UNIVERSITY OF CALGARY
Kananaskis Centre

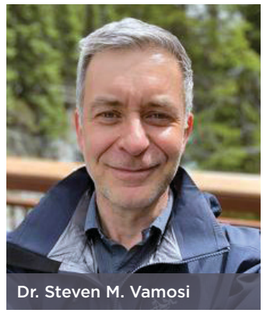
University of Calgary Kananaskis Centre

Science, Research and Education in the Canadian Rockies

June 2026 | Triennial Report

TABLE OF CONTENTS

DIRECTOR'S MESSAGE



Dr. Steven M. Vamosi

Greetings from the Eastern Slopes of the Rocky Mountains! Before I go any further, I want to take a moment to acknowledge that the University of Calgary Kananaskis Centre field stations are on lands that have been home to Indigenous Peoples since time immemorial. Indeed, archaeological evidence indicates their presence in the area for at least 10,300 years, coinciding with the retreat of the Cordilleran and Laurentide ice sheets. To that put that into context, if we scale that time to a single 24-hour clock, work on our first field station began with a little over 10 minutes left in the day. We are aware of, and grateful for, the privilege of sharing this space and we continually strive to be good neighbours and partners.

The time period covered by this 2023-2026 triennial report has witnessed sustained growth in use and activities since we resumed full operations after the COVID-19 pandemic, which we detail later in the document. Importantly, it also coincides with three major milestones. Because many of the significant dates are from before I was born, let alone my time with the University of Calgary, I've pieced together details to the best of my ability through consulting original annual reports, a book, other archival materials, and people.

In 2025, we celebrated the 75th anniversary of the field station located on Gorge Creek in south Kananaskis Country. Originally named the Alberta Biological Station, it was first established by Dr. Richard Bernie Miller (professor at the University of Alberta) in May 1950, with the goal of conducting research to better understand the low survivability of hatchery-raised trout in montane streams. In 1965, the field station was renamed to the RB Miller Field Station in his honour, after he tragically passed away at an early age in 1959. To my understanding, and with reference to annual (and related) reports created by the University of Alberta and the University of Calgary, oversight of the RB Miller Field Station was transferred from the University of Alberta to the University of Calgary in 1991.

In 2026, we celebrate two milestones. First, it marks the 60th anniversary of the field station at Barrier Lake, originally known as the Environmental Science Centre. Because I can't recall the last time his name came up, I want to take a moment to acknowledge Dr. Paul K. Anderson, who began to advocate for a 'Kananaskis Biological Station' at least as early as 1962, no more than a year after he became an Assistant Professor in the Department of Zoology at the University of Alberta, Calgary (i.e., four years before the University of Calgary became an autonomous entity). In a very real way, generations of students, teachers, researchers, and community members continue to benefit from Dr. Anderson's foresight.

Second, we mark another name change, and associated identity refresh, for the aforementioned umbrella entity that oversees the vision and mission of the two field stations. Initially, the Environmental Sciences Centre (ESC) oversaw the field station at Barrier Lake as well as a "laboratory and office space in the Biological Sciences building on the main campus of the University of Calgary." In 1978, the then-President of the University of Calgary arranged for the name to be changed to the Kananaskis Centre for Environmental Research (KCER), to "lessen confusion between the Centre and the Faculty of Environmental Design." It appears to have been called KCER until 1991, when it was renamed to Kananaskis Field Stations (KFS), coinciding with the addition of the RB Miller Field Station and the start of Dr. Edward A. Johnson's long tenure (1991-2018) as director. In 2006, KFS was renamed to the Biogeoscience Institute (BGI). Starting in late 2024, initially with Dr. William A. Ghali (Vice-President, Research) and Dr. Andre G. Buret (then Associate Vice-President, Research overseeing field stations), and then Dr. Ghali, Dr. Stephanie L. Borgland (Associate Vice-President Research overseeing field stations), Marjorie Moreau (Senior Director, VPR Operations), and Adrienne Cunnings (Field Research Manager, BGI), we held a large number of consultations and gave many presentations to socialize a place-based name that honoured longstanding research and scholarship programs while also welcoming emerging interdisciplinary and transdisciplinary efforts. Collectively, we arrived at University of Calgary Kananaskis Centre (UCKC), coming into effect on May 1 to match the anniversary of the University of Calgary as an independent institution.

During my time working on the name change, I became better acquainted with the people associated with these facilities, and here I'd like to share a few more names and dates. Dr. David A. Boag ran the Alberta Biological Station from 1958-1960, handing it over to Dr. Victor Lewin from 1960-1963, before leading it again for nearly three decades (1963-1990). The first director of the ESC was Dr. James B. Cragg, who retired from the role in 1972 due to illness, with Dr. Michael H. Benn taking over as acting director until 1973. (Incidentally, the Department of Chemistry runs a Distinguished Speaker Series in Dr. Benn's honour.) Dr. Gordon W. Hodgson became ESC director in 1973, apparently holding the role until Dr. Dennis Parkinson became KCER director in 1983. Finally, Dr. Ross M. Lein was KCER director from 1989-1991.

I'm grateful for my association with the University of Calgary Kananaskis Centre, first as a faculty member in the Department of Biological Sciences conducting research and teaching field courses in the region since I moved to Calgary in 2003, and more recently as Scientific Director since 2018. To help the reader get a deeper sense for the importance of these facilities, I reached out to a number of long-term principal investigators to share their stories. Because education and community connections are also core priorities, I asked the Education team, as well as leadership of The Howl Experience, to prepare comparable pieces. I hope our stories inspire you to visit and support the University of Calgary Kananaskis Centre so that we may keep high quality science and community connection alive for decades to come. As always, I encourage you to reach out to us at kc@ucalgary.ca to arrange a tour of our facilities or book us for a stay.

I leave you with a passage from a 1967 grant application by Dr. Cragg to the National Research Council of Canada, in which he summarized the objectives of the Environmental Centre:

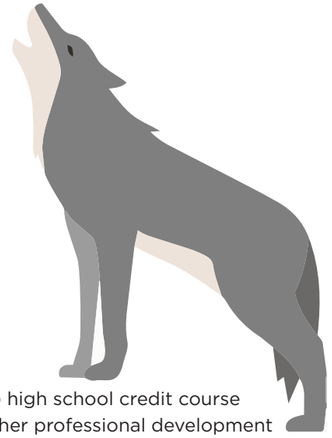
"The purpose of the Centre is to promote teaching and research on the natural environment through the encouragement of interdisciplinary studies... The work of the Centre will be concerned with basic research of an interdisciplinary nature in environmental science. It is hoped, if the growth of the Centre can be accelerated, that the Centre will make valuable contributions which will have a bearing on the maintenance of the quality of man's environment."

Other than the gendered reference to the environment and acknowledging that the term transdisciplinary would not be coined for another three years, I think this vision holds up pretty well almost 60 years later. Certainly, we are witnessing unprecedented rates of environmental change, biodiversity loss, and social upheaval, which are intricately tied together and require novel and collaborative approaches to address and resolve.

Dr. Steven M. Vamosi, Scientific Director,
University of Calgary Kananaskis Centre

The Howl Experience: Connecting Youth to Land, Science, and Story

Submitted by the Kananaskis Center School Program Team



The Howl Experience began partnering with the Biogeoscience Institute (BGI) in 2022 to offer experiential land-based learning programs for youth and educators. The Barrier Lake Field Station has been a home base for Howl's Rockies programs, providing accommodation, amazing meals, and access to environmental educators that enhance our organization's programming. The Centre's educators Briana & Savannah provide ecology-focused and scientific inquiry educational activities on Howl programs– from Howl High and Youth Exploration programs to Educator Professional Development. These perspectives are offered from a Two-Eyed seeing* lens; Howl program participants learn about the lived environment through both Indigenous and non-Indigenous ways of knowing.

The Howl Experience hosts our summer CALM Peaks (Career and Life Management) high school credit course at Barrier Lake Field Station. In October 2024, Howl and Inside Education ran a teacher professional development experience at the Station. Through ecology walks and hikes in the Kananaskis area, program participants learn about ecosystem dynamics, relationships between flora and fauna, and how humans fit into the ecosystem. The Centre's educators collaborate with Howl to guide participants through real-world problems through the process of scientific inquiry. The Howl team is grateful for this important, hands-on education centre in Kananaskis!

**A term introduced by Mi'kmaq Elders Albert Marshall and Murdena Marshall from Eskasoni First Nation.*

School Programs: A Legacy of Learning, Rooted in the Rockies

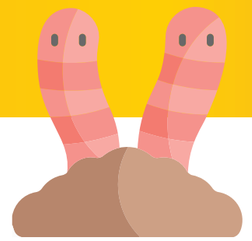
Submitted by the Kananaskis Center School Program Team

The Biogeoscience Institute School Program has been delivering innovative science education since 1988. What began as a pilot project with 100 junior high students has grown into a program which has reached thousands of students and fostered meaningful relationships between the Barrier Lake Field Station, teachers and students. The program plays a valuable role in connecting students from Calgary to the ecological systems where they live. Students have also travelled from across the country to learn about the importance of mountain ecosystems.

In our programs, we strive to provide a cutting edge, experiential learning environment to students by facilitating access to world-class research and supporting them in uncovering links between various ecological concepts. As students participate in this process they bridge the gap between many different disciplines. They are exposed to new and creative ways of thinking about science as an active participant in their own learning and the scientific process, connecting this learning to the world around them. Our programs are unique as they focus on the nature of science, not just the outcomes, which is often not how learning is structured in the classroom. We encourage students to ask questions based on observations of the world around them, develop their own methods to answer these questions, while learning to accept failures and setbacks as an essential part of the scientific process, and important opportunities for growth.

We encourage practicing and pre-service teachers to approach their practice through inquiry and experiential learning by partnering with the Werklund School of Education and offering professional development. Our education program is also committed to fostering scientific literacy and cultivating relationships between the public and researchers through community-based programming.

[Students] are exposed to new and creative ways of thinking about science as an active participant in their own learning.



Exotic Earthworms and Rethinking Forest Ecology from the Ground Down

Contributors: Nico Eisenhauer, Professor, German Centre for Integrative Biodiversity Research; Olga Ferlian, Postdoctoral Researcher, German Centre for Integrative Biodiversity Research

Our scientific association with the Barrier Lake Field Station began in 2004 in the context of Nico's Master thesis. The resulting first publication (Eisenhauer et al. 2007) laid the foundation for what has since developed into a long-term research program on the ecological consequences of European earthworm invasion in North American forests. At that time, Nico was supervised by Prof. Stefan Scheu and Prof. Dennis Parkinson, who had already been working on this topic since the early 1990s. Their pioneering research at Barrier Lake established the site as a globally recognized natural laboratory for studying belowground invasions and their ecosystem-level consequences.

Building on this strong scientific legacy, we continued to conduct research at the Barrier Lake Field Station over the past two decades. Our work has evolved from initial assessments of earthworm impacts on soil fauna and nutrient cycling to increasingly integrative studies linking above- and belowground biodiversity and ecosystem functioning. This long-term engagement has been supported by competitive third-party funding, including an ERC Starting Grant, which enabled us to expand the scope of our research to multitrophic interactions and ecosystem multifunctionality. With support by Prof. Edward Johnson, the continuity of research at Barrier Lake has allowed us to address ecological questions at temporal and organizational scales that would not have been possible in short-term projects.

Over the years, Nico has overseen a diverse and highly collaborative research team at the Barrier Lake Field Station. In total, the work has involved: one professor (Nico), four postdoctoral researchers (including Olga), three field technicians, and eight BSc and MSc students. Together, we conducted six major field campaigns during the summers of 2004, 2006, and 2016-2019, with individual stays ranging from four to ten weeks.

The Barrier Lake Field Station has also served as an outstanding training ground for young scientists. To date, seven BSc and MSc theses have been successfully completed based on data collected at the site. These theses addressed topics such as plant community responses to earthworm invasion, shifts in soil microbial and faunal communities, alterations in nutrient cycling processes, and changes in above–belowground interactions. Many of these trainees have since continued careers in ecological research, demonstrating the field station's important role in academic capacity building.

Our long-term engagement at Barrier Lake has resulted in approximately 20 publications in peer-reviewed international journals, with additional manuscripts currently in preparation.

Early work, including Eisenhauer et al. (2007; Soil Biology & Biochemistry), showed that invasive earthworms fundamentally restructure soil food webs and nutrient dynamics by removing litter layers and relocating organic matter into deeper horizons. These changes alter habitat structure and resource availability, cascading through soil communities and affecting decomposition. Subsequent work demonstrated strong aboveground effects: earthworm invasion reduces understory plant diversity and shifts community composition. Loss of the litter layer and altered nutrient and seedbed conditions disadvantage native species while favoring disturbance-tolerant plants, identifying earthworms as powerful ecosystem engineers. More recently, integrating above- and below- ground data revealed that earthworm invasion decreases multitaxon biodiversity and soil ecosystem multifunctionality. Overall, European earthworm invasion simplifies forest ecosystems, homogenizes communities, and weakens ecosystem functioning—patterns highly relevant under interacting global change drivers such as climate and land-use change. In summary, long-term research at the Barrier Lake Field Station has shown that soil biological invasions can strongly affect forest biodiversity and ecosystem functioning, while also supporting impactful science, training young ecologists, and fostering international collaboration.

We gratefully acknowledge the consistently outstanding onsite support — ranging from excellent food and help with spontaneous constructions to creative problem-solving and the provision of even the most uncommon supplies — with special thanks to the coordinators Adrienne Cunnings and Farah Lodhawalla, as well as to the people working behind the scenes who make the station such a welcoming and productive place to stay.

German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Leipzig University; Puschstr. 4, 04103, Leipzig, Germany. Institute of Biology, Leipzig University; Puschstr. 4, 04103, Leipzig, Germany.

Where the Water Flows: Research Shaped by the Mountains

Contributor: Richard M. Petrone, Ph.D., Professor, University of Waterloo

Since 2015, our research program has been based in the Kananaskis Valley, operating out of the Barrier Lake Field Station. During this period, we have supported the training of five MSc students, two PhD students, ten Honours thesis students, and one postdoctoral fellow, establishing a strong record of highly qualified personnel development in alpine ecohydrology.

Our research has demonstrated the importance of understanding the coupling among mass fluxes, water storage, and vegetation across alpine landscape units, as well as the need to partition evapotranspiration at the landscape scale to quantify water yield and ecosystem responses to disturbance. Ongoing work integrates innovative field measurements and analytical approaches to determine how alpine wetlands and forests function, interact, and are sustained, and how their water use influences downstream supply. These insights directly inform improved modeling of water resources and are broadly applicable beyond the Rocky Mountain region.

This program is enabled by the continued support of the Barrier Lake Field Station and the University of Calgary, which ensures safe, efficient, and highly productive field operations year after year.

The Day I Learned Fieldwork Was Not a Walk in the Park

Contributor: Dr. Stephen Matter, PhD, University of Cincinnati

My first visit to the Barrier Lake Field Station in 1999 was memorable. I had just started as a post-doc in Jens Roland's lab at the University of Alberta and I was looking for a field site to manipulate habitat quality for the Rocky Mountain Apollo butterfly and determine its effects on their dispersal. Kris Sabourin, Jens' technician who had worked in Kananaskis Country in previous years, was my guide. On the first day he suggested we go to Jumpingpound Ridge. Since we only had one vehicle, he thought parking at the first trailhead, walking along the ridge and then down to the second trailhead would be the most efficient. I asked if the hike was hard, and he said no. I asked how much water he brings and he said a liter should be enough. I was expecting a walk.

The first trail, before you are in the butterflies' alpine meadow habitat, is about 1.5km with 500m elevation gain - that is it is steep. It was a hot day in mid-June, and I was out of shape and definitely not accustomed to the elevation. The hike must have taken me three hours because I must have stopped 100 times. I was out of water before we got to the last very steep part of the trail we now affectionately call the "thigh master."

I do remember seeing the meadows for the first time, but being tired, thirsty and somewhat disoriented, I don't really recall the normal sense of awe. I was thinking there is no way my research is going to happen here, if I have to do this hike. But there was more in store. Rather than go 1.5 km downhill back to the truck, we continued the tour along the ridgetop. While it is only about 3 km along the top of Jumpingpound Ridge, it is about 12 km back to the first trailhead with 7 km of the trip along the hot, dusty road. Luckily about halfway back the road someone gave us a lift to the first trailhead. I was dead tired, dehydrated, and wondering how I would ever get this project done. I think I fell asleep on the ride back to the field station. One thing I learned from that first day is to always keep extra water in the truck.

The next day, perhaps realizing that his easy hike was an ordeal for me, Kris suggested we go to Powderface Ridge. The drive was longer, but the hike was much less intense. I found a field site for my experiment. To some degree it was better that I used Powderface for my manipulations, because the experiment would have muddied future investigations of population growth and genetic structure on Jumpingpound Ridge.

Despite that rocky start, I've returned every summer since (minus those two forgettable COVID years). I think it is because each "answer" is really a new question. As an example, our long-term research (1995-present) on the population dynamics of the butterfly revealed that overwintering survival and population growth was affected by air temperature and snow cover. If it was too warm in early winter, overwintering eggs hatched prematurely and died. If it was too cold, they froze and died. We assumed the effect of snow was largely due to its insulting effect. Air temperature can be quite cold, but even a little snow keeps the temperature at ground level, where the eggs are overwintering, near freezing.

However, when we related survival and population growth to temperature on the ground, which should account for the insulating effect of snow, we still found an effect of snow on survival and population growth. Thus, snow is doing more than providing insulation. ***What is it doing?*** Protecting against desiccation? Providing cover from predators?

I don't know, but that is why I'll be back this summer...

Building a Legacy of Alpine Research, One Study at a Time

Contributor: Masaki Hayashi, Department of Earth, Energy, and Environment, University of Calgary

My association with BGI (now Kananaskis Centre) started when Ed Johnson invited me to participate in the G8 Chair in Wildlife Ecology program. I set up a new alpine hydrology study site in the Lake O'Hara watershed in Yoho National Park in 2004 and recruited graduate students and a postdoctoral fellow to work on the project, supported by the G8 Chair program and BGI.

In the ensuing years, I was invited to give workshops for school teachers or present our research results at public outreach events at BGI. I always enjoyed interacting with mountain enthusiasts at these events. In 2015, we started a new study of alpine groundwater at the Fortress Ski Area, and we used BGI as a staging ground for our field campaigns.

It was very nice to have BGI's support for our work. Throughout my entire career at the university, BGI has supported our work on alpine hydrology. All the discoveries we made in the mountains would not have been possible without BGI.

Students measuring groundwater outflow from a spring at the headwater of Opabin Creek in the Lake O'Hara watershed in Yoho National Park (September 17, 2008).

Through the alpine hydrology studies at Lake O'Hara and Fortress, I have trained two postdoc fellows, one PhD student, five MSc students, and three BSc thesis students. In addition, I always had summer undergraduate assistants for field work, resulting in approximately twenty students trained in various aspects of hydrological research.

The alpine hydrology studies at Lake O'Hara and Fortress generated 26 papers in peer-reviewed scientific journals and helped us develop a new conceptual understanding of groundwater in alpine catchments. Our conceptual model has influenced similar studies conducted in alpine regions around the world, and is guiding the development of hydrological models for predicting the future conditions of mountain rivers under a warmer climate.

Our conceptual model [based on local alpine groundwater] has influenced similar studies conducted in alpine regions around the world.

Following the Butterflies, Finding a Career

Contributor: Nusha Keyghobadi, PhD, Western University

My first experience at the Barrier Lake Field Station was in the summer of 1995. I had just moved from Ontario to start grad studies at the University of Alberta under the supervision of Jens Roland and Curtis Strobeck. Jens was establishing what would eventually become a long-term study of the Rocky Mountain apollo butterfly on Jumpingpound Ridge, and my goal was to use genetic data to understand dispersal and gene flow in the metapopulation. Through this work, we made early contributions to the field of 'landscape genetics', testing hypotheses about how landscape composition and configuration shaped patters of genetic variation.

After graduate school and several amazing field seasons, I was certain my time at the field station was done. Fortunately, I was wrong! Jens and Steve Matter, who had continued work on the system, documented a metapopulation-wide demographic crash on the ridge in 2003. This raised questions about how bottlenecks affect genetic variation in the context of a multiple, interconnected populations.

I supervised a group of students from the international Distributed Graduate Seminar in Landscape Genetics who examined genetic data from 'before' and 'after' the crash. We were surprised to initially find the crash did not reduce genetic diversity of the metapopulation. More in-depth analysis revealed that different local populations maintained different genetic variants through the crash and each local population subsequently recovered diversity depending on its degree of connectivity within the metapopulation. As usual, more questions than answers were raised and I was pulled back to working at the Barrier Lake station, re-centering the Jumpingpound Ridge system at the core of my research program.

My experience as a student at the station shaped my thinking as a scientist and launched my academic career; so, it's been a privilege to introduce my own students to this place. Over the past ten years, nine graduate students from Western University have worked on the system: Helen Chen (MSc), Maryam Jangjoo (PhD), Mel Lucas (PhD), Andrew Chaulk (PhD), Kevin Park (MSc), and most recently, Evan Bennett (MSc), Laura Bax (MSc), Emily Laver-Shareski (MSc), and Parinaz Khalilzadeh (PhD). An equal number of Western undergraduate and visiting students have also helped with our field work.

A key theme that has emerged from our studies is the extent to which resilience of the metapopulation, both demographic and genetic, is underlaid by the movement of individuals among habitat patches. Our current work is examining in more detail individual and population genetic responses to extreme weather (which may drive population crashes), and the traits that allow individuals to successfully disperse among local populations.

"...questions about how bottlenecks affect genetic variation..."

The Research Station That Started it All

Contributor: Jens Roland, PhD, University of Alberta

I first came to the Research Station as a summer research assistant in 1975! I was working on a study of alpine lichens at the University of Alberta. Although officially working on lichens, I also did a side project, collecting alpine Colias butterflies, looking at colour variation among sites at different altitudes and latitudes. This side project turned into my undergraduate thesis, and initiated what became a 50-year career studying alpine butterflies at Kananaskis.

For my MSc at the University of British Columbia (1979-1981) I studied the benefit, at high elevation, of melanistic (darkening) of wing colouration in alpine Colias butterflies. I knew that I wanted to conduct that research at Kananaskis, again, based at the Barrier Lake Research Station. Working at Mt. Alan and Mt. Collembola, I found that increased melanisation of butterflies at higher elevation, allowed them to raise body temperatures sufficiently to remain active in that cooler habitat.

As a new Professor at the University of Alberta in 1992, I initiated long-term population study of another alpine butterfly, the Rocky Mtn. Apollo, Parnassius smintheus, basing that project once again at the Barrier Lake Station. This study was initiated to identify the effects of the isolated and fragmented nature of alpine habitat on movement and dynamics of butterfly populations. In 1995, I found the perfect place for that study at a series of alpine meadows at Jumpingpound Ridge. The opportunity to work on alpine butterflies attracted a number of excellent, and keen, graduate students and Postdocs: Nusha Keyghobadi PhD, Sherri Fownes MSc, Kurt Illerbrun PhD, Amanda Doyle MSc. Steve Matter PDF, Tomas Roslin PDF and Alex Filazzola PDF.

We found that spatial structure of alpine meadows, due to intervening forest between meadows, limits dispersal among populations, altering the spatial structure of their genetic variation (Nusha Keyghobadi), altering resource acquisition by adult butterflies (Steve Matter), and desynchronizing dynamics among subpopulations. Given the long-term, and ongoing, nature of this project, we additionally examine the potential effect of changing weather and climate on behaviour and population dynamics. **Most people think of butterflies as summer insects, but Parnassius butterflies over-winter as eggs,** and we identified that winter weather, among the four seasons, has the greatest impact on dynamics; years with little or no snow cover, result in population declines. The long-term continuity and productivity of this project has resulted in consistent funding over the last 30 years, from the NSERC Discovery Grants Program.

Each summer from 1995 to 2004, I also taught the undergraduate Animal Ecology Field Course, through the University of Alberta. The Station provided the ideal location (alpine and montane habitats), and logistical support for this course to be both popular and successful for the 140 students that took part over the years, learning to conduct research in a field setting.

Previous students, and long-term collaborators, Nusha Keyghobadi (Western University), Steve Matter (University of Cincinnati), and Sherri Fownes (Parks Canada), have provided continuity of this research over the past three decades, and will continue to do so in future.

The opportunity to work on alpine butterflies attracted a number of excellent, and keen, graduate students and Postdocs.

From Field Volunteer to Global Research Leader

Contributor: Dr. Peter Neuhaus, Adjunct Professor, University of Calgary, Department of Biological Sciences

I was first introduced to the RB Miller Field Station as a volunteer helping with research on Columbian ground squirrels in 1994. I officially started my PhD through the University of Berne, Switzerland the following year studying cost of reproduction in Columbian ground squirrels. Back then the field station offered space for 15-20 scientists, students and volunteers. Many different projects were done simultaneously on birds, insects, plants and mammals with the two long-term studies on Bighorn Sheep and Columbian ground squirrels being continuously done until now. The value of such long-term studies to understand nature and its connectivity and ecology is immense. Besides this, the field station is also an invaluable source of education having a great mix of professors, graduate students, undergraduate students and volunteers from all over the world living together, socializing in the same small place collecting data and learning about nature.

First as an assistant Professor at the University of Neuchatel, Switzerland and later as an adjunct Professor at the University of Calgary, I try to continue the great tradition of this unique place introducing young students and scientists to the marvel of science and ecology, although with an unfortunately reduced capacity of only about six people in the new building. As a scientist I have supervised or co-supervised more than twelve graduate thesis and twelve undergraduate projects on an array of different species and topics, mainly ground squirrels and bighorn sheep but also mice and voles, red squirrels, and plant communities. My closest collaborator is my lovely wife Dr. Kathreen Ruckstuhl.

I'm involved in more than 40 peer reviewed publications from RB Miller research, and it is difficult to point out the 'most significant' contributions. There is a wide array of topics dealing with basic questions to understand biology and ecology, conservation, climate change, to improving drug combinations to minimize impact on bighorn sheep during capture. In my main study species, the Columbian ground squirrel, main findings deal with costs of reproduction, understanding mating strategies and thanks to the long-term datasets also factors dealing with lifetime reproductive success and longevity.

A huge part of my research here has also been using an interdisciplinary approach, including population genetics, parasitology, endocrinology, and more, to study the behavioural ecology of individuals. In addition, we have developed intense and very productive international collaborations with other institutions in Europe and North America. Here I would like to point out the current very close collaboration with a team from CNRS in Strasbourg, France mainly working on physiological aspects of the behaviour and ecology in Columbian ground squirrels.

Where Curiosity Takes Flight: Students, Science, and Songbirds

Contributor: Christopher B. Sturdy, Professor for the Psychology Department, University of Alberta.

When the Songbird Neuroethology Laboratory (SNL) started coming here to do field research, the Biogeosciences Institute (BGI) was known simply as Kananaskis Field Stations (KFS) Barrier Lake Station. Over more than 24 years of collaboration, we have had the privilege of asking numerous research questions regarding our local chickadee species.

We started in the early years by taking field recordings of the birds and conducting playback experiments. From these, we learned more about black-capped and mountain chickadee behavior in the wild.

We also started using BGI as an annual trapping site in order to take a few birds back with us to our lab at the University of Alberta. Across the years, these birds have participated in hundreds of laboratory-based experiments, such as cognitive puzzles and learning tasks. Due to their remarkable work, we have learned a great deal–from songbird development and acoustic perception, to communication and social structures. Recently, we have been focusing our efforts at BGI on mountain chickadees, as their vocalizations are less known to the scientific community.

In addition to our experimental work, we have also had many opportunities to engage in public outreach at BGI. While we are there conducting our work with the birds, we give short talks in front of school groups, across educational levels, about our research. These questions have ranged from specific questions about the SNL's research to more general questions regarding what a career in science could look like and how to get started in the academic world. For these reasons and more, we hope that we can spearhead future interest in these incredible species with our continued work at BGI.

Visit >> The Songbird Neruoethology Labratory (SNL)

We have learned a great deal – from songbird development and acoustic perception, to communication and social structures.

Since 2002, the Songbird Neuroethology Laboratory has hosted:

30 graduate students

140+ undergraduate students

7 postdoctoral researcher and research associates

MANY increadible volunteers

...plus, produced:
36 Honors, Masters, and Doctoral theses

Life, Aging, and the Behavior of Ground Squirrels in a Changing World

Contributor: Vincent Viblanc, Director of Research, French National Center for Scientific Research (CNRS)

I am a Director of Research at the CNRS (French National Center for Scientific Research). My work is specialized in evolutionary ecology, specifically the fields of behavioral ecology and animal ecophysiology. I'm interested in understanding the adaptation allowing animals to cope with an ever-changing environment, with a more specific interest in understanding the bi-directional relationships between individuals and their social environments.

I started working at RB Miller in 2008 – initially as a MSc student of F. Stephen Dobson, Professor (now retired) at Auburn University, Alabama, USA. Prof Dobson was working on the ecology and life history of Columbian ground squirrels (Urocitellus columbianus) and responsible for a long-term study initiated in 1973-1982 by Jan O Murie and David A Boag (University of Alberta).

At the time I did my MSc, our interest was in understanding the social structure of the species and how females may benefit from their close kin relatives in terms of increased reproductive success. We found that females clustered close to relatives, and those with more close kin relatives enjoyed higher reproductive success than others. This benefit appeared to be owed to lower aggression, and to more time and energy females could allocate to reproduction, likely due to less time expended in territorial defense. These results were important as they demonstrated an evolutionary basis necessary for ongoing kin-selected cooperation in Columbian ground squirrels.

After a PhD working on social energetics in penguins, I returned to RB Miller in 2013 and have been working at RB Miller on the Columbian ground squirrels ever since. I took over the long-term monitoring of the population in 2020, when F. Stephen Dobson retired. My major contribution to the long-term study has been to add in a physiological component to our understanding of these animals' ecology and behavior. Thus, over the years and in collaboration with Drs. Peter Neuhaus and Kathreen Ruckstuhl (University of Calgary), we have worked on a variety of topics including scent communication and the effects of territory marking on individual stress, the effects of climate on individual stress, the oxidative and cellular costs of reproduction, and the effects of microhabitat variability on individual seasonal patterns amongst others.

Since 2013, I have overseen more than ten Postdocs, PhD and Msc students working on separate projects based on the long-term ground squirrel work. Together with my collaborators, the long-term data on ground squirrels has generated more than a hundred scientific publications since its inception in 1992.

A particular interesting and recent finding that has led to our current work is the ability of Columbian ground squirrels to "rejuvenate" following hibernation. These animals appear to have the capacity to restore their telomere length, a cellular marker of ageing, on a seasonal basis. Our current research, funded by the ANR (French National Agency for scientific Research, equivalent to NSERC) and the CNRS, is focused on understanding how they do so, and whether these animals may give us some insights into possible mechanisms of cancer resistance, since the mechanisms involved in telomere restoration are also though to be partly responsible for the emergence of malignant cells.

Another significant project we are currently working on is the role of the "gut-brain axis" in shaping individual cognition and social behavior. Specifically, what role does the gut microbiota play in shaping individual behavior in the wild?

The Columbian ground squirrel long-term research project (CGS project) is also a flagship project that is internationally recognized. It has been included in the novel and key long-term Studies in Ecology and Evolution (SEE-Life) program of the CNRS that aims to support long-term research in all key domains of ecology and evolution.

Through the support of the BGI and collaboration with UCalgary, it generates data and field opportunities that contribute to student training and professional development on a yearly basis, as well as contribute to informing policy on a global level.*

Visit >> groundsquirrels.cnrs.fr to learn more information about past and on-going CGS projects.

*see Viblanc et al. 2026 ; "Science at risk: the urgent need for institutional support of long-term ecological and evolutionary research in an era of data manipulation and disinformation"

Together with my collaborators, the long-term data on ground squirrels has generated well over 100 scientific publications since '92.

Where Students Become Scientists

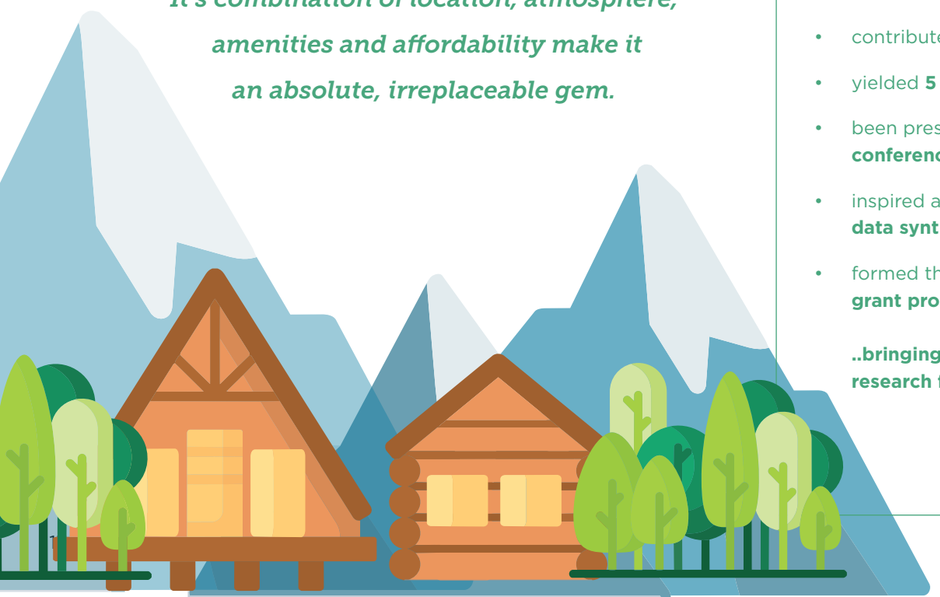
Contributor: Anna Hargreaves

I started working at the field station during my PhD in 2010 (though I'd first heard of the station during my MSc in 2005 at the University of Calgary, in countless stories from fellow graduate students of fieldwork and comradery). I study the edge of species' distributions, and mountains are unparalleled places for this type of work, as species have elevational ranges replicated across many peaks. Not to mention the amazing plant diversity of Kananaskis (more than 900 species of vascular plants!). The field station is a pillar of my research program. It is one of the few well-resourced and affordable field stations left. This combination makes it possible to send all sorts of students off to do fieldwork in the mountains, which invariably becomes the highlight of students' degrees. I still try and join my students for part of every field season–it's not only crucial as a place to gather data, but as a place of inspiration–many of my best ideas have come to me while poking around the field station grounds and nearby mountains.

As a professor, I've had students working at the field station every year since 2018, including 2020. I've sent 18 students to the field station; seven doing their own research projects (two PhD, three MSc, two BSc Honours), plus 11 field assistants. Not to mention my own family and collaborators, who I've coaxed to Alberta to work with me with the winning combination of rugged mountains, a functional kitchen, and hot showers.

Finally, the staff of the field station has been consistently wonderful, helpful, and welcoming. I cannot say enough good things about the Station, nor emphasize strongly enough how important it has been to ecological research in Canada. It's combination of location, atmosphere, amenities and affordability make it an absolute irreplaceable gem, that has shaped the career and lives of many lucky biologists, including myself.

It's combination of location, atmosphere, amenities and affordability make it an absolute, irreplaceable gem.



Our main findings include:

Populations at the edges of species ranges **can be locally adapted**, but this may not facilitate upward range shifts in response to climate change as often assumed.

Populations at the edges of species ranges **can also suffer from poor genetic quality,** potentially inhibiting range shifts.

In addition to declines in the quality of habitat, species ranges **can be limited by declines in the amount of suitable habitat** (a common prediction of theory but this is the first experiment support from nature).

The data we've collected during these summers has:

- contributed to **4 scientific papers**
- yielded **5 theses**
- been presented at **countless conferences**
- inspired and contributed to **4 global data syntheses**
- formed the basis of **7 successful grant proposals**

..bringing in more than $3M CAD in research funding!

A Living Laboratory and Three Decades of Discovery

Contributor: Dr. Kathreen Ruckstuhl, PhD, Professor, Faculty of Science, University of Calgary

My research out of the RB Miller Research Station spans more than three decades, beginning in 1994 when I started my PhD research on the foraging behaviour and sexual segregation of bighorn sheep (Ovis canadensis). Over this period, the field station has served as the backbone of my longterm research program. The station's unique landscape and long-term monitoring opportunities have enabled a continuous, multi-year research agenda addressing fundamental questions about sex differences, habitat use, mating systems, social behaviour, and parasite–host interactions.

Throughout my involvement, I have supervised, co-supervised, or mentored a large and diverse group of Highly Qualified Personnel (HQP), including two visiting international scholars, seven postdoctoral fellows, two research associates, 18 MSc and six PhD students, 80 honours students, and more than 40 research assistants and volunteers. These individuals contributed to a broad range of projects spanning behavioural plasticity, sexual segregation, reproductive strategies, social networks, disease ecology, physiological ecology, predator–prey dynamics, and the evolution of life histories.

Many HQP have gone on to successful careers in academia, wildlife biology, conservation NGOs, government agencies, environmental consulting, medicine, and international research institutes, including one student who is now an associate professor at the University of Sherbrooke, one an assistant professor at the University of Florida, one a researcher at the University of Coimbra, Portugal and one a researcher with the Chinese Academy of Science in Urumqi, China. My students have been working on topics such as bighorn sheep horn morphology and dominance, sexual segregation, social networks, personality, parasitology, mating tactics, mate choice and life-history evolution. Dozens of undergraduate research projects have been carried out in the field resulting in scientific publications or award-winning presentations.

Across these years, the RB Miller field station has served as a living laboratory and hub for developing ecological field skills, quantitative analysis, scientific writing, and interdisciplinary thinking, all essential for HQP development in behavioural ecology, wildlife parasitology, and evolutionary biology.

Significant Research Findings

1. Sexual segregation in ungulates and the ecological drivers behind it
My research clarified how predation risk, habitat preference, seasonal activity budgets, and social dynamics shape the widespread phenomenon of males and females living in different groups.

2. Long-term insights into mating systems and reproductive strategies
Research on bighorn sheep documented the complex trade-offs males face between mating effort, dominance, energy expenditure, and parasite burden. Collaborative work revealed behavioural plasticity in mating tactics, determinants of female mate choice, and how horn growth can be affecting by various extrinsic and intrinsic factors.

3. Social networks, group structure, and their fitness consequences
Multiple MSc and PhD projects demonstrated how social ties influence survival, maternal investment, offspring development, and the spread of parasites. This work integrates behavioural ecology with disease ecology and quantitative network analysis.

4. Parasite–host dynamics and their interaction with life history
From gastrointestinal parasites in lambs to parasite-driven behaviour in ground squirrels, the research station supported cutting-edge work linking ecological drivers with sex differences in infection patterns.

5. Impacts of environmental change and human disturbance
Undergraduate and graduate projects explored how grazing, predators, climate change, and landscape changes influence behaviour, habitat use, and physiological stress in bighorn sheep.

Collectively, these contributions have enriched the scientific understanding of sex differences, behavioural ecology, and life-history evolution in a way that is only possible through multi-decade individual based research.

STATS AT A GLANCE

Student Union Grant Impact

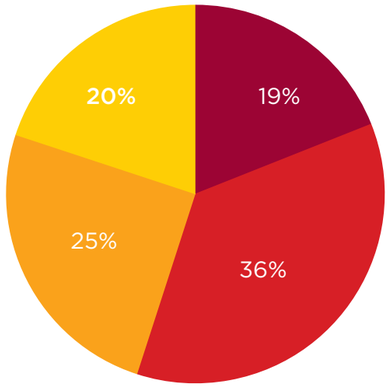
The Kananaskis Centre welcomes a variety of user type groups including secondary education (junior/high school) groups, community groups including all academic institutions, non-profit, government groups hosting conferences and retreats, University credited field courses, and field-based research groups.

In 2025, the Barrier Lake Field Station was thrilled to receive funding from the Students' Union for the Outdoor Learning Spaces Project, with a total grant award of $43,480. The project supported the development of three key outdoor learning areas: a covered outdoor classroom for 40–50 students equipped with flexible seating and teaching technology; a trapper-style tent designed to support Indigenous land-based learning and the sharing of traditional knowledge; and accessible, sustainable outdoor seating areas for studying, socializing, and dining.

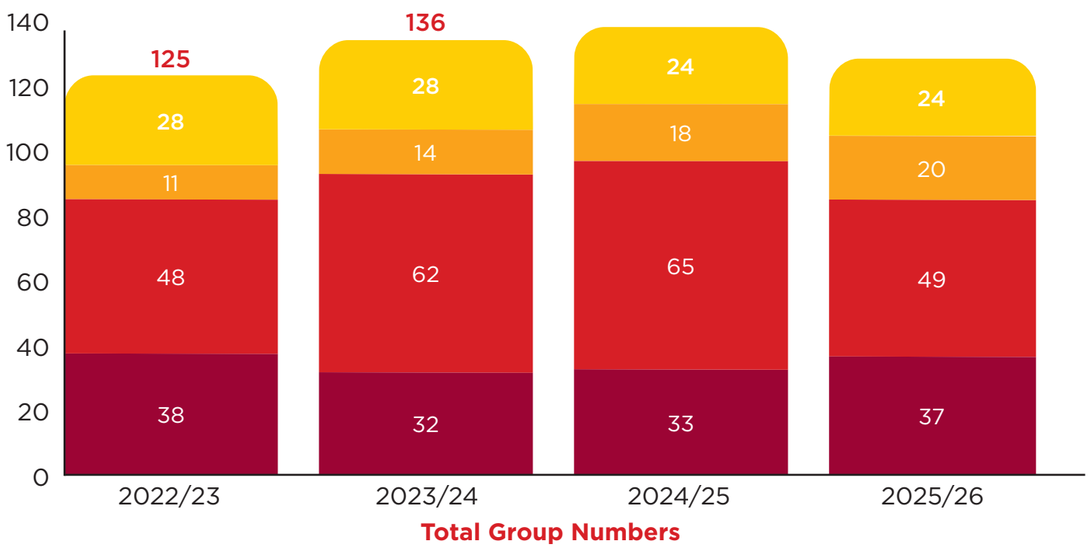
These enhancements strengthen educational quality by fostering collaboration, creativity, and hands-on learning opportunities in an outdoor setting. They also improve student well-being by increasing connection to nature and supporting diverse learning needs. Importantly, the project maintains affordability and accessibility by ensuring no additional cost to students while incorporating inclusive design features such as ADA-compliant seating. Overall, this Students' Union investment will create lasting, flexible outdoor learning environments that support academic excellence, enhance the student experience, and advance inclusive education for years to come.

In June 2025, we had the privilege to facilitate with activities surrounding the 51st G7 Summit located in the Kananaskis Provincial Park. For three weeks, the Barrier Lake Field station supported government employees and contractors involved with the event. This special event is not reflected in the above graph resulting in a slight decrease in group numbers as we were unable to accommodate our regular user groups during the summit.

User Day Numbers (%)



The pie chart tabulates the number of user days based on how many people use the field station per day.



Total Group Numbers

MEET THE PEOPLE

The Kananaskis Centre Team Welcomes You!

Behind every successful field course, research project, and unforgettable mountain experience is a dedicated team working hard to keep the Barrier Lake and RB Miller Field Station running smoothly. From preparing meals to maintaining trails, fixing facilities, and supporting learning, our staff are here to make your stay safe, comfortable, and memorable.

Kitchen Team

Shane Katsuno, Executive Chef
Olivia Lageux
Nicolas Catherine
Brett Jobbins
Yves Levesque

The fuel behind every great field day! Our kitchen staff work early mornings and well into the evenings to prepare delicious meals, accommodate dietary needs, and keep everyone energized through the thousands of cookies baked each year.

Housekeeping/Groundskeeping Team

Deidre MacEachern
Paul Mudford
Lisa Poulin

The crusaders of clean and comfortable spaces for both indoors and out. Whether preparing accommodations for arriving groups to shoveling snow paths, this team keeps the shared facilities welcoming and tidy giving a cozy home away from home feel.

Building Operator

Tevor Woods

The problem-solver and fixer of just about everything is none other than Trevor Woods. When something breaks, leaks, sticks, squeaks, or simply refuses to cooperate, Trevor is ready to tackle the challenge and keep the station operating.

Education Team

Savannah Hollander
Briana Van Den Bussche

Savannah and Briana are the connectors, mountain enthusiasts, and learning leaders. The education team works with students, teachers, and researchers to create meaningful learning experiences, coordinate ecology inspired programs, and help create life-long memories at the Barrier Lake Field Station.

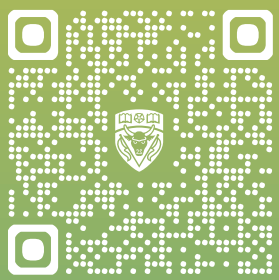
Centre Manager

Adrienne Cunnings

Keeping the wheels turning, Field Station Manager Adrienne Cunnings is the behind-the-scenes coordinator who helps keep the stations running smoothly. From supporting staff, researchers, and instructors to tackling unexpected challenges and planning for future growth, Adrienne works with every team to ensure guests have an exceptional experience in the heart of Kananaskis Country.

"We've become known as a place to come and work, with easy access to glaciers, mountains, forests, lakes, rivers and small mammals. It's not just a place to study the environment, as we are also being mindful of the human presence."

-Dr. Steven M. Vamosi



Contact: **kc@ucalgary.ca**

Website: researchdirectory.ucalgary.ca/**kananaskis-centre**