



## Al Martin HCTF Conservation Fellowships Recipient 2024



### Carlie O'Brien

Carlie O'Brien is an MSc student in the Wildlife and Ecosystem Bioindicators Lab at the University of Northern British Columbia working under supervision of Dr. Heather Bryan in collaboration with the British Columbia Moose Research Group. She holds a Bachelor of Science degree with a specialization in Conservation Biology from Trent University.

Her research "Effects of landscape and climate change on moose trace mineral levels and immune responses" explores how environmental characteristics are associated with bioindicators of health in cow moose from populations across the interior plateau of BC. Imbalances in trace minerals can significantly impact the health, reproductive success, and survival of animals. For example, adequate levels of minerals such as zinc, selenium, and copper are essential for optimal immunity, and imbalances can affect immune responses and ultimately disease outcomes. In moose, trace mineral levels are closely linked to the diversity and trace mineral content of their seasonal forage, which can vary greatly across space and time. This is of concern for moose whose ranges have been modified by human activities or natural events, such as forestry practices or wildfires, which can alter the quality and quantity of available forage plants. However, the effects of habitat on trace mineral uptake in wildlife is poorly characterized.

Given potential links between environmental change and forest management with trace minerals, her goals are to 1) Identify trace minerals associated with moose immune function markers, survival, and pregnancy and 2) identify habitat variables associated with variation in trace minerals and immune function. Carlie is measuring a suite of trace minerals in cow moose hair samples and immune markers (e.g., cytokines, acute phase proteins, globulins) in serum samples collected as part of the British Columbia Provincial Moose Research Project. She will then combine these data with health-related data collected from moose at capture, GPS location data obtained from collars, and spatial datasets to identify individual and environmental predictors of trace mineral levels and immunity.

Carlie's research will contribute to advancing conservation in BC as it will generate implications for both wildlife and forest management to help support moose population persistence. Specifically, this work aims to provide a better understanding of the effects of forest harvesting on moose health by identifying associations between trace minerals and immune responses associated with forest structure and management practices. Further, this research will offer a deeper understanding into the use of bioindicators for monitoring the impact of environmental changes on moose and other wildlife. In addition, this work will also develop a fundamental moose health baseline that could be used to monitor future changes in moose health.

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In the future, Carlie plans to follow her passion for wildlife sciences by continuing to conduct research that elucidates how wildlife responds to environmental changes by analyzing variation in wildlife health throughout the landscape. She hopes to positively influence stewardship, management, policies, and decision-making regarding wildlife in British Columbia.



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