University of Alberta, studying in the St. Clair Lab as part of the Edmonton Urban Coyote Project. Sage's work focuses on understanding the ecology and behaviour or urban coyotes to develop management strategies that promote human-coyote coexistence.

1145-1200: Wildlife management implications of the Volterra Principle
Mark Boyce, University of Alberta
Coauthors: John Linnell
Abstract: Coexistence with large carnivores is one of the world's highest profile conservation challenges. Conflicts caused by livestock depredation and risks to pets and humans justify predator control whereas ecologists and wildlife managers identify benefits and advocate tolerance. Nearly 100 years ago Vito Volterra predicted that increased mortality on both prey and predators results in increased abundance of prey and decreased abundance of predators. Indeed this principle has been shown to be robust and is often consistent with the objectives of wildlife management. The Volterra Principle is seldom recognized as a fundamental outcome of ecological theory with an important message for conservation.
Biosketch: Mark Boyce is Professor of Ecology and Alberta Conservation Association Chair in Fisheries and Wildlife at the University of Alberta. His research focus is the interface between ecological theory and wildlife management. He is a Fellow of The Wildlife Society and the Royal Society of Canada.

APPENDIX B: SATURDAY PM

Session 2A

Methods

1300-1305: Camera traps for density estimation: an eye to improving the science that guides management
Jamie Clarke, University of Victoria
Coauthors: Jason Fisher, Holger Bohm, Cole Burton

Abstract: Measures of population density (abundance/area) are essential for wildlife management - especially for establishing sustainable yields of game species and building trust in hunting regulations. Ungulates (e.g., moose) are an important group of terrestrial mammals for subsistence and Indigenous hunters. The Government of BC has standard protocols for measuring ungulate densities, with aerial ungulate surveys (AUSs) recommended for most species. AUSs are a well-established but imperfect survey tool, leading practitioners to wonder: what other tools and methods are at their disposal? This project will compare the robustness and feasibility of camera trap surveys versus AUSs for ungulate density estimation and, ultimately, game species management. It will test camera trap density models for unmarked species, evaluating the effects of sampling design and assumption violations. The quality of density estimates will be compared between camera trap models and to concurrent AUSs. Density is an essential metric for wildlife management - but to be useful, estimates must be accurate, precise, and produced at regular intervals, using methods that are economical and safe. Existing protocols for ungulate density estimation do not meet these criteria. This project asks: could camera trap surveys fill knowledge gaps in AUS programs, improving the science that guides wildlife management?
Biosketch: Jamie Clarke is a first-year Masters student at the University of Victoria in Dr. Jason Fisher's ACME Lab. Prior to starting her MSc, she worked with WildCAM, writing a handbook on density estimation using camera traps.

1305-1310: Comparing Acoustic Data Quality between Generalized and Specialized Bat ARUs
Kiana Weed, Lethbridge College
Coauthors: Lethbridge College, Bighorn Wildlife Technologies (BWT)
Abstract: Bats are of ecological importance and play a critical role in biodiversity. The nature of bats, as they are nocturnal, causes difficulties in detecting, quantifying, and identifying species; however, autonomous recording units (ARU) have been used to successfully document species in several regions globally. Different types of ARUs are available with each containing different settings and varying costs. The more specialized the bat detector generally equates to higher cost, the purpose of this project was to assess four different types of ARUs concerning cost, detections, and analysis time. Methods: Four ARUs (AudioMoth, SM4BAT FS, SM4 Mini, and TSAE) were strategically positioned in the same survey locations using literature installation methods. ARUs were programmed for two-hour intervals for two weeks in the peak seasonal time for bats. Comparing the data consisted of calculated frequency distributions for individual bat species, for each device and location, and were evaluated using non-parametric statistical tests (Kruskal-Wallis and Mann/Whitney) to receive a detectability result for each of the species to their respective devices. Results: Data comparison is ongoing until February 2024.

1310-1325: Individual identification in acoustic recordings: applications and opportunities in ecological research
Elly Knight, Alberta Biodiversity Monitoring Institute
Coauthors: iTessa Rhinehart, Devin de Zwaan, Matthew J. Weldy, Mark Cartwright, Scott Hawley, Jeffery L. Larkin, Damon Lesmeister, Erin Bayne, Justin Kitzes
Abstract: Recent advances in bioacoustics have resulted in broad-scale implementation of passive acoustic monitoring (PAM); however, the inability to identify individual animals in acoustic recordings remains a barrier. Ecological and evolutionary applications that require individual identity typically rely on traditional methods like mark-recapture that are invasive, labor-intensive, and potentially biased. Acoustic individual identification (AIID) has the potential to revolutionize ecological and evolutionary research of acoustic species by replacing those traditional methods. We reviewed the literature and found strong evidence that acoustic signatures exist across taxa;

however, we found a mismatch between the passive acoustic monitoring methods that are required for real-world application of AIID and the methods used in AIID research. We suggest that broad-scale implementation of AIID is achievable in the near future, given recent success in adjacent acoustic disciplines like human speech recognition. The road forward for AIID should include 1) prioritizing efforts towards passive acoustic monitoring, 2) exploration of opportunities for cross-disciplinary and collaborative research, and 3) understanding how AIID affects the outcome of ecological and evolutionary application. We provide concrete suggestions for research and development and a conceptual framework for practitioners to evaluate relative difficulty of AIID for their study system.
Biosketch: Elly Knight is a Quantitative Ecologist with the Alberta Biodiversity Monitoring Institute and Boreal Avian Modelling Project, with a background in applied avian ecology and passive acoustic monitoring.

1325-1340: Chirps and Checklists; Comparing Avian Species Richness through Standardized and Citizen Science Methodology
Madison Pusch and Emelie Dykstra, University of Alberta
Abstract: Citizen science has grown in popularity in recent years, and is becoming an increasingly important data source for scientific research. Citizen contributions to ornithology build comprehensive, wide-range datasets, but are subject to criticism from the scientific community. In this study, we compiled eBird data for the Whitemud Ravine hotspot in Edmonton Alberta from December to February from 2016-2023 and analysed it comparatively to standardized transect counts for the same location. To reduce the area bias resulting from the undefined eBird hotspot geography, we restricted species types to those present in the habitats that were sampled on our transect route. We analysed species composition with comparative graphs, and total richness using Chao1 richness estimators and rarefaction curves. Our results found that citizen science observed higher species richness due to increased area and temporal diversity. However, species composition between the two methods was very similar, meaning there was no favouritism from citizens to record interesting species. When comparing all years of standardized data to individual years of citizen data, we found that if standardized methods were given more time and effort, the methods could be comparable. Overall, we found that citizen-collected data could be very useful for researchers because of their increased effort with consistent accuracy. However, it is important to be aware of and account for its limitations, such as double counting and spatial or temporal biases.
Biosketch: Madison Pusch and Emelie Dykstra are high-standing 4th-year Environmental students at the University of Alberta. Madison has completed an internship studying house wrens and received the NSERC award for assistant permafrost research. Emelie has assisted in tree genetic research and is completing a methodology paper for ecological CT scanning technology.

1340-1355: Remote cameras sample mountain ungulate population demography as compared to aerial surveys in an Indigenous-led community-based monitoring program
Sydney Goward, University of Victoria
Coauthors: Andrew Barnas, Édouard Bélanger, Steve Andersen, Trevor Lantz, Jason Fisher
Abstract: Wildlife demography is a crucial parameter in monitoring and modelling a population's persistence through time. Aerial surveys have been the most common method for obtaining demographic data, but they come with limitations such as sample size, temporal constraints, costs, and cause significant disturbance to wildlife. Remote cameras are a non-invasive alternative to wildlife monitoring, providing continuous longitudinal and repeated sampling of a population,

particularly useful for species that aggregate in fission-fusion dynamics, such as Dall's sheep (Ovis dalli dalli). We collected and compared Dall's sheep population demography data for three years, through an Indigenous-led, community-based monitoring program. The objective was to investigate the variability of lamb:nursery and ram:nursery ratios, and ram classification as captured by remote cameras and aerial surveys. We found that with sufficient samples, camera data collected in appropriate seasons produced precise lamb:nursery, ram:nursery, and ram classification proportions, as compared to aerial surveys, ultimately indicating similar population status trends between the two methods. Incorporating a remote camera system in monitoring allows for a more comprehensive examination of demography, with additional benefits such as broader mammal community monitoring. Our methods could apply to any population of social ungulate, where sufficient knowledge exists on high-use sites and seasonal habitat use. Further, our community-valued approach to this inquiry transcends the bounds of historical scientific research. This has included hosting community open houses and engaging with over 180 youth in the classrooms. These efforts, their impact, and the philosophy of this community-valued scientific approach will be the focus of this proposed talk.
Biosketch: As an early-career wildlife ecologist and Registered Professional Forester, Sydney's work centers on wildlife stewardship and meaningful collaborations with Indigenous communities. Concurrent to her MSc research, she is a Practices Forester in the BC Ministry of Forests, and a co-author of BC's Thinhorn Sheep Stewardship Framework.

Disease

1355-1410: Phylodynamics of H5N1 avian influenza viruses in North American wildlife reveal the emergence of reassortants with increased fitness
Anthony Signore, National Centre for Foreign Animal Disease
Coauthors: Anthony V. Signore, Jolene Giacinti, Cassidy N.G. Erdelyan, Megan Jones, Stéphane Lair, Claire Jardine, Brian Stevens, Dayna Goldsmith, Chelsea Himsworth, Margo Pybus, Stephanie Avery-Gomm, Catherine Soos, Tamiru N. Alkie, Yohannes Berhane
Abstract: H5Nx highly pathogenic avian influenza viruses (HPAIV) belonging to the A/Goose/Guangdong/1/96 clade 2.3.4.4 have been the underlying cause of worldwide outbreaks since 2014. H5Nx viruses have only been detected once previously in North America when H5N8/H5N2 viruses briefly circulated between 2014 and 2015. However, this lineage re-emerged in Atlantic Canada as H5N1 in November 2021 and spread rapidly across the continent. Substantial inter-agency collaborative surveillance efforts (>30,000 samples tested to date, ~10% HPAIV positive) have revealed the devastating impacts of H5N1 HPAIV on Canadian wildlife. This extensive sampling effort has led to the sequencing of >3000 complete H5N1 genomes at the National Centre for Foreign Animal Disease. These data were combined with publicly available H5N1 genome sequences and epidemiological information to assess viral evolution and transmission across North America. These analyses reveal significant viral diversification, as 37 distinct H5N1 genotypes have emerged in North America since November 2021. Despite all sharing a recent common ancestor, these genotypes display clear differences in relative fitness, host dynamics, virulence and geographic diffusion. While Anseriformes and Charadriformes are well known HPAI reservoirs, our analyses find Charadriformes play a reduced role in the spread of HPAI in North America, with increased contributions from Passeriformes and raptors. Moreover, phylogeographic reconstructions of viral diffusion have revealed geographic regions that are key to transcontinental viral spread. These novel insights to the diversification, host dynamics and spatio-

temporal diffusion of H5N1 HPAI will inform ongoing surveillance efforts to minimise ecological damage as this virus continues to circulate throughout North America.
Biosketch: Anthony completed a Ph.D (University of Manitoba-2016) and two post-doctoral fellowships (University of Nebraska-2016, University of Manitoba-2021) focused on molecular biology, evolutionary genomics, protein biochemistry and respiratory physiology. Anthony now works as a Research Scientist at the National Centre for Foreign Animal Disease studying the evolution of avian influenza viruses.

1410-1425: A Bioeconomic Tool to Assess Harvest Strategies for Chronic Wasting Disease Management in Alberta
Evelyn Merrill, University of Alberta
Coauthors: Vic Adamowicz, Marty Luckert, Qin Xu, Mary Asante, Anne Hubbs, Margo Pybus, Hans Martin, Josh Nowak"
Abstract: Chronic wasting disease (CWD) can produce population-level declines in wild cervids, with associated ecological and socio-economic repercussions. To date, harvest management is the primary approach to reduce CWD transmission and spread in wild populations. We present our efforts to develop an Integrated Population Modeling approach (IPM) for mule deer as part of a Bioeconomic Tool directed at assessing potential harvest policies for managing CWD in Alberta. First, we describe approaches and challenges to compiling, error checking, and determining decision rules for data input into the model. Second, we present results of analyses that reflect adding movement of deer among Wildlife Management Units (WMUs) based on deer density, deer habitat attraction, and ecological connectivity across the landscape. Third, we describe our approach to integrating CWD transmission into the IPM and its effects on deer population dynamics and hunter behavior related to harvest. Finally, we give an overview of how the Bioeconomic Tool can be used in a structural decision-making framework for consideration in management and policy decisions.
Biosketch: Evelyn is Professor Emerita at the University of Alberta. She has been studying CWD in deer in Alberta since its detection in 2005. She is the Canadian Representative to The Wildlife Society Council, lives near Elk Island National Park, enjoys gardening, horseback riding, and entertaining her grand kids.

1425-1440: Evaluating spatial and temporal trends in winter tick burdens on moose in Alberta using images from remote camera traps
Marcus Becker, Alberta Biodiversity Monitoring Institute
Coauthors: David Roberts
Abstract: The winter tick (Dermacentor albipictus) has long attracted the attention of wildlife managers throughout Canada for its impact on wildlife health, most notably moose (Alces alces). The pressure of high tick burdens, which often results in hair loss and anemia, is an important factor in moose mortality rates; in particular, calves are susceptible to high tick loads before they are recruited to the adult population. Although major moose mortality events due to ticks have been documented in regions of Alberta before (e.g., 1999), ongoing systematic monitoring of the spatial and temporal dynamics between the two species to inform management has been lacking. In this study we make use of an existing provincial-scale dataset of images from over 3,000 remote cameras deployed between 2015-2019 to estimate trends in winter tick burdens on moose over both time and space. Using images collected between January and May, the degree of tick infestation severity on each individual moose was evaluated using the previously-developed Hair

Loss Index (HLI), where a score between 1 and 5 is assigned based on the observed hair loss. This information was then used to calculate the prevalence and degree of infestation severity both by region of the province and through the study time period. The findings from this effort can be used to evaluate spatial and temporal patterns of tick pressure on moose in Alberta, as well guide future hypotheses regarding tick-moose response to factors such as a changing climate and human land use.

Biosketch: Marcus Becker is an applied ecologist with the Alberta Biodiversity Monitoring Institute, based out of the University of Alberta in Edmonton. He works primarily with remote camera trap data to model and map native species habitat associations, evaluate the impacts of human disturbance to wildlife, and report on population trends.

Recreation

1440-1455: Collective action for ecologically informed recreational land use: a case study of Alberta's northeastern Rocky Mountain slopes

Courtney Hughes, Alberta Forestry and Parks

Coauthors: Cam McClelland, Wendy C. Harrison

Abstract: Recreation across mountain ecosystems are increasing in popularity, particularly given the rugged and challenging terrain, aesthetically pleasing views, and opportunities to see wildlife. This includes backcountry hiking, horseback riding, mountain or e-biking, and off-highway vehicle use, of which is increasingly recognized as important for human wellbeing and supporting local economies. However, increased human land use, particularly when clear management direction is lacking, can bring about potential negative ecological and wildlife impacts, including soil erosion and sedimentation, invasive species, and wildlife and fisheries conflicts. Moreover, unmanaged recreation can pose significant human safety risks, and can damage culturally and historically important sites. Here, we present our approach to recreational planning in the Grande Cache, Alberta area. Through a series of online and in-person meetings and workshops with various recreational user groups, community members, Indigenous Peoples, and industrial land users, we gathered data to identify the values, risks and opportunities to inform a master trail plan. This included recommendations for biodiversity, ecological and cultural values related to future trail designations and infrastructure. We share how our collaborative approach enabled stakeholders a safe space to share their expertise and values, stimulate discussion, and proactively participate in planning. In turn, our approach helped participants better understand government-led planning and policy processes, including how species at risk and other ecological values are integrated into landscape-level decisions. Moreover, we share how our approach helped improve relationships between stakeholders and government, and contributes to broader efforts and literature related to landscape-level planning and conservation management.

Biosketch: A dedicated conservation professional, Courtney has been fortunate enough to work in various countries around the world including her home base in Alberta, Canada. Her work includes her PhD on the social dimensions of grizzly bear conservation, human-wildlife conflict, collaborative community-based approaches, citizen science and educational outreach, and landscape planning and monitoring.

1455-1500: Redesigning a campground to reduce human wildlife conflicts in Kananaskis Country, Alberta

John Paczkowski, Alberta Forestry and Parks

Abstract: In Kananaskis Country Alberta, there are just over 3000 campsites available to the public. Managing and mitigating human wildlife conflicts in and around campgrounds and facilities is an ongoing management concern. In response to ongoing human wildlife conflicts, Alberta Parks is in the process of reconfiguring a campground in Kananaskis Country. Historically, 50 campsites were spread along 5.3 kilometers of Lakeshore within a well used wildlife movement corridor. Human wildlife incidents, especially involving grizzly and black bears, occurred regularly and were difficult to manage due to the layout of the campground. The new design of the campground provides 54 campsites distributed along 1.3 km of shoreline encompassing a total of 17 hectares. Within the footprint of the new campground all natural wildlife attractants, mainly buffalo berry, will be mechanically removed. To mitigate for the loss of habitat within the campground a 34-hectare habitat enhancement area has been created away from the new campground. The habitat enhancement area consisted of 6 separate areas where trees were removed, while organic woody debris was left onsite. A 1.3-kilometer wildlife bypass trail was created around the campground to allow wildlife to circumnavigate the new campsites. Alberta Parks will continue to monitor wildlife human incidents in the area as well as monitoring the vegetation succession and use of the adjacent habitat enhancement areas. This project provides a good example of how Alberta Parks is striving to provide quality recreational opportunities while balancing the needs of wildlife.

Biosketch: John is a biologist with over 30 years of experience working with large carnivores, mostly bears. In a previous life, John worked on brown bears and Amur tigers in the Russian Far-East, but for most his career he worked in Alberta and British Columbia. Currently, John is employed by the Government of Alberta as the Human Wildlife Coexistence Team Lead for the Kananaskis Region, based out of Canmore. The program in Kananaskis Country is greatly augmented by a team of about 40 volunteers and students, who contribute about 8,000 hours annually to research and monitoring projects in the region. John is very open to collaborating with other biologists and students and has some amazing long term wildlife camera and grizzly bear GPS data sets to share. John has been attending ACTWS conferences for over 25 years and recently has been part of the executive board.

1500-1505: Assessing factors influencing off-highway vehicle activity across linear features in Alberta

Apoorv Saini, University of Alberta
Coauthors: Dr. Erin Bayne

Abstract: About 61% of land in Alberta is forested with most of it belonging to the boreal forest providing pivotal ecological services and wildlife habitat for numerous species. However, the forested area faces continuous increasing threats from anthropogenic disturbances, particularly in the oil and gas sector. Linear features such as seismic lines, pipelines, and transmission lines, alongside rising Off-Highway Vehicle (OHV) usage, contribute to environmental degradation. This study employs stratified and random sampling techniques to map OHV trails, focusing on the oil sands region in the north-east and the foothills region. Utilizing ordinal logistic regression, we tested what factors predict different levels of OHV activity across linear features. Sampling around 850 linear feature points in 2023, current models find that being *** to mines ($p = 0.04$), *** to industrial sites ($p = 0.01$), *** to active well pads ($p = 0.02$) along with percentage of vegetation ($p < 0.01$) and maximum height of vegetation on the linear features ($p < 0.01$) influence intensity of OHV use. The use of rapid linear feature assessment and statistical models are being used to determine

where networks of linear features are being used by OHV to help prioritize restoration planning. These findings contribute to informed conservation practices, addressing ecological concerns in Alberta's boreal ecosystem amid expanding human, recreational, and industrial activities.
Biosketch: Apoorv Saini is a PhD student working with Dr. Erin Bayne at the University of Alberta and Boreal Ecosystem Recovery and Assessment (BERA) on recreation ecology. He is working on how anthropogenic disturbances arising due to human use of linear features (seismic lines, pipelines, transmission lines, trails and roads) are affecting biodiversity in the province of Alberta. Apoorv is an ecologist, conservationist and also a nature photographer who obtained his masters from the UK. He is currently living in Edmonton.

Session 2B

Nutrition

1300-1305: Diet Analysis of Prairie Amphibians
Jordan Vos, University of Lethbridge
Coauthors: Dan Johnson
Abstract: Amphibians play vital roles in the Canadian prairie ecosystem, contributing to intricate food web dynamics. Despite their importance, the dietary interactions of prairie amphibians remain understudied, creating a critical knowledge gap. This study addresses this gap by initiating an exploration into the eating physiology and biomechanisms of amphibians, employing stomach flushing and DNA analysis for dietary content identification. The study aims to answer questions related to the dietary habits of prairie amphibians, utilizing stomach flushing for more detailed assessments. Integrated hypotheses explore dietary preferences, size and morphological adaptations, and the influence of habitat on prey items. The overarching goal is to identify and analyze the dietary preferences and ecological roles of amphibians in the Canadian prairies. Specific objectives include pioneering stomach flushing for diet analysis, identifying diet diversity, exploring the relationship between morphology and prey size, and comparing habitat types of insects through GIS analysis. This research is ongoing into the field season of 2024 and will form the foundation for a comprehensive exploration of amphibian ecology in the Canadian prairies, providing valuable insights into dietary preferences, trophic relationships, and ecological dynamics. While aiming for comprehensive insights, the study acknowledges limitations such as potential seasonal influences on amphibian behavior and constraints in capturing a representative sample. Generalization to other regions may be limited, but the methodologies employed could prove useful for future studies in southern Alberta. Despite the absence of conclusive results, at this time, the research anticipates a significant contribution to herpetological studies by providing a base knowledge for multiple ecological and conservation applications.
Biosketch: Jordan Vos, a Master of Science student specializing in Biology at the University of Lethbridge, graduated with a Bachelor of Ecosystem Management, fostering a passion for amphibian conservation. Her background in park interpretation and current role as a sessional instructor at Lethbridge College bridges academia and public understanding, which contributes to amphibian species conservation and environmental awareness.

1305-1310: Winter diet of five sympatric ungulates in west-central Alberta.
Suzanne Stevenson, fRI Research
Coauthors: Dr. Laura Finnegan, Dr. Chris Johnson, Dr. Roy Rea

Abstract: Diet is an important determinate of ungulate ecology. Variation in diet can influence movement, distribution, and population dynamics of an individual species as well as interspecific competition among species that share a similar foraging niche. However, there have been few studies of the diet of sympatric ungulates in western Canada. We used DNA metabarcoding of fecal samples to evaluate the winter diet of white-tailed deer (Odocoileus virginianus), mule deer (O. hemionus), moose (Alces americanus), elk (Cervus canadensis), and caribou (Rangifer tarandus caribou) in west-central Alberta. We found that grasses, forbs, and lichenicolous fungi were present in the diet of each ungulate. Forbs comprised 53–82% of the reads from plant DNA, while mosses, sedges, grasses, and shrubs made up relatively little of each ungulate's diet. There was considerable overlap in the diet of the five ungulates (Horn-Morisita index = 42–64% overlap; Bray-Curtis index = 20–45% overlap). Moose had the most distinct diet, while elk and caribou had the least distinct. Our results suggest that forbs are an important winter diet item for these five ungulates. Also, forages other than lichens appear to play an important role in the winter diet of caribou.
Biosketch: Suzanne Stevenson is based in Hinton Alberta. She recently completed her Masters in Biology at the University of Northern British Columbia studying mountain caribou and white-tailed deer resource use in west-central Alberta. Broadly, Suzanne is interested in understanding fish and wildlife responses to landscape disturbance and novel ways to study ecosystems such as DNA metabarcoding and eDNA studies.

1310-1325: Endangered deep-snow mountain caribou have a distinct gut microbiome that may be altered by maternal penning

Scott Sugden, University of Alberta
Coauthors: Colleen St. Clair, Lisa Stein, Toby Spribille

Abstract: Canada's mountain caribou populations have undergone dramatic population declines and are now critically endangered. Of these populations, the deep-snow or "Southern Mountain" ecotype is behaviorally distinct and characterized by a unique winter diet of arboreal rather than terrestrial lichens. This dietary specialization would be expected to produce a distinct gut microbiome in deep-snow mountain caribou. Captivity-based population recovery efforts, including maternity penning, may further alter the gut microbiome because they replace or supplement natural diets with commercial pellet feed. We tested these hypotheses by using fecal DNA metabarcoding to compare diet and gut microbiome composition among six herds of deep-snow caribou, two herds of shallow-snow caribou, deep-snow caribou from the Revelstoke maternity pen, and semi-domesticated reindeer. Our results verified that deep-snow caribou specialized on the arboreal hair lichens Bryoria and Nodobryoria, whereas shallow-snow caribou consumed the terrestrial lichens Cladonia and Stereocaulon. Dietary specialization was reflected by clear separation in microbiome composition between these two groups, with deep-snow caribou containing significantly higher abundances of the bacterial genus Paramuribaculum. Maternity penning also significantly altered forage habits and microbiome composition: penned caribou consumed more foliose lichens and had a distinct microbiome compared to wild caribou. Our results suggest that captive caribou programs could reduce nutrition-based stress by carefully replicating the diets of wild populations and maintaining access to specialized forage. We further suggest that caribou feces be routinely monitored for diet and microbiome composition, especially during periods of captivity, as an indicator of animal metabolism in support of conservation efforts.
Biosketch: Scott is a third-year PhD student in Natural Resource Sciences at McGill University. He previously completed an MSc in Biological Sciences at the University of Alberta, where he then spent two years working as a research assistant.

Population Monitoring

1325-1340: Snakes of the Plain: Monitoring Snake Populations in Southern Alberta
Alina Couch, AJM Environmental Inc.
Coauthors: Adam Martinson
Abstract: Snake species are often cryptic with long periods of inactivity, which creates challenges in estimating their population size. Conservation and management programs depend on reliable population estimates and robust data for successful snake protection plans. Biologists can provide such data through long-term mark-recapture monitoring programs. In Alberta, snake species are vulnerable to population decline and face mounting pressures from habitat loss, habitat fragmentation, and human development (i.e., roads, petroleum extraction). To monitor and determine the effects of infrastructure development on snake populations, AJM Environmental Inc. implemented a long-term mark-recapture study of two hibernacula adjacent to pipeline construction sites. Population monitoring began pre-construction in 2019 and has continued annually through the construction and post-construction phases. A combination of intensive field sampling and passive antenna arrays is used to determine seasonal hibernacula use, return rates, peak activity times, population demography, and population health. To date, sampling efforts have been largely successful in marking and re-encountering snakes at the monitored hibernacula sites. In total, 1463 snakes have been PIT tagged, with 953 having been recaptured at least once. Population models indicate larger than anticipated populations at both hibernacula, and monitoring infers minimal population differences between 2019 and 2022. Seasonal hibernacula use and times of peak activity guide the timing of field sampling and can inform provincial mitigation setbacks. Data collected through this project is shared with provincial regulators with the goal of supporting management of snake species and critical overwintering habitat in the face of climate change, declining populations, and increasing human activity.
Biosketch: Alina Couch has over fourteen years of environmental consulting experience as a field crew lead, project manager, and supervisor. Her expertise includes wildlife biology, regulatory compliance, and environmental reporting. Alina has worked with AJM Environmental Consulting on this snake monitoring project in southern Alberta since 2020.

1340-1355: Combining multiple data sources to model population dynamics of Eastern Canada-West Greenland bowhead whales
Brooke Biddlecombe, Fisheries and Oceans Canada
Coauthors: Mads Peter Heide-Jørgensen, Steven H. Ferguson, Darren Gillis, Cortney A. Watt
Abstract: The Eastern Canada-West Greenland (EC-WG) bowhead whales (Balaena mysticetus) were heavily harvested from 1530 – 1915, and the population was depleted to commercial extinction. Obtaining reliable estimates of abundance through aerial surveys can be challenging due to the vast area that needs to be covered. To overcome this, a Brownian bridge movement model (BBMM) was used with data obtained from satellite-tagged bowhead whales. The BBMM allowed the calculation of the probability of occupancy both inside and outside areas surveyed during aerial surveys conducted in 1981, 2002 and 2013. Using a Quasi-Poisson regression, the relationship between the probability of occupancy and abundance in surveyed areas was established. This relationship was then used to extrapolate survey estimates into unsurveyed areas. Extrapolated estimates were included with genetic mark-recapture abundance estimates from 2013 and 2017 and harvest history into a Bayesian stock production model to recreate population

dynamics post-commercial whaling, 1915-2022, and project 10 years into the future under various harvest levels (0, 10, 20, 30 whales). The model estimated a 2022 population of 8243 (95% CI 5201-14,950) whales, and an initial population (N1915) estimate of 1028 (95% CI 213-4758) whales. Calculating the likelihood of population decline indicated probabilities ranging from 24-53% after a 10-year period across all harvest levels. The findings of the model suggest that EC-WG bowhead whales have been consistently recovering following the cessation of commercial whaling and have already surpassed the point of maximum productivity, leading to a slowdown in growth in recent years.
Biosketch: Brooke Biddlecombe is an Aquatic Biologist with Fisheries and Oceans Canada, and an instructor at the University of Alberta. Brooke completed her PhD at the University of Manitoba in 2023, and her Masters degree at the University of Alberta in 2019. Her research focuses Arctic marine mammal management.

1355-1410: The Use of Drones to Survey Urban Ungulates
Kira Weddell, Red Deer Polytechnic
Coauthors: Sandra MacDougall
Abstract: White-tailed deer (Odocoileus virginianus), mule deer (Odocoileus hemionus) and moose (Alces alces) are found throughout the City of Red Deer, Alberta. Our objectives were to estimate the population density and winter distribution of these ungulates in Red Deer's natural areas using a drone-based survey method. An aerial survey of the 9.65 km2 of the parks and green belt areas of Red Deer was conducted in January of 2023 using a DJI Matrice 300 drone collecting both red-blue-green (RBG) and infrared thermal video. We employed a stratified sampling design, flying at an altitude of 100 m following a parallel lawn-mower pattern spaced 50 meters apart in densely forested areas and 100 meters apart in open habitats in January of 2023. We found distinct spatial separation between white-tailed and mule deer winter herds in the city, with a population density estimate of 20 deer/km2 in the green spaces, with a 70% white-tailed deer to 30% mule deer ratio. In larger patches of habitat, white-tailed deer formed herds ranging from 19 to 45 individuals, with smaller groups of eight to twelve nearby. Mule deer exhibited a more scattered distribution, often found in smaller herds of three to nine individuals (max herd size = 18). While easy to detect, moose did not show strong habitat selection for the green spaces during the daytime surveys with many anecdotally reported in nearby neighborhoods. Detectability is a crucial consideration, influenced by weather conditions and sunlight intensity. Determining the optimal temperature contrast for thermal settings is essential and involves a learning curve for observers.
Biosketch: Kira is a fourth-year BSc Biological Sciences student at Red Deer Polytechnic who will be graduating in April 2024. She plans to use her biological sciences degree to pursue a career in wildlife biology with a focus on conservation and human-wildlife interactions.

Behaviour

1410-1425: Using snowshoe hares to test predictions around animal home range size and population density
Juliana Balluffi-Fry, University of Alberta
Coauthors: Yasmine Majchrzak, Michael Peers, Liam Horne, Emily Studd, Ally Menzies, Alec Robitaille, Emily Monk, Nicole Humeniuk, Alice Kenney, Charles Krebs, Rudy Boonstra, Dennis Murray, Stan Boutin

Abstract: Animals exhibit home range space use whereby their activities are restricted to an area that remains consistent over space, theorized to be a more energetically efficient method for resource acquisition than random searching. Animal home range size tends to decrease with population density, but this trend is unintuitive and lacks a mechanism. If home range size is largely a function of energetic requirements, we would predict that home range size should positively correlate with conspecific density due to the decrease in per capita resource availability (resources per individual). The negative trend between home range size and population density could be a result of the frequent confound between population density and resource density (resources per area). Over six winters, we utilized the snowshoe hare 10-year population cycle and individual-level food add experiments as a case study to assess if the mechanism of the relationship between home range size and population density is related to resource density or per capita resource availability. Like other studies, we found a negative relationship between home range size and hare density, even in individuals with constant supplemental food, suggesting that resource density is not the underlying driver of this relationship. We hypothesize that the negative association between home range size and population density is caused by non-resource related factors, potentially being the cognitive effort required when foraging amongst many neighbors.
Biosketch: Juliana has a BSc from McGill University and a MSc from Memorial University. She is currently a PhD Candidate and Vanier Scholar in the Department of Biological Sciences at the University of Alberta. She is supervised by Dr. Stan Boutin.

1425-1440: Partial migration driven by wildfire influences reproductive success of a generalist herbivore

Lisa Koetke, University of Northern British Columbia
Coauthors: Dexter P. Hodder, Chris J. Johnson

Abstract: Anthropogenic disturbances and environmental change have resulted in the loss of migratory behaviors, an important life-history strategy of many species. Identifying the mechanisms and ecological benefits of migratory behavior are important for conservation and management decision-making. We explored the drivers of partial migration in moose (Alces americanus) populations occupying landscapes characterized by anthropogenic and natural disturbances. We quantified differences in ecological experience and four aspects of fitness that may be influenced by the choice to migrate. Wildfire disturbance in the winter range was the primary driver of migration. Most migratory moose experienced less wildfire disturbance in their summer range than their winter range. However, migration was less effective at reducing the amount of wildfire disturbance in the summer range after two exceptionally severe wildfire seasons. Moose were more likely to become pregnant and be parturient if they migrated longer distances in the spring of the previous year. Neonates of moose were more likely to survive if their mother employed one of two migratory strategies: a longer migration or a shorter and slower migration ending with late arrival in their summer range. Adult residents were more likely to die of health-related causes while migrants were more likely to die from predation. Increased wildfire severity could reduce the benefits of migration, which could lead to the loss of migratory behaviors and population declines through decreased rate of pregnancy and neonate survival. Our results highlight the potential for climate change to contribute to the loss of migratory behaviors with implications for population decline.
Biosketch: Lisa Koetke is a PhD candidate at the University of Northern British Columbia. Her dissertation is part of the BC moose research project and focuses on the behavioral and distributional responses of moose to industrial forest practices.

1440-1455: Sharing is caring: The evolution of communal roosting behaviour in birds
Sandra Cuadros, University of British Columbia Okanagan
Coauthors: Michael Noonan
Abstract: Communal roosting- aggregations of unrelated individuals, is a behaviour that can be seen in many taxa including mammals, fish and birds. It has been hypothesized that the emergence of communal roosting can be explained through an increase in foraging efficiency as naïve individuals acquire information on the location of feeding areas from more experienced individuals at the roost (i.e., the Information Center Hypothesis). To the date, however, this idea has not been tested on a broad scale in birds, and support is still mixed. Here, we apply the comparative method via Bayesian phylogenetic regression models to test the importance of biological and physiological variables as evolutionary drivers of communal roosting behaviour using a dataset of traits for more than 170 species from 11 families of core land birds that we compiled from online databases or from scientific literature. Our modelling revealed a positive correlation between the probability of communal roosting behaviour and both Hand-wing Index and body mass, suggesting that large, vagile birds are more predisposed to evolve communal roosting. We also show that trophic guild had a significant effect on the probability of communal roosting behaviour, with omnivores and scavengers being the most likely feeding guilds to roost communally. Collectively, these results suggest that in birds, communal roosting might have evolved as a behavioural mechanism to increase food security and foraging efficiency, with roost sites acting as valuable information hubs. Hence, roost sites are likely a key component in the conservation of highly social bird species.
Biosketch: Peruvian researcher studying a PhD student at UBCO. Her background is in ornithology, mostly endangered species. The current focus of her work is on the ecology and conservation of raptors and vultures, especially movement ecology, habitat use, and human-wildlife interactions.

1455-1500: Comparing the avoidance behavior of birds in response to UV absorbent and reflective vest colour.
Paige Asplund, Lethbridge College
Coauthors: Lethbridge College and Bear Tracks Environmental services
Abstract: While previous studies have determined that observer vest colouration influences a bird's avoidance of them, none have incorporated the ultraviolet spectrum. This study tested if an observer wearing a UV reflective vest would influence a bird's flight initiation distance (FID) compared to a UV absorbent vest. Two vests were constructed out of cardboard and painted black, one with UV reflective paint and the other with UV absorbent paint. The observer walked transects wearing each vest type through cottonwood stands of similar structure within Lethbridge AB. When a bird was spotted, its FID was recorded along with the weather conditions, time, species and anything noteworthy about the encounter. The Common grackle (Quiscalus quiscula), American robin (Turdus migratorius), and European starling (Sturnus vulgaris) were chosen to focus on based on their prevalence in the area. The FIDs were compiled and analyzed using a simple T-test for each species separately. The data analysis and compilation will continue until March 2024. This information is important in the design of more valid research in future studies. Observer clothing colour can cause bias in studies of richness and abundance. The results of this project will determine if ultraviolet colours have the potential to further cause sway in such research.
Biosketch: Paige Asplund is a fourth-year student at Lethbridge College working towards her Bachelor of Science in Ecosystem Management. This study is being completed independently through the Senior Project course at the college.

Wildlife Trade

1500-1505: Sizing them up? Sure, but how? Lack of consistency in how body size is measured leads to different predictions of the use of mammals in the wildlife trade
Ivana Schoepf, University of Alberta
Coauthors: Jocelyn Kublik, Chi-Hang Yuen
Abstract: The trade in wildlife and its parts is one of the major drivers of biodiversity loss in the Anthropocene. The wildlife trade is an umbrella term used to describe a set of human activities associated with the harvesting of wild species from their natural environment. Some of these activities include the capture of live specimens for pet keeping, sport hunting, and the collection of body parts/whole animals for food consumption and medicine. Because of its global and pervasive nature, transcending socio-economic, political, and cultural boundaries, the wildlife trade has received considerable attention, with several studies investigating the links between its uses and certain desirable species traits driving it. As large-bodied species are also often in high demand, one of the most researched desirable traits is body size. Thought what body size represents is sometimes unclear in the literature, and this term is used to describe body mass, body length, body condition, or a combination of these measures. However, while related, these measures are not interchangeable and using them as such may yield to biased estimates. Here we present the results of a study we conducted in mammals aimed at testing whether using measures of body size based on length, mass, or condition (calculated using popular scaling indices) would similarly predict their uses in the wildlife trade. Our findings show that these measures do not consistently predict the use of mammals in the wildlife trade and call for a more precise use of how body size is measured in this context.
Biosketch: Ivana is an Assistant Professor in Biology at the University of Alberta. Ivana is a broadly-trained evolutionary biologist. Ivana's research focuses on adaptive phenotypic plasticity in individuals experiencing environmental, parasitic, and anthropogenic challenges. Her research is multi-disciplinary, tackling questions at the proximate and ultimate levels, using field experiments in natural populations.

APPENDIX C: SUNDAY AM

Session 4A

Habitat Use

1000-1015: Impact of placer gold mining on Wolverines (Nätra), Lynx (Ninju), and Marten (Tsŭk) in the Klondike Gold Fields, Yukon
Zachary Fogel, University of Alberta
Coauthors: Karlie Knight, Piia Kukka, Paul Boyce, Alice McCulley, Thomas Jung, Fiona Schmiegelow
Abstract: Nähträ/Wolverines are threatened by human disturbance across their circumpolar range. In central Yukon, Tr'ondëk Hwëch'in First Nation's (THFN) stewardship of the land and its inhabitants has been interrupted by industrial mining. Wolverines are bioculturally significant for

THFN, who have identified mining as a threat to wolverines and other furbearers in their Traditional Territory. Academic research indicates that wolverines are affected by industrial activity but little research has focused on mining. In response to its high biodiversity and current changing landscape, Yukon South Beringia, which overlaps the THFN Traditional Territory, has been identified as a Priority Place. The Priority Place Initiative is a commitment to shift toward collaborative management that explicitly includes Indigenous Peoples and Traditional Knowledge. To meet this commitment, we are partnering to quantify the relationship between landscape condition and wolverine abundance and distribution. We have deployed trail cameras and autonomous sound recording units (ARUs) across a gradient of disturbances. The ARUs will record the industrial soundscape. We will estimate wolverine abundance using camera data, quantify industrial activity using ARU data and aerial imagery, and evaluate the relationship between wolverine abundance and industrial activity. Our results will inform and support THFN's stewardship responsibilities, regional land use planning and environmental assessments, and inform wider conservation efforts for wolverines and other furbearers. We are currently processing data, but we expect that furbearer population density will be lower in areas with more intensive industrial activity.
Biosketch: Zach is a graduate student at University of Alberta, based at Yukon University in Whitehorse, Yukon. He completed his BSc at the University of Michigan in Ecology and Evolutionary Biology, and his research experience includes large carnivore monitoring, population estimates, and database management.

1015-1030: Predation and forage affect the competition potential between reintroduced Bison and ungulates in Banff National Park

Jonathan Farr, University of Montana
Coauthors: Karsten Heuer, Jesse Whittington, Evelyn Merrill, Mark Hebblewhite

Abstract: Trophic rewilding focuses on restoring keystone species to fill an ecological niche that was left empty by their loss. However, rewilding rarely considers the potential for interspecific competition resulting from reintroducing large herbivores to ecosystems where, during their absence, other species may have adapted to fill their niche. In 2017, Parks Canada reintroduced plains bison (Bison bison) to the remote backcountry of Banff National Park. Ungulate habitat with low predation risk and high-quality forage is limited in Rocky Mountain ecosystems, especially during winter months, leading to potential for bison to compete seasonally with elk (Cervus canadensis) or bighorn sheep (Ovis canadensis). I used GPS collar data from Parks Canada and the Ya Ha Tinda long-term elk research project to test the hypothesis that forage requirements and predation avoidance will mediate seasonal niche overlap between bison, elk, and bighorn sheep. Using a behavioural-state informed step selection analysis, I evaluated seasonal foraging arena selection, and simulated utilization distributions to quantify overlap in potential space use. Forage biomass and predation risk affected ungulates differently across seasons, and niche partitioning was lowest during the winter. Bison densities in Banff are currently low, and evaluating the competition potential further informs proactive management of ungulate numbers, distribution, and habitat to achieve ecological and cultural management goals. Banff National Park and the adjacent Ya Ha Tinda grassland contain some of the highest quality ungulate habitat in the Canadian Rockies, and rewilding these ecosystems with competition in mind will help to ensure their ecological integrity for future generations.
Biosketch: Jonathan Farr completed his undergraduate degree in Biology at the University of Alberta in 2021 and is currently a graduate student at the University of Montana. When Jonathan is not studying the ecology of reintroduced bison in Banff National Park, he enjoys Nordic skiing, backpacking, and playing the piano.

1030-1045: Using autonomous recording units to determine the habitat use and migration phenology of Alberta's nesting Sandhill Cranes.

Wyatt Villetard, University of Alberta
Coauthors: Erin Bayne and Mark S. Boyce

Abstract: In 2020 the province of Alberta approved a sandhill crane (Antigone canadensis) hunting season. But, to date, no projects conducted have focused on Alberta's nesting population, creating a provincial knowledge gap surrounding the species. With Alberta having a large migratory population, but a relatively small nesting population, this knowledge gap has raised concerns that small local nesting populations may unknowingly be at risk of local extirpation. By accessing autonomous recording units (ARUs) on WildTrax, distributed by the Alberta Biodiversity Monitoring Institute and the Bioacoustic Unit, we hope to shrink this knowledge gap by determining province-wide habitat use of nesting sandhill cranes under an occupancy framework, while also determining spring migration phenology by comparing positive crane detections across space and time. We hope this study can firstly act as a framework for other ARU projects in western Canada looking to monitor sandhill or whooping cranes (Grus americana) and hopefully assist with the development of a more complete picture of the movement ecology of sandhill cranes across Canada's portion of the central flyway. Secondly, we hope our efforts can assist Alberta's broader conservation community and enable us to answer important ecological questions surrounding sandhill crane movement and primary habitat in the province, while providing information to inform future management and assist with the regulation of a responsible sandhill crane hunt.

Biosketch: Wyatt Villetard is a graduate student in the Boyce Lab at the University of Alberta currently working on sandhill crane movement ecology in Alberta. Outside of academia you will most likely find Wyatt partaking in team sports with his friends or enjoying Alberta's beautiful landscapes and ecosystems.

1045-1100: Owls Well That Ends Well, Housing the Barred Owl (Strix varia) in Alberta, Canada

Lisa Takats Priestley, STRIX Ecological Consulting
Coauthors: Chuck Priestley, Laura Trout, Wendy Crosina

Abstract: The Barred Owl is a cavity nester associated with older mixedwood forest, a year-round resident, and has been selected as an indicator species by Alberta Environment and Protected Areas (AEPA). A project was initiated by West Fraser and Weyerhaeuser forest companies, and STRIX Ecological Consulting in managed forests around Hinton, Edson, Drayton Valley, Rocky Mountain House, Grande Prairie, and Slave Lake. The goals were to determine Barred Owl occupancy and nesting success, collect habitat information in Barred Owl territories, and test a model that has been developed by AEPA. Since 2021, 37 Barred Owls (24 female/13 male) have been fitted with Lotek PinPoint VHF 240 satellite transmitters. Fifteen nests have been found, 11 in balsam poplar natural cavities and four in trembling aspen (three natural cavity and one broken top bowl). Twenty-eight owls have been carrying transmitters for over a year and have over 700 locations each. Mean female breeding season home range was smaller than males, and winter ranges were larger for both sexes. Some Barred Owls made winter forays out of territory in the winter. One owl moved over 20 km, assumed a winter territory, and moved back to the breeding territory the following year. Barred Owls require an intact forest stand around their nest sites, but home ranges have forested and open habitats (natural or anthropogenic disturbance). Satellite and VHF technology offer great insights into the movements of Barred Owls, and data can be downloaded remotely reducing researcher intrusion.

Biosketch: Lisa has been working on owls for over 30 years. She completed her Masters on Barred Owls, and is excited to be working in some of the same forest stands that still contain Barred Owls. Now that's territory longevity.

1100-1115: Disturbance-driven spatiotemporal trends of a threatened songbird in Alberta
Taylor Hart, University of Alberta
Coauthors: Dr. Erin Bayne, Dr. Lionel Leston, Dr. Alberto De Rosa
Abstract: The Black-throated Green Warbler (Setophaga virens) is an old-growth interior forest specialist listed as a species of special concern in Alberta, due to habitat loss and degradation on their breeding grounds in the boreal forest. To assess the long-term spatiotemporal patterns in response to changing forest landscapes in Alberta, we revisited past monitoring locations across the province, selected for their habitat suitability using the 'cure4insects' package in R. Our analysis integrates human point count and Autonomous Recording Unit (ARU) data, applying dynamic occupancy models to investigate the impact of human footprint and patch metrics. These year-varying metrics include the extent and proximity to harvested areas, seismic lines, pipelines, roads, and industrial facilities, as well as habitat patch size, shape, and isolation, which were quantified using a species-centered perspective and the 'landscapemetrics' package. Our methodology provides an assessment of site-specific turnover rates and long-term persistence, highlighting 'source' sites that merit greater conservation efforts compared to locations with higher turnover. The insights gained from this research will equip forest managers with strategic recommendations on habitat management to aid in the long-term preservation of the Black-throated Green Warbler, and other such species reliant on Alberta's old-growth forests.
Biosketch: Taylor is a MSc student in the Bayne Lab at the University of Alberta. Her research focuses on the impacts of human disturbance on Black-throated Green Warblers in the boreal forest of Alberta.

1115-1130: Effects of temperature on mammals' movement and habitat selection in British Columbia, Canada
Stefano Mezzini, University of British Columbia Okanagan
Coauthors: Michael J. Noonan
Abstract: Anthropogenic changes in climate during the last two centuries have exposed wildlife in BC to increasingly warm winters and hot summers. Since large mammals in the province already contend with numerous other human-induced stressors, understanding the effects of climate change on mammalian movement and habitat use is essential for developing conservation strategies with long-term population viability. To address this need, we estimated the effects of temperature on the movement of six BC mammal species (Canis lupus, Cervus elaphus, Oreamnos americanus, Puma concolor, Rangifer tarandus, Ursus arctos horribilis) to understand how changes in climate through the current century might affect when, how much, and where mammals will move. Using GPS location data, continuous-time movement models, and hierarchical generalized additive models, we estimated how individuals' movement frequency, speed, and habitat selection changed in response to temperature. We then paired these relationships with ClimateNA's spatially explicit climate change projections to predict behavioral responses to the different climate change scenarios. While the models suggested most species will move less frequently at higher temperatures, the changes in mammals' movement frequency, speed, and habitat selection were non-linear, and there were no strong common trends between species. Consequently, we cannot assume the environments we are currently protecting and restoring will be equally valuable to species in the future, and conservation strategies should depend on the species of interest, future

changes in habitats, and how temperature will affect the species' habitat selection. These results will help inform long-term conservation and proactive management, including designing conservation areas.
Biosketch: Stefano is a PhD candidate at the University of British Columbia Okanagan. His thesis is on the effects of environmental change and stochasticity on mammalian movement with a focus on the effects of resource stochasticity on mammals' space-use requirements.

1130-1135: Rapid-Fire Response Needed: An Analysis of the Columbian Fisher Population in British Columbia
Alexia Constantinou, University of Victoria
Coauthors: Dr. Joanna Burgar, Dr. Jason Fisher, Francis Johnson
Abstract: Fishers (Pekania pennanti) in central British Columbia are declining at a rapid pace and are predicted to become extinct in the next decade. These estimates of decline are built on habitat values and rates of forest harvesting and trapping, but greater certainty requires that current models are validated with fisher detection data. To obtain these we are using camera traps: multi-species, non-invasive monitoring tools that allow us to monitor not only fishers, but their prey and their weasel-family relatives. We ask where these species occur on the landscape (and more importantly, are missing), in what habitat types they occur, and what habitat stewardship methods can be implemented, led by First Nations leaders to enhance fisher habitat. Thus far, collaborations have been built with small-scale, local forest harvesting operations to create more useful habitat for fishers as well as their prey, but there are no regulations from government for these adjustments. We hope to detect fishers across central BC in collaboration with Esk'etemc, T'exelc and Stwecem'c Xget'tem Nations, compare these detections against the habitat models previously created, and detect fisher relatives and their prey in the same area. We also ask if current cultural and prescribed burns can facilitate enhanced habitat for these species, especially as fishers require coarse woody debris for pursuing prey and large diameter, mature trees for denning. Pursuing applied habitat treatment with the Nations' stewardship teams will allow for a more holistic, multi-knowledge system approach to conserving fishers and the ecosystem to which they belong.
Biosketch: Alexia has just begun her PhD at the University of Victoria, sponsored by Alkali Resource Management. She graduated from UBC with her MSc in Forestry in the Wildlife Coexistence Lab. Her research focuses on British Columbia's southern interior fisher population, its decline, and ways to improve fisher habitat by working with First Nations, fire, and industry.

1135-1150: White-tailed deer response to forest harvesting in west-central Alberta
Laura Finnegan, fRI Research
Coauthors: Leonie Brown, Tracy McKay
Abstract: White-tailed deer populations are increasing across the boreal forest, driven by a combination of climate and landscape change. These shifts in deer populations are altering predator prey-dynamics and disease risk for boreal wildlife species, including threatened species like caribou. Although forestry is one of the primary drivers of landscape change across the boreal forest, little is known about deer response to forest harvesting and silviculture practices. We used GPS location data collected from deer (n = 23) during 2019-2022 to assess response to forestry at three spatial scales: 1) landscape (3rd order RSF), 2) fine-scale movements (SSF), and 3) within harvest blocks. At the landscape and fine scales deer generally selected areas closer to blocks <25 years old, although responses varied among seasons and with the habitat surrounding the harvest block. At the block scale, deer generally selected intermediate-aged larger blocks that were planted

more recently and chemically tended less recently. Females also selected blocks according to the specific silviculture practices applied, including the area of site preparation and planting densities of lodgepole pine and white spruce. Sustainable forest harvesting requires detailed information on wildlife response to forestry at landscape and fine-scales, including information on wildlife response to the altered forage availability resulting from silviculture practices. Our study links deer habitat use to forestry and silviculture practices, providing practical information that may be used to inform sustainable landscape management to benefit boreal species, including threatened caribou.
Biosketch: Laura Finnegan is the lead researcher of the Caribou Program at fRI Research in Hinton. She has a PhD from Trinity College, Dublin, and did her postdoctoral research at Trent University, Ontario. For the past decade the Caribou Program team has focused on applied research relative to caribou conservation including linear feature restoration and assessing the links between habitat disturbance caribou, other ungulates, and predators.

1150-1205: Long-term Variability and Drivers of Ungulate Winter Range Grassland Productivity
Sarah Straughan, University of Montana
Coauthors: Jonathan Farr, Mark Hebblewhite, Benjamin Larue, Evelyn H. Merrill, Tara K. Meyer, Connor Meyer, Trevor Weeks
Abstract: Grasslands provide critical forage for ungulate populations across the world. In the Canadian Rocky Mountains, grassland winter ranges are vital for the survival of large herbivores including elk (Cervus canadensis). However, the ability of grassland winter ranges to support ungulates may be in peril from land use changes, conifer and shrub encroachment, fire regime shifts, modified grazing regimes, and climate change. Here, we leverage twenty years of research to evaluate variability and drivers of grassland forage productivity (biomass). Our study area was the Ya Ha Tinda Ranch (YHT), a critical winter range for partially migratory elk population. We sampled ~ 61 repeat vegetation plots at peak forage biomass (late July to early August) on YHT from 2005 - 2023. To understand the drivers of grassland biomass, we collected data on precipitation, temperature, winter severity, spring timing and duration, fire history data, land cover, and soils. Additionally, we evaluated annual trends in elk grazing density by estimating elk utilization distributions. Finally, we used structural equation modeling to explore both the direct and indirect effects of our covariates and understand which factors drive peak forage biomass on the Ya Ha Tinda ranch. Preliminary results using linear modeling and AIC selection find a positive linear effect of precipitation and a non-linear effect of elk-use where intermediate levels of grazing facilitated the highest levels of biomass. Our results provide a comprehensive understanding of the ecological drivers shaping grassland biomass dynamics at YHT, contributing valuable insights for management and conservation in similar landscapes.
Biosketch: Sarah Straughan is a research associate in the Hebblewhite lab at the University of Montana and works on the Ya Ha Tinda Elk Long-Term Monitoring Project. She completed her B.S. in Wildlife Biology at Texas State University. Sarah has enjoyed working on a wide array of projects from managing aquatic invasive species in Texas to studying the life history of songbirds around the world.

Session 4B
Management

1000-1015: Integrating science with stakeholder and agency values: Insights from structured decision-making in wildlife management
Anne Hubbs, Environment and Protected Areas
Coauthors: Courtney Hughes
Abstract: Resource managers must make complex decisions involving multiple objectives, competing stakeholder values, and varying degrees of uncertainty. Traditional methods of decision-making fail to adequately engage stakeholders and/or incorporate scientific evidence, and typically focus solely on management strategies without first defining the objectives and decision required. As a result, there has been growing criticism from stakeholders and the science community of decisions made by management agencies using traditional approaches. Structured decision-making (SDM) is a decision aiding framework that is transparent, value-focused, and informed by scientific evidence. It uses a systematic and oftentimes collaborative process to engage managers, stakeholders, and researchers to address uncertainty and recommend management actions that best meet agency and stakeholder objectives. In this presentation, we will discuss the SDM process, including its advantages and challenges, using real-life case studies of resource management decisions in Alberta and elsewhere. We will also highlight the suite of SDM tools that can aid decision-makers in determining optimal management strategies, assessing trade-offs, and prioritizing data management needs. Lastly, we will provide recommendations for helping to ensure that wildlife management decisions are value-focused and informed by science, and ultimately integrated into policy and agency actions.
Biosketch: Anne has been a Senior Wildlife Biologist for the Alberta government for over 20 years, engaging on issues from cumulative effects modeling to remote cameras and disease management. She was the Big Game Specialist for the province and has frequently applied structured decision-making to her past and present work.

1015-1030: Conservation Breeding to Enable Recovery of Caribou in Jasper National Park
Lalenia Neufeld, Parks Canada - Jasper National Park
Coauthors: Jean-François Bisaillon, Joshua Kummerfield, Leanna Parker, Karly Savoy, Madeline Trottier, Jessica Theoret
Abstract: Jasper's southern mountain caribou subpopulations, part of the Jasper/Banff Local Population Unit, have been at or below quasi-extinction levels for many years, primarily due to decades-ago management actions that led to high wolf density. Only two of the four subpopulation ranges are still occupied, with the Banff and Maligne subpopulations declared extirpated as of 2009 and 2018, respectively. Despite the continued improvement in ecological conditions for caribou survival and ongoing protection of critical habitat and individuals under the Species at Risk Act and the National Parks Act, current subpopulations are too small to recover from declines experienced in previous decades. While a few options for direct population recovery exist, including translocations and maternity penning, the lack of source animals for both strategies will be insufficient to substantially augment herds to desired recovery levels, or allow for reintroduction of caribou into extirpated ranges. Conservation breeding is another strategy that has led to successful recovery of species at risk across the world and, after careful analysis, is the only option remaining to recover small caribou subpopulations in Jasper. Construction of a conservation breeding centre

for caribou is underway in Jasper National Park, with aim to build a captive caribou herd and recover southern mountain caribou in the Jasper/Banff Local Population Unit.
Biosketch: Layla is a biologist for the caribou program in Jasper National Park, and since 2006 has been responsible for coordinating, identifying, and reporting on caribou research and monitoring priorities.

1030-1045: Looking at the big picture: Assessing the impacts of landscape development disturbance in and outside of the Canadian Mountain National Parks on wildlife
Rebecca Smith, University of Victoria
Coauthors: Dr. Nancy Shackelford, Dr. Andrew F. Barnas, Dr. Jason T. Fisher
Abstract: Protected areas (PAs) are one of the key approaches to conserve wildlife amid prolific landscape alteration and serve particular importance to wide-ranging wildlife species. Unfortunately, many species face declines within PA boundaries, so the effectiveness of PAs in safeguarding wildlife populations often remains unclear. Since PAs are intrinsically linked to wider surrounding context, anthropogenic pressures outside of PAs can be sources of direct and indirect mortality for mammals using habitat that spans PA boundaries. We examined the influences of landscape development disturbances in and outside of PAs on the occurrence of ten wildlife species within PAs: black bear, coyote, cougar, grizzly bear, lynx, moose, mule deer, white-tailed deer, wolf, and wolverine. Species occurrences were sampled using systematically deployed wildlife camera traps across Canada's Mountain National Parks and we used generalized linear mixed models to relate these occurrences to distinct anthropogenic development disturbances in and outside of the park boundaries. Nine of the ten species occurrences analyzed were found to be best predicted by models that comprised both in- and outside-park disturbances, demonstrating that PAs do not offer the full protection they are mandated to conserve – especially for large mobile mammals. These nine species also occurred more frequently in interior regions of the parks, as distance to external boundaries and associated pressures increased. Thus, to ensure wildlife conservation benefits are maximized moving forward, we suggest that PAs be considered within the context of the wider ecosystem and surrounding unprotected landscapes.
Biosketch: Rebecca Smith is a master's student at the University of Victoria under the co-supervision of Dr. Jason T. Fisher and Dr. Nancy Shackelford. Her research interests focus on understanding the impacts of human disturbances on wildlife, and examining the methods by which such conservation challenges can be solved.

1045-1100: How Best to Proceed with Western North American Woodland Caribou: Get Back to Basics?
Bob Stewart, Independent Researcher
Coauthors: Erika Almasi-Klausz
Abstract: Maintaining an umbilical link between wildlife management and research is essential to ensure that applied research fills critical knowledge gaps to foster the development of socially acceptable and effective management treatments.
A detailed review of the 50+ year log of literature for threatened and endangered populations of boreal, mountain and northern woodland caribou in western North America, frames caribou as victims of complex ecological consequences of persistent, landscape scale, anthropogenic and natural disturbances resulting in an increase in the extent of early successional forest areas (favoured by moose/elk/deer) expensed against a reduction of the mature forest communities and peatlands that caribou have evolved to exploit over the last million years. The increased range overlap with these species has also exposed caribou to higher rates of encounters with their

predators, primarily wolves, potentially contributing to higher rates of additive mortality (i.e., Theory of Apparent Competition – AC). This reality may ultimately be expressed by caribou population declines, including the extirpation of some fragile subpopulations. The uptake of the AC theory and the almost singular identity of wolves as the predator of concern has biased the research/management agenda for decades leading to erroneous assumptions that wolf reduction programs could, in themselves, mitigate the effects of range disturbances, that are in reality, an indelible part of our economic past and future. This presentation advances the humble imperative that we rethink cause-and-effect predator management approaches with offers of novel, minimally invasive, affordable and non-lethal solutions that may contribute to successful and sustainable outcomes.
Biosketch: Bob is a biologist with 50 years experience in research and management dating back to the early 1970's specializing in moose, bears and large-scale forest management planning. He has published several popular articles advancing novel approaches to the management of woodland caribou.

Community Ecology

1100-1115: Simulated impacts of black bear predation on neonatal loss in boreal caribou
Liam Horne, University of Alberta
Coauthors: Craig DeMars, Melanie Dickie, Tal Avgar, Rob Serrouya, Stan Boutin
Abstract: Boreal caribou (Rangifer tarandus caribou) populations are declining across their range and the direct cause is predation. Black bears (Ursus americanus) can be significant predators of caribou neonates, and black bear density in the western boreal forest is estimated to be nine times higher than neonate density. At these densities, only a small proportion of bears could kill calves without extirpating the population, but the interactive effect of bear density and bear-neonate spatial overlap on predation rates is rarely addressed. Using a simulation parametrized by empirical black bear and caribou data, we assessed i) how bear movement, habitat use, and density interact to influence predation on caribou neonates, and ii) whether caribou spatially separate from bears during calving to reduce predation risk. Simulated neonates were placed in either high-quality calving habitat or throughout caribou range and were “killed” when movement paths from GPS-collared bears came within a specified detection distance of stationary neonates ≤2 weeks old. Simulations indicated low kill rates by individual bears can cause substantial neonate mortality when scaled to either the average or minimum bear density estimate for our study area. Further, caribou selection of calving habitat within caribou range provided sufficient spatial separation from bears to reduce predation risk. Our results highlight that density estimates are necessary to understand the importance of incidental predation from the prey perspective. We suggest that management strategies that promote spatial separation between bears and caribou during calving will be more effective at improving neonate survival than reducing bear density.
Biosketch: Liam Horne is a M.Sc. student in Stan Boutin's lab at the University of Alberta.

1115-1120: Factors that affect the genetic diversity and population structure of coastal wolves in Northern British Columbia
Michelle Hoang, University of Alberta
Coauthors: Ramona Maraj, Gretchen Roffler, Shelley Marshall, Mark Boyce

Abstract: Functional connectivity provides insight into population structuring and gene flow within and among populations of organisms. Wolves that inhabit coastal British Columbia and Southeast Alaska are considered genetically, morphologically, and ecologically distinct from their mainland conspecifics. The current literature and available data on genetic population structuring for coastal wolves in BC is limited and there is a gap in our knowledge regarding the genetic variation and gene flow among populations, particularly across the international border. This project's main objectives are to: 1) characterize the genetic diversity and population structuring of coastal wolves in northern BC; 2) examine landscape connectivity between subpopulations; and 3) identify how geographical features impact gene flow. To accomplish these goals, I have collected over 500 genetic samples, consisting of hair and scat, which will be used for DNA extraction and genotyping by Wildlife Genetics International. I will use the program STRUCTURE to identify subpopulation differentiation. Then, using the software package Omniscape, I will use habitat attribute layers such as land cover, digital elevation models, hydrology layers, and prevailing ocean currents to model the terrestrial landscape connectivity and connectivity between islands and the mainland. Identifying corridors that are valuable for gene flow will provide a planning tool for recreation and urban planning, forestry, and other industrial activities. This is particularly important as forestry practices were identified as having a large impact on coastal wolf populations in recent petitions to list the subspecies as threatened or endangered under the Endangered Species Act in the U.S.
Biosketch: Michelle is a MSc student at the University of Alberta under the supervision of Dr. Mark Boyce. She is studying the genetics of coastal wolves in Northern British Columbia and spent her field season immersed in the pristine and rugged landscapes of the northern coast. Beyond academia, Michelle is an avid outdoor enthusiast and passionate wildlife photographer.

1120-1125: Maximum Entropy (MaxEnt) Model for Milkweed (Asclepias spp.) in the Mixedgrass Natural Subregion of Alberta

Ednna Stobschinski, Lethbridge College

Abstract: The monarch butterfly (Danaus plexippus) is a species of lepidopteran that has been recently re-classified as 'Endangered' under Canada's Species At Risk Act (SARA). The monarch is a milkweed (Asclepias spp.) obligate, specifically at their larval stage. Critical habitat for the monarch remains on the decline throughout its range, including Canada's grasslands, putting their survival at stake. A variety of milkweed species occur in Alberta; within the Mixedgrass Natural Subregion, both showy milkweed (Asclepias speciosa) and green milkweed (Asclepias viridifolia viridifolia) can be found. However, research that correlates critical monarch breeding habitat in grassland ecosystems remains scarce. The use of predictive models, such as the Maximum Entropy (MaxEnt) model, can be an effective tool in the identification of suitable habitats for the conservation of species at risk. The objectives of the study were to develop a Maximum Entropy (MaxEnt) model using presence-only data for the distribution of milkweed in the Mixedgrass Natural Subregion of Alberta. Model outputs were to be used in identifying suitable monarch breeding habitat in the region, facilitating the prioritization of conservation lands. Methods: Occurrence-only data for milkweed, obtained from the iNaturalist database (https://inaturalist.ca/), along with temporal and spatial parameters are to be used to develop the MaxEnt model. Goodness-of-fit of the final model was determined using AIC and ROC for further GIS mapping. Results: Model creation and evaluation remain ongoing until February 2024.
Biosketch: Ednna Stobschinski is an international student and aspiring ecologist from Mexico, currently taking the B.Sc. in Ecosystem Management at Lethbridge College, AB. She also serves as President of the Lethbridge College Chapter of The Wildlife Society (LCCTWS) and as interim Chair of the ACTWS EDI Committee.

1125-1130: Evolving prey behavioural responses to predators: Using individual based artificial neural network genetic algorithms to investigate caribou-wolf interactions

Andrew Barnas, University of Victoria
Coauthors: Christina Semeniuk, Jason Fisher

Abstract: Anthropogenic landscape change in Canada's Oil Sands regions has increased predation of caribou by wolves. Predicting responses of vulnerable prey populations to continued landscape change and altered predator regimes is difficult but may benefit from simulation approaches examining underlying mechanisms of population decline. Caribou populations evolved under different predation regimes prior to industrial resource extraction, so the evolutionary context of evolved behavioural responses is critical to understand. One approach is individual based models which incorporate artificial neural networks (ANNs) combined with genetic algorithms, which offer more flexible approaches to identifying fitness-maximizing behaviours by more realistically representing evolution of behaviours. These models allow virtual agents to evolve optimal strategies under natural historic conditions, and then examine responses of evolved strategies to novel predator regimes. We simulated populations of caribou and wolves, where caribou are equipped with ANNs to sense characteristics of wolf hunting patterns, and fitness-maximizing behavioural strategies are passed on to the next generation via genetic algorithms. Caribou face trade-offs between remaining in habitat patches to maximize energy intake or to flee their habitat in response to wolf presence. Preliminary results indicate caribou with ANNs have a greater fitness than those without. Simulated prey populations converge on optimal anti-predator behaviours, but these are sensitive to predation pressure and immigration rates. Future model development will examine changing predator characteristics via altered landscapes, and exposing evolved caribou responses to these novel environments.

Biosketch: Dr. Andrew Barnas is a postdoctoral fellow at the University of Victoria.

1130-1135: Indigenous-led research on Traditional Territories highlights the impacts of forestry harvest practices on culturally important plants

Kathleen Carroll, University of Victoria
Coauthors: Fabian Grey, Nicholas Anderson, Nelson Anderson, Sydney L. Goward, Jason T. Fisher

Abstract: Indigenous Knowledge and governance are critical to successful conservation and Indigenous Peoples' ability to live sustainably on their lands. However, various industrial land-use practices impact the conservation value and traditional resources these lands provide. Here, we evaluated the effects of harvest, glyphosate application, and fire on 51 edible and medicinal plant species identified by traditional knowledge of Indigenous Peoples in the western boreal forest of Canada, a landscape of rapid industrialized landscape change. Using linear models, machine learning methods, and vegetation data collected between 2007 and 2020, we found that the richness and abundance of edible and medicinal plant species were best explained by glyphosate application and harvest. Despite our models' indication that species richness and abundance were higher in harvested and treated study sites, detailed qualitative data based on Indigenous Knowledge suggests these forestry practices negatively impacted Indigenous Peoples' ability to use traditional plants. Importantly, plants in areas treated with glyphosate were unsuitable for human consumption and exhibited abnormal colour and flavour presentations. Concerns over access to traditional resources are increasingly important as industrial impacts continue to expand globally. Thus, we hope that this Indigenous-led study design leveraging both quantitative and qualitative

data can result in successful partnerships that better reflect the environmental concerns of Indigenous Peoples.
Biosketch: Kathleen Carroll is a Postdoctoral Research Fellow in the ACME Lab at the University of Victoria.

1135-1150: Connecting Plant, Insect, and Bird Biodiversity on Native Grasslands in Saskatchewan
John Wilmshurst, Canadian Wildlife Federation
Coauthors: Tom Harrison, Diego Steinaker, Behnam Motamedinia, Kiel Drake, Birds Canada
Abstract: Insects are a critical link between plant communities and breeding birds in Canada's native grasslands. Typical of plant communities everywhere, the mosaic of plant communities that grow in the Great Plains respond to climate, soil type, topography, and disturbance history. Grassland breeding birds are among the most threatened group of species in North America. Canada's prairies have been subject to more than a century of conversion to exotic perennial and annual crops, obscuring the ecological relationships among native grassland plants and animals. This includes fundamental relationships like those among plant communities, insects, and grassland breeding birds. Although bird nest site selection is commonly linked to vegetation structure, they are dependent on insects to feed nestlings. Insect distribution and abundance is associated with diverse grassland characteristics and local conditions, not all of which are tied to vegetation structure per se. Hence, the interactions among vegetation community composition and structure, breeding bird distribution and insect habitat selection are complex and poorly understood. We have measured this interaction on grazed native grasslands in southern Saskatchewan since 2022. Preliminary findings suggest that bird diversity is positively linked to insect abundance, but not necessarily insect diversity, with only select insect taxa important in bird diets. Insect diversity is associated with plant community richness, but abundance is sensitive to climate and disturbance. Reversing declines in grassland breeding birds will require, among other land management practices, the conservation of native grasslands as a mosaic of vegetation and insect communities.
Biosketch: John Wilmshurst manages the native grassland conservation program for the Canadian Wildlife Federation. He is an ecologist with 35 years of experience in conservation, research, communications, and protected areas management

1150-1205: Dracula's Ménagerie- Understanding carnivore community ecology in the Romanian Carpathians
Marissa Dyck, University of Victoria
Coauthors: Ruben Iosif, Barbara Promberger-Furpass, Viorel D. Popescu
Abstract: Carnivores are important top-down regulators in ecological communities and the loss of carnivore species can have devastating ecosystem effects. As such, rewilding efforts have become increasingly popular. Some top predators readily reestablish in human-dominated landscapes and exhibit potential coexistence with humans. However, the recovery of apex predators after sustained absence raises questions about their impacts on the existing community. The Romanian Carpathians represent one of the few areas in Europe that still harbor intact viable populations of carnivore species, and serve as a stronghold for populations, despite anthropogenic influences. We used data from camera traps coupled with multispecies occupancy models and structural equation models (SEM) to assess community dynamics within the carnivore guild. We evaluated seasonal patterns of occupancy and interspecific interactions between three carnivores: wolf, lynx, and wildcat using multispecies occupancy models. We found seasonal differences in the predictors of occupancy and co-occurrence. For both seasons, we found that conditional occupancy

probabilities of all three species were higher when another species was present, and for apex predators was higher with increased forest cover. We applied SEMs to camera trap data of apex predators, mesocarnivores, and prey species to evaluate the relative importance of top-down versus bottom-up influences in shaping community dynamics. Preliminary results suggest that environmental variables play a more critical role in species occurrence than interspecific interactions.
Biosketch: Postdoctoral Fellow at University of Victoria (PhD Biology Ohio University, B.S. Zoology and Environment and Natural Resources University of Wyoming)

APPENDIX D: POSTERS

1. Examining the Response of Mountain Goats to COVID-19 Induced Reductions in Helicopter Traffic in Cathedral Provincial Park
   Aimee Chhen, University of British Columbia, Okanagan
   Coauthors: Ryan Gill, Kirk Safford, Michael J. Noonan
   Abstract: While protected areas are important for species conservation, many are operating under severe human pressure, which risks compromising their conservation value. Studying the impacts of human activity in protected areas is challenging, however, as we often lack controls or baselines against which observations can be compared. Here we leveraged the COVID-19 pandemic to assess the impacts of helicopter flight training in and around Cathedral Mountain Park, in southern BC on the movement behaviour of a vulnerable population of mountain goats. Using 66,378 GPS location data from 10 mountain goats and 194 helicopter flight paths, we compared the home-range size and movement patterns before, during and after the pandemic. Movement metrics and home ranges were estimated using the continuous-time methods implemented in the ctmm R package, which allowed for robust comparisons. From our analyses, we found no evidence that helicopter traffic during the COVID-19 park closure, as compared to before and after the park closure, influenced mountain goat home-range sizes (before: 133.7 km2, during: 147.1 km2, after: 135.2 km2) nor diffusion rates (before: 77.3 hm²/day, during: 75.5 hm²/day, after: 77.0 hm²/day). However, we also found no evidence that helicopter traffic was significantly impacted by the COVID-19 induced park closure. Our findings contribute to the development of effective management strategies to support human-wildlife coexistence in shared landscapes, while maintaining the integrity of BC's protected areas.
   Biosketch: Aimee Chhen is a MSc student in the Quantitative Ecology Lab at the University of British Columbia, Okanagan. She was a marine endangered species intern with the

Government of Thailand. Chhen has a BSc in Zoology and an interest in animal behaviour and species conservation.

2. What camera traps tell us about small mammal response to linear feature disturbance in Northeastern Alberta?
Alessandro Franceschini, University of Alberta
Coauthors: Erin Bayne
Abstract: The boreal region of Alberta is undergoing increasing habitat loss and fragmentation as a consequence of anthropogenic activities related to the energy sector. In this landscape, linear features represent the most prevalent human-related disturbance. Although the impact of linear features on various species is well-documented, small mammals, crucial for ecosystem functioning and forest restoration processes, have often been overlooked. From June to August 2023, we deployed 528 cameras in the Lower Athabasca region in Alberta, across a gradient from upland to lowland forest and stratified by linear feature width. We built GLMM to analyze how habitat type, linear feature width, and Julian date explain small mammal detection for each of the nine small mammal species recorded. Our findings indicated that linear feature width was a predominant factor influencing the detection of many small mammal species. However, we observed notable variations in species-specific response to linear feature width, especially between forest-adapted and grassland-adapted species. Interestingly, habitat type didn't show a strong correlation for many species except for the Red squirrel. Julian date was significant only for shrew spp. which were almost entirely absent in June. Our research highlights the complex and varied responses of small mammal species to environmental disturbances. The differing reactions among species lead to substantial variations in species composition across different sites. Given that the majority of these small mammals are herbivores, it is crucial for future research to focus on how these changes in community composition might affect the rates of environmental recovery and footprint reclamation.
Biosketch: Alessandro's research examines how industrial activities affect small mammals' ecology and behavior in Alberta's oil sand region, using a combination of camera traps, ARUs, and GIS to analyze community patterns across linear features and well pads.

3. Best bird for buck? Evaluating the influence of a grassland restoration program on bird diversity in North Dakota.
Ashlyn Herron, University of North Dakota / Smithsonian Institution
Coauthors: Kevin J. Kading, Greg W. Link, Sandra K. Johnson, Susan N. Ellis-Felege, and Andy J. Boyce
Abstract: Temperate grasslands are the most endangered and least protected ecosystem in the world, with agricultural conversion perpetuating continued loss. As a result, grassland avifauna have experienced the greatest population decline of all avian groups in North America since 1970. Grassland restoration can be used to reverse habitat loss; however,

success has traditionally been measured by effort, not by ecological function. A large-scale restoration program in North Dakota began reseeding grasslands in 2022, creating an opportunity to assess the outcomes in ecologically meaningful terms. Our research aims to determine if occupancy of grassland obligate bird species increases on restored grasslands and on adjacent grasslands due to an increase in patch-size. To estimate avian occupancy, autonomous recording units were deployed on eleven properties across North Dakota in spring 2023. Our results should provide an evaluation of the success of a grassland restoration program using avian responses as an ecological metric of return on investment.
Biosketch: Ashlyn Herron is a MSc student at the University of North Dakota, where she is advised by Dr. Susan Felege (UND), and Dr. Andy Boyce (Smithsonian Institution). Her passion for conserving grasslands has led her from Alberta to North Dakota where she is studying how birds respond to grassland restoration.

4. Harvesting for Habitat: Evaluating the dynamics of avian communities under different forest management practices

Bijaya Dhami, University of Alberta
Coauthors: Erin Bayne

Abstract: The boreal forest has rapidly industrialized in the past five decades, primarily driven by forestry, energy, and mineral extraction. As a linchpin of Canada's economy, forestry has exerted substantial pressure on this expansive ecosystem. Forest harvesting is expected to bring about significant alterations in the habitat of boreal birds, impacting forest structure, composition, and age, and, consequently, affecting the composition and abundance of bird communities. This highlights the necessity for sustainable forest management that balances wood production and maintains biodiversity. In response to concerns over biodiversity loss, alternative harvesting methods like Understory Protection (UP) have gained attention over traditional harvesting practices like Clear cut and Natural disturbance harvesting (NDH). In this study, we aim to evaluate the difference in species richness and community composition between three treatments (NDH, UP, and unharvested forest). From 2015 to 2023, autonomous recording units were deployed to conduct extensive avian surveys across these treatments. We hypothesize that avian communities in UP will exhibit distinct differences compared to NDH, with a higher similarity to unharvested forests, attributed to increased tree retention in UP and providing habitat for mature forest-associated species. Through this rigorous, long-term investigation, we aim to provide valuable insights into the intricate relationships between forest management practices. The insights gained will inform policymakers and the forestry industry, fostering the development of sustainable practices that balance economic and ecological considerations.
Biosketch: Bijaya Dhami is a forester, and a wildlife researcher pursuing a Master's in Landscape Ecology at the University of Alberta. His current focus is understanding how birds and mammals respond to diverse forest harvesting practices in Canada's boreal forest.

5. Assessing the ecological and social dimensions of conservation of hog deer (Axis porcinus) in Shuklaphanta National Park, Nepal

Bipana Maiya Sadadev, University of Northern British Columbia
Coauthors: Thakur Silwal, Chris Johnson, Sinead Early, Heather Bryan

Abstract: Estimating population density and distribution is crucial for the management of endangered wildlife species. Hog deer (Axis porcinus) are small ungulates that occurs in southern Asia and are listed as Endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Despite being endangered, few studies have been done recently to examine hog deer density and distribution. Accordingly, we are comparing two methods for the estimation of hog deer density: distance sampling and random encounter models from camera traps. In March-April of 2023, we conducted distance sampling along 17 (2-km) transects in Shuklaphanta National Park, Nepal. We estimated that the density of hog deer is 34 individuals/km2 (SE = 8.48). Based on camera images, we detected hog deer at 10/30 camera traps with around 300 encounter rates of hog deer in total. By combining detection data with encounter rates, we will generate a density estimate for comparison with the distance sampling based on cost, time, and variability. In addition to comparing density estimation methods, we are modeling the habitat suitability of hog deer under current and future (2050 and 2070) climatic scenarios. Our results reveal that the high potential area for hog deer is 25.5 km2 whereas the unsuitable area is 417 km2 under present climatic conditions. So far, these findings emphasize the urgency of implementing proactive conservation strategies to mitigate the adverse effects of shrinking suitable habitats. Also, we interviewed 30 local people to understand their knowledge and attitudes towards hog deer conservation.

Biosketch: Bipana is a graduate candidate at University of Northern British Columbia, Prince George, Canada with hand in experience in wildlife surveys. Bipana has around a dozen of articles published in peer-reviewed national and international journals. Moreover, Bipana has been awarded with several scholarships such as Graduate Entrance Research Scholarship and grants such as Rufford small grants, IDEA WILD.

6. Assessing the Potential for Competition Between Feral Horses and Native Ungulates in the Upper Foothills of Alberta

Birch Gano, University of Montana
Coauthors: Mark Hebblewhite, Evelyn Merrill

Abstract: The Ya Ha Tinda (YHT) partially migratory elk herd has been the subject of extensive research for over two decades. The significance of this long-term study has consistently been reaffirmed, as it has provided insights that shorter-term projects can overlook. One such finding relates to the elk herd's adaptive migratory behavior, a phenomenon observed as a response to the trade-offs between predation risk and forage availability. As the YHT elk population exhibits decreased migration into Banff National Park

(BNP), the elk herd has become increasingly reliant on an eastern migration tactic. With the expansion in elk using the eastern upper foothills region, we begin to think more critically about new variables that might influence their long-term survival. A daunting, yet increasingly more important question emerges; How are increasing feral horse populations in Western Alberta affecting the ecological dynamics of native ungulates? My research aims to integrate top-down and bottom-up inferences regarding competition, focusing on the following questions: How does the extent of niche overlap among feral horses, cattle, and elk, estimated through DNA metabarcoding and camera-based occupancy models, vary across different seasons? What is the significance of feral horses in the diets of large carnivores such as wolves, grizzly bears, black bears, and cougars, and how does this significance vary seasonally between winter and summer? This study aims to provide evidence-based insights into the intricate relationships among feral horses, native ungulates, and large carnivores in the upper foothills, contributing crucial information for informed conservation and management strategies.

Biosketch: Birch Gano completed her BSc in biology from the University of Victoria and is now a first-year wildlife biology master's student at the University of Montana. She serves as the lead field biologist for the Ya Ha Tinda long-term elk monitoring project, a role she has held for three years.

7. Declining population of Harlequin Duck on the Bow River, Alberta, Canada: 25 years of monitoring

Brenda Shepherd, Jasper National Park

Coauthors: Cyndi M. Smith, Brenda Shepherd, Mark Bradley, Shelley Humphries

Abstract: Harlequin Duck (Histrionicus histrionicus) is a small sea duck that winters in coastal waters and breeds on fast-moving mountain streams in western North America. Because of its dependency on streams and coastal near-shore habitat with healthy macroinvertebrate populations, population trends of this species can be used as an indication of healthy freshwater and marine ecosystems. From 1995 to 2020 we conducted roadside surveys for Harlequin Ducks on the Bow River in Banff National Park, Alberta. We calculated the population's trend by modeling maximum annual count, which showed a population decline over the 25 years of 3.3% per year. The trajectory varied over time: A relatively stable population from 1995 to 2005, a steep decline until 2011, then stabilizing at a much lower level, with a slight rebound in recent years. The predicted number of ducks from our state-space model closely tracked the maximum number of ducks observed in annual counts. During stable or slightly increasing population estimates the male:female (M:F) ratio fluctuated considerably but stayed high (1.4:1 and 1.3:1, respectively), and during the period of steep population decline the M:F ratio was at its lowest (1.1:1). This declining population trend is concerning because it is occurring within a protected area, but it is similar to data from other studies in the Rocky Mountains and at the coastal wintering area, suggesting that causes may not be solely due to issues on the breeding streams.

Biosketch: Brenda Shepherd is a Jasper National Park ecologist. She leads the monitoring program and the team also works on species at risk recovery. The monitoring program uses indicators including mammal occupancy, alpine plant phenology, glacier mass balance, and songbird diversity to report on the State of the Park every 10-years.

8. Impacts of passive placer mine revegetation on songbird communities in central Yukon

Clara Reid, Wildlife Conservation Society Canada
Coauthors: Morgan Brown, Chrystal Mantyka-Pringle

Abstract: In central Yukon, placer gold mining is a major industrial disturbance to riparian habitats. Mining activities fragment and excavate coniferous forests and vegetated wetlands, leaving behind open-water wetlands and bare ground which revegetates primarily with shrubs and deciduous trees. Understanding the impact these disturbances have on wildlife and ecological integrity is necessary to make responsible land use decisions. We addressed this through studying songbirds, which are relatively easy to detect and a good indicator of ecological health. Our objective was to determine how songbird community composition changes across stages of revegetation, and compare this to unmined riparian habitats. During the 2023 breeding season, we surveyed birds using autonomous recording units and in-person point counts at 26 mined sites varying in age since mining, and 15 unmined riparian sites. We quantified disturbance and habitat types within 300 metres of survey stations using satellite imagery analyses and wetland inventories. In total, 68 bird species were detected, including five species at risk. Species richness was higher at mined sites (mean = 28, 95% CI = 25-30) than at unmined riparian sites (mean = 18, 95% CI = 14-21). We will present further findings about bird community composition across the habitats surveyed, providing insights into which species are adversely impacted by mining disturbances, and which ones are present in revegetated mine sites. This research will inform cumulative effects thresholds for land use planning in the Dawson and Northern Tutchone regions of the Yukon.

Biosketch: Clara Reid is an Avian Research Intern at Wildlife Conservation Society Canada, based in Whitehorse, Yukon. She has previously worked as a technician on forest ecology, regenerative agriculture and palaeontology projects. She holds a B Sc. in Biology and Environmental Studies from the University of Victoria.

9. Cougar spatiotemporal response to human activities in a temperate rainforest recreational multi-use landscape

Emerald Arthurs, University of Victoria
Coauthors: Dr. Jason T. Fisher, Dr. Christopher Bone, Elicia Bell

Abstract: The establishment of protected areas often contends with the dual mandate of protecting wildlife such as large carnivores and enhancing opportunities for recreation. However, recreational activities may induce fear responses in carnivores, causing both spatial and temporal displacement that can have cascading effects on the wider ecological community. This research aimed to quantify the spatial and temporal responses of cougars

(Puma concolor) to human activities on southern Vancouver Island in British Columbia, Canada. We modeled cougar weekly occurrence frequency in relation to human activity (hiking and vehicles) occurrence frequency and landscape features, using generalized linear models. Temporal responses of cougars were investigated using activity pattern analysis, comparing activity within a recreation area and a no-entry reserve. Results demonstrate that cougars avoid occurring with humans (recreationalists), but not vehicles, within the same week at the same site. We observed minimal influence of habitat features and prey availability on cougar occurrence frequency, as measured by information loss (AIC scores). Activity pattern analysis did not demonstrate differences in cougar activity patterns between the recreation area and no-entry reserve, suggesting a lack of temporal response. These results suggest recreational activities on southern Vancouver Island are impacting cougar spatial but not temporal dynamics. Insights on how cougars are responding to recreation activities can help inform landscape management and policies by providing information that can be used to mitigate negative impacts and thus ensure that recreational activities are remaining compatible with conservation efforts.

Biosketch: Emerald Arthurs (BSc. Hons) is a research technician at the University of Victoria's Applied Conservation Macro Ecology Lab. Her undergraduate Honours thesis research investigated the impact of recreational activities on cougar spatiotemporal dynamics on Vancouver Island and she is interested in researching the impact of human disturbance on large mammals.

10. Evaluating the Use of Remote-Sensing Approaches to Assess Landscape Reclamation Criteria

Emily Herdman, InnoTech Alberta

Coauthors: Erin Bayne, Dean McKenzie, Eduardo Loos, Olivier Tsui, Michael Desilets

Abstract: In Alberta, when a site is disturbed by industrial activity, the company responsible for the site is required to obtain a reclamation certificate to demonstrate that the site is self-sustaining and meets equivalent land capability. Labor- and time-intensive in-field assessment are currently used to evaluate sites, and implementation of remote sensing techniques could reduce costs while improving safety and data quality. This project will provide guidance on the use of technology-based assessment to augment field-based assessment of reclaimed sites for the purpose of achieving reclamation certification under government policies and practices.

Repeatability of results will be measured across practitioners, site, and habitat types to understand how well remote sensing approaches can assess across landscape, soil, and vegetation parameters. Risks and benefits underlying the use of field- and technology-based assessments for reclamation certification will be evaluated, including consideration of ecological impacts. A guidance document for practitioners and regulators will identify best practices for key technologies. The outcome of this project is a scientifically defensible evaluation of technologies that can be used to support the reclamation certification process and assessments of industrial impacts on the landscape. While this project is initially

focused on the application of remote sensing data in a regulatory context, these techniques will be further applied to assess the impact and efficacy of restoration activities on avian habitat availability. Broadly, these approaches will be useful in evaluating effectiveness of reclamation practices in achieving desired ecological outcomes and identifying options to improve practices.

Biosketch: Emily Herdman is the Acting Director of Environmental Services at InnoTech Alberta, where she completes applied research to help industry, government and practitioners address challenges in environmental impacts and management. She has a special interest in cumulative impacts and leveraging technology to better understand environmental outcomes.

11. Leave it, burn it, or cut it down? Best management practices for birds in post-mountain pine beetle-attacked forests

Emily Swerdfager, University of Alberta

Coauthors: Dr. Erin Bayne, Brenda Shepherd

Abstract: The Canadian Rocky Mountains and Foothills of Alberta are exhibiting increasingly frequent and severe forest disturbances, as a result of climate change, including an unprecedented mountain pine beetle (MPB) hyperepidemic, subsequent wildfires, and salvage-logging practices. These disturbances alter the vegetation structure and composition of the forest, which presumably results in changes to avian communities . The aim of this research is to evaluate how bird communities vary between standing MPB-attacked forests, MPB-attacked forests that have burned, and salvage-logged MPB-attacked forests. Our goal is to provide guidance on best management practices for birds in post-MPB-attacked forests by evaluating how community metrics like species richness, community composition and functional diversity change over time. Using a time-for-space substitution, we have deployed 160 Autonomous Recording Units in targeted areas in Alberta in 2023 and we will return to the field in 2024 to balance out sample sizes across treatments, in order to measure changes in avian communities over time.

Biosketch: Emily started her MSc in Ecology at the University of Alberta in January 2023. The idea for her research originated from her time doing ecological monitoring fieldwork in Jasper National Park and the other mountain parks.

12. Understanding the Effects of Human Intervention on Wild Boar Ecology in Alberta

Hannah Bordin, University of Alberta

Coauthors: Mark S. Boyce

Abstract: The wild boar (Sus scrofa) is one of the widest-ranging, invasive mammals in the world. Native to Eurasia, wild boar were introduced in Canada in the 1980s to diversify the livestock industry, and have since spread across the prairie provinces. Wild boar are a growing concern in Canada, posing a significant risk to the agricultural industry, natural biodiversity, and public health. Current management strategies in Alberta focus on whole sounder trapping, while hunting is actively discouraged as it causes behavioural adaptions

(i.e., increased nocturnality and dispersal) that make continued management more difficult. Additionally, hunting can disrupt wild boar social structures, which is suggested to promote selection for earlier sexual maturity and shorter generation time, ultimately increasing population size. Wild boar have been studied in Europe and the United States; however, limited information on their ecology exists for Canadian populations. Our objective is to understand the effects of human intervention on the movement ecology and reproductive behaviour of wild boar in Alberta. In collaboration with Alberta Agriculture and the University of Calgary, wild boar will be radio-collared in areas subjected to different interventions (i.e., hunting, trapping, and non-intervention). GPS data will be used to assess the movement, habitat selection, and diel activity of wild boar. Camera traps will be placed within the range of collared boar, and photographs will be assessed to monitor the frequency of reproduction and litter size. The results of this study will provide spatial ecological data to better inform management decisions for wild boar populations in Alberta.

Biosketch: Hannah Bordin is a MSc. student at the University of Alberta, under the supervision of Dr. Mark Boyce. In collaboration with the University of Calgary and Alberta Agriculture and Irrigation, Hannah is studying wild boar populations in Alberta.

13. Bighorn ram movement ecology and disease risk

Ian Gazeley, University of Alberta

Coauthors: Mark Boyce

Abstract: Transmission of disease and pathogens from domesticated animals presents a substantial risk to native species. Populations of wild sheep are at high risk from the novel bacterium Mycoplasma ovipneumoniae (M.ovi) which occurs at high rates in domestic caprid herds (30-70% of operations). The mountains and foothills of southwest Alberta, Canada are home to significant populations of Rocky Mountain bighorn sheep (Ovis canadensis canadensis) that have experienced both historic and recent disease outbreaks associated with exposure to domestic livestock. To evaluate the risk of transmission to bighorns, and predict spread of disease among bighorn populations, a collaborative project between the University of Alberta, the Alberta Government, Parks Canada, and multiple NGOs was initiated to provide a thorough understanding of movement behaviours, habitat selection, and metapopulation connectivity in the region. In 2022-2023 a total of 70 bighorn rams 1.5 - 9.5 years old (median 4.5) were aerial net-gun captured (n=61) or chemically immobilized (n=9) and fitted with GPS collars. Preliminary analyses of data collected between April 2022 and October 2023 suggest patterns of migration, dispersal and foray are highly variable among individuals and herds. Average daily movement were 3.55 km (2.03 – 5.57) in summer (Apr. 1 – Oct. 31) and 3.14 km (1.07 – 5.67) in winter (Nov. 1 – Mar. 31). Total distance travelled averaged 753.5 km (434.7 – 1010.0) in summer, and 452.1 km (176.7 – 697.9) in winter. Local convex hull estimates (K=25) of annual home range averaged 69.6 km2 (10.3 – 242.7). Next steps include habitat selection, migration, corridor and foray analyses.

Biosketch: Ian received a diploma in Renewable Resource Management from Lethbridge College (2007) and then a BSc. Environmental Science (2017) and MSc. Biology (2021) from the University of Lethbridge. Currently in Dr. Mark Boyce's lab at the UofA his research centres around bighorn sheep movement ecology and disease risk.

14. Effects of reproduction and immigration on the short-term population dynamics of urban black-tailed deer (Odocoileus hemionus columbianus).

Isabel Deutsch, University of Victoria
Coauthors: Dr. Jason T. Fisher

Abstract: Abundant urban deer reduce biodiversity and pose human-wildlife conflicts. Urban areas lack predators and contain high-quality forage that facilitates high deer abundance. On Vancouver Island, BC, immunocontraception (IC) programs have successfully lowered birth rates in urban black-tailed deer (BTD). It's suggested that this may only be effective in insular environments where immigration is minimal. In an open environment, if a population is reduced, it can create space for fertile deer to immigrate and reproduce. Population dynamics is how a population size changes overtime, and what partly shapes this is the addition of individuals to the population via births or immigration. Therefore, we must investigate both factors. I will assess how reproduction and immigration shape short-term population dynamics in open and closed populations of BTD on Vancouver Island who have received IC. I hypothesize i) birth rates primarily contribute to net population change in the closed system and ii) both birth rates and immigration primarily contribute to net population change in the open system. To test this, I will estimate population densities over time using spatial capture-recapture modelling. A better understanding of BTD population dynamics will inform conservation and management for large urban wildlife species across Canada and enhance urban biodiversity.

Biosketch: Isabel Deutsch is a Masters student at the University of Victoria in the Applied Conservation Macro Ecology Conservation Lab. Isabel's research interests encompass population and community ecology, conservation and wildlife management. Isabel is passionate about exploring these topics to help solve human-wildlife conflicts and promote human-wildlife coexistence.

15. Does habitat quality predict reproductive investment in a population of declining tree swallows (Tachycineta bicolor) in Alberta?

Jinxuan Cui, University of Alberta
Coauthors: Lucille Wang, Ivana Schoepf

Abstract: Global environmental change is pushing species to the limits of their adaptability. Some of the most dramatic landscape changes are occurring in agricultural environments and many species occupying these ecosystems are now rapidly declining worldwide. Avian aerial insectivores feed primarily on flying insects and are often associated with agricultural environments. They are also rapidly declining across North America. The reasons for their

declines are not fully understood but deteriorating habitat quality on their breeding grounds is often cited as a main contributor of their continued decrease. Here, we present the result of a study we conducted in a population of tree swallows (Tachycineta bicolor) breeding across a natural-agricultural gradient in Central Alberta. While several studies have looked at the link between habitat quality and reproductive success in species breeding in agricultural environments, including tree swallows, most work have focused on reproductive success and not investment. Yet, investment, particularly during the early stages of reproduction, is well-known for having important effects on survival. The goal of our research was to test whether there is a link between habitat quality and early reproductive investment. To do so, we collected data on incubation behaviour of tree swallows nesting at two sites differing in their habitat quality: one site located in a natural area and a second site located in an agricultural area. The results of this study, presented for the first time at ACTWS/CSTWS joint conference in Jasper, are part of broader research looking at how individuals cope with anthropogenic challenges.

Biosketch: Jinxuan is a 4th year Biology student at the University of Alberta. I am a bird lover and enjoy field work. After Jinxuan graduates, they would like to continue studying animal behaviour and ecology in a Master or a PhD program.

16. Spatially predicting annual ungulate forage biomass from 2001 to 2022 in the Canadian Rocky Mountains

Jonathan Farr, University of Montana

Coauthors: Evelyn H Merrill, Mark Hebblewhite

Abstract: Food availability is one of the key factors regulating ungulate populations across North America, and ungulates select habitats that balance trade-offs between forage quantity and quality. However, ungulate forage selection is challenged by constant change to the foodscape from abrupt disturbances from fires, droughts, and forestry practices, and gradual alterations from alpine conifer and shrub encroachment, grazing pressure, and climate change. To quantify and map annual ungulate peak herbaceous forage biomass in the Canadian Rocky Mountains from 2001 to 2022, we used remotely sensed and field sampled forage biomass data from the Ya Ha Tinda long term elk research project. First, field data of forage biomass was collected at 900 plots between 2001 and 2004. Second, we constructed regression models of forage biomass based on landscape covariates representing topography, fire history, landcover, overall vegetative productivity, climate, and phenology. Third, we predicted annual forage biomass across the study area. Fourth, we used 686 biomass plots from 2012-2022 sampled at the Ya Ha Tinda ranch to validate predictions. Model predictions demonstrated significant inter-annual variation in biomass estimates from climatic factors and burns. Overall, predictions correlated well with external field data, but predictive accuracy varied across years. Peak biomass is an important determinant of summer nutritional availability, but also winter range carrying capacity for grazing ungulates. As such, our results inform the management of not only elk and bighorn

sheep in the eastern slopes, but also the recently reintroduced bison population in Banff National Park.

Biosketch: Jonathan Farr is a graduate student at the University of Montana, where he is studying the niche ecology of reintroduced bison in Banff National Park to understand potential competitive consequences of rewilding. In his spare time, Jonathan enjoys coaching nordic skiing, climbing, backpacking through the rockies, playing piano, and making fancy lattees.

17. Reading the Sign: a call for wildlife track and sign identification training for wildlife professionals

Joseph Litke, Fiera Biological Consulting Ltd.

Coauthors: Bria Griffin

Abstract: The skill of seeing, recognising, and interpreting the tracks and signs of wildlife has always been an important skill for humans. In early times, the linkage between survival and tracking ability ensured that advanced skills remained in human populations. Today, wildlife research and monitoring projects, as well as citizen science programs like iNaturalist, frequently use tracking observations to document and detect changes in species occurrence and distribution. This is despite the fact that few professionals receive even the most basic training in track identification, and modern living has eliminated any selective pressure that might have ensured advanced skill remained within the population. In this poster presentation, we will explore trends in tracking data submitted to iNatualist, discuss the benefits of using highly trained trackers for field-based wildlife studies, and advocate that tracker training and certification should be an essential professional development activity for wildlife professionals in Alberta.

Biosketch: Joseph is a Sr. Biologist with over 20 years of experience as an Ecologist, Wildlife, and Habitat Specialist throughout western Canada. He has a diverse range of skills and experience including substantial work with most of Alberta's wildlife guilds. Joseph has an internationally-recognised certification in Wildlife Track and Sign interpretation.

18. Effects of Winter Severity and Hunting on White-tailed and Mule Deer Populations

Kathryn Vaughan, University of Alberta

Coauthors: Mark Boyce

Abstract: White-tailed deer (Odocoileus virginianus) and mule deer (O. hemionus) play crucial roles in Alberta's ecosystems and economy, impacting vegetation, predator-prey dynamics, hunting practices, and overall biodiversity. However, no studies have addressed the combined effects of winter severity and hunting on deer populations across Alberta, which can lead to unpredictable harvest fluctuations. We aim to fill this knowledge gap by comprehensively documenting factors influencing deer harvest fluctuations, especially during periods of low hunter success, to inform effective management strategies. To achieve this, we will develop a Winter Severity Index (WSI) to predict winter severity in

various regions across the province, identify drivers of deer hunter success (e.g., winter severity, Normalized Difference Vegetation Indices, hunting), and explore a potential Hydra Effect—a phenomenon wherein harvests foster populations stabilization through density dependence and harvest interaction. Leveraging data from the Government of Alberta, Forestry and Parks, historical WSIs, and NASA Daymet V4 satellite weather data, we will assess hunter success responses to WSIs and analyze the impact of varying hunting pressure on harvest. This research significantly contributes to wildlife management and conservation in Alberta, bridging knowledge gaps and offering insights into hunter success and harvest fluctuations. The study benefits hunters and conservation authorities alike, emphasizing the positive role of hunting in conservation efforts. By developing a predictive Winter Severity Index and understanding factors shaping deer populations, our research aims to ensure the health and stability of white-tailed and mule deer populations amid Alberta's evolving environmental and economic landscape.

Biosketch: Kathryn Vaughan is a Biological Sciences Master's student at the University of Alberta specializing in ecology, studying under the supervision of Dr. Mark Boyce. Kathryn's research focuses on the impacts of winter severity and hunting on white-tailed and mule deer populations.

19. Hatchery Effectiveness in Olive Ridley (Lepidochelys olivacea) Sea Turtle Conservation; Comparing Nest Success of Hatchery Relocated Nests to Beach Relocated Nests

Kira Weddell, Red Deer Polytechnic

Coauthors: Sandra MacDougall, Gabriela Ibarguchi, Nínive Espinoza-Rodríguez, Graciela Pulido-Petit, Isabel Naranjo

Abstract: Sea turtle conservation is essential for maintaining marine biodiversity, ecosystem sustainability, and supporting coastal economies. Despite being the most abundant sea turtle species, the Olive Ridley turtle (Lepidochelys olivacea) faces significant threats, with a global population decline of 30-50% since 1980. Conservation strategies include intensive beach management with nest relocation to hatcheries. In some cases, nests cannot be relocated to a hatchery, for example, due to the eggs being laid late in the season or hatchery space constraints. Nests left in situ are exposed to threat of predation or poaching, thus, the objective of this study was to compare hatching success between Olive Ridley nests relocated to a hatchery versus nests relocated on the beach to discourage poaching. This study was conducted at Playa Costa de Oro on the Nicoya Peninsula in Costa Rica. Beach patrols were conducted daily from July to early December in 2023. We monitored various metrics of nest success and recorded if predation or poaching had occurred. Preliminary analysis from October to December showed that 67% of relocated nests on the beach were predated by raccoons or dogs whereas predation at the hatchery decreased significantly after the installation of a wire roof. Our results provide support for hatchery-based conservation strategies and can inform resource allocation.

Biosketch: Kira is a fourth-year BSc Biological Sciences student at Red Deer Polytechnic who will be graduating in April 2024. She plans to use her biological sciences degree to

pursue a career in wildlife biology with a focus on conservation and human-wildlife interactions.

20. The association between wildfire smoke and reproductive success in a population of declining tree swallows (Tachycineta bicolor) in Alberta

Lucille Wang, University of Alberta
Coauthors: Jinxuan Cui, Ivana Schoepf

Abstract: Human-induced climate change is one of the major threats facing the planet today. Extreme weather events are expected to become more common and severe as the climate crisis deepens. Wildfires are an example of such extreme weather events and they are increasingly difficult to ignore. In 2023, wildfires burned millions of hectares of forest and destroyed communities around the world, including several here in North America. While we are too familiar with the direct effects of wildfires (e.g., number of lives lost) we remain largely in the dark about their indirect effects. For example, we know close to nothing about how wildfire smoke affects fitness. Part of the problem stems from data shortages. Extreme weather events are typically rare and detecting their effects is difficult without a large historical dataset, which is often lacking for most species. Here we present the result of a study aimed at investigating the association between wildfire smoke and fitness in a population of tree swallows (Tachycineta bicolor) breeding in central Alberta. We gathered data on tree swallow fitness by measuring their reproductive success, which we extracted from a historical dataset collected from these birds over the past 10 years. Then, we linked these data to wildfire smoke indices collected from the same area over the same time. These results are part of broader research looking at how individuals cope with anthropogenic challenges. We are excited to share our findings for the first time at the ACTWS/CSTWS joint conference in Jasper.

Biosketch: Lucille is a 4th year student majoring in Environmental Science at the University of Alberta. Lucille is interested in studying how human or natural disturbances can affect birds. Lucille plans on pursuing a Master's degree after graduation to gain more knowledge and expertise in the field of ecology.

21. Evaluating lead exposure in scavenging species linked to big-game hunting in Saskatchewan, Canada.

Lynsey Bent, University of Saskatchewan
Coauthors: Jim Bahr, Kirsty E. B. Gurney

Abstract: For free-ranging animals, chronic exposure to lead, a toxic heavy metal, can manifest in discrete physiological changes, alter behaviours, and contribute to increased mortality. In Canada, although lead ammunition has been banned for hunting waterfowl, carrion contaminated with lead fragments from bullets used in rifle-hunting remains a potential source of exposure for wildlife, particularly scavenging species. Data to quantify lead exposure in these species related to hunting activities in most of Canada, however, are

lacking. The main goal of my thesis research is therefore to evaluate the risk of lead exposure to scavenging wildlife as a result of big-game hunting in Saskatchewan, Canada. By quantifying lead mass in hunted animal remains (i.e. viscera and organs), and evaluating scavenger community assemblages feeding at kill sites, I aim to achieve two main objectives: (i) enhancing techniques to quantify lead in large tissue samples by bridging the gap between traditional (medical radiography) and advanced (synchrotron based) imaging technologies and (ii) identifying spatial and temporal factors that affect scavenger community composition. My findings will contribute important information to the continuous assessment of terrestrial lead and its potential impact on wildlife.

Biosketch: Lynsey Bent is currently pursuing a Master's degree in Biology at the University of Saskatchewan, specializing in assessing lead exposure risks to scavenging wildlife. With extensive experience in both field and laboratory settings, Lynsey blends technical expertise with a holistic approach to examine the connection between big-game hunting and scavenger lead exposure.

22. Monitoring changes in deer abundance in Jasper National Park as a component of the Southern Mountain Caribou Recovery Strategy

Madeline Trottier, Parks Canada

Coauthors: Lalenia Neufeld

Abstract: Maintaining critical habitat for caribou is a key component of the Southern Mountain Caribou Recovery Strategy in Jasper National Park (JNP). Critical matrix habitat functions to provide 'security' for caribou by providing the ecological conditions to maintain low predation risk through low wolf density (<3 wolves/1000km ^{2}). Non-caribou ungulate abundance in these habitats can provide an indication of food available to support wolves and other predators and thus is an important metric to consider when evaluating critical habitat. In JNP, changes to the landscape and proportion of matrix habitat near the Jasper townsite (as part of wildfire risk reduction) may have impacts on ungulate abundance in the park by creating early-succession habitat favourable to deer. We monitored changes in deer abundance and density in JNP using 83 remote cameras and a novel technique for unmarked individuals, space-to-event modelling (STE; Moeller et al. 2017). Data from a pilot study over 2017 – 2018 provide a baseline estimate to compare white-tailed and mule deer estimates for the study area over 2021 – 2023 following wildfire risk reduction clearing. Tracking changes in deer abundance, and the associated effect on wolf density, is key to better understand habitat disturbance impacts on the function of matrix habitat in JNP, and is thus a major consideration of the caribou recovery strategy.

Biosketch: Madeline works for Parks Canada as a Caribou Resource Management Technician. Previously, Madeline worked as a consultant biologist following the completion of a MSc at the University of Alberta studying elk behaviour at the Ya Ha Tinda ranch. Madeline hails from Ontario originally, and moved to Alberta in 2019 after graduating with a BSc with honours from Trent University in 2018.

23. Lack of consistency in black bear response to oil sands disturbance features: what pieces are missing?

Megan Braun, University of Victoria
Coauthors: Jason Fisher

Abstract: In the Alberta Oil Sands Region, largescale landscape changes associated with petroleum extraction have altered habitat availability for mammal species. Depending on species-specific resource requirements, this has created both “winner” species that benefit from anthropogenic disturbance features, and “losers” which disfavor these changes. Numerous studies have been performed to investigate responses of individual species and the entire community to disturbance features, ultimately with the purpose of directing future industrial activities and restoration efforts. Although some clear patterns have emerged (ex., positive response of canids to linear features), there is still uncertainty regarding responses of certain species, such as black bears. Black bear response to these landscape changes is particularly intriguing because results throughout the literature are largely inconsistent, with studies that indicate either a positive, negative, or negligible reaction to features. The purpose of this study is to explore other factors involved in black bear habitat selection that could help explain these inconsistencies. I hypothesize that more robust patterns will emerge when different biologically important seasons are considered, a predictor that has not been examined in previous literature. I also hypothesize that the presence of cubs will affect bear preference for features. I will test these hypotheses by first collecting bear distribution data from camera arrays employed under the Oil Sands Monitoring program, then modelling this data to determine whether designated predictor variables explain habitat selection. The results of this study will hopefully provide clarity on how black bears are being affected by disturbance features and thus inform conservation initiatives.

Biosketch: Megan is a Master's student in the Applied Conservation Macro Ecology (ACME) lab at the University of Victoria. Her research focuses on boreal mammal ecology and the response of species to anthropogenic disturbances in the Alberta Oil Sands Region.

24. Habitat Selection of Feral Horses and Domestic Cattle in Alberta’s Foothills: Implications for Biodiversity?

Sejer Meyhoff, University of Alberta
Coauthors: Dr. Erin Bayne

Abstract: Many ecosystems have evolved with large grazing animals as an intrinsic component of the disturbance regime. However, livestock grazing and introduced grazers like feral horses have altered this dynamic in some regions, leading to shared areas becoming overgrazed with potential impacts to native wildlife. This study, focused in the Ghost Public Land use Zone (PLUZ), aims to quantify habitat selection of feral horses, cattle, and native grazers to improve our understanding of temporo-spatial overlap of forage use that may impact native ungulates and bird communities. The Ghost PLUZ is a multiple use landscape including livestock grazing and timber harvest, guide outfitting, hunting, and

other cultural, industrial, and recreational interests. Land use conflicts arise as there is perceived competition for forage between feral horses and cattle, and feral horses are thought to hinder forestry reclamation efforts. Questions around feral horse habitat selection, density, and multi-species interactions remain unanswered in the context of sustainable rangeland practices, which make sustainable land use practices difficult to achieve. Long term and continued wildfire suppression in the area has also led to shrub encroachment on grasslands, further reducing forage availability for grazing animals and increasing the potential for overgrazing to occur. This poster presents the current state of knowledge on feral horse habitat selection and management in Alberta and outlines the current study design and implementation using camera traps, acoustic recording units, and range exclosures. Preliminary results from the first year of data are presented. Please come and share your thoughts on the feral horse issue!

Biosketch: Sejer completed my MSc at the University of Lethbridge in 2020 and worked as a biologist and wildland firefighter in northern BC before beginning a PhD at the University of Alberta in 2022 with the Bayne lab.

25. Estimating the effect of browse subsidy on seismic lines in Alberta's boreal forest

Spencer Quayle, University of Alberta

Coauthors: Dr. Scott E. Nielsen

Abstract: Within Alberta’s boreal forest, natural and anthropogenic disturbances over the last century have coincided with a region-wide increase in white-tailed deer (Odocoileus virginianus) and a decline for threatened boreal caribou (Rangifer tarandus caribou). Much of this disturbance is the result of seismic exploration for petroleum reserves that began in the mid 20th century and continues today. While climate change is considered a primary driver of changes in deer populations, the role of disturbances is less clear. A few mechanisms have been put forward, with one theory being that regenerating exploratory footprints, specifically seismic lines, harbour more palatable winter browse, facilitating expansion of competitor ungulates into historically forage-poor caribou refugia. Here we test where and to what extent such browse subsidies may be present on seismic lines and how they vary with different ecosite types, stand ages, and line characteristics. Evidence for a browse subsidy on seismic lines in peatlands or in older coniferous stands could represent an incentive for competitor ungulate use, and support the disturbance-mediated apparent competition hypothesis. Large subsidies outside of core caribou habitat, may also be important if they increase deer or moose fecundity or survival. By comparing browse abundance and use by ungulates between online, line edge, and offline plots, we mapped browse subsidy at a regional scale across northeast Alberta, providing a tool to prioritize restoration efforts to minimize browse subsidy. We illustrate those patterns here.

Biosketch: Spencer is a MSc student at the U of Alberta. Spencer’s work deals with the distribution of ungulate winter browse in fragmented boreal landscapes, specifically on seismic lines.

26. Black Bear Habitat Use in Response to the Construction and Operation of a Wind Power Plant

Tawnee Dupuis, University of Alberta

Coauthors: Jaclyn Comeau, Katy Gieder, Mark S. Boyce

Abstract: Historically, the American black bear (Ursus americanus) occupied the majority of forested areas in North America. However, with the expanding human footprint, forested habitats available to bears have decreased significantly in both quality and quantity. To prevent human-bear conflicts while maintaining sustainable black bear populations, preserving high-quality habitats is essential. This is the first study to examine how black bear habitat is impacted by wind power development, as reflected through changes in habitat use by bears. This project is being completed in partnership with the Vermont (USA) Fish and Wildlife Department. Between 2012 and 2020, 40 black bears with home ranges near the wind farm footprint were collared and equipped with GPS transmitters. Geospatial locations from collared bears were collected during all three phases of the wind development: pre-construction, construction, and post-construction (operation) of the wind power facility. Logistic regression on used versus available location points was used to derive resource selection functions (RSFs) during the different phases of development. Differences in relative selection strength were used to quantify changes in preference for different habitat features throughout the development process. Models were validated with Akaike's information criterion (AIC) and K-fold cross validation. Predictive maps were created from the model outputs to visualize differences in habitat suitability during all three phases of the development. Findings from this study aim to direct future wind energy development plans to mitigate impacts on black bears and other terrestrial mammals.

Biosketch: Tawnee Dupuis is currently pursuing her M.Sc. in Ecology at the University of Alberta. Originally from Saskatchewan, Tawnee has worked and played across western Canada. She is eager to continue cultivating ecological knowledge from the land beneath her feet.