PhD Position - Forecasting mammal species distributions and habitat associations using camera-trap data (Trent University)

The Integrative Wildlife Conservation Lab at Trent University (Ontario, Canada) is seeking a PhD student to lead an investigation of species distributions and habitat associations of boreal mammals using a 10-year, multi-species camera-trap dataset spanning >200 sites in the southwest Yukon. The dataset includes 6-10 focal species with consistent, year-round detections, providing an exceptional foundation for modeling habitat use, mapping spatial patterns, and forecasting future distributions across heterogeneous boreal landscapes. This project is centered on understanding where species occur, why they occur there, and how those patterns may shift under future environmental change, with a primary emphasis on spatial prediction. The student will have the flexibility to define independent research questions within the overarching goals of the project.

The project will address questions such as:

- How do landcover, vegetation structure, productivity, and topography shape species-specific habitat associations across the boreal forest?

- How consistent are habitat–occurrence relationships across space and time, and where do they break down?

- Can spatial models be used to forecast future distributions under projected climate and landcover change scenarios?

- How do species-level distributional responses scale up to community-level spatial patterns across landscapes?

- Which areas are most likely to function as future biodiversity hotspots, refugia, or zones of rapid turnover?

The student will develop and apply predictive modeling frameworks including Species Distribution Models (SDMs), dynamic occupancy models, dynamic hotspot analysis, hierarchical Bayesian spatial models, and spatio-temporal Gaussian Process approaches. The project may integrate remotely sensed covariates (e.g., vegetation indices, landcover, terrain), climate data, and landscape metrics to generate predictive maps and evaluate model uncertainty and transferability to other regions.

Qualifications

- MSc in Ecology, Wildlife Biology, Quantitative Biology, Statistics, or a related field

- At least one senior-authored peer-reviewed publication

- Strong quantitative and computational skills, with experience in R

- Interest in species distribution modeling, landscape ecology, and applied conservation science

- Ability to link ecological questions with predictive spatial models

Start date: Flexible (2026). Fully funded for 4+ years.

To apply, please send a CV, unofficial transcripts, a short statement of research interests, and contact information for two references to dennismurray@trentu.ca. Review of applications will begin immediately and continue until the position is filled. See www.dennismurray.ca for additional details.

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Dennis Murray

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Integrative Wildlife Conservation