ACTWS CONFERENCE 2023

WHERE THE WILD THINGS MEET

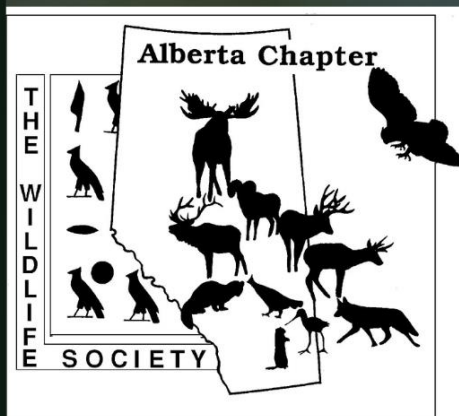## CONNECT • COLLABORATE • CULTIVATE

MARCH 9TH - 12TH, 2023

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Alberta Chapter

THE WILDLIFE SOCIETY

ACTWS 2023

where the wild things meet

Calgary, AB | March 10-12

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CONFERENCE SPONSORS

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

PRESIDENT'S MESSAGE

Greetings Alberta Chapter of the Wildlife Society members, old and new,

It is great to be welcoming you back to our first ACTWS in-person conference in three years. I am looking forward to seeing old friends and making new acquaintances in our world of wildlife enthusiasts and professionals. Please join me in extending gratitude to our President-elect Sarah, and all the members of the conference organizing committee, who have been meeting weekly for months and working diligently to problem solve to present to you the 2023 ACTWS conference. They have been supported by a wave of volunteers, without whom the conference would not be possible. Also, our Executive Director, Shantel has been steadily and expertly moving us towards conference day. Please do take the time to thank everyone involved. They are truly an excellent group of people, and you are lucky to have them working to serve you and the 2023 ACTWS conference. I appreciate you all. Finally, we have been blessed by a great group of sponsors and donors in 2023. I urge you to reach out and thank all those individuals, companies and organizations who have contributed generously to our Chapter to make our conference a success.

Finally, I look forward to hearing the presenters speak and reviewing the posters and having lively conversations about topics that only a bunch of wildlife geeks would find interesting. I am also looking forward to attending the banquet and acknowledging the great work of our members. Also, we have a kick-ass band for your dancing enjoyment into the evening. See you in Calgary. Let's get it on!

-John Paczkowski, ACTWS President

CONFERENCE AT A GLANCE

Thursday, March 9	4:30 – 6:00 pm: Virtual ACTWS Annual General Meeting
	6:00 – 7:30 pm: Virtual public talk on "How the Wild Things Flow," presented by Sofie Forsström of Oldman Watershed Council
Friday, March 10	9:30 am – 4:00 pm: Field Trip to Bow Habitat Station & Inglewood Bird Sanctuary
	6:30 – 8:30 pm: Student Conclave
	7:00 – 10:00 pm: Mixer
Saturday, March 11	8:30 – 9:30 am: Plenary on "The role of private lands in conservation" presented by Lorne Fitch a retired provincial Fish and Wildlife Biologist, Norine Ambrose with Cows and Fish, and Michael Gibeau with Southern Alberta Land Trust.
	9:30 am – 4:35 pm: Open paper program & poster session
	5:00 pm – 12:00 am: Reception, banquet, student scholarships, professional awards, auction, live music by The Nico Tobias Band
Sunday, March 12	8:30 – 9:30 am: Keynote speakers, Wes Olson & Johane Janelle, "The Ecological Buffalo: On the trail of a keystone species."
	9:30 – 10:00 am: Keynote speaker, Justin Bruised Head, 'The Kainai Iinnii Rematriation Project, Restoring the plains bison as an ecological and Cultural Keystone.'
	10:00 am – 12:40 pm: Open paper program
	12:40: Student presentation awards and closing remarks

VIRTUAL ANNUAL GENERAL MEETING

Thursday, March 9, 2023 | 4:30 – 6:00 PM MST

Join us for our annual general meeting, where we discuss the latest news from the Society and the big issues in Alberta wildlife, including the vibrant work of our Conservation Affairs Committee, and elect new members. All welcome!

Click here to join.

VIRTUAL PUBLIC TALK
HOW THE WILD THINGS FLOW

Sofie Forsstöm, Oldman Watershed Council

Thursday, March 9, 2023 | 6:00 PM MST

Come along as we explore the concept of "Thinking like a watershed." All living things are connected by water, and the way it moves over the landscape and through bodies of wildlife, people, plants, and ecosystems has a profound impact on both living and nonliving worlds.

Sofie Forsstöm, is the Education Program Manager for the Oldman Watershed Council, based out of Lethbridge. In addition to overseeing education projects, she also coordinates OWC's volunteer restoration events and aquatic biomonitoring program in the headwaters. Sofie has a Masters degree in Applied Ecology and previously worked for Alberta Parks and the Royal Tyrrell Museum. In her spare time, she volunteers as a Scout leader, rides her horse, and goes running with her dog, Quiche.

Click here to join.

FIELD TRIP

Friday, March 10, 2023 | 9:30 AM – 4:00 PM

Explore different aquatic environments and over 20 of Alberta's fish species in the aquariums at the Bow Habitat Station & Sam Livingston Fish Hatchery! You will also have the chance to feed trout in North America's largest fish hatchery. The hatchery is part of the Alberta Fish Stocking Program, stocking over 200 lakes and ponds across the province. There will also be booths set-up from the City of Calgary, Alberta Bat Program, and the Junior Forest Rangers highlighting Alberta's forests.

We also partnered with Nature Calgary to provide a guided bird watching walk through the Inglewood Bird Sanctuary. To date, 270 species of birds, 21 species of mammals, and 347 species of plants have been recorded at the sanctuary. This ecological haven is something you don't want to miss!

STUDENT CONCLAVE AND MIXER

Student Conclave 6:30 PM | Mixer 7:00 PM

Friday, March 10, 2023

Student Conclave activities include "speed dating with a wildlife professional", where you can talk to professionals in the wildlife field about careers, advice, crazy stories, and anything you like. There will also be wildlife trivia with some great prizes to be won!

Students will then join the mixer where all other conference attendees are mixing and mingling. There will be a cash bar for refreshments.

The afterparty will take place at the Canadian Brewhouse, a short walk away!

WORKSHOP

Saturday, March 11, 2023 | 12:00 - 1:00 PM MST | Garden Courts

REGISTER HERE

WILDLIFE ACOUSTICS WORKSHOP

Turning Sound into Discovery: Using Wildlife
Audio Recorders as a Valuable Research Tool

March 11th, 2023
12:00-1:00PM

EXPERT PANEL DISCUSSION:
THE ROLE OF PRIVATE LANDS IN CONSERVATION

Saturday, March 11 2023 | 8:30 AM MST

PANELISTS

Lorne Fitch, Retired Provincial Fish and Wildlife Biologist

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.

Mike Gibeau, Conservation Manager, Southern Alberta Land Trust Society

Born and raised on a farm in southern Alberta, Mike Gibeau migrated to the mountains in the mid 1970's. He still lives in Canmore and is now the Conservation Manager for the Southern Alberta Land Trust, after a 33-year career with Parks Canada. Mike has extensive experience in the ecology and management of large carnivores including research on coyotes, wolves, black bears and grizzly bears. These days Mike's work is centered on private ranches. His focus lies in applying innovative conservation measures on the ground.
Mike has a MSc in Wildlife Biology from the University of Montana and a PhD in Conservation Biology from the University of Calgary. He is currently also an Adjunct Professor in the Geography Department at the University of Calgary and advises graduate students at several universities in Canada and the United States.

Norine Ambrose, Executive Director, Cows and Fish

In her 24 years with Cows and Fish, Norine has focused on working with landowners, communities and natural resource professionals to help them recognize the value of riparian areas, and what they can do to maintain these areas as healthy, productive pieces of our landscape. Her work with community leaders, organisations and agencies emphasises sharing lessons learned in effective program design and delivery. She combines her wetland ecology research experiences from the University of Alberta and farm upbringing in central Alberta with extensive development of new outreach and monitoring tools at Cows and Fish, to help bridge science, management and education around riparian ecosystems. She believes strongly that those who manage and use the land are critical to ensuring a healthy landscape through their management choices.

KEYNOTE SPEAKERS

Sunday, March 12, 2023 | 8:30 AM MST

Wes Olson & Johane Janelle
Title: *The Ecological Buffalo: On the Trail of a Keystone Species*

Abstract: We've all heard stories about the vast herds of bison that once roamed the forests and grasslands of North America. Herds of such massive size they took 10 days to pass by an observer. We've also learned about the bison-genocide that took place during the mid-1800s, when the North American plains bison population crashed from 30-60 million to just 23 wild bison over a 20-year period. What many have not learned about was the incredibly complex, inter-woven relationships that bison have with the species they share time and space with.

Join author/artist Wes Olson on a journey into the heart of the northern mixed-grass prairie. Through the lens of photographer Johane Janelle, discover the incredible beauty of the wildlife that are now re-establishing their ancestral relationships with bison.

Johane Janelle

Ever since Johane's childhood in the small Quebec village of Cap Sante, on the north shore of the St. Lawrence, Johane has loved being in nature and capturing special moments and

places on film. This passion for wild places brought her west on a backcountry horse trip in 1983, and from then on she was hooked on the west. Her photography has graced the covers of dozens of equestrian magazines from across North America, in Journal articles, in books and museums. Her first collaboration with Wes was the publication of their first book, Portraits of the Bison in 2005, and then A Field Guide to Plains Bison in 2012.

Wes Olson

Wes grew up in Black Diamond, along the east slopes south of Calgary. Wes has been drawing and painting from an early age, but writing is a talent he began to explore only later in life. Following a 40-year career working with wild species in wilderness areas he has been provided with a lifetime of experience upon which he draws inspiration for his art, books, and presentations. He and Johane travel extensively to give presentations to a wide range of audiences, with the goal of helping people understand the complexities of nature, and how inter-related all wild beings are to each other, and how incredibly important it is for us to help protect these places and the species that inhabit them.

Sunday, March 12, 2023 | 9:30 AM MST

Justin Bruised Head

Abstract: Bison are considered both an ecological and cultural keystone for the Blackfoot/Kainai people. Bison were essential for our survival and ceremonial practices, and their absence has had devastating effects on the land and our culture.

The Kainai Iinnii Rematriation Project (KIRP) is an eco-cultural restoration project that centers around the restoration of the land and culture of the Kainai (Blood) First Nation by re-introducing plains bison (*Bison bison bison*) back to the native mixed-grass prairie pastures on the North End area of the Blood Reserve. A herd of 40 plains bison from Elk Island National Park were re-introduced to the Blood Tribe on Feb 12, 2021. First-Nation-led environmental research is being undertaken to study and better understand how re-introducing plains bison can benefit mixed-grass prairie ecosystems. Members of the KIRP herd will be harvested and utilized for meat distribution and ceremonial practices for tribal members once carrying capacity is reached.

The Kainai Eco-cultural herd will provide many benefits to our people including healing from trauma, revitalizing public health, job creation as well as enhancing our local economy, educational opportunities, cultural revitalization, and environmental research, restoration, and protection. The herd is not being utilized for harvest yet, but some of their parts, such as their winter fur and chips (dung) are being used for ceremonial practice. Bison have

been absent from these lands for ~155 years, but their return to the land has already had a profound positive effect on the community and local ecosystem.

Justin Bruised Head

Justin Bruised Head ("Akkamootskoonaki") is The Kainai Iinnii Rematriation Project Coordinator at Blood Tribe Land Management. Justin was born and raised in Southern Alberta and is a member of the Blood Tribe First Nation of the Blackfoot Confederacy. Justin received his Post-Secondary Diploma in Renewable Resource Management in 2017 and Bachelor of Applied Science Degree in Ecosystem Management in 2019 from the Lethbridge College. Justin enjoys the outdoors and is an advocate for grassland conservation and restoration on the Blood Reserve.

OPEN PAPER PROGRAM: SATURDAY

Saturday, March 11, 2023 | Plaza 3-5

08:30 – 09:30
Lorne Fitch, Retired provincial Fish and Wildlife Biologist
Norine Ambrose, Cows and Fish
Michael Gibeau, Southern Alberta Land Trust.
Plenary on "The role of private lands in conservation"

Connectivity

0930 - 0945
Sage Raymond, Student, University of Alberta
Title: *Factors associated with coyote dens and scats could be used to mitigate human-coyote conflict*

0945 – 1000
Sandra MacDougall, Ecology Instructor, Red Deer Polytechnic
Title: *A spatiotemporal analysis of ungulate-vehicle collision hotspots in response to road construction and realignment*

1000 – 1015
Sarah Elmeligi, Conservation Biologist, Consultant
Title: *Conservation Through Connection: How to effectively engage communities in grizzly bear research*

Development and Land Use

1015 – 1020
Alessandro Franceschini, Student, University of Alberta
Title: *Small mammals response to linear features disturbance and feedback on line recovery*

1020 – 1025
Andrew Barnas, Postdoctoral fellow, University of Victoria
Title: *Large-scale anthropogenic and natural landscape traits entrain different mammalian responses to local anthropogenic disturbance*

1025 – 1030
Emily Herdman, Researcher, InnoTech Alberta
Title: *Using remote cameras to understand changes to boreal mammal spatial networks in industrializing boreal landscapes and mammal responses to outdoor activities in the foothills of Alberta*

1030 – 1045
Coffee Break Provided in Concourse

Disease

1045 – 1100
Deanna Steckler, Wildlife Biologist, Applied Aquatic Research Ltd.
Title: *Age-dependent relationships among diet, body condition, and Echinococcus multilocularis infection in urban coyote*

1100 – 1115
Margo Pybus, Provincial Wildlife Disease Specialist, Fish and Wildlife
Title: *Avian influenza virus: a new chapter in an old book*

1115 – 1130
Qin Xu, Post-doc, University of Alberta
Title: *Hunter response to changes in Chronic Wasting Disease (CWD) prevalence in Alberta*

1130 – 1145
Maria Dobbin, Alberta Wildlife Population Model (AWPM)
Title: *Bioeconomic Tool: harvest strategies for Chronic Wasting Disease management in Alberta*

Behaviour

1145 – 1200
Austin Zeller, Master's Student, University of Alberta
Title: *Temporal Variation of Pileated Woodpecker Drumming Behavior*

Read speaker abstracts in Appendix A.

1200 – 1300
Lunch Provided in Concourse
Wildlife Acoustics Workshop in Garden Courts

Conservation

1300 – 1315
Dee Patriquin, District Environmental Manager, Canadian Division of Flatiron Constructors Canada
Title: *Building Biodiversity - Incorporating Biodiversity Management in Civil Construction*

1315 – 1330
Norine Ambrose, Cows and Fish
Title: *Working together to recover native trout in Alberta - highlights from the Alberta Native Trout Collaborative*

1330 – 1345
Ruiping Luo, Alberta Wilderness Association
Title: *Reversing the sage-grouse decline*

Recreation

1345 – 1400
Norine Ambrose, Cows and Fish
Title: *Understanding your Audience - Survey of Recreational Users in the Eastern Slopes and Needs for Conservation Programs*

1400 – 1405
Lilli Gaston, Research Assistant, University of Victoria
Title: *Anthropogenic footfall contrasts anthropogenic footprint in predicting fisher (Pekania pennanti) occurrence across diverse Albertan landscapes*

1405 – 1435
Coffee Break Provided in Concourse

Habitat

1435 – 1440
Anna Jacobsen, Master's Student, University of Alberta
Title: *High-elevation bird response to shrub dominance on Yukon Mountains*

1440 – 1455
Corey Scobie, Assistant Curator of Ornithology, Royal Alberta Museum
Title: *Consistent autumnal use of grouse leks by displaying males*

1455 – 1510
Glynnis A. Hood, Professor of Environmental Science and Vice Dean, University of Alberta's Augustana Campus.
Title: *Dark skies: Enhancing our temporal and spatial understanding of the ecology of riparian species*

1510 – 1515
Isabelle Lebeuf-Taylor, Master's Student, University of Alberta
Title: *Does tree retention become more valuable over time for forest songbirds?*

1515 – 1530
Peter Thompson, PhD Student, University of Alberta
Title: *Time-dependent spatial memory in Arctic grizzly bears*

1530 – 1545
Jonathan DeMoor, Ecologist, Elk Island National Park
Title: *Development of a predictive ecosystem model for Elk Island National Park*

1545 – 1600
Camila Hurtado, Master's Student, University of Alberta
Title: *Effects of Latitude on Bat Nightly Activity Patterns in Western Canada*

1600 – 1605
Sejer Meyhoff, PhD Student, University of Alberta
Title: *Habitat use and selection by feral horses and domestic cattle in Alberta's foothills: Implications for biodiversity?*

Collaboration

1605 – 1620
Cassie Stevenson, Wildlife Camera Coordinator, University of Alberta
Title: *Strength in numbers: collaboration through innovative new tools and resources for wildlife camera users to address large-scale ecological questions*

Energy Development

1620 – 1635
Lionel Leston, Researcher
Title: *Thresholds, patterns, and interactions: exploring cumulative effects of oil and gas footprint on boreal birds*

Read speaker abstracts in Appendix B.

OPEN PAPER PROGRAM: SUNDAY

Sunday, March 12, 2023 | Plaza 3-5

08:30 – 09:30
Keynote speakers: Wes Olson & Johane Janelle
The Ecological Buffalo: On the trail of a keystone species

09:30 – 10:00
Keynote speaker: Justin Bruised Head
The Kainai Iinnii Rematriation Project, Restoring the plains bison as an ecological and Cultural Keystone

Population

1000 – 1015
Carter Littlefair, Master's Student, University of Alberta
Title: *Biological and environmental correlates of cougar (Puma concolor) survival in west central Alberta*

1015 – 1030
Robert Anderson, Researcher
Title: *Are wolverines eating their neighbour's lunch? Furbearer co-occurrence in Alberta's boreal forest*

1030 – 1045
Kimberley Barrett, Population Geneticist and Master's Student, University of Alberta
Title: *Albertan cougars (Puma concolor) display panmixia as population and range expands*

1045 – 1050
Alina Fisher, PhD Student, University of Victoria
Title: *Birth control for deer? The effectiveness of non-lethal population reduction methods for urban deer management in Victoria, BC*

1050 – 1105
Coffee Break Provided in Concourse

Conflict

1105 – 1120
Gabrielle Lajeunesse, Master's Student, University of Alberta
Title: *An urban coyote intervention program reveals coyotes to be rare and retreat from people in residential neighbourhoods*

1120 – 1135
John Paczkowski, Human Wildlife Coexistence Team Lead, Alberta Forestry Parks and Tourism
Title: *Aversive conditioning and management of grizzly bears in Kananaskis Country, Alberta, between 2000 and 2022. A review of theory, practice and challenges*

1135 – 1150
Claire Edwards, Master's Student, University of Alberta
Title: *Measuring the success of aversive conditioning of grizzly bears in Kananaskis Country, Alberta, Canada*

Habitat

1150 – 1205
Lisa Takats Priestley, Wildlife Researcher, STRIX Ecological
Title: *Housing the Barred Owl (Strix varia) in Alberta: nests and home ranges*

Read speaker abstracts in Appendix C.

Development

1205 – 1220
Andrew Crosby, Research Associate, University of Alberta
Title: *Domains of scale in cumulative effects of energy sector development on boreal birds*

1220 – 1235
Jason Fisher, Director of the Applied Conservation Macro Ecology (ACME) Lab, University of Victoria

Title: *Let the good times roll! Boreal mammals hustle to exploit the landscape subsidies from development*

1235 – 1240
Spencer Quayle, Student, University of Alberta
Title: *Seismic lines, browse, and growing deer populations in the oil sands region*

POSTER SESSION

Saturday, March 11, 2023 | Plaza 3-5

Cora Kaplan, Student, MacEwan University
Title: *Using Citizen Science to Monitor Franklin's Ground Squirrels*

Peter Thompson, PhD Student, University of Alberta
Title: *Evaluating the efficacy of wildlife corridors in Canmore, Alberta*

Wyatt Villetard, Master's Student, University of Alberta
Title: *Movement ecology and hunting on Alberta's nesting Sandhill Cranes*

Taylor Hart, Master's Student, University of Alberta
Title: *The long-term impacts of landscape configuration on Black-throated Green Warbler (Setophaga virens) occupancy and site turnover at Calling Lake, Alberta over 25 years*

Leif Hvenegaard, Student, University of Alberta's Augustana Campus
Title: *Snowed under: Novel detection methods for use of winter wetlands by mammals*

Payton Baltzer, Student, Red Deer Polytechnic
Title: *Home Ranges of Female Elk (Cervus canadensis) in Elk Island National Park, Alberta*

Lisa Wilkinson, Senior Species at Risk Biologist and Provincial Bat Specialist, Alberta Environment and Protected Areas
Title: *Alberta Bats under Threat*

Cory Olson, Program Coordinator, WCS Canada's Alberta Bat Program
Title: *Use of bridges by bats in western Canada and their applications for wildlife health monitoring*

Tharindu Kalukapuge, PhD Student, University of Alberta
Title: *Effects of linear feature width on boreal songbird communities How much does width matter?*

Read presenter abstracts in Appendix D.

CONFERENCE COMMITTEES 2023
THANK YOU!

The ACTWS is an organization blessed with many dedicated volunteers who continually donate their time, expertise, and passion to organizational operations. We are so grateful for their hard work! This conference would not be what it is without them!!

Conference Chair: Sarah Hatt

General Planning Committee: Sarah Hatt, Shantel Carels, Emily Herdman, John Paczkowski, Samantha Stamler, Glenn Mack, Remington Bracher, Robb Stavne, Alyssa Bohart

Open Paper Program: Robb Stavne, Emily Herdman, Robin Gutsell, Thea Carpenter

Expert panel discussions: Sarah Hatt, Sarah Elmeligi, John Paczkowski, Nikki Heim

Public Talk: Sarah Hatt

Student Event: Remington Bracher

Professional Awards: Samantha Morris-Yasinski, Margo Pybus, Everett Hanna, Lee Foote, Dragomir Vujnovic, Phil Walker, Nick Parayko

Field Trip and Workshop: Shantel Carels and Meghan Anderson

Student Presentation Awards: Samantha Stamler, Lionel Leston, Corey Scobie, Dragomir Vujnovic, Jessica Melsted, Meghan Anderson, Thea Carpenter, Dan Farr

Scholarships and Grants: Glenn Mack, Robb Stavne, Corey Scobie, Shantel Carels

Indigenous Liaison Support: Ednna Stobschinski

Auction: Glenn Mack, Samantha Stamler, Shantel Carels, Sarah Hatt

Sponsorship: Alyssa Bohart, Larissa Clayton, Shantel Carels, Samantha Stamler

Registration: Samantha Stamler

Website: Layla Neufeld, Lucas Habib, Shantel Carels

Communications and MC: Sarah Hatt, Emily Herdman, John Paczkowski, Samantha Stamler, Glenn Mack, Remington Bracher, Robb Stavne

Program: Emily Herdman, Shantel Carels

Day-of Volunteers: Logan Farr, Andile Ncube

APPENDIX A: SATURDAY AM

Connectivity

09:30 – 09:45
Sage Raymond
Co-authors: Colleen Cassady St. Clair
Title: *Factors associated with coyote dens and scats could be used to mitigate human-coyote conflict*

Abstract: Urban coyotes (*Canis latrans*) are associated with both physical conflict (e.g., attacks) and zoonotic disease risk, which include the zoonotic tapeworm *Echinococcus multilocularis* that sheds eggs with coyote scats. Both forms of conflict might be mitigated with more understanding of how the unique ecology of coyotes in urban areas causes humans and coyotes to overlap. We advanced this information by identifying locations of coyote dens and scats in Edmonton, Alberta where the tapeworm is especially prevalent, and comparing both to environmental predictors and reports of coyote conflict submitted by members of the public. We also tested a subset of scats for infection with the tapeworm. Among 120 detected dens, we found few broad scale environmental predictors, but a preference for dense vegetation on east-facing slopes, often with surprising proximity to buildings, and a higher prevalence of reports by the public. Among 1532 scats, deposits were common near human residences, often contained anthropogenic food, and were sometimes fed upon by magpies (*Pica hudsonia*), which may redistribute microscope tapeworm eggs in their own feces. Among 269 scats we tested, infection was more common in scats that contained anthropogenic food or were deposited near compost. Our results provide environmental predictors that might be used to mitigate risk of conflict associated with urban coyotes, such as by thinning vegetation that could attract denning coyotes near residential areas, securing compost associated with infection and other coyote attractants, and educating the public about the potential for tapeworm eggs to accumulate in locations frequented by coyotes.

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.

0945 – 1000
Sandra MacDougall
Co-authors: Michal Bil, Richard Andrášik, Jiři Sedonik and Esther Stuart
Title: *A spatiotemporal analysis of ungulate-vehicle collision hotspots in response to road construction and realignment*
Abstract: The purpose of this study was to evaluate the spatiotemporal evolution of ungulate-vehicle collision (UVC) hotspots in response to major road construction. Our approach was novel in that we tested the paired use of a clustering method known as Kernel Density

Estimation Plus and a spatiotemporal stepwise modification of this method to monitor UVC hotspots. Two different locations and scales in the province of Alberta were examined: (1) Deerfoot Trail, a major artery into the City of Calgary which included wildlife mitigation (4.5 kilometers of fencing with underpasses); and (2) 54.5 kilometers of Highway 63 in northern Alberta which was converted from a 2-lane undivided to a 4-lane divided highway. Using government police collision and carcass data (2000-2021), the spatiotemporal analysis was applied using a 3-year moving window with a one-day step to assess hotspots. Before-after or control-impact analyses were used to assess changes to UVC rates (UVC/km/year). Emerging UVC hotspots were detected shortly after Deerfoot Trail opened, including a stable hotspot at the end of the wildlife exclusion fence and ephemeral hotspots within the fenced zone. Wildlife mitigation measures had a large effect on reducing UVC. At the second study site, Highway 63, the majority of historical UVC hotspots re-emerged after construction of the divided highway was complete with slight, but not significant, increases in UVC rates. We demonstrate the complimentary nature of different UVC clustering approaches as part of retrospective analyses or for dashboard-based real-time monitoring of UVC hotspots.

Biosketch: Sandra MacDougall is an ecology instructor at Red Deer Polytechnic in Red Deer, Alberta.

1000 – 1015

Sarah Elmeligi

Co-authors: Andrea Morehouse and Courtney Hughes

Title: *Conservation Through Connection: How to effectively engage communities in grizzly bear research*

Abstract: In Alberta, wild spaces are in short supply, and consequently bears and people increasingly share the landscape, though not necessarily by choice. As a result, peoples' needs may not be prioritized over those of bears, even in cases of human-bear conflict. For bear conservation to be effective, and coexistence possible, the needs of both bears and people must be simultaneously addressed. Rather than an afterthought or a sentence in the conservation/management implications section of a paper, the "human" in human dimensions of wildlife should be addressed before, during, and after a research project. However, this can be a difficult and often complicated task, for multiple reasons. Building relationships founded on trust, respect and reciprocity with community members takes commitment, time, and a willingness by researchers to be open-minded in terms of methodologies. Different cultural norms, beliefs, perspectives and biases can further exacerbate these challenges. We share three short case studies reflecting our own research experiences engaging with communities and integrating social science in large carnivore research and conservation action. We offer several guidelines for moving forward and suggestions for tackling some of the common barriers to effective community engagement. By working collaboratively with communities, we suggest a more holistic and applicable approach to conservation science, established on a foundation of strong community support and thoughtful, robust interdisciplinary science.

Biosketch: Sarah Elmeligi, PhD is an interdisciplinary conservation biologist whose research has focused on grizzly bear management and coexistence with communities and recreationalists. She

has worked for environmental non-profits organizations and government, and now owns her own consulting company. She values working collaboratively with communities to further conservation.

Development and Land Use

1015 – 1020

Alessandro Franceschini

Co-authors: Erin Bayne

Title: *Small mammals response to linear features disturbance and feedback on line recovery*

Abstract: Small mammals are critical components of terrestrial ecosystems, with functions that range from seed and seedling predation to mycorrhizal spores and seed dispersal. Studies on European boreal forests suggested a significant role of small mammals in forest regeneration, with effects on plant establishment rates comparable to or stronger than those mediated by larger herbivores. However, little is known about small mammals' role in North American boreal forests' regeneration. This information is crucial to reduce the human footprint in a scenario of increasing exploitation from natural resource extraction as the boreal region of Alberta is experiencing. This project will explore the response of a forest specialist (the Southern red-backed vole, *Myodes gapperi*), an open-habitat (the Meadow vole, *Microtus pensylvanicus*), and a generalist (the Deer mice, *Peromyscus maniculatus*) rodent species to linear features in the lower Athabasca region. Through a combination of remote sensing, live trapping, and exclosure experiments, I will infer patterns of habitat use, the intensity of use, and foraging behavior of these rodent species across a gradient of upland to lowland forest stratified by linear feature width (narrow seismic, conventional seismic, and pipelines). This project will contribute to a better understanding of how the small mammals community responds to the oil and gas disturbance and how the resulting community affects the regeneration trajectory of disturbed sites. The results will help implement more successful regeneration treatments and provide recommendations for a more efficient restoration.

Biosketch: Hi, I am Alessandro Franceschini, a first-year PhD student in the Bayne lab at the University of Alberta. I have a strong background with camera traps, and I am broadly interested in addressing mammal ecological questions by combining data from different remote sensing methods.

1020 – 1025

Andrew Barnas

Co-authors: Andrew Ladle, Joanna Burgar, Cole Burton, Mark Boyce, Laura Eliuk, Fabian Grey, Nicole Heim, John Paczkowsi, Frances Stewart and Jason Fisher

Title: *Large-scale anthropogenic and natural landscape traits entrain different mammalian responses to local anthropogenic disturbance*

Abstract: In the western Nearctic boreal system, effects of resource extraction are documented to have altered mammal populations and communities. Many studies focus on a single landscape, but species-stressor relationships may vary among landscapes. Large-scale syntheses of camera data are advantageous in identifying generalizable trends, and examining interactions between site (e.g.

disturbance at camera sites) and landscape level (e.g., cumulative landscape disturbance, productivity levels) effects. We collected images from 957 camera sites across 9 landscapes in Alberta from 2009-2020, representing 380,635 camera trap days, and fit generalized linear models examining weekly occurrence for 11 mammal species. Interactions between site and landscape level disturbance yielded two statistically significant trends; white-tailed deer preferred higher disturbed sites within lower disturbed landscapes ($\hat{I}^2$ = -0.28 [-0.4 - -0.15]), whereas moose preferred higher disturbed sites within higher disturbed landscapes ($\hat{I}^2$ = 0.2 [0.09 - - 0.31]). Higher productivity habitats in high disturbance sites were preferred by black bears ($\hat{I}^2$ = -0.24 [-0.46 - -0.01]), lynx ($\hat{I}^2$ =-0.75 [-1.08 - -0.41]), and wolves ($\hat{I}^2$ =-0.51 [-0.79 - -0.24]). This relationship was opposite for mule deer ($\hat{I}^2$ = 0.77 [0.39 - - 1.14]), and white-tailed deer ($\hat{I}^2$ = 0.24 [0.01 - - 0.47]), with a higher probability of occurrence in low productivity habitats with increasing site disturbance. Large-scale syntheses can identify generalized trends for some species, but fail to do so for others, indicating more specific conservation interventions may be required. Promoting large scale syntheses to direct conservation actions should be prioritized for future projects.

Biosketch: Andrew Barnas is a postdoctoral fellow at the University of Victoria. His primary research interests involve understanding the effects of disturbance on wildlife communities, specifically how disturbance can lead to new predator-prey interactions. Outside of science, Andrew is an avid kayaker, woodworker, and video game addict.

1025 – 1030

Emily Herdman
Co-authors: Cole Burton, Gonçalo Curveira-Santos, and Solène Marion
Title: *Using remote cameras to understand changes to boreal mammal spatial networks in industrializing boreal landscapes and mammal responses to outdoor activities in the foothills of Alberta*

Abstract: Compound effects of anthropogenic disturbances on wildlife emerge through a complex network of direct responses and species interactions. In boreal ecosystems, rapid land-use changes driven by the energy and forestry industries impact species and their habitats, whereas recreational land use is a key driver in the foothills of the Rocky Mountains. Uncertainty remains about both a) the extent to which the direct and indirect effects of disturbance emerge and propagate across mammal communities in different landscape contexts and b) the impacts of recreation on species habitat use. Using camera trap arrays in 4 locations in Alberta, we tested a) disturbance-mediated pathways governing the spatial structure of multi-predator, multi-prey boreal mammalian networks across a disturbance gradient within Canada's Athabasca Oil Sands Region and b) the habitat choice and behaviour of mammals between areas of relatively high and relatively low recreation pressure in Alberta's foothills. Results and implications of this research for management of land use will be highlighted and access to additional information sources will be shared.

Biosketch: Emily Herdman is a researcher at InnoTech Alberta working to enable efficient, effective and economical environmental monitoring and management for a broad spectrum of organizations. Wildlife biology is her passion but managing people and processes takes up a lot of her time.

Disease

1045 – 1100

Deanna Steckler

Co-authors: Scott Sugden, Dana Sanderson, Bill Abercrombie, M. Alexis Seguin, Kyra Ford and Colleen Cassady St. Clair

Title: *Age-dependent relationships among diet, body condition, and Echinococcus multilocularis infection in urban coyote*

Abstract: Urban coyotes (*Canis latrans*) in North America increasingly exhibit a high prevalence of *Echinococcus multilocularis*, a cestode of recent and rising public health concern that uses rodents as intermediate hosts and canids as definitive hosts. However, little is known about the factors that drive the high urban prevalence of this parasite. We hypothesized that the diet of urban coyotes may contribute to their higher *E. multilocularis* infection prevalence via either (a) greater exposure to the parasite from increased rodent consumption or (b) increased susceptibility to infection due to the negative health effects of consuming anthropogenic food. We tested these hypotheses by comparing the presence and intensity of *E. multilocularis* infection to physiological data, short-term diet, and long-term diet in 112 coyote carcasses collected from Edmonton, Alberta and the surrounding area. Overall, the best predictor of infection status in this population was young age, where the likelihood of infection decreased with age in rural coyotes but not urban ones. Neither short- nor long-term measures of diet could predict infection across our entire sample, but we found support for our initial hypotheses in young, urban coyotes: both rodent and anthropogenic food consumption effectively predicted *E. multilocularis* infection in this population. The effects of these predictors were more variable in rural coyotes and older coyotes. We suggest that limiting coyote access to areas in which anthropogenic food and rodent habitat overlap (e.g., compost piles) may effectively reduce the risk of infection, deposition, and transmission of this emerging zoonotic parasite in urban areas.

Biosketch: Deanna is a recent M.Sc. graduate of the University of Alberta and is now employed as a Wildlife Biologist at Applied Aquatic Research Ltd. in Calgary, AB. Her education and experience have focused heavily on animal behaviour, wildlife diseases, and the mitigation of human-wildlife conflict.

1100 – 1115

Margo Pybus

Co-authors: A. Goldsmith

Title: *Avian influenza virus: a new chapter in an old book*

Abstract: Avian influenza virus (AIV) is ancient. It likely coevolved along with avian progenitors as they moved on from being feathered dinosaurs. It has global distribution, with primary natural reservoirs in waterfowl and shorebirds. The long-standing relationship between these species and AIV results in minor pathologic effects and general lack of mortality in wild birds. Until now! Throughout 2022, a virulent strain of AIV, an H5N1 form, was associated with significant mortality in wild waterfowl, raptors, and corvids, with spillover into wild mammals that ate infected birds. Avian influenza hit Alberta in April as migrating waterfowl returned north. Snow geese were the most common birds found dead, but numerous hawks, owls, corvids, and striped skunks also died with

AIV. Through summer, mortality at cormorant and grebe colonies revealed H5N1 infections. Things died down in late summer but mortality picked up in fall as arctic waterfowl migrated south, crossing through Alberta. The virus flared up again in winter concentrations of Canada geese and some dabbling ducks on open water reaches of the Oldman and South Saskatchewan rivers and nearby reservoirs and ponds. In a global context, H5N1 is now widespread in wild waterfowl and shorebirds across Asia, Europe, Africa, and North America. Recent reports indicate southern spread into Central and South America. Like a certain endless bunny, this form of avian influenza virus just keeps on going and going and going. It is indeed writing a new chapter in its old old book, living proof that nothing is written in stone.

Biosketch: Margo is the provincial wildlife disease specialist with Fish and Wildlife, and a longstanding member of ACTWS. She leads and coordinates multiple wildlife disease programs in Alberta, and has done for many years. She is part of a network that integrates and communicates all aspects of wildlife diseases.

1115 – 1130
Qin Xu
Co-authors: Vic Adamowicz, Marty Luckert, John Pattison-Williams, Evelyn Merrill, Maria Dobbin, Anne Hubbs, and Margo Pybus
Title: *Hunter response to changes in Chronic Wasting Disease (CWD) prevalence in Alberta*
Abstract: Chronic Wasting Disease (CWD) has the potential to diminish deer populations and affect various segments of society including recreational hunters. Hunter harvest programs can be a cost-effective and socially acceptable approach to CWD management. However, there is little information on hunter behavioral response to CWD and whether they will be willing to play this role as the prevalence of CWD increases. Our study estimates the effect of CWD prevalence, mandatory zone designation, and other factors, on hunter applications for draw licenses for mule deer (*Odocoileus hemionus*). License applications reflect the first step in hunter demand for deer. We use aggregate application data across 37 Wildlife Management Units (WMUs) in Alberta from 2006-2022. Two-way fixed effects models are employed to identify the relationship between CWD prevalence at various levels and draw applications. Preliminary results indicate that applications for mule deer decline when CWD prevalence rates increase. For example, the applications for antlered mule deer licenses are estimated to decline by 6.6% if CWD prevalence rates increase from 10% to 20%. Our findings suggest there may be limitations regarding the extent to which hunters may be willing to participate in CWD management.

Biosketch: Qin Xu is a Post-doc from University of Alberta. She got her PhD degree in Food, Agricultural, and Resource Economics from University of Guelph. Her research interest includes consumer's behavior, climate change, water, and agriculture production. She is working on projects about hunter's behavior response to Chronic Waste Disease (CWD).

1130 – 1145

Maria Dobbin

Co-authors: Evelyn Merrill, Maria Dobbin, Anne Hubbs, Margo Pybus, Vic Adamowicz, Marty Luckert, Qin Xu and Mark Lewis

Title: *Bioeconomic Tool: harvest strategies for Chronic Wasting Disease management in Alberta*

Abstract: Chronic wasting disease (CWD) produces 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. We present an Integrated Population Modeling approach (IPM) for developing the scientific basis for adaptive, harvest policies for managing CWD in Alberta. IPMs can improve precision by using data from different sources for increased precision, are statistically rigorous in the face of incomplete data, and quantify uncertainty. The project focuses on adapting an IPM for mule deer to address CWD management. Inputs to the model include mule deer population numbers from aerial surveys, mule deer demographic, harvest data and hunter preferences from hunter-harvest surveys, mule deer population processes from field studies, and disease prevalence data from the Alberta CWD surveillance program between 2000 - 2022. First, we provide a brief overview of the structure of and components of the mule deer IPM. Second, we present how CWD transmission is incorporated into the IPM and how spatio-temporal changes in CWD prevalence influences hunter behaviour and its impact on effective harvest strategies. Third, we give an overview of how the IPM is integrated into a Bioeconomic Tool for assessing the cost-benefit of a suite of CWD harvest strategies for maintaining deer populations and hunting opportunities while minimizing CWD prevalence and spread. Finally, we illustrate how strong research collaboration, including an Advisory Committee of Alberta experts, helps to ensure data rigour and standardization, and deer management application, including recommendations for future data collection.

Biosketch: Maria Dobbin is currently working with the Alberta Wildlife Population Model (AWPM) as part of a collaborative team that includes members from Alberta Environment and Protected Areas and the University of Alberta to create a bioeconomic tool that addresses strategies for managing chronic wasting disease in Alberta.

Behaviour

1145 – 1200

Austin Zeller

Co-authors: Erin Bayne, Lisa Mahon

Title: *Temporal Variation of Pileated Woodpecker Drumming Behavior*

Abstract: This study investigated the temporal variation in detection of pileated woodpecker's (*Dryocopus pileatus*) drumming behavior using autonomous recording units (ARUs) in the boreal forest and foothills regions in Alberta, Canada. Results revealed a significant relationship between pileated woodpecker drumming behavior and day of year, with a peak in activity early April. We additionally revealed a significant relationship between pileated woodpecker drumming and time of day, with the highest activity observed around sunrise and a secondary peak during the crepuscular hours in the evening. The study suggests that pileated woodpeckers use drumming as an attractant for potential mates during the breeding season, but also for other purposes unrelated to breeding,

for detection remains possible beyond the projected breeding season. Furthermore, we found that pileated woodpeckers use day length as a seasonal indicator which explains shifts in drumming behavior over the course of the year. Inversely, daily weather patterns did not seem to influence pileated woodpecker drumming behavior, suggesting that seasonality may be the main driving factor behind changes in pileated woodpecker behavior. The findings provide insights into the temporal dynamics of pileated woodpecker drumming behavior and can inform conservation and management efforts for the species, as well as serve as a tool for studying the behavior of other wildlife species. The study recommends future sampling to take place around April 6th and to focus on the time period of one hour after sunrise for the highest probability of detection.

Biosketch: I am a Master's of Science student at the University of Alberta studying woodpecker ecology. Previously I have worked mainly with endangered and species of special concern throughout North America. My research interests include northern ecology, population ecology, ecological theory, abstract ecology and landscape management.

APPENDIX B: SATURDAY PM

Conservation

1300 – 1315
Dee Patriquin
Title: *Building Biodiversity - Incorporating Biodiversity Management in Civil Construction*

Abstract: Sustainability has become a corporate expectation, and the civil construction industry is no exception. Flatiron Constructors Canada, with other HOCHTIEF companies has committed to the HOCHTIEF Sustainability Plan 2025, a global initiative with ambitious targets, including biodiversity management. To support this goal, we have increased focus on how we manage impact to species and habitats during construction. Through new programs, we aim to raise awareness of management options, as well as biodiversity itself. Pilot programs using the citizen science app "iNaturalist" ask staff to record their observations of plants and wildlife activity on and near project sites. Communications on ecological restoration expand our mitigation toolbox corporately. These changes help meet typical contractual and regulatory obligations, but also teach our owner-contractor construction teams more about the natural environments they work in, and ultimately, will help them better mitigate impacts on site. This talk will describe the early phase of implementation of a corporate switch to biodiversity management, lessons learned, and next steps in the program.

Biosketch: Dee is the District Environmental Manager for the Canadian Division of Flatiron Constructors Canada. Her previous experience in environmental assessment, policy and management, gained over a 32 year career in environmental consulting and construction management brings a sustainability lens to Flatiron's Environmental Programs. Working with Flatiron's

project teams across Canada, she helps design and constructs projects through a collaborative environmental management approach.

1315 – 1330

Norine Ambrose

Co-authors: Amy McLeod

Title: *Working together to recover native trout in Alberta - highlights from the Alberta Native Trout Collaborative*

Abstract: Headwater streams of the Eastern Slopes are the last stronghold for Alberta's threatened Native Trout but with cumulative pressures, including recreation, grazing, and industry, it can be overwhelming to know where to focus recovery efforts. The Alberta Riparian Habitat Management Society (Cows and Fish) works with watershed groups, land users, and land managers to help mitigate human pressures on riparian and aquatic habitats. In recognition of the need to work together to tackle this complex issue, Cows and Fish joined the Alberta Native Trout Collaborative (NTC) in 2019. The NTC is a group of organizations, partnering to support native trout recovery in Alberta through coordination of resources and effort, watershed prioritization, habitat restoration, monitoring, and education and outreach. Bringing together a diversity of data, skillsets, and stakeholders, the NTC has developed new tools to prioritize and mobilize. Moving from analysis to action, engaging Albertans on the issues facing Native Trout has not been without its challenges. Lessons learned in this work are less about the fish and more about the people, which can then be applied to wildlife and habitat work requiring such collaborations. Cows and Fish has focused on education, supporting the communications team of NTC, as well as restoration of critical riparian habitat, and will talk about some of the accomplishments as well as challenges faced.

Biosketch: In her 23 years with Cows and Fish, Norine has focused on working with landowners, communities and natural resource professionals to help them recognize and value riparian areas, to maintain these areas as healthy, productive pieces of our landscape, by sharing lessons learned in effective program design and delivery.

1330 – 1345

Ruiping Luo

Title: *Reversing the sage-grouse decline*

Abstract: Sage-grouse are an iconic prairie bird, and once roamed most of the Great Plains of North America. Since then, settlement and development has fractured much of their habitat, and devastated sage-grouse populations. We present a brief history of sage-grouse, their reliance on sagebrush, and the past and present threats to their habitat. We examine the protections and conservation efforts to restore sage-grouse populations and the effectiveness of these measures, and we discuss requirements for a resilient and self-sustaining sage-grouse population. Sage-grouse numbers remain critically low. Their numbers are dependent on intact sagebrush habitat, and human impacts pose a serious threat to the remnant populations. Urgent action is needed to prevent the loss of this species from Alberta.

Biosketch: For the past year, I have been working with the Alberta Wilderness Association on grasslands and species-at-risk issues. AWA works to bring awareness of threats to Alberta's wild

areas, and to protect and conserve habitat for wildlife. Sage-grouse have long been a particular focus for AWA's conservation work.

Recreation

1345 – 1400

Norine Ambrose

Co-authors: Amy McLeod

Title: *Understanding your Audience - Survey of Recreational Users in the Eastern Slopes and Needs for Conservation Programs*

Abstract: Since 1992 Cows and Fish has worked extensively with landowners, partners and local watershed community groups to create long-lasting outcomes for improved riparian health, through thousands of outreach activities and riparian health inventories, hundreds of partnerships, plus several external program evaluations. In recent years, we've expanded to more work on public land in the Eastern Slope's land used by those recreating and not necessarily living or working there. To better understand this audience and direct our program, we completed a large survey of those using these places. This survey revealed some apparent contradictions in what people say, versus what they see, and our anecdotal observations. Some types of recreational user are more knowledgeable than others and there was a wide spectrum of behaviour, but most types had similar priorities for conservation of wildlife and natural spaces, meaning there is opportunity to focus on shared values in conservation programs. By better understanding behaviours, knowledge and attitudes of recreational users, we are working to fill gaps in knowledge and can direct where our, and other's, can be focused to maintain or improve ecosystem health.

Biosketch: In her 23 years with Cows and Fish, Norine has focused on working with landowners, communities and natural resource professionals to help them recognize and value riparian areas, to maintain these areas as healthy, productive pieces of our landscape, by sharing lessons learned in effective program design and delivery.

1400 – 1405

Lilli Gaston

Co-authors: Rebecca M. Smith, Andrew Ladle, Frances E.C. Stewart and Jason T. Fisher

Title: *Anthropogenic footfall contrasts anthropogenic footprint in predicting fisher (Pekania pennanti) occurrence across diverse Albertan landscapes*

Abstract: Species distribution models (SDMs) are one method used to explain and predict animal occurrences. Occurrence is influenced by multiple ecological processes that vary across landscapes, leading to misrepresentation of the importance and strength of distribution drivers. Fishers (*Pekania pennanti*) are a mesocarnivore known to favour forests with complex structure, yet the influence of other abiotic and biotic factors driving their distributions varies among studies. We aimed to determine the strongest predictors of fisher occurrence across multiple landscapes by evaluating the strength of; (1) natural landcover; (2) anthropogenic landscape disturbances; (3) snow and topography; and (4) co-occurrence of competitors, predators, and prey. We also aimed to determine the directionality of occurrence in relation to specific anthropogenic disturbance features. We sampled fisher

occurrence using camera traps deployed systematically across three study landscapes in Alberta, Canada. These landscapes vary markedly in natural landcover composition, anthropogenic disturbance density, and other biotic and abiotic features: the Rocky Mountains, central boreal-aspen parkland, and the northeast boreal forest. Anthropogenic landscape disturbance most strongly predicted fisher occurrence. Occurrence was negatively explained by the "footfall" of anthropogenic disturbance (actively used features), and positively by the "footprint" (inactive features). Natural landcover was not the strongest predictor of occurrence; however, fishers were positively associated with all available habitat types. SDMs must consider the relative strength and direction of distribution predictors when isolated from regional habitat availability constraints by including multi-landscape observations. Developed landscapes have severe implications for sensitive and wide-ranging species, thus multi-landscape inferences are required for conservation and management objectives.

Biosketch: Lilli Gaston is a Research Assistant in the Applied Conservation Macroecology Lab at the University of Victoria, where she recently graduated with a B.Sc. in biology. In the spring, she will be attending Carleton University to pursue a M.Sc. in wildlife ecology. Lilli enjoys kayaking, birdwatching, and reading fiction.

Habitat

1435 – 1440
Anna Jacobsen
Co-authors: Dr. Erin Bayne and Dr. C. Lisa Mahon
Title: *High-elevation bird response to shrub dominance on Yukon Mountains*

Abstract: This project examines the implications of increasing shrub dominance on high-elevation bird populations in the Yukon. Shrubs are among the taxa expanding their habitat ranges farther north and to higher elevations as a result of increasing global temperatures, and bird species that live and breed in sub-alpine and alpine-tundra habitats may be influenced by this increased shrubification. Thompson et al. (2016) examined the implications of increasing shrub dominance across a latitudinal gradient on bird species abundance in Alaska, and found varying non-linear relationships between each bird species abundance and different variables of shrub dominance. My project is based on similar concepts and methods, but will examine the relationships between shrub height, cover, and density and predicted bird abundance along an elevational gradient on mountains in the Yukon Territory. I hope to answer questions about which high-elevation bird species may be positively or negatively impacted by increasing shrub dominance, which components of shrub dominance may have the greatest effect on future distribution and abundance of high-elevation bird species, and compare whether relationships across a latitudinal gradient in Alaska align with relationships across an elevational gradient in the Yukon in similarly vegetated habitats.

Biosketch: I am a MSc student in Dr. Erin Bayne's lab at the University of Alberta.

1440 – 1455
Corey Scobie
Co-authors: Dave Scobie, and Erin Bayne

Title: *Consistent autumnal use of grouse leks by displaying males*

Abstract: Sharp-tailed grouse attend leks all year, with peaks in attendance during April and again in the autumn. We identified sharp-tailed grouse leks that were active in the spring and re-surveyed them in the autumn by setting-up Autonomous Recording Units programmed to record sound each morning during September and October in 2017 and 2018. The purpose of this study was to quantify when sharp-tailed grouse attend active leks in the autumn. We recorded 2.4 TB of acoustic data from 77 active leks located in southern and central Alberta. We developed a sharp-tailed grouse recognizer in Song Scope (Wildlife Acoustics) and used it to identify probable sharp-tailed grouse "gobbles" in the audio data. We then manually listened to all sounds the recognizer identified as sharp-tailed grouse gobbles for every fifth day for each lek site, each year. The presence or absence of sharp-tailed grouse gobbles each 30 minutes was examined against date, time and environmental conditions (wind, temperature, humidity, etc.) to identify factors that influence grouse attendance at leks during the autumn. We will present preliminary results, which show a pattern of predictable grouse lek use in the autumn. Our results will be used to outline wildlife survey conditions which give the ability to detect sharp-tailed grouse leks during wildlife surveys in the autumn. This will increase opportunities to identify and protect these important ecological features.

Biosketch: Corey Scobie is Assistant Curator of Ornithology at the Royal Alberta Museum where he helps manage the Ornithology collection, prepares birds and runs various research projects. Previously, Corey worked with Species at Risk in the grasslands of Canada, where he focused on the influence of industrial sound on burrowing owls.

1455 – 1510

Glynnis A. Hood

Title: *Dark skies: Enhancing our temporal and spatial understanding of the ecology of riparian species*

Abstract: Freshwater habitats support high levels of biodiversity and provide important habitat for wetland-dependent taxa; however, impairment of aquatic connectivity through wetland loss, stream alterations, and light pollution impede dispersal, gene flow, and prey availability. Quantifying occupancy of these habitats to assess their use by riparian animals can be challenging, especially for cryptic species. This study examines habitat use of riparian mammals and wetland birds, and their spatial and temporal relationships with other species within the Beaver Hills Biosphere Reserve in Alberta, Canada. Using a multi-method detection approach "including camera boxes, cameras on beaver dams, and camera rafts" we applied multivariate analyses to determine temporal and spatial patterns of habitat use and species associations. From ~50,000 images, we identified over 84 species. For example, wildlife cameras recorded 52 species of birds and 26 species of mammals. Species consistently varied by deployment method. Of the mammals, most were small mammals. Birds were evenly split among songbirds and waterbirds, including species of concern with no recent previous records within the study area. Over 75% of the observations occurred at night, although there was a distinct preference for daytime activity for birds. Relative to moon phase, most mammal activity was lowest during full-moon periods, with new-moon periods being the second least active moon phase. There were significant species associations and temporal patterns in detection. The use of modified camera traps dramatically increased detection of cryptic riparian species not readily "captured" by traditional placement of camera traps.

Biosketch: Dr. Glynnis Hood is an ecologist and Professor of Environmental Science and Vice Dean at the University of Alberta's Augustana Campus in Camrose.

1510 – 1515

Isabelle Lebeuf-Taylor

Co-authors: Dr. Erin Bayne

Title: *Does tree retention become more valuable over time for forest songbirds?*

Abstract: The boreal forest in Alberta is increasingly subjected to large-scale anthropogenic industrial activities, such as logging. One mitigation strategy that forestry managers have implemented to minimize the impact of logging on wildlife is the retention of mature trees within harvest units. Although these patches of retained trees are often small in size, they may serve as important refugia for forest songbirds. The purpose of this study is to test the hypothesis that retained mature trees within harvest units accelerate the rate of forest songbird return to logged forests.

Six versatile forest songbird species are being studied across conifer, mixedwood, and deciduous forests throughout Alberta. The rate of use of these birds will be compared between areas within harvest units that retain mature trees and areas that were fully logged. The study encompasses a 20-year gradient to evaluate the response of the birds over time. The detection of birds was obtained through the use of Autonomous Recording Units (ARUs) capable of detecting and recording birdsongs from a distance.

A new approach will be adopted in this study, which is to limit the amplitude of the detected birdsongs to enhance the precision of the ecological answer. This approach will provide a more accurate measure of the time birds spend singing in retained trees relative to areas without retained trees or the adjacent unlogged forest. The results of this study will provide invaluable feedback to forestry managers on the value of retained patches in harvests.

Biosketch: Isabelle is a Masters student in the Bayne Lab at the University of Alberta. Her current work is on the rate of return of forest songbirds to harvests that retain mature trees during logging.

1515 – 1530

Peter Thompson

Co-authors: Mark A. Lewis, Mark A. Edwards and Andrew E. Derocher

Title: *Time-dependent spatial memory in Arctic grizzly bears*

Abstract: Animal movement modelling can provide unique insight about how perception, memory, and other cognitive processes influence space use. By pairing animal location data with environmental data that quantify spatiotemporal landscape heterogeneity, statistical models can identify patterns that suggest spatial memory-informed movement in wild animals. We designed such an approach and applied it to a population of barren-ground grizzly bears (*Ursus arctos*) in the Mackenzie Delta region of northern Canada. The Mackenzie Delta is a cold, low-productivity region where grizzly bears are forced to switch between seasonally available food resources. While these resources are very heterogeneous across spatial and temporal scales, they are also predictable. We hypothesized that grizzly bears would leverage this predictability to revisit resource-rich patches at

predictable time lags. Our memory-informed models outperformed traditional habitat selection approaches in 71% (15/21) of the bears in our sample. The maximum likelihood estimates for our model parameters suggested that these bears waited approximately one year before returning to previously visited regions of their home ranges, potentially to capitalize on annually reoccurring food sources. Our model offers insight into complex cognitive drivers behind the movement of an opportunistic, omnivorous mammal in the Arctic, and can be used more broadly to identify memory-driven movement in other ecological systems.

Biosketch: I am a movement ecologist in the final stages of my Ph.D. at the University of Alberta. Most of my interests lie in understanding why animals go where they do. I hope to use this knowledge to predict changes in animal space use in the face of anthropogenic change.

1530 – 1545
Jonathan DeMoor
Co-authors: Dr. Rob Found
Title: *Development of a predictive ecosystem model for Elk Island National Park*
Abstract: Elk Island National Park protects a small reserve of the threatened Aspen Parkland ecoregion and contains populations of the full native ungulate guild. Maintaining the ecological integrity of the overall park ecosystem including the grazing and browse resources while also ensuring the health and genetic integrity of the park's ungulate herds is a delicate balance. The relatively small size of the park, the fact that it's entirely fenced, and that large carnivores are largely absent makes management especially challenging. Elk Island National Park staffs have developed an implementation of the SAVANNA ecosystem model to better understand how active management decisions interact with natural processes in the context of large-scale climate change. SAVANNA is a deterministic, process-driven, spatially explicit model that is informed by biotic, abiotic, and management-related inputs. The model contains multiple interacting sub-models including vegetation productivity, hydrology, soil fertility, herbivory, predation, and fire. SAVANNA has been applied in grazing-dominated systems around the world, including Yellowstone and Kruger National Parks, to inform the management of herbivore populations and predict changes to vegetation and ecosystems. A well-parameterized and calibrated ecosystem model can be used to answer many different research questions, and to inform a broad range of management decisions. We will present results from initial modelling experiments to determine the ungulate carrying capacity of the park, and discuss our future plans to use SAVANNA to inform park management decisions and to collaborate with research partners to apply the model more broadly.

Biosketch: Jonathan DeMoor has been an Ecologist at Elk Island National Park since 2016, leading a team responsible for the ecological monitoring, active management, and conservation science at

the park. He has a background in ornithology and forest ecology and has enjoyed learning about ungulate grazing ecology and human wildlife coexistence.

1545 – 1600

Camila Hurtado

Co-authors: Erin Bayne and Matina Kalcounis-Rueppell

Title: *Effects of Latitude on Bat Nightly Activity Patterns in Western Canada*

Abstract: Light levels guide the activity times of bats, as their peak activity tends to align closely to the few hours after sunset and before sunrise. Bats at high latitudes face unique challenges associated with limited night length or a complete absence of darkness during the summer months. Some North American bat species have continental ranges that allow us to examine how timing and duration of darkness influence species-specific behaviours. Using acoustic recordings, we are examining the effects of latitude, night length, and landscape cover on overall and species-specific nightly activity of bats across a 3000km transect from Southern Alberta into the Northwest Territories and Yukon, Canada. We acoustically sampled bats in a south (49°N) to north (65°N) transect at 137 sites for a total of 1701 recording nights, across the summer seasons of 2021 and 2022. We found that at southern latitudes a characteristic bimodal pattern of activity, with a large peak after sunset and another peak before sunrise, occurred throughout the sampling time. Northern sites had a unimodal pattern of activity, with a large peak happening after sunset, during the longest days of the year but as nights lengthened, towards the end of summer, the activity curves had the characteristic bimodal pattern. Exploring how bats adapt to environments with high levels of natural light, will help us understand how bats might adapt to increasing levels of anthropogenic light in the environment. We acknowledge our partners, and land guardians of the Dene First Nations of Canada.

Biosketch: Camila is a Masters student at the University of Alberta focused on bat research using bioacoustics. Throughout her degree she has developed a strong passion for conservation ecology and science education.

1600 – 1605

Sejer Meyhoff

Co-authors: Erin Bayne

Title: *Habitat use and selection by feral horses and domestic cattle in Alberta's foothills: Implications for biodiversity?*

Abstract: This project will explore habitat use and selection by feral horses and domestic cattle in Alberta's foothills and the implications for vegetation and birds. Research questions will be framed around multispecies habitat use, intensity of use, temporospatial overlap, and potential consequences to biodiversity through modification of vegetation and subsequent effects on local and regional bird biodiversity. Questions will also be framed in the context of human land-use and human footprint in the foothills, which are a multiple-use landscape that include livestock grazing, timber harvest, oil and natural gas exploration and extraction, tourism, cultural, traditional, and recreational uses. Feral horses and cattle have the potential to cause irreversible ecological damage in shared areas that may become overgrazed. A lack of understanding of the complex nature of feral horse habitat selection has made management concerns difficult to address. I will also explore habitat

specific associations of cattle with the brown-headed cowbird (*Molothrus ater*), an obligate brood parasite historically associated with bison and now believed to associate with cattle. The presence of cattle in the foothills, where bison were not historically present in large numbers, may be exposing native bird species to nest parasitism reducing nest success. I am using an extensive network of trail camera data and bioacoustic data from autonomous recording units to assess temporospatial overlap of these large-bodied, non-native herbivores. I will use birds as an indicator of ecological response to the presence of feral horses and cattle on the multiple-use foothills landscape at different spatial scales.

Biosketch: I am a PhD student in the Bayne lab at the University of Alberta.

Collaboration

1605 – 1620
Cassie Stevenson

Title: *Strength in numbers: collaboration through innovative new tools and resources for wildlife camera users to address large-scale ecological questions*

Abstract: Over the last decade, the use of cameras for wildlife monitoring has grown exponentially. Many wildlife agencies and environmental groups use wildlife camera networks to supplement or replace previous monitoring systems (e.g., aerial ungulate surveys). Thousands of wildlife cameras are in use across Alberta; however, there is little coordination among users, which has limited our ability to reduce costs, improve efficiencies, and address large-scale ecological questions. In 2020, the Alberta Remote Camera Steering Committee (RCSC) merged with the B.C. Wildlife Camera Committee to form WildCAM (Wildlife Cameras for Adaptive Management; https://wildcams.ca/about-us/), a wildlife camera network for western Canada, which aims to address camera user's desires for enhanced coordination, knowledge sharing, tools, and guidelines. In this presentation, you will learn about new resources (e.g., R packages), and Wildlife Camera Survey Guidelines and Metadata Standards developed for Alberta and B.C. to improve data quality, efficiencies and collaboration amongst all camera users. We will also discuss new initiatives for 2023-24 (e.g., an online decision support tool for study design) and the follies of missing metadata. Lastly, you will learn how to become an active member of the RCSC team to help further ongoing initiatives to advance and align wildlife camera research and monitoring in western Canada. For more information, see https://wildcams.ca/ or e-mail the Alberta Wildlife Camera Coordinator (Cassie Stevenson; cjsteven@ualberta.ca).

Biosketch: Cassie is a Wildlife Camera Coordinator for Dr. Erin Bayne's lab (UofA). She coordinates the Alberta Remote Camera Steering Committee, and collaborates with WildCAM to support data standardization and integration among wildlife camera users in western Canada. She also works with ABMI to help camera users integrate data in WildTrax.

Energy Development

1620 – 1635

Lionel Leston

Co-authors: Erin M. Bayne

Title: *Thresholds, patterns, and interactions: exploring cumulative effects of oil and gas footprint on boreal birds*

Abstract: To manage the cumulative effects of oil and gas activity on wildlife, a better quantification of these effects is needed. Modeling distance to different footprint types provides evidence of positive or negative edge effects for developing management buffers, while modeling footprint amount (total or specific types) provides information on functional changes in habitat. We used point counts in Alberta's boreal forests to evaluate how well amounts of and proximity to seismic lines, pipelines, well sites, roads, and energy facilities predicted abundance of 48 bird species. We developed models for each species, evaluating the best functional forms for different footprint effects, then predicted how different model structures influenced estimates of regional population size. Initial models indicated nonlinear responses to footprint amount (79% of species) or distance (88%). Models based on footprint amount and proximity generally predicted negative effects of footprint on species associated with older coniferous forests and positive effects of such footprint on species associated with open lands and young forests. In one-third of species, effects changed from a positive to negative relationship (or reverse) at a threshold distance from at least one footprint. Models based on footprint proximity had better fit than those based on footprint amount for 29 of 48 species, but both model types produced similar population estimates and were useful for assessing cumulative effects on wildlife and mechanisms causing change. We are now exploring interactions between different footprint and habitat types and effects of footprint age, pattern, and edge contrast.

Biosketch: Lionel Leston grew up in Vancouver, BC, where he attended Simon Fraser University. He conducted graduate research on urbanization and Northern Cardinals (2003-2005), effects of human infrastructure on grassland biodiversity in urban and prairie landscapes (2006 - 2014), and effects of human footprint on boreal forest birds (2015-present).

APPENDIX C: SUNDAY AM

Population

1000 – 1015

Carter Littlefair

Co-authors: Andrew Derocher, Paul Frame, Mark Edwards

Title: *Biological and environmental correlates of cougar (Puma concolor) survival in west central Alberta*

Abstract: Cougar (*Puma concolor*) habitat selection is well documented, but the hazards that cougars face across the landscape are poorly understood. The risks that landscape features present may increase risk in one sex but not the other. Additionally, these risks can change temporally, increasing survival in one season while being a danger in another. We radio-collared 87 cougars and tracked them between 2016-2021 in west central Alberta, Canada, for a total of 1158 cougar months with a mean monitoring time of 13.3 months. We documented 41 deaths and determined causes of mortality, finding harvest as the highest cause of mortality for both males and females, with males more likely to be legally harvested. Survival estimates were determined using Kaplan-Meier models by sex and age class annually and seasonally. We modelled risk that biological and environmental variables imposed on each sex annually and seasonally using Cox proportional hazards models with the Anderson-Gill model for staggered entry. Both sexes had increased risk annually with high crossing rates of secondary roads and linear features, closer proximity to secondary roads and closer proximity and higher density of residential areas. Sexes differed annually with males showing increased hazard in open areas and wetlands and a reduced risk in agriculture areas. Females did not show landcover as a risk but did have an increased risk with higher primary road crossing rates. Hazards also varied between sexes within the winter and hunting season. Our results show that biological and environmental variables affecting survival vary by sex and seasons.

Biosketch: Carter is a student at the University of Alberta and recently obtained a MSc for a project examining cougar survival and how biological and environmental variables impact survival of males and females differently.

1015 – 1030

Robert Anderson

Co-authors: Bill Abercrombie, Brian Bildson, Mike Jokinen, Neil Kimmy, Doug Manzer, Andrea Morehouse, Shevenell Webb

Title: *Are wolverines eating their neighbour's lunch? Furbearer co-occurrence in Alberta's boreal forest*

Abstract: Wolverines (*Gulo gulo*) have been difficult to study with traditional research methods; however, the development of remote-camera technology has allowed for new insights into habitat associations and interactions with other furbearing mesocarnivores. Baited camera trap sites (n=146) were established across northern Alberta and monitored by trapper volunteers. We used a multi-stage generalized linear model framework to model detections of wolverines, fisher (*Pekania pennanti*), lynx (*Lynx canadensis*), and marten (*Martes americana*) in association with forest cover and stand age, climate, and anthropogenic disturbance. We then investigated whether the presence of other furbearer species and their mutual prey helped to explain the observed pattern of occurrence. Wolverine detections were associated with cooler mean annual temperature and the co-occurrence of lynx and prey species. Likewise, lynx detections were best explained by the co-occurrence of wolverines and prey species. Fisher were more likely to be found in areas with a higher mean annual temperature. Marten presence was positively associated with snow depth and negatively associated with the amount of conifer-dominated forest in the surrounding landscape. Climate-related wolverine results aligned with what we had learned previously from the local ecological knowledge of trappers. We were able to build on that information through co-created citizen science, documenting a relationship in our study area among wolverines, lynx, and their

common prey items. Top marten models were contrary to what we expected with respect to forest cover. Further research into this topic may be warranted to better understand habitat associations for marten in Alberta's Boreal Forest Natural Region.

Biosketch: Robert lives with his family in Crowsnest Pass, where they enjoy a variety of outdoor pursuits in the mountains. He was a student presenter at the Alberta Chapter of The Wildlife Society conference in Calgary, a mere 25 years ago!

1030 – 1045

Kimberley Barrett

Co-authors: Joshua M. Miller, Rhiannon Peery, Corey S. Davis, Paul F. Frame, Delaney D. Frame, Mark A. Edwards, David W. Coltman, Andrew E. Derocher

Title: *Albertan cougars (Puma concolor) display panmixia as population and range expands*

Abstract: As landscapes continue to change under climate change, mass extirpations and extinctions are expected to continue. Some species, however, are expected to persist and expand in population size and range. Changing landscape dynamics have been found across North America, as have range and population increases in some large predators. Growth and expansion are detectable using population genetic techniques, specifically either stepwise structuring or clinal patterns in relatedness (isolation by distance, IBD) is found depending on gene flow, and lower expected heterozygosity is anticipated in both situations. Using 858 single nucleotide polymorphisms genotyped via double digestion restriction-site associated digestion from 120 cougars (*Puma concolor*) in Alberta, we attempted to characterize this expanding population. The population was assessed with (Analysis of Molecular Variance [AMOVA], IBD, STRUCTURE) and without (principle component analysis, discriminant analysis of principle components, STRUCTURE) prior location information. Each predicted and tested group was characterized (observed and expected heterozygosity, and FST) and mapped. While many subgroups were predicted, none were consistent nor biologically informative, neither was there any detected IBD (r2 = 0.1, p = 0.04). However, heterozygosity was lower than expected across all groups tested. Our results suggest that the Albertan population of cougars is expanding as suggested by the lower-than-expected heterozygosity, but the lack of structure or IBD suggests panmixia (random mating). This is a unique finding in modern cougars, and of importance for managers both of this population and of other predators as climate change continues to alter habitats and behaviours.

Biosketch: Kimberley Barrett is a population geneticist pursuing a master's degree in the Derocher lab (University of Alberta). As the recipient of the CGSM and USRA NSERC awards she is currently studying cougars and has published work on the highly endangered Vancouver Island marmot in the Gorrell lab (Vancouver Island University).

1045 – 1050

Alina Fisher

Co-authors: Adam Hering, Jason T. Fisher

Title: *Birth control for deer? The effectiveness of non-lethal population reduction methods for urban deer management in Victoria, BC*

Abstract: Urban wildlife management has historically focused on culls for population reduction, yet shows questionable cost- and outcome-effectiveness as it regularly results in population rebounds. Within the Oak Bay municipality of Victoria, British Columbia, a non-lethal population control study on the native Columbian black-tailed deer (*Odocoileus hemionus columbianus*) has been taking place over the last 3 years that offers insights for more effective urban wildlife control. Through the combined use of camera traps and GPS collars, we have found that deer tend to have relatively small home ranges (0.14 km^2) compared to their non-urban counterparts and that they tend to select green spaces and large, lush lots that provide a significant source of supplemental non-native browse. Concurrently, we are showing that the application of immunocontraception to >63% of the doe population (in our case 60 does) has decreased fawn abundance by 58% after one year of contraception with Zonastat-D (PZP vaccine). Immunocontraception, in tandem with methods to decrease deer access to supplemental urban food sources, shows promise for effective non-lethal population control, saving both effort and cost to municipalities.

Biosketch: Alina is a PhD student in Environmental Studies at the University of Victoria whose research focuses on wildlife conservation, restoration, human-wildlife interactions, and science communication.

Conflict

1105 – 1120

Gabrielle Lajeunesse

Co-authors: Howie W. Harshaw, Colleen Cassady St. Clair

Title: *An urban coyote intervention program reveals coyotes to be rare and retreat from people in residential neighbourhoods*

Abstract: Human-coyote conflicts often arise when coyotes follow, pursue or attack pets or people. Hazing applied by members of the public is often promoted as a way to mitigate human-coyote conflicts, but this method has only been studied recently and there are few guidelines for its implementation. We developed a community-based hazing program for urban coyotes in Edmonton implemented by volunteers who patrolled their neighbourhoods while recording coyotes. When coyotes were observed, volunteers walked towards the coyotes and recorded the overt reaction distance and the flight response distance. If coyotes did not retreat when volunteers were within 40 m of the animal, volunteers conducted hazing by running towards the coyote while shouting and throwing weighted tennis balls in the direction of the animal. Over the two field seasons of our program, we recruited, trained, and engaged 120 volunteers from 71 neighbourhoods who conducted 1598 patrols, observed coyotes in 175 instances, and conducted hazing 23 times. Coyotes retreated before volunteers were within 40 m during 70.6% of the observations and 22/23 (95.7%) of coyotes retreated from hazing. Perhaps owing to limitations of sample size, we found little evidence that hazing changed subsequent measures of overt reaction or flight response distances by coyotes and its effects on the number or timing of subsequent coyote reports by members of the public were inconsistent. Our study emphasizes the rarity of close encounters with coyotes and the high frequency with which they retreat from human advances and even directed attention.

Biosketch: Gabrielle is a Master's student from the University of Alberta, where she developed a community-based hazing program aiming to increase the wariness of coyotes. She hopes similar

non-lethal tools will help improve wildlife management and human-wildlife coexistence. Gabrielle also currently works as a Resource Conservation Officer at Elk Island National Park.

1120 – 1135

John Paczkowski

Co-authors: Claire Edwards, Jay Honeyman, Derek Ryder

Title: *Aversive conditioning and management of grizzly bears in Kananaskis Country, Alberta, between 2000 and 2022. A review of theory, practice and challenges*

Abstract: Aversive conditioning is a management tool employed in the Parks and Protected areas of Kananaskis Country, Alberta, since the year 2000. The program applies different conditioning stimuli to grizzly bears to modify bear behaviour and maintain public safety. We discuss the context, evolution and operational requirements of the program. We review over 10,000 grizzly bear aversive conditioning records collected between the 2000 and 2022. Most of the over 60 grizzly bears involved in the program were habituated females that demonstrated a strong fidelity to the facility zones, an area of high human visitation and recreational infrastructure. Juvenile and young bears typically required more aversive conditioning actions, while required conditioning frequency diminished with age. None of the bears involved in the aversive conditioning program were involved in a serious human wildlife conflicts causing human injury or death. The aversive conditioning program has also reduced the need for local facility closures and management removals of bears, which may contribute to greater reproductive success. Bears that left the operational area of the aversive conditioning program, specifically protected areas, were often subject to a higher frequency of management actions and removals. We discuss the efficacy of different noise, projectile and contact projectile stimuli as well as the use of Karelian Bear dogs. The Kananaskis aversive conditioning program is a model of how management actions can achieve both public safety and conservation objectives in a high recreational use landscape specifically parks and protected areas.

Biosketch: John is the Human Wildlife Coexistence Team Lead for Alberta Forestry Parks and Tourism in Kananaskis, Alberta and works with a great team of staff and volunteers. For about 30 years John has been working with large carnivores, mostly bears, in Canada and other parts of the wild world.

1135 – 1150

Claire Edwards

Co-authors: Colleen Cassady St. Clair, John Paczkowski

Title: *Measuring the success of aversive conditioning of grizzly bears in Kananaskis Country, Alberta, Canada*

Abstract: Protected areas provide important refugia for threatened populations of grizzly bears (*Ursus arctos*) in Alberta, Canada. Protected areas address human-bear conflict with a suite of techniques, which can include aversive conditioning and hazing. These tools apply negative stimuli

to bears, aiming to increase wariness and reduce proximity to people. In Kananaskis Country from 2000-2019, teams of technicians conditioned 37 marked grizzly bears in 4949 conditioning events. Bears were conditioned using 20 stimuli, grouped by modality into; approach (vehicle/foot), noise (associated with vehicles/humans), projectiles (contact/non-contact), and pursuit (with/without Karelian bear dogs). In most events, bears immediately retreated from conditioning (93% of 4949 events). For remaining events, bears either ignored or assessed technicians, approaching on rare occasions (0.004% of 4949 events). In logistic regression analysis examining the effect of tool type on response, bears were most likely to retreat when pursued, followed by when projectiles were fired. Bears were less likely to retreat if cubs were present and more likely to retreat when closer to the technician and vegetative cover. Within tool types, bears were more likely to retreat when approached by technicians on foot, relative to in vehicles and when projectiles contacted the bear, relative to when they didn't. In the next encounter with a technician, bears were more likely to retreat when the previous event included more conditioning actions. These results suggest that bears in Kananaskis Country learned to retreat from aversive conditioning and this tool can help to reduce conflict-associated behaviour, supporting long-term residency by bears in this area.

Biosketch: Claire is an MSc. student at the University of Alberta, where she is studying human-bear conflict management, trying to better understand correlates for success of hazing and aversive conditioning programs for bears. Before her MSc., Claire worked as a human-bear conflict manager with government agencies in BC, AB and YT.

Habitat

1150 – 1205
Lisa Takats Priestley
Co-authors: Chuck Priestley, Laura Trout, Wendy Crosina
Title: *Housing the Barred Owl (Strix varia) in Alberta: nests and home ranges*

Abstract: Barred Owl breeding territories are associated with older mixedwood forest in Alberta. In 2021, a Barred Owl-focussed project was initiated by West Fraser and Weyerhaeuser forest companies, and STRIX Ecological Consulting in managed forests of Alberta's boreal and foothills. As an obligate cavity nester and year-round resident, the Barred Owl has been selected as an indicator (umbrella) species by Alberta Environment and Parks (AEP). The goals were to create range maps, determine Barred Owl occupancy and nesting success, and collect detailed habitat information in Barred Owl territories. To date, 21 Barred Owls (15 female/6 male) have been fitted with Lotek PinPoint VHF 240 satellite transmitters. Nine nests have been found, 7 in balsam poplar natural cavities and two in trembling aspen (one natural cavity and one broken top bowl). Two owls have carried transmitters for over a year, and each have more than 600 locations. Mean female breeding season home range was 279.0 ha (range 148 to 603 ha, n=10). Male breeding home range averaged 460.9 ha (range 251 to 1032 ha, n=7), and two winter home ranges were 2706 and 489 ha. Some Barred Owls made forays out of territory in the winter on multiple occasions. Combining satellite and VHF technology offers great insights into the movements of Barred Owls. Data can be downloaded remotely which reduces researcher intrusion. Future plans include tagging 15 more owls in 2023, assessing their habitat selection and territory longevity, and testing a habitat model that was developed by AEP.

Biosketch: Lisa has been involved in wildlife research/monitoring for 25yrs. She has a biological sciences diploma (NAIT), a Bachelor of Science and Master's on the ecology of Barred Owls (UofAB). She and her husband incorporated STRIX Ecological in 2005 and work on a variety of terrestrial wildlife projects. She's an OWLNUT.

Development

1205 – 1220

Andrew Crosby

Co-authors: Lionel Leston, Erin M. Bayne

Title: *Domains of scale in cumulative effects of energy sector development on boreal birds*

Abstract: Industrial development in Alberta's boreal forest creates cumulative environmental effects on wildlife and biodiversity. Effective regulation of this development requires understanding how anthropogenic disturbance influences species distributions. However, scale dependence in these effects creates uncertainty in understanding, thus hindering management efforts. Our objective was to evaluate evidence for domains of scale in distributional responses of migratory songbirds to energy sector development within the boreal region of Alberta. We developed a hierarchical, multi-scale sampling and modelling framework to compare effects of energy development across five spatial scales for sixteen boreal songbird species. We used Bayesian Lasso to facilitate direct comparison of parameter estimates across scales, and tested for differences in grouped parameter estimates among scales. We found consistent scale-dependent patterns, showing variable responses to development at the smallest scale, little effect at intermediate scales, and stronger, mainly positive effects at the largest scales. Differences in grouped parameter estimates across scales provided strong evidence for scale domains in the response of songbirds to energy sector development, with positive effects at larger scales driven by local colonization by habitat generalists and non-forest species. These domains of scale reflected differences between local scale habitat selection and landscape scale distribution. Our novel analytical framework provides an effective sampling and modelling structure for understanding effects of land-use change on biodiversity across multiple spatial scales. Our results suggest that limiting cumulative area of disturbance within a given management unit is the most likely path towards conserving avian biodiversity in the face of large-scale energy development.

Biosketch: Andy Crosby is a research associate at the University of Alberta. His research focuses on linking habitat and population changes of wildlife species in the boreal region of Canada. Andy is currently coordinating the Alberta Biodiversity Chairs Program, conducting risk assessments for biodiversity in the Oil Sands region.

1220 – 1235

Jason Fisher

Title: *Let the good times roll! Boreal mammals hustle to exploit the landscape subsidies from development*

Abstract: Over half of Alberta is boreal forest and the mammal wildlife living there - from squirrels to moose - are dealing with the widespread effects of resource development. That development affects the whole mammal community is well established, with some species winning and others

losing. But what are the mechanisms behind these relationships? I synthesize a decade of research on mammals in the oil sands based on camera-trapping in multiple landscapes, from high to low development. Two trends emerge from the complexity of boreal systems. First, herbivores are exploiting the resource subsidies generated by converting old forest to new. Second, predators and competitors are exploiting those herbivores, which provide their own form of resource subsidy. A third major system shift - reduction of top predators, wolves - changes this hustle even further, as subordinate competitors are free to exploit new resources. I show how the oil sands monitoring in the boreal is set to examine these complex relationships into the future, and what wildlife managers can gain from collaborative multi-landscape research that examines entire communities.

Biosketch: Jason is Director of the Applied Conservation Macro Ecology (ACME) Lab at the University of Victoria. With over 60 peer-reviewed publications, he researches mammals from the Arctic to southern boreal, mountain, and coastal systems. His focus is on how landscape and climate change affect wildlife persistence and conservation.

1235 – 1240

Spencer Quayle

Co-authors: Scott Nielsen

Title: *Seismic lines, browse, and growing deer populations in the oil sands region*

Abstract: In the Lower Athabasca region of northeastern Alberta, linear clearcuts associated with seismic exploration dissect the landscape at a density of 1-5 km/km². Forest recovery is protracted on many of these seismic lines, with some failing to show regeneration after >50 years. This disturbance is associated with the expansion of white-tailed deer into the Lower Athabasca region over the last century. Deer habitat use triples within 1000 m of seismic lines, a preference that may be related to increases in browse availability in these cleared areas.

Winter is the limiting season for browse, and abundant winter browse may play a role in springtime reproductive success. Deer populations increased 17-fold within the region between 1994 & 2010. Increased ungulate density leads to growing wolf populations, which range farther into peatland refugia, threatening caribou, a high-profile threatened species. Missing in our understanding is the link between linear disturbance and browse abundance and palatability, as well as evidence of differential browsing on and off of linear disturbances. My thesis will test this hypothesis of browse subsidy: whether it exists and where it may be found. This will help land managers allocate restoration resources to where they will have the greatest effect.

Biosketch: Spencer is a grad student at the University of Alberta

APPENDIX D: POSTERS

Cora Kaplan
Co-authors: Jessica Haines, Richard Schneider, Stephanie Weizenbach
Title: *Using Citizen Science to Monitor Franklin's Ground Squirrels*

Abstract: Franklin's ground squirrels (Poliocitellus franklinii) are found in parkland habitats in Alberta. They are not currently listed under SARA and in Alberta their species status is undetermined. But anecdotally, there are concerns that they could be in decline as some naturalists have observed that this species seems to have disappeared from many locations where it previously occurred in the province. Given the paucity of data available for this species, this project first aims to use citizen science to identify the current distribution of this species and potential locations of colonies. We will then select a subset of these colonies for population monitoring. In this presentation, we will discuss results from the first season of citizen science data collection. We will also outline plans for the upcoming season, which will focus heavily on outreach events to encourage more members of the public to participate in the project. We also hope to collaborate with experienced naturalists who could contribute observations of the current or past distribution of this species.

Biosketch: Cora is a student at MacEwan University

Peter R. Thompson
Co-authors: John Paczkowski, Jesse Whittington, Colleen Cassady St. Clair
Title: *Evaluating the efficacy of wildlife corridors in Canmore, Alberta*

Abstract: Managing human-wildlife conflict is an increasing challenge in areas with growing populations of both people and wildlife. This challenge occurs in and around the town of Canmore, Alberta, in the Bow River Valley, where human development is expanding into areas that were previously occupied by large mammals, including grizzly bears (Ursus arctos) and wolves (Canis lupus). Wildlife managers and landscape planners affiliated with Alberta Parks have designated corridors to support movement through the region of these wary species, but the efficacy of these areas for supporting movement has not been quantified or compared to non-designated areas that may, nonetheless, function as corridors. Here I present a proposed framework for a) evaluating how effectively existing and potential new designated wildlife corridors promote connectivity for grizzly bears and wolves; b) evaluating how grizzly bears and wolves respond to the presence of humans, particularly recreationalists, on the landscape; and c) identifying future land-use changes (e.g., closing existing trails or designing new trails) that could increase the functional connectivity of this landscape. Our analyses will integrate multiple data sources, including images from remote cameras, GPS collar telemetry, and citizen-generated metrics of human use. We will work collaboratively with several agencies and initiatives in the valley to advance human-wildlife coexistence in the Canmore area.

Biosketch: I am a movement ecologist in the final stages of my Ph.D. at the University of Alberta. Most of my interests lie in understanding why animals go where they do. I hope to use this knowledge to predict changes in animal space use in the face of anthropogenic change.

Wyatt Villetard
Co-authors: Erin Bayne, Mark Boyce

Title: *Movement ecology and hunting on Alberta's nesting Sandhill Cranes*

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. With Alberta having a large migratory population, but a relatively small nesting population, this knowledge gap has raised concern, in some, that small local nesting populations may not be large enough to support a harvest. Our study aims to reduce this knowledge gap by deploying ARUs (autonomous recording units) and GPS transmitters. During the summer of 2023, roughly 150 ARUs will be deployed horizontally across the province to track incoming cranes at different latitudes. We will also capture and fit 15 individual cranes from small nesting populations throughout Alberta with GPS transmitters to determine provincial movement, wintering grounds, and if cranes nesting outside huntable WMUs (wildlife management units) are migrating through huntable regions in the fall, thus exposing them to hunting pressure. Newly acquired data will be coupled with previously collected data by ABMI (Alberta Biodiversity Monitoring Institute) and the Bayne Lab at the University of Alberta. This information will grant us, and Alberta's broader conservation community, the ability to answer important ecological questions surrounding Sandhill Crane movement in the province while providing information to inform future management.

Biosketch: My name is Wyatt Villetard. I am a first-year graduate student at the University of Alberta studying Sandhill Crane Movement ecology in the Boyce Lab. I was born and raised in Alberta. On the weekends you'll most likely find me skiing or hiking in Alberta's beautiful National Parks.

Taylor Hart
Co-authors: Lionel Leston, Erin Bayne

Title: *The long-term impacts of landscape configuration on Black-throated Green Warbler (Setophaga virens) occupancy and site turnover at Calling Lake, Alberta over 25 years*

Abstract: Habitat fragmentation and loss due to natural-resource extraction is a major contributor to ongoing avian population declines in Alberta's boreal forest. Linear features such as seismic lines, transmission lines, and roads, create a large amount of edge habitat, which has particularly negative effects on interior species reliant on old-growth forests. The Black-throated Green Warbler (Setophaga virens) has been designated a Species of Special Concern in Alberta due to perceived population declines caused by habitat loss and fragmentation. It is unknown how this species responds to hard and soft linear features over a long time period. My research assessed the long-term impacts of forest fragmentation on Black-throated Green Warbler site occupancy and turnover at Calling Lake, Alberta over 25 years. I used multi-season occupancy models to assess whether occupancy, colonization, and extinction probabilities were predicted by distance to linear features, stand age and composition. Black-throated Green Warbler occupancy was affected by distance to roads, but there was no effect of the soft linear features, suggesting vegetation recovery has softened the edge effects of seismic lines and cutblock edges over time. The fragmented and connected treatments had a negative influence on probability of colonization and extinction. The continued population decline at Calling Lake, in controls and fragments, suggests potential regional factors responsible for the decline.

I am a MSc student in Ecology at the University of Alberta studying how varying types of human footprint are impacting Black-throated Green Warbler populations. I am interested in landscape ecology, conservation biology, and the effects of human disturbance on wildlife.

Leif Hvenegaard
Co-authors: Glynnis A. Hood

Title: *Snowed under: Novel detection methods for use of winter wetlands by mammals*

Abstract: Ecological engineers, such as the North American beaver (Castor canadensis), demonstrate the important effect that ecological facilitation can have on an ecosystem. Modification of the environment by beavers increases wetland connectivity and habitat heterogeneity, which then increases invertebrate diversity, promotes amphibian presence, waterbird richness, and riparian plant and mammalian biodiversity. This study explored the effects of beaver occupancy in ponds on winter biodiversity of riparian mammals in Miquelon Lake Provincial Park, located within the southern dry mixed-wood boreal forest in central Alberta. We used specially modified trail cameras to collect wildlife presence data. To differentiate between mammal size classes, we installed cameras on trees for large and medium-sized mammals and inside specifically designed camera boxes placed on the ground prior to the first snowfall to detect small mammals. Cameras captured 11,200 photos. Box cameras captured five species groups, including two species of weasel. Tree-mounted cameras captured six species, including moose, and snowshoe hare. We identified higher moose presence on beaver-occupied ponds, and staggered activity times between moose and deer species, with moose most active at dusk and deer most active at dawn. Vole and shrew species had similar temporal activity, with most activity at dusk; however, voles had a separate spike in activity in the late morning. This study increases our understanding of beavers as facilitators of biodiversity in wetland habitats, aids our management of riparian mammal populations in areas where beavers modify wetland ecosystems, and improves our understanding of understudied subnivean species, which are underrepresented in research.

Biosketch: Leif Hvenegaard is a 4th year student in Environmental Science at the University of Alberta's Augustana Campus.

Payton Baltzer
Co-authors: Chelsea Beach, Erin Henderson, Sandra MacDougall

Title: *Home Ranges of Female Elk (Cervus canadensis) in Elk Island National Park, Alberta*

Abstract: The objective of this study was to determine annual and seasonal home range characteristics of the two female elk (Cervus canadensis) populations within a high density and low predation environment. Elk Island National Park (EINP) is a 194 km2 protected area that is part of the UNESCO Beaver Hills Biosphere Reserve. Comprised of aspen parkland, the park is separated

into two completely fenced blocks of differing sizes due to the presence of a major four lane divided highway. We compared annual and seasonal home ranges and the social group distributions for female elk using 154,517 GPS locations taken in 2-hour intervals from 34 radio-collared individuals (19 in the North block and 15 in the South block) between 2020-2022. Seasonal home range intervals were delineated as winter, spring, calving, summer and rut. Minimum convex polygons (MCP) and kernel density estimates were calculated using RStudio. The female elk population in the larger north block population was partitioned into 5 social groups and had a significantly smaller mean annual home ranges (18.73 km2 ± 7.05 SD) than those of the two social groups in the South block population (27.97 km2 ± 10.12 SD). For the entire park annual home range size was largest in the winter (19.44 km2 ± 8.83 SD) and smallest during the summer months (8.39 km2 ± 3.57 SD). This data will be used to model the expansion of liver fluke (Fasciola hepatica) into the southern block population and monitor the impact of increasing carnivore populations on elk.

Biosketch: Payton Baltzer is in his third year of the Bachelor of Science (Biological Sciences) at Red Deer Polytechnic. He and fourth year Biological Sciences student Chelsea Beach completed this project in partial fulfillment of the requirements for the course Methods in Ecology.

Lisa Wilkinson

Title: *Alberta Bats under Threat*

Abstract: Alberta has at least nine species of bats with different over wintering strategies: six species hibernate and three species migrate south. Hibernating species are vulnerable to White-Nose Syndrome, the disease caused by a fungus found in caves. The fungus was detected in Alberta in 2022 and it won't be long before bats begin to succumb to the disease. Based on data from eastern North America, some populations could decline by 90%. Monitoring programs are in place to: 1) detect the fungus (guano collection under bridges), 2) survey cave hibernacula, 3) track changes in activity levels through acoustic detection, and 4) capture bats to look for signs of the disease. Two species have been listed as Endangered to enhance protection of bats and their habitats, which will be key to help populations recover. Migratory bat species face a different threat: mortality from wind turbines. These bats species use southern migratory routes that intersect with wind farms. Modelling suggests that the North American hoary bat population could decline by 90% in less than 50 years. Ways to reduce mortality are being explored and implemented. Mitigating these threats is confounded by the fact that it takes a long time for bat populations to recover from declines because they typically have only one pup per year.

Biosketch: I am a senior Species at Risk Biologist and Provincial Bat Specialist with Alberta Environment and Protected Areas, based in Edson.

Cory Olson

Co-authors: Erin Low, Caley Strother-Stewart, Susan Holroyd

Title: *Use of bridges by bats in western Canada and their applications for wildlife health monitoring*

Abstract: Thousands of bridges occur across Alberta and into the most remote regions of the country. All of these structures cross what are among the most important habitats for bats - rivers and riparian areas. Although bats in some regions of North America are well known to use bridges, until recently, it was assumed that these features would be less attractive to bats in Canada - cool climate, and were often overlooked. Over the last two years, WCS Canada, along with several partner organizations, volunteers, and government agencies, has been undertaking the largest scale survey of bridges in Canada to document use by bats. To date, we have surveyed over 800 bridges across western Canada. About half of the surveyed bridges had evidence of use by bats, primarily bat guano stuck to surfaces beneath the bridge deck. Most use was from bats resting below the bridge during the night, but we also observed day-roosting bats, including large maternity colonies, at several locations. Being on public land, bridges offer one of the most accessible ways to monitor bats and collect samples needed to fill knowledge gaps affecting bat conservation in Canada. Using guano samples collected at these bridges, we have confirmed the first detections in Alberta and Saskatchewan of Pseudogymnoascus destructans, the fungus that causes white-nose syndrome in bats. We are also using samples for DNA barcoding to determine the bat species using these sites. We have found nearly all prairie species using bridges, and results are expanding our understanding of bat distributions in Canada.

Biosketch: Cory Olson is Program Coordinator for WCS Canada's Alberta Bat Program. He has studied bats for over 14 years, during which he has conducted numerous bat surveys across western Canada, authored several reports, and lead the development of multiple research, conservation and outreach initiatives relating to bats.

Tharindu Kalukapuge
Co-authors: Erin Bayne

Title: *Effects of linear feature width on boreal songbird communities How much does width matter?*

Abstract: The boreal forest in Alberta is one of the most fragmented landscapes in the region due to the presence of linear features such as seismic lines, pipelines, transmission lines and roads. These linear features can impact associated bird communities differently as they vary in gap width. In this study, we investigated how the width of linear features influence boreal songbird communities and whether there is a threshold width that fundamentally alters these communities. We surveyed over 300 linear feature sites including seismic lines, pipelines and transmission lines using autonomous recording units. The sites were located in the north and northeast of the Alberta boreal forest. Our initial findings illustrate that, as gap width increases, the composition of bird communities tends to change, suggesting that songbird community composition change as a function of linear feature width. Our results have implications for the restoration of forest habitats with linear features, as they highlight the importance of considering the width effects on wildlife communities.

Biosketch: PhD student at the University of Alberta.