Fish, Fur, and Feathers:
Science Across Ontario's Ecosystems

Joint conference held by the

Ontario Chapter of The Wildlife Society

and

The American Fisheries Society, Ontario Chapter

American Fisheries Society
Ontario Chapter

March 21- 23rd, 2025 | Guelph, Ontario

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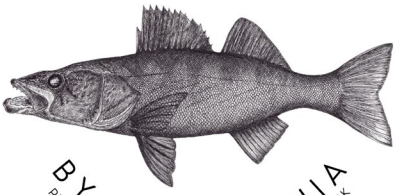

BY ABBY WYNIA

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Land Acknowledgement & Action Statement

The 2025 OCTWS and AFS-OC joint conference is being held in Guelph, Ontario, which occupies the shared traditional territories of Haudenosaunee, Anishinaabeg, and the Attiwondaronk peoples, and is held in treaty with the Mississaugas of the Credit First Nation through the Between the Lakes Treaty, No. 3 of 1792. Collectively, our organisations' members come from the traditional and unceded territories of many Indigenous peoples throughout Ontario and beyond, each with their own unique histories, cultures, and languages imperilled by historical and contemporary colonialism.

Notwithstanding OCTWS and AFS-OC's dedication to conservation, sustainability, and education, we must also recognise that our organisations are inherently colonial institutions. Our organisations were founded on the promotion of western science and ideals, to the detriment of Indigenous laws, traditions, and knowledge systems that have guided the stewardship of these lands since time immemorial. We are immensely grateful to the Indigenous peoples of Turtle Island for their past, present, and future leadership, and as colonial institutions we recognise our responsibility to actively engage in reconciliation to the best of our abilities. This includes encouraging those of us who are non-Indigenous (and especially those of us who are most privileged) to:

- Reflect on the ways in which we work with and live on Indigenous traditional territories;
- Be aware of how often Indigenous peoples are forced to shoulder the burden of educating others about colonialism; and,
- Take it upon ourselves to learn about colonial structures and mechanisms of oppression, and how to practice meaningful allyship.

Academic conferences like this have long been tailored towards members of society wielding great social privilege, excluding the perspectives and contributions of historically oppressed and marginalised groups. As we gather to meet and share in our knowledge and experiences, let us all be cognisant of our various positionalities, degrees of privileges, and other factors that we must consider in order to make this joint conference a safe, respectful, and equitable space for everyone.

Joint Statement on Equity, Diversity, and Inclusion

The Ontario Chapter of the Wildlife Society (OCTWS) and American Fisheries Society, Ontario Chapter (AFS-OC) would like to acknowledge the importance of inclusion at our conference. It is our goal that everyone attending our events, now and in the future, feels welcome and accepted. We are all committed to ensuring equity, diversity, and inclusion (EDI) is always considered within our societies.

We want to emphasize that everyone is welcome at our events, and that we will always strive for this to be a safe space. This year, we have made several efforts to make our conference as accessible to everyone as possible. However, we are always open to suggestions to improve, and invite anyone with suggestions to our annual general meetings to voice these suggestions.

As we are committed to providing a safe space, we would like to remind everyone that we have a no-tolerance policy when it comes to harassment of any nature, in accordance with our code of conduct.

We look forward to hosting you at this year's event, and many more to come.

OCTWS President’s Message

My name is Bryan Hughes, I am the current president of the Ontario Chapter of the Wildlife Society. I would like to extend a welcome to all of our members attending this year's conference. I look forward to hearing about the many great works happening throughout Ontario this year.

As we continue to grow as a society, I thank everyone for their continued support and enthusiasm. We are always looking for ways to expand and offer more to our members. I hope that many of you will be in attendance for our annual general meeting, to continue to voice your enthusiasm for our events going forward. I would also like to encourage members interested in joining our board of directors to reach out, as we have several open positions this year.

With great pleasure,
Bryan Hughes

AFS-OC President’s Message

My name is Silviya V. Ivanova, and I am honoured to serve as the current President of the Ontario Chapter of the American Fisheries Society (AFS-OC). To all of our members, I would like to begin by thanking you for your continued support of the Ontario Chapter. Your membership and participation drives our ability to provide Ontario with an active community dedicated to conservation, fish and fisheries research, supporting opportunities for knowledge sharing, networking, educational outreach, and professional development training.

I am proud of our Chapter and its members for our accomplishments and ongoing efforts. For example, our Policy Subcommittee reviews policies and actions that are relevant to fish and fisheries science in Ontario, such as government species recovery plans, and drafts responses accordingly to foster constructive dialogue for effective management efforts. Our Diversity and Inclusion Subcommittee works to create training opportunities, address challenges and create solutions relating to diversity, equity, and inclusion in research and conservation. Our Student Subunit coordinates initiatives like mentor mixers and educational site visits, and also sponsors our annual Outstanding Mentor Award and mentorship events at our Annual General Meetings. Our social media and newsletter team communicates with our members and the public, sharing the works and achievements of our members along with other contributions of interest to our membership.

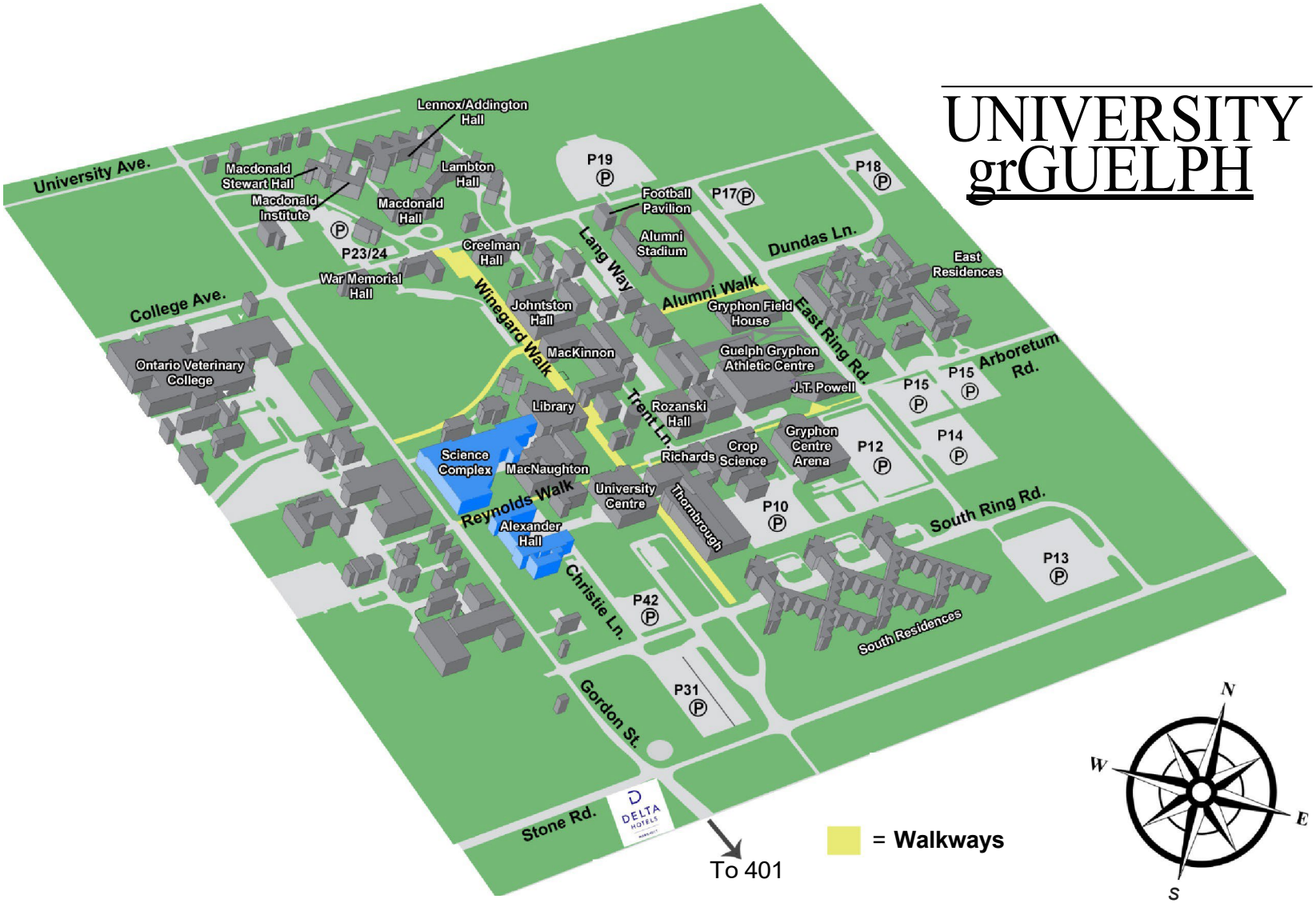
As we look forward to the next year, I want to call attention to the opportunities we have to increase our impact and engagement with Ontario's fish and fisheries science community. AFS-OC is always on the lookout for passionate individuals who are interested in getting involved and supporting our work. In particular, we elect a new President-Elect each year, and we have several vacancies on our Executive Committee such as regional representative positions. Our Student Subunit is open to anyone looking to expand their leadership and professional experiences with the Chapter while pursuing university or college education. If you are interested in getting involved, we would love to hear from you.

Thank you again for your dedication and support.

Sincerely,

Silviya V. Ivanova

Campus Map


University Ave.
College Ave.
Lennox/Addington Hall
Macdonald Stewart Hall
Macdonald Institute
Lambton Hall
Macdonald Hall
P23/24
War Memorial Hall
Creelman Hall
Winegard Walk
Lang Way
P19
Football Pavilion
Alumni Stadium
P17
P18
Dundas Ln.
East Residences
Alumni Walk
Gryphon Field House
East Ring Rd.
Johntston Hall
MacKinnon
Ontario Veterinary College
Guelph Gryphon Athletic Centre
J.T. Powell
P15
P15
Arboretum Rd.
Library
Trent Ln.
Rozanski Hall
Science Complex
MacNaughton
Richards
Crop Science
Gryphon Centre Arena
P12
P14
Reynolds Walk
University Centre
Thornbrough
P10
South Ring Rd.
Alexander Hall
Christie Ln.
P42
P13
South Residences
Gordon St.
P31
Stone Rd.
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Schedule of Events

Day/Time Block	Time	Events	Room
Friday March 21st (University of Guelph – Summerlee Science Complex)			
Welcome	5:30-6:00 p.m.	Registration & brief welcome from both AFS-OC and OCTWS chapter presidents	SSC Atrium
Social with light snacks	6:00-8:30 p.m.	Student - Professional mixer and social	SSC Atrium
Saturday March 22nd (University of Guelph – Alexander Hall & Summerlee Science Complex)			
Registration	8:30-9:00 a.m.	Registration/ Poster Setup/Sponsor Setup	SSC Atrium
	9:00-9:05 a.m.	Opening Remarks for the day and welcome to keynotes	Alex Hall 100
Keynote speakers	9:05-10:45 a.m.	Dr. Sarah Alderman Dr. Quinn Webber	Alex Hall 100
Break 1	10:45-11:15 a.m.	*Coffee & light snacks provided*	SSC Atrium
Presentations 1	11:15 a.m.-12:30 p.m. (two concurrent sessions)	1A - Contributed Oral Presentations - Methodologies for Ecological Monitoring	Alex Hall 218
		1B - Contributed Oral Presentations - Impacts of Environmental Stressors on Fish	Alex Hall 117
Lunch	12:30-2:00 p.m.	*Lunch provided* (Atrium)	SSC Atrium

Presentations 2	2:00-3:00 p.m.	2A - Contributed Oral Presentations - Drivers of Habitat Use and Resource Selection in Wildlife	Alex Hall 218
		2B - Contributed Oral Presentations - Human-Wildlife, Predator-Prey, & Pathogen-Host Interactions	Alex Hall 117
Break 2	3:00-3:15 p.m.	*Coffee & light snacks provided*	SSC Atrium
Keynote speakers	3:15-4:00 p.m.	Dr. Graham Raby	Alex Hall 100
Poster Session	4:15-5:30 p.m.	Poster Session/Silent auction	SSC Atrium
Dinner	6:00-9:00 p.m.	Banquet Dinner Provided (Summerlee Science Complex Atrium)	
Sunday March 23rd (University of Guelph – Alexander Hall)			
AGMs	8:30-9:30 a.m.	OCTWS and AFS	Alex Hall 100 (OCTWS), Alex Hall 117 (AFS).
Break	9:30 – 10:00 a.m.	Coffee and snacks provided	Foyer
Wrap up	10:00-10:30 a.m.	*Student award announcement and thank closing remarks*	Alex Hall 100
Lunch	10:30-1:00 p.m.	On your own	The lovely city of Guelph
Workshop	1-4 p.m.	Introduction to VHF Telemetry workshop with Matt Purvis (registration required)	Arboretum, Alex Hall 218
Workshop	1-4 p.m.	Introduction to R workshop with Bryan Hughes and Connor Reid (registration required)	Alex Hall 117

Workshops

Introduction to R

Date/Time: Sun Mar. 23 (1:00-4:00 pm)
Location: Alex Hall 117

Leads: Bryan Hughes, Connor Reid
Bryan is a Ph.D. student at McGill University, Montreal Quebec, who has previously completed a B.Sc. at Trent University and a M.Sc. at Laurentian University. He has worked extensively with R and is most familiar with predictive modelling and using machine learning to assess ecological phenomena.

Connor is a postdoctoral fellow at Carleton University, Ottawa, who has researched fish stress and welfare in the context of chemical anaesthesia and electrical immobilisation techniques. He has experience analysing various types of physiological and behavioural data in R/RStudio.

Description: Participants will be introduced to the statistical software R. This workshop is geared towards people interested in learning R, with little to no previous experience. We will work through a pre-designated data set and go through the basics of data “wrangling” and plot creation. Attendees should come prepared with their own laptop and the latest version of R/R-studio in advance. There will be outlets for charging and space for luggage for anyone who has checked out from their hotel before the session.

Introduction to VHF Telemetry

Date/Time: Sun Mar. 23 (1:00-4:00 pm)
Location: Alex Hall 218

Lead: Dr. Matt Purvis

Matt is a professor in the Fish & Wildlife Technician program at Fleming College in Lindsay, ON. He has an extensive background in the application of VHF and satellite telemetry in wildlife research and monitoring across a variety of wildlife species and with various agencies in North America.

Description: Attendees of this half-day workshop will learn the principles of VHF radio telemetry – from basic signal theory and the components that make up a radio telemetry system, to current monitoring applications. Attendees will also have the opportunity to use radio telemetry equipment and practice techniques such as homing and triangulation to find transmitter locations around the property. Attendees

should come prepared for a fair bit of walking, and dress for a variety of weather conditions.

Scientific Program – Saturday, March 22nd

Keynotes (Alex Hall 100)

9:05 a.m. – Dr. Sarah Alderman, University of Guelph
Comparative physiology of marine and freshwater fish

10:00 a.m. – Dr. Quinn Webber, University of Guelph
Caribou ecology, behaviour, and management in Canada

Boreal caribou are listed as threatened in Canada and the survival of the species is inextricably linked to anthropogenic disturbance. However, the threat of local extirpation for any given caribou population across Canada is highly variable. Among the most important reasons for variation in risk are the degree of anthropogenic impact on the landscape and predation rates. In this talk, I will speak about caribou conservation in Canada and how different populations likely face different pressures, my experiences studying caribou in Newfoundland, and finally, I will conclude with an overview of the work we are doing in Ontario.

3:15 p.m. – Dr. Graham Raby, Trent University
Unraveling the mystery of sexual size dimorphism in walleye

Bioenergetics models provide a useful, first-principles to answering fundamental questions in animal ecology. The bioenergetic model for walleye has been used extensively in fisheries research for decades yet is not parameterized with robust estimates of metabolic rate, potentially limiting its accuracy. Walleye are also sexually dimorphic, with females growing to much larger sizes than do males, a phenomenon whose proximate cause is not fully understood. To improve walleye bioenergetic models and help unravel the mystery of sexual size dimorphism, we have embarked on a multi-year field and lab project to estimate metabolic rates in male and female walleye across a range of water temperatures and body sizes. Here, I will review our progress in understanding sex differences in metabolism and behaviour in walleye. Accelerometer sensor transmitters implanted in walleye across four Great Lakes are giving us unprecedented insights into spatial and temporal patterns of energy expenditure in wild fish, and helping us tease apart sex-differences in energy expenditure.

Oral Presentation Sessions (Multiple rooms; see below)

Session 1 (11:15 a.m. - 12:30 p.m.)

Session 2 (2:00 p.m. - 3:00 p.m.)

Session 1A: Methodologies for Ecological Monitoring
(Alex Hall 218)

Time	Presenter	Title
11:15 a.m.	Elizabeth Porter	Trends in 24 years of Canadian Bird Citizen Science Literature
11:30 a.m.	Bojian Chen	Integrated toolset for amphibian diversity monitoring in the Upper St. Lawrence River basin
11:45 a.m.	Nelson Zabel	Effects of Ethanol Preservation on Mercury and Stable Isotope Ratios in Salmonid Dorsal Muscle
12:00 p.m.	Aliana Hellmuth	Evaluating changes in urban fish community composition in the Greater Toronto Area from 2001-2024

Session 1B: Impacts of Environmental Stressors on Fish
(Alex Hall 117)

Time	Presenter	Title
11:15 a.m.	Erin Stewart	Coping with Climate Change: Drivers of Variation in Brook Trout Thermal Ecology
11:30 a.m.	Ashley Grew	Interactive effects of anthropogenic stressors on juvenile Northern Clearwater Crayfish
11:45 a.m.	Jacob Coates	Pugnose Shiner (*Miniellus anogenus*) Occurrence In Relation To Local Abiotic And Biotic Factors
12:00 p.m.	Raegan Davis	Dam it, I'm stranded: Evaluating fish stranding downstream of a hydropeaking facility on the Michipicoten River, ON.
12:15 p.m.	Zira MacFarlane	Any Port in a Storm: Impacts of Freshwater Salinity Increases on Amphibian Breeding

Session 2A: Drivers of Habitat Use and Resource Selection in Wildlife (Alex Hall 218)

Time	Presenter	Title
2:00 p.m.	Anne Haley	Advancing the concept of energy landscapes in animal ecology
2:15 p.m.	Amber Fedus	Drivers of within- and among-individual variation in home range size in freshwater sportfish
2:30 p.m.	Kiaunna Lee	Habitat Selection of Coyotes in Long Point National Wildlife Area
2:45 p.m.	Nick Luymes	Expanding frontiers: Muskox resource selection in the boreal forest

Session 2B: Human-Wildlife, Predator-Prey, & Pathogen-Host Interactions (Alex Hall 117)

Time	Presenter	Title
2:00 p.m.	Natasha Serrao	Using fisher knowledge and scientific data to understand species importance in Chilika Lagoon, India
2:15 p.m.	Ryan Hodgson	Metabolic and Behavioural Consequences of Catch and Release Angling
2:30 p.m.	Karen Vanderwolf	Cave ecosystems and microbiomes
2:45 p.m.	Lauran Stoner	Spatial-temporal interaction of Coyotes and White-tailed Deer in Long Point NWA

Poster Presentations Session (SSC Atrium)
4:15 - 5:30 p.m.

Presenter	**Title**
Rose Myatt & Romain Dejeante	A dynamic foodscape: Implications for movement patterns and diet selection of boreal woodland caribou (*Rangifer tarandus caribou*) in northern Ontario
Abby Turner (University of Toronto)	Seasonal changes in the drivers of reproductive investments in male snowshoe hares
Alex Walmsley	Ecological insights from whole-lake fish removals in Canada's north
Aamaan Leacock	Navigating change: Red fox and marten dynamics in Ontario's far north
Bojian Chen	Adaptive advantages of invasive mosquitofish over native medaka in a warmer, hypoxic world
Christine Dunbar	Habitat associations of an expanding muskox (Yutthéjëré; *Ovibos moschatus*) population
Emilie Knighton	Filtering out the noise where things are quiet: A deep dive into our knowledge of N.Ontario wildlife
Jacob Lasci	Effects of introduced salmonids on native lake trout in Lake Huron
Julia Schonfield	Evolving methods of analyzing bioacoustic data
Lindsey Wamboldt	Nuts about trash: Indicators of metabolic health in grey squirrels across an environmental gradient

List of Abstracts

Oral Session 1A

Elizabeth Porter (University of Guelph)

Trends in 24 years of Canadian bird citizen science literature

Citizen science (CS) bird monitoring has generated extensive spatial and temporal datasets that provide insights into long-term trends in bird populations. Substantial ongoing volunteer contributions to CS projects have led to some of the oldest (e.g., Christmas Bird Count) and most established (e.g., North American Breeding Bird Survey, BBS) monitoring programs. In this study, we explored trends in the use of Canadian bird CS data for ornithological research by examining 34 years (1990-2024) of peer-reviewed literature. Only 50% of the time is volunteer participation transparently attributed in the articles. Most papers used data from a single CS project (predominantly BBS), but those that used 2 or more projects tended toward more transparent attribution. Transparency was not significantly related to journal prestige. While there has been improvement over time, instances lacking transparent attribution still occur. Since contribution to scientific research is an important motivator for CS participation, transparent attribution is crucial to ensure long-term volunteer commitment and recognize the significant volunteer contributions that make CS datasets valuable.

Bojian Chen (Queen's University)

Integrated toolset for amphibian diversity monitoring in the Upper St. Lawrence River basin

The St. Lawrence River ecosystem faces significant environmental threats from habitat loss and degradation due to intensive industrial and agricultural activities and climate change. Monitoring the ecosystem's health, particularly in near-shore wetland zones, is urgently needed. Amphibians, which occupy habitats between terrestrial and aquatic environments, play a crucial role in maintaining ecosystem structure and function. Their condition serves as a biological indicator of ecosystem changes. However, traditional survey methods are often logistically challenging, costly, and incomplete, especially for endangered and cryptic amphibian species. Our goal is to develop an integrated toolset to monitor amphibian diversity in the St. Lawrence River basin for environmental management and conservation purposes. This toolset includes two major components: species distribution modelling (SDM) and environmental DNA (eDNA) determination. The SDMs generate heat maps of suitable habitats for amphibian species, enabling targeted eDNA sampling and near real-time monitoring. The toolset can be used for either detecting species of concern or monitoring general diversities.

Nelson Zabel (University of Guelph)

Effects of ethanol preservation on mercury and stable isotope eatios in salmonid dorsal muscle

Effects of ethanol preservation on the carbon-to-nitrogen (C:N) ratio, stable carbon and nitrogen isotope ratios (δ13C, δ15N), and total mercury concentration ([tHg]) of Lake Trout (*Salvelinus namaycush*) and Round Whitefish (*Prosopium cylindraceum*) tissues were investigated using paired subsamples. Preservation resulted in significant increases in δ15N and [tHg], and species-specific changes in δ13C. No differences were observed in C:N ratios for either species. Linear error-in-variables regression models were developed to correct isotope ratios and [tHg] of ethanol-preserved fish tissues.

Aliana Hellmuth (Toronto and Region Conservation Authority)

Evaluating changes in urban fish community composition in the Greater Toronto Area from 2001-2024

Long-term environmental monitoring programs are vital for environmental management agencies as the data collected informs planning and decision making. The Regional Watershed Monitoring Program (RWMP) samples fish communities in the Greater Toronto Area. Over the course of a 3-year period, 162 stations across 10 watersheds are sampled by single pass backpack electrofishing. Total length (mm), weight (g), and identity of fish are recorded. We sought to evaluate the current conditions and long-term trends (2001-2024) for fish communities. While there is no evidence of declines in biomass (b= -193.4, R=5.01 x 10-4, $F_{1,80}$=1.04, p>0.05) or species richness (b=0.04, R= 5.63 x 10-4, $F_{1,80}$=0.04, p>0.05) over time in the overall fish community, declines in catches of vulnerable species such as brook trout (b= -1.05, p=0.054) and redside dace (b = -0.9841, p<0.05) have been observed. Long-term monitoring can help to capture changes in fish communities and can be used to support restoration or protection initiatives for vulnerable species in urbanized environments.

Oral Session 1B

Erin Stewart (Trent University)

Coping with climate change: Drivers of variation in brook trout thermal ecology

The effects of climate change are expected to vary based on aquatic habitat type and geographic area, so understanding how coldwater fish respond to warming at the population level will be essential for effective conservation and management. Fish size and maturity, acclimation, and genetic variation are known to drive variation in thermal tolerance within a species. Brook trout, thermal generalists among

coldwater fish, exhibit substantial diversity in both ecotype and life history as a result of occupying both lentic and lotic habitats across their wide range. To assess variation in thermal tolerance of brook trout, and thus, how resilient they may be to climate warming, we studied their thermal ecology across life stages, ecotypes, and environmental contexts. Drawing on results from five studies including over 30 distinct populations, we identify key drivers of brook trout thermal ecology and discuss their implications for conservation under climate change.

Ashley Grew (Queen's University)

Interactive effects of anthropogenic stressors on juvenile northern clearwater crayfish

Freshwater ecosystems are undergoing major transformations as environments change due to anthropogenic stressors. Two prominent sources of aquatic ecosystem stress are declining calcium concentrations [Ca^{2+}] and climate warming. These stressors could be contributing to crayfish population declines across Ontario, and while these stressors have been studied individually, their interactive effects on freshwater ecosystems are largely unknown. This study focuses on the interactive effects of ambient water [Ca^{2+}] declines and heat wave events on the physiology of Northern Clearwater Crayfish (*Faxonius propinquus*). Using a factorial design of calcium treatments and temperature treatments, we examined the survival, growth, and total body Ca^{2+} of specimens to determine whether rising temperatures exacerbate the physiological impacts of low ambient water [Ca^{2+}]. Our results indicate that high water [Ca^{2+}] increases total body Ca^{2+} and decreases survival, while heat waves increase growth rate and, when combined with high [Ca^{2+}], increase survival. This study provides insight into the effects of multiple stressors on aquatic organisms.

Jacob Coates (Trent University)

Pugnose shiner (*Miniellus anogenus*) occurrence in relation to local abiotic and biotic factors

Freshwater coastal wetlands contain numerous at-risk fish species that are increasingly threatened by habitat degradation. Designing effective strategies to recover these fishes requires understanding the role of local habitat factors on species distribution. To understand the factors affecting the distribution of the Threatened Pugnose Shiner (PNS) in Canada, we assembled data on local abiotic (site-level percent coverage of submerged aquatic vegetation, SAV) and biotic factors (site-level occurrence and abundance of Largemouth Bass, LMB, and Blackchin Shiner, BCS) and related these variables to all known detections of PNS in Canada from 2002 – 2023 (n = 1104). Results found weakly positive relationships with PNS abundance and % SAV (r2 = 0.02) and LMB with PNS occurrence (ϕ = 0.21) as well as moderately positive relationships between BCS with PNS occurrence (ϕ= 0.51). Also, PNS abundance was significantly higher in sites

containing BCS ($p = 0.045$). Findings suggest that LMB or SAV alone are not strong determinants of PNS occurrence at the site scale, but BCS presence may be a greater indicator for identifying potential PNS habitat or potential sites for species reintroductions.

Raegan Davis (Carleton University)

Dam it, I'm stranded: Evaluating fish stranding downstream of a hydropeaking facility on the Michipicoten River, ON.

Hydropower is a renewable energy source that offers the capacity to produce low carbon energy and the flexibility to meet daily fluctuating energy demands. Hydropower facilities that use hydropeaking regimes operate at different flow discharges to supply energy to the grid as required to accommodate changes in energy demand throughout the day. Large changes in wetted areas occur downstream of the dam when the dam discharge changes from minimum flow to maximum flow and then back to minimum flow, referred to as a peaking event. The loss in wetted area with the move to minimum flow may potentially result in fish becoming stranded on dry substrate or in pools disconnected from the main channel. To investigate the factors that drive fish stranding on rivers that operate with hydropeaking regimes, we deployed cameras on the Michipicoten River below the Scott Falls Generating Station from June to October in 2023 and 2024 ($n_{2023} = 11$, $n_{2024} = 33$) to remotely capture occurrences of fish stranding. Scott Falls GS has a 22.5 MW generation capacity, a maximum turbine flow of 100 m^3/s and a minimum flow of 17 m^3/s. Cameras captured 47 (2023) and 76 (2024) stranded fish. To understand what factors drove fish to strand at these locations a predictive model was created, using calendar day, substrate (mm), wetted history (minutes), horizontal ramping rate (cm/h), and fish density ($fish/m^2$) as factors known to influence stranding rates. This model will allow for comparison with other hydropeaking systems to better understand if factors driving fish stranding are common among rivers, to help identify potential mitigation strategies to minimize such events.

Zira MacFarlane (University of Toronto Mississauga)

Any port in a storm: Impacts of freshwater salinity increases on amphibian breeding

Ontario's amphibians face a barrage of threats, particularly in areas of increasing urban development. Urbanization simultaneously reduces freshwater habitat availability and increases exposure to pollutants like salt. Increased salinity has been associated with changing reproductive dynamics for amphibians – increased mortality and altered metamorphosis regimes. However, frog populations still inhabit contaminated ponds, provoking the question of whether occupancy is driven by a limitation in habitat or whether amphibians are unable to select by salinity. In this experiment, we aim to clarify how salt pollution affects amphibian

breeding in terms of behaviour, demography, and development by studying changes in habitat selection, larval mortality, and metamorphosis rate in an open experimental pond grid with adjacent contaminated and control ponds. Over the past two years, we have observed increased larval mortality in ponds with elevated salinity. In turn, we found that Lithobates species avoided contaminated ponds, while American toads preferentially selected salted ponds, suggesting that freshwater salt pollution may even create ecological traps for certain species.

Oral Session 2A

Anne Haley (Carleton University)

Advancing the concept of energy landscapes in animal ecology

Energy is a fundamental currency in biological systems that both drives and constrains a range of ecological phenomena, in which the spatial domain and environmental interactions are essential factors. The concept of the 'energy landscape' has been defined as the influence of environmentally dependent variation on the cost of transport related to animal space use and movement. Recent research has expanded this concept to encompass diverse facets of ecological energetics, including resource availability and physiological trade-offs. Here, we aim to further explore the energy landscape paradigm and advance the concept to incorporate a variety of sources of energetic costs and gains. Doing so allows for the characterization of the spatiotemporal distribution of net energetics for animals through linkages with the ecological and environmental conditions of the landscape. Considering spatial dynamics of diverse sources of energetic costs and gains, the concept is relevant to individual behaviour, growth, and fitness. The concept can also be extended to population and ecosystem scales, and we discuss how to do so, with specific case studies relating to aquatic environments.

Amber Fedus (Trent University)

Drivers of within- and among-individual variation in home range size in freshwater sportfish

Home range size within and among species can vary from environmental, intrinsic, physical, and social drivers. Individuals can shift their home range to reflect changes in resource needs or physical demands over time. In our study, we aimed to determine the drivers of variation in home range size within and among individuals and species of sportfish using Stoney Lake, Ontario (part of the Kawartha Lakes). Five sportfish species (muskellunge, walleye, smallmouth bass, yellow perch, and black crappie) were implanted with acoustic transmitters of varying sizes (tags; V7, V13, V13A, V13AP, V16AT) from fall of 2022 to spring of 2024. Kernel utilization distribution was used to estimate 50% and 95% of an individual's or species' home

range on weekly to seasonal scales. These estimates were compared to determine intra- and inter-specific variation in home ranges. To assess the drivers of home range size in individuals and species, generalized additive mixing models were used with environmental and biological drivers (i.e. surface temperature, length, mass). Our findings help to illustrate and understand variation in home range size and habitat use in freshwater fishes.

Kiaunna Lee (University of Western Ontario)

Habitat selection of coyotes in Long Point National Wildlife Area

Long Point National Wildlife Area provides a unique, undisturbed habitat for diverse wildlife species. While bird habitat use in this region has been extensively studied, less attention has been given to mammalian species such as coyotes (*Canis latrans*). This study examines habitat selection by GPS-collared coyotes at Long Point, using step selection functions (SSFs) to model movement in relation to landscape features. Unlike previous research in agricultural, urban, or forested areas, this study explores coyote habitat use in a protected area with minimal human influence. Using SSFs, we model patterns of selection across a variety of habitats and quantify the likelihood of habitat selection by identifying key environmental drivers of movement. Preliminary results suggest a preference for dunes and open habitat, while wetlands and water bodies are generally avoided. Additional movement metrics such as step length and turning angle provide further behavioural insights into patterns of habitat use.This research broadens our understanding of coyote ecology, offering important insight into conservation strategies for protected areas and broader landscape management.

Nick Luymes (Wilfrid Laurier University)

Expanding frontiers: Muskox resource selection in the boreal forest

Muskoxen are an ecologically and culturally significant species in Canada's North, but their ongoing southern range expansion in the Northwest Territories (NWT) has led to questions regarding their impact on other wildlife, especially caribou. After severe depletion due to overexploitation, muskoxen have been recolonizing into the boreal forest, an area where research is scarce. Communities in NWT are interested in whether the habitat requirements of muskoxen overlap with other important boreal species, including boreal caribou. I used data from 10 GPS-collared muskoxen in the Sahtú Region to study seasonal variation in resource selection. Using integrated step selection functions, I looked at the influence of topography, land cover, and fire history on movement decisions. Muskoxen selected for recently burned areas in the summer and forested uplands in the winter. These habitat associations suggest that muskoxen may be occupying different niches in the boreal forest compared to caribou. This research will enhance our understanding of how habitat requirements differ across environmental gradients and inform

multi-species conservation strategies as distributions change.

Oral Session 2B

Natasha Serrao (University of Waterloo)

Using fisher knowledge and scientific data to understand species importance in Chilika Lagoon, India

Fishers are negatively impacted by fish decline through income loss and food security. To mitigate this decline, a strong connection is required between scientific research and local practices. My research strengthens this association using keystone theory and community perspectives to understand fisheries conservation. To gather local perceptions on fish importance, I interviewed 90 individuals across three socially diverse villages in Chilika Lagoon, India. I captured responses across a range of demographic variables including age, gender, and caste. Interviewees were asked to identify fish shown in photographs I provided, to understand linkages between scientific and local naming. My study revealed a high variation of local names assigned to each species, with much of this diversity attributed to phonetic differences. Secondly, fish identification that matched the literature was higher in villages where fish were caught, likely related to active fishing of target species. My findings are critical to ensuring a shared language between fishers, resource users, and scientists, so that limited conservation resources can be allocated to target species.

Ryan Hodgson (Carleton University)

Metabolic and behavioural consequences of catch and release angling

Recreational fisheries offer significant socio-economic benefits, with approximately 3.2 million anglers contributing over $7.9 billion annually to the Canadian economy. However, climate change-induced temperature rises threaten these fisheries, particularly affecting cold-water species like Brook Trout (Salvelinus fontinalis). Among recreational fisheries, fish that are captured and released (i.e., C&R) may experience sublethal impacts or even mortality with those impacts being mediated by water temperature. To that end, this study investigated the energetic costs of C&R stress on Brook Trout under warm (16 °C) and cold (10 °C), temperature regimes following C&R simulations with varying air and chase exposures. Post-exercise oxygen consumption (EPOC) and time to resume feeding data were recorded to determine whole organism recovery. These data will help to elucidate the total energetic cost of a C&R event, providing insights into the synergistic interaction between temperature and C&R practices on fish physiology and ultimately fitness. Results will help to guide fisheries management in establishing temperature-related closures and best C&R practices.

Karen Vanderwolf (University of Waterloo)

Cave ecosystems and microbiomes

Caves are unique ecosystems due to lack of light, limited nutrients, and relatively stable microclimates. Microbes are the most speciose biota in these ecosystems, which includes pathogens such as *Histoplasma* spp. and *Pseudogymnoascus destructans* (Pd) that cause histoplasmosis and white-nose syndrome, respectively. I will synthesize multiple research projects I conducted on cave microbiota and suggest future directions. My research examined: 1. drivers of hibernating bat skin microbiomes and whether these microbiomes are correlated with susceptibility to the fungal disease white-nose syndrome among bat species; 2. Factors affecting mycobiomes on aeroponic roots and macroinvertebrates in caves; and 3. Temporal patterns of environmental reservoirs of Pd in caves. Future research directions include: 1. What factors influence the persistence of pathogens in caves; 2. How do influxes of nutrients or pollutants change cave ecosystems; 3. How does the chemistry of caves influence the microbiomes of cave biota.

Lauran Stoner (University of Western Ontario)

Spatial-temporal interaction of coyotes and white-tailed deer in Long Point NWA

An overabundance of White-tailed Deer in Long Point NWA has impacted the ecosystem through over-browsing, leading to active management. Coyotes are the top predator at Long Point, and are known to predate deer in a variety of ecosystems. However, little is known about their role in ecosystems such as Long Point. In this study, we use camera traps (n = 90 sites) to explore the spatial-temporal interaction of coyote and deer in Long Point as a proxy of predator-prey dynamics. We use time-to-event analysis to study the time elapsed between observations of deer and coyote, indicating the rate of interaction and associated spatial covariates. We have observed coyote following an observation of deer (n = 444), with a peak in such events being within an hour (n = 54). We have also captured active pursuit, and a single event of a coyote carrying a deer. Preliminary results did not find a statistical relationship between interactions and covariates such as habitat type. Our observations also indicate alternative species of prey such as wild turkeys. This study will provide further insight into the relationship between coyote and deer, and inform on the need for continuing deer management.

Poster Presentations

Rose Myatt & Romain Dejeante (University of Guelph)

A dynamic foodscape: Implications for movement patterns and diet selection of boreal woodland caribou (*Rangifer tarandus caribou*) in Northern Ontario

Boreal woodland caribou (*Rangifer tarandus caribou*), listed as threatened under Canada's Species at Risk Act since 2003, are experiencing widespread population declines due to habitat loss and increased predation risk from human development. While extensive research has examined caribou space use and predator avoidance, diet and resource selection remain understudied in Ontario. Of particular importance, energy availability varies dynamically throughout the year due to seasonal changes in snow cover and vegetation growth in boreal ecosystems. Our study will map these spatio-temporal variations of available energy to caribou populations in Northern Ontario. We will assess temporal and spatial patterns in caribou diet and movement in Northern Ontario using high-resolution video collar and GPS data from caribou feeding events (n=23, 13000 videos), augmented with in-situ monthly vegetation sampling to assess variations in abundance and quality of available forage. Gaining insights into drivers of caribou movement and diet selection across spatial gradients of habitat productivity, permeability, human interference, and energetic costs is crucial for the strategic planning of woodland caribou management and conservation in Ontario.

Abby Turner (University of Toronto)

Seasonal changes in the drivers of reproductive investments in male snowshoe hares

Research on the energetic investments of reproduction in animals has primarily focused on females. In mammals specifically, it is often assumed that female investments into reproduction far outweigh males. Strategies for meeting the energy requirements of reproduction can be divided into two categories; capital breeding, wherein animals rely on stored energy, and income breeding, wherein animals increase their resource uptake to meet demands. Here, we present results on the influence of energy stores and resource availability on male reproductive effort in snowshoe hare (*Lepus americanus*). Males are believed to invest into reproduction through mate-chasing behaviours during multiple breeding periods over a single breeding season. We found evidence that males adjust their approach to the energetic demands of reproduction between capital and income strategies based on energetic stores, time of breeding season and resource availability. Our results provide compelling evidence of the energetic limitations on male reproductive effort in snowshoe hare and contribute to previous work suggesting that males contribute significant energetic investments into successful reproduction.

Alex Walmsley (Queen's University)

Ecological insights from whole-lake fish removals in Canada’s north

Resource extraction supports many communities in Canada’s north, but it often negatively impacts fish habitats. Canada’s Fisheries Act requires avoiding, mitigating, or offsetting harm to fish habitat, but management is challenged by limited data from northern fish populations and ecosystems. We aim to fill this gap by studying the fish communities of two subarctic lakes drained for mining projects. Our two main objectives are: (1) evaluating the predictions from Ontario’s Broad Scale Monitoring (BsM) netting program in the subarctic, and (2) investigating fish habitat use and food webs in subarctic lakes. A standard BsM protocol completed for each lake will be validated against a complete count of fishes during drainage. Complete censuses of aquatic ecosystems like these are rare and valuable in developing reliable predictions of fish abundance and distribution. Examination of fish stomach contents and analysis of tissue stable isotopes will be used to determine positioning in lake food webs and how different species use their habitats. Results will support conservation management by informing habitat mitigation, offsetting, and restoration in Canada’s rapidly changing north.

Aamaan Leacock (Wilfrid Laurier University)

Navigating change: Red fox and marten dynamics in Ontario's far north

Canada’s northern landscapes are undergoing accelerated environmental change due to resource extraction and climate shifts, yet limited data exist on species responses to disturbances. Understanding species detection patterns across heterogeneous landscapes can provide insights into habitat use and shifts in species distributions. In Northern Ontario, where the Hudson Bay Lowlands meets the Ontario Shield, home to American marten (*Martes americana*) and Red fox (*Vulpes vulpes*). This heterogeneous landscape is ideal for understanding factors predicting their overlap and response to landscape change. Using an array of wildlife camera traps (272 cameras deployed between March 2022 and March 2023, across 61 plots), we compare the detections of both mesocarnivores and which habitat characteristics, abiotic conditions, and co-occurrence patterns impact their distribution. Initial findings show red fox and marten spatially segregate, co-occurring at only 2 plots. This research will enhance understanding of ecological interactions in a remote northern system, shedding light on competition or niche partitioning between these two furbearing species under anticipated environmental change.

Bojian Chen (Queen's University)

Adaptive advantages of invasive mosquitofish over native medaka in a warmer, hypoxic world

Anthropogenic climate change has significantly degraded freshwater ecosystems. The increased frequency and intensity of heatwaves are expected to exacerbate hypoxic conditions in aquatic environments, threatening native species but potentially favouring invasive ones. Our study assessed the hypoxia tolerance of *Gambusia affinis*, a North American originated global invader, and *Oryzias sinensis*, native to the lower Yangtze River, at 30°C. We analyzed tissue-specific transcriptomic responses (gill, liver, and muscle) to acute extreme hypoxia (1 mg/L dissolved oxygen for 24h at 30°C) to understand their adaptive mechanisms. Results showed that *G. affinis* endures acute extreme hypoxia better than *O. sinensis*. Both species activate the HIF-1 pathway, inhibit protein synthesis, enhance antioxidant defences, and improve oxygen transport. However, *G. affinis* demonstrates broader regulatory mechanisms, including inter-tissue protein degradation and amino acid catabolism in the gills. The upregulation of chaperone proteins, especially heat shock proteins, and enhanced dual-pathway energy production in the liver provide *G. affinis* with flexible metabolic adaptations.

Christine Dunbar (Wilfrid Laurier University)

Habitat associations of an expanding muskox (Yutthéjëré; *Ovibos moschatus*) population

Canada’s north is changing rapidly due to climate change, altering habitat availability and the distribution and abundance of resident species. Whereas most ungulates are predicted to move north with climate-induced habitat change, muskox (*Ovibos moschatus*) on the mainland of the Northwest Territories (NWT) have been expanding their range south of the tree line into the boreal forest. My research uses photos from camera traps to quantify seasonal muskox-habitat associations across a boreal-tundra transitional region on the East Arm of Great Slave Lake (Tu Nedhé), specifically Thaıdene Nëné Indigenous Protected Area. I ask whether muskox occurrence varies spatially and temporally across habitats and investigate if muskox select habitat based on predation pressures, foraging quality and quantity, thermoregulation, or recent burns. The information that will be uncovered from this study will support management and conservation of muskox in the north as they begin occupying new habitats south of the tree line. It can also help us understand how far they might move as the landscape changes, and if there are associations with other species that might affect wildlife management practices.

Emilie Knighton (Wilfrid Laurier University)

Filtering out the noise where things are quiet: A deep dive into our knowledge of N.Ontario wildlife

Ontario's north has some of the most intact landscapes in the world and is home to a rich diversity of vertebrate species. However, the remote nature of this landscape has drastically limited the ability for data acquisition; it is costly to travel and adequately sample. This fact raises the question: how much of what we know about northern Ontario comes from local research and how much is inferred from other - somewhat similar - landscapes? We hypothesize our current knowledge is primarily based on: i) Indigenous knowledge ii) western science iii) expert opinion and iv) extrapolated information from adjacent regions. We predict that our current knowledge of northern Ontario is based on a mix of these factors, with expert opinion and extrapolated knowledge contributing the most information, as measured by published and grey literature. I will be conducting a literature review of information recorded through scientific publications, government reports, data repositories, and expert mapping exercises. This information will help to outline knowledge gaps by ecoregion, habitat types, and species while also prioritizing the key research questions for this region going forward.

Jacob Lasci (University of Western Ontario)

Effects of introduced salmonids on native lake trout in Lake Huron

Lake Huron's fish community is comprised of many non-native species, including the piscivorous Pacific salmonids chinook salmon *Oncorhynchus tshawtscha*, coho salmon *Oncorhynchus kisutch*, and rainbow trout *Oncorhynchus mykiss*. The only abundant native piscivorous salmonid is the lake trout *Salvelinus namaycush*. Since 1980, there has been a steady decline in the biomass of the prey fishes these salmonids consume. Considering the collapse of alewife *Alosa pseudoharengus*, there has been growing concern that lake trout will be outcompeted by the non-native salmonids. Paramount to understanding this concern is determining the diet overlap between salmonids and how the overlap has shifted with changes in prey abundance. Stable isotope analyses (δ13C, δ15N) from lipid-extracted muscle tissues were compared among salmonids revealing large percentages of lake-wide isotopic niche overlap. Comparisons of these isotopes from salmonid scale samples taken before and after the alewife collapse revealed a shift in the diets of chinook salmon that now overlap with lake trout. Given the strong competitiveness of chinook salmon, this result is concerning for the management of the native lake trout.

Julia Schonfield (LGL Limited)

Evolving methods of analyzing bioacoustic data

Passive acoustic monitoring is commonly used to monitor for birds and amphibians. Advances in autonomous recording units (ARUs) have improved over the past decade, and current models can record for even longer periods of time due to efficient battery use. Passive acoustic monitoring programs easily generate large volumes of audio recordings, and automated species recognition can be the best approach to analyzing audio data. When I started my PhD research in 2013 using ARUs to survey for owls, I developed recognizers for three owl species in the program Song Scope. At the time, Song Scope was a good option for a machine learning tool to scan recordings and detect species of interest. Since then, other more user-friendly programs have emerged. In my current position as an ecologist with LGL Limited, myself and co-workers have been using BirdNET from Cornell Lab of Ornithology and developed an efficient workflow to verify detections of species at risk in R, and initial results are promising. Verification by experienced biologists remains a key step, but programs with improved accuracy and efficiency at detecting species of interest are advancing the field of bioacoustics.

Lindsey Wamboldt (University of Guelph)

Nuts about trash: Indicators of metabolic health in grey squirrels across an environmental gradient

Access to human food waste in urban environments influences wildlife physiology, including that of grey squirrels. This study expands on previous findings by analyzing plasma levels of glycated serum protein (GSP), a 2–3-week blood glucose measurement, and low-density lipoprotein cholesterol (LDL-C), the complex responsible for depositing plaque on arterial walls, in wild grey squirrels. Male and female squirrels in urban, urban-adjacent, and rural environments were captured to measure GSP and LDL-C levels. We predicted that females would have lower levels of both compounds than males and that urban individuals would have higher levels than non-urban individuals due to unnatural food subsidies from trash. This study found that GSP levels were significantly greater in urban squirrels, and, although not statistically significant, LDL-C levels appeared lower in urban individuals. There was no significant difference between sexes. These results indicate that urban environments are altering squirrel physiology and further studies on the health outcomes of altered GSP levels and potentially LDL-C levels will help us to better understand the effects of urbanization on this wild species.