

Graduate Opportunities

1. PhD Position – Behavioural Ecology and Population Dynamics of Snowshoe Hares in a changing Boreal Landscape

Nearly five decades of ecological research in southwest Yukon have produced one of the world's most influential long-term studies of boreal ecosystems. The Integrative Wildlife Conservation Lab at Trent University is recruiting a PhD student to join this research program by examining snowshoe hare responses to dynamic boreal landscapes. The project will take place at Kluane Lake, Yukon, Canada, where snowshoe hare population cycles and boreal forest ecosystem dynamics have been studied for nearly 50 years. Leveraging the most extensive long-term dataset available on snowshoe hare populations, this research will address longstanding questions about how behavioural responses to food availability, habitat structure, and predation risk scale up to influence hare population dynamics and their iconic 10-year cycles.

Through hare GPS telemetry and accelerometry, combined with remotely sensed measurements of vegetative structural cover and forage availability and quality, the project will investigate:

1. How do hares adjust movement, habitat use, predator avoidance, and foraging behaviour in response to seasonal variation in forage and cover?
2. How do behavioural dynamics vary across phases of the hare population cycle and with local population density?
3. How do nutritional and structural landscapes vary through space and time, and do these dynamics influence hare survival, reproduction, and population growth?
4. Can hare–vegetation dynamics help explain the relative importance of food limitation versus food–predation interactions in driving population cycles?
5. How might climate-driven changes in boreal vegetation and seasonal variation alter hare behaviour and future population dynamics?

The project offers exceptional opportunities to integrate behavioural ecology, movement ecology, population dynamics, remote sensing, and ecological forecasting. Students will have access to extensive historical telemetry and accelerometry datasets, long-term ecological monitoring records, and opportunities to develop novel analytical approaches for quantifying forage quality and animal–environment interactions. Beyond addressing longstanding questions in population ecology, this research will contribute to predicting wildlife responses to environmental variability and climate change in northern ecosystems. The successful candidate will be encouraged to develop their own research direction within the broader framework of the project.

Applicants must have:

- An MSc in Ecology, Conservation Biology, or a related field
- Evidence of peer-reviewed publications or other demonstrated research productivity

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- Strong field and quantitative skills
- Interest in working collaboratively within a large research team

Additional desirable experience includes animal handling, remote sensing, drone operation, data post-processing, GPS telemetry, animal movement modelling, spatial analysis, and working in field environments.

For additional details, see www.dennismurray.ca.

To apply, send a cover letter, curriculum vitae, unofficial academic transcript, and contact information for 3 references to: Dennis Murray (dennismurray@trentu.ca).

The position will be filled as soon as a suitable candidate is found.

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2. PhD Position to study Boreal Forest Dynamics under Climate Change

Nearly five decades of ecological research in southwest Yukon have produced one of the world's most influential long-term studies of boreal ecosystems. The Integrative Wildlife Conservation Lab at Trent University is recruiting a PhD student to join this research program by examining climate-driven changes in boreal forest structure and vegetation dynamics in northern ecosystems. The project will take place at Kluane Lake, Yukon, Canada, where boreal forest ecosystem dynamics, wildlife populations, and environmental change have been studied for nearly 50 years. Building on this unique long-term research program, the project will address fundamental questions about how the boreal forest is being reshaped by ongoing and predicted future climate change, and how these changes may influence future ecosystem structure and function.

Using unmanned aerial vehicles equipped with LiDAR, multispectral, and RGB sensors, together with archived satellite imagery and ground-based environmental measurements, the project will investigate:

1. How do forest productivity, regeneration, and phenology vary through space and time across the Kluane landscape?
2. What factors drive variation in forest structural complexity and resilience to disturbance, including wildfire and insect outbreaks?
3. How are climate-driven changes in forest composition and deciduous vegetation (e.g., shrubification) altering boreal ecosystem structure?
4. How might future climate change alter vegetation dynamics, and what are the implications for boreal ecosystem processes and wildlife habitat?
5. How rapidly are boreal vegetation communities changing, and can historical remote sensing records reveal early indicators of ecosystem transition?

The project offers exceptional opportunities to integrate remote sensing, landscape ecology, forest ecology, and ecological forecasting. Students will have access to long-term ecological monitoring records, historical satellite imagery, advanced UAV-based remote sensing platforms, and opportunities to develop novel approaches for quantifying vegetation dynamics across seasonal landscape conditions. Beyond advancing our

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understanding of northern ecosystem dynamics, this research will contribute to predicting how vegetation landscapes are likely to change over coming decades, and the consequences of those changes for boreal biodiversity and ecosystem function.

The successful candidate will be encouraged to develop their own research direction within the broader framework of the project.

Applicants must have:

- An MSc in Ecology, Geography, Environmental Science, or a related field
- Evidence of peer-reviewed publications
- Strong field and quantitative skills
- Experience with GIS and related analyses
- Interest in working collaboratively within a large, interdisciplinary research group

Additional desirable experience includes UAV/drone operation, remote sensing data processing, and working in remote field conditions.

For additional details, see www.dennismurray.ca.

To apply, send a cover letter, curriculum vitae, unofficial academic transcript, and contact information for 3 references to: Dennis Murray (dennismurray@trentu.ca).

The position will be filled as soon as a suitable candidate is found.