We stand for wildlife

WCS CANADA

When you are facing major conservation challenges, it is great to have some bright young minds handy to help spark new ideas, gather new understandings and share their enthusiasm for the natural world. WCS Canada's Weston Family Foundation Fellows program is now entering its 12th year and we are pleased to welcome nine fellows for the 2021 field season. Our fellows -- graduate students drawn from universities across Canada -- undertake projects in two key landscapes: the far north in Ontario and the northern boreal mountains region of Yukon-BC that are focal areas for WCS Canada research. Each of their research projects helps deepen our understanding of critical conservation issues in these globally important landscapes, from the "shrubification" of tundra areas to how climate change may be changing soil microbe communities.

Juliana Balluffi-Fry (PhD candidate, University of Alberta) is studying the diet and nutritional ecology of the snowshoe hare, a keystone boreal herbivore, in the southern Yukon. Populations of generalist herbivores like the snowshoe hare are limited by the availability of multiple types of nutrients and minerals, but the complexities of their dietary requirements are not yet fully understood. With climate change warming the boreal forest, nutrient availability and plant communities are expected to change. By understanding the exact nutritional requirements of the diet-sensitive snowshoe hare, we can better anticipate the effects climate change will have on this keystone species.

Juliana Balluffi-Fry

Matthew Fuirst (PhD candidate, University of Guelph) is investigating the mechanisms behind the juvenile dispersal of Canada jays using radio telemetry and long-term monitoring data. Canada jay populations along the southern edge of their range in Ontario have been declining dramatically since the 1980s, potentially due to climate

change spoiling their frozen stored food. This tracking study on Canada jays will help determine if range contraction is being driven by the movements by young towards more viable habitats for caching food and breeding.

Matthew Fuirst

Alexandra Golt (MSc candidate, University of Northern British Columbia) is studying the impacts of glyphosate-based herbicides (GBH) on the reproduction of forest understory plants. These herbicides are used in forestry operations across Canada to reduce populations of competitive plant species. They are used on a wide provincial scale and are applied to cutover areas annually. In previous research, she found that GBHs cause multiple changes to prickly rose, such as a reduction in pollen viability, seed pods that do not open, and significant colour changes to the anthers, carpels, and petals. Her research is looking at how these changes impact detection and visitation by insect pollinators, as well as whether or not insect pollinators and hummingbirds are exposed to GBH through consumption of contaminated pollen or nectar from GBH-treated plants. It is critical that we understand how residues of glyphosate, even years after application, are changing food webs and the complex dynamics of plant and animal communities that exist in forest ecosystems.

Alexandra Golt

Oliver Holt (MSc Candidate, University of Northern British Columbia) is investigating how predator diets affect caribou distribution across a range of habitats in the mountainous northern boreal region of British Columbia. Oliver has developed partnerships with Indigenous and non-Indigenous governments to support a community-based approach to monitoring the dietary preferences of focal predators of caribou, such as wolves. Additionally, he will use caribou GPS collar data to investigate the distributional response of caribou to habitat disturbance and predator diet composition. His research is the first investigation into how predator-prey dynamics can influence caribou population dynamics in northwestern British Columbia.

Oliver Holt

Adam Kirkwood (PhD candidate, Laurentian University) is mapping changes in permafrost conditions in the Hudson Bay Lowlands and how these changes impact the storage of mercury. This project will map mercury storage in soils of the Hudson Bay Lowlands and look at the transformation of inorganic mercury into its biologically available form of methylmercury (a contaminant of concern that may impact subsistence fishing practices of Northern communities) through a process known as mercury methylation. This research will help us understand how microbial communities in the environment perform methylation and how permafrost thaw can change these microbial communities. The goal is to be able to identify areas where mercury methylating microbial communities might be more abundant and therefore determine which types of permafrost environments or areas may have high potentials for mercury methylation.

Adam Kirkwood

Owen Lucas (MSc candidate, Trent University) is looking at shrub expansion across Arctic regions, a concept commonly referred to as "shrubification." This has been well documented in tundra regions, but less has been done to assess the extent of shrub expansion directly within the boreal biome at a large spatial and temporal scale despite strong evidence that it is occurring in some regions. His research aims to establish a method of assessing shrubification of the boreal forest across space and time by combining field, lidar and satellite data. This method will be tested and applied in the Kluane region of Yukon to assess the extent to which shrubification has occurred and to better understand the impacts these changes are having on biodiversity in the region.

Owen Lucas

Haley Moskal (MSc candidate, Laurentian University) is studying aquatic biodiversity recovery in Killarney Provincial Park. These lakes have faced multiple stressors, including historic acidification from Sudbury smelter emissions as well as the current effects of climate warming, browning and invasive species. Haley will repeat a detailed biodiversity study carried out between 1995 and 1997 using the original sites and sampling methods to assess the recovery of various sensitive indicator species including benthic and pelagic fish, zooplankton, amphipods, and mayflies in the

Haley Moskal

Killarney Wilderness Park watersheds especially now that air pollution levels have fallen significantly. Another important focus of the project will be the assessment of the effectiveness of the protected area for the recovery of biodiversity. This research could prove to be useful for understanding ecosystem connectivity and the role of protected areas for resilience and recovery of diverse biotic communities within freshwater ecosystems.

Francis Quinby (PhD candidate, Trent University) is focusing on the effects of climate change on the microbiome of boreal forest soils. Plants in boreal ecosystems, like in many other regions, rely heavily on soil microbes for nutrient fixation and symbiotic/sharing relationships. This project will test how the soil microbial community responds to predicted changes in temperature and precipitation through a series of field experiments within the Kluane region in the Yukon Territory. Next-generation DNA sequencing will allow for the detection of shifts in microbial community structure that can then be correlated with soil function and health. If this microbial community shows resistance to the effects of climate change it could act as a mitigating factor, reducing the negative effects of climate change on the boreal ecosystem. Alternatively, if this community is susceptible to climate change, then it may compound these negative effects. Therefore, results will contribute to predictive modelling of boreal ecosystem response to climate change, which is vital information for steering conservation efforts in the region.

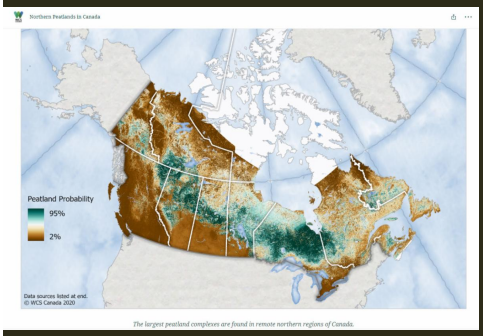
Francis Quinby

Gabriel Rivest (MSc candidate, University of Alberta) is analyzing the response of small mammals to a large forest fire in central Yukon, particularly in relation to the severity of the fire. Wildfire is a major driver of the boreal forest's natural cycle, but with the effects of climate change, fires are predicted to occur more often, on a larger scale and with greater intensity. Small mammals are a key component of the energy flow in boreal forests in Canada and they occupy an important position in the food web of the Northern Boreal Mountains region. Changes in the composition and abundance of the small mammal community may therefore have direct effects on boreal forest ecosystems and understanding their response to

Gabriel Rivest

wildfire will help us determine how such fires may affect the associated food web and ecosystems, particularly if fires become more frequent and intense.

A special mapmaker



You've seen Meg Southee's maps in our publications and in a number of "story maps" where she has visually communicated everything from the importance of peatlands to the impact of mining on caribou, so you know she knows her way around a map projection. Now WCS Canada's Geographic Information Systems (GIS) specialist has been awarded the GIS Professional (GISP) Certification from the GIS Certification Institute. To obtain her certification, Meg had to demonstrate her commitment to the field, such as her service as a board member with the Society for Conservation GIS, and her GIS knowledge through a rigorous exam among other steps. Congratulations Meg!

Support our work to save wildlife!

At WCS Canada, we stand for wildlife and are in the field every day working to save wildlife and wild places. You can support our work by making a secure donation right now!

Top banner image of fieldwork: Eric Palm

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