Effect of forest condition on food web structure and other aquatic indicators in headwater streams in different regions of Canada.

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Project team

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Abstract

Nearly two-thirds of Canada's land base is forested, and this forms the basis of one of Canada's most important resource industries. However, forests are also key suppliers of aquatic ecosystem services (AES); thus, it is critical to understand the relationship between forest management and the sustainability of these services. This thesis project intends to address this by accomplishing two main objectives: 1) to study how forest management affects food web structure (via stable isotopes and ecological stoichiometry of macroinvertebrates and their food resources) in headwater streams differing in degree of disturbance and consequent forest condition in Ontario, British Columbia and New Brunswick. 2) To develop indicators of AES in streams to understand the degree to which forest condition (structure and species composition) influences water quality, flow, productivity and biodiversity. This objective is being addressed in New Brunswick by measuring several aquatic endpoints (macroinvertebrate community structure, food web structure, water chemistry, litter decomposition capacity, sediment transport, discharge and temperature) across 15 streams ranging in area of the watershed that has been logged. These in-stream indicators of aquatic ecosystem integrity are being related to forest condition through advanced modeling of watershed characteristics using high-frequency LiDAR and other enhanced forest inventory tools.

Keywords: Headwater stream, food web, forestry, ecological stoichiometry, macroinvertebrates, stable isotopes, LiDAR

Geographic Location: Black Brook Forestry District, Northern New Brunswick, Canada; Mount Carleton Provincial Park, Northern New Brunswick, Canada; White River, Ontario, Canada; Malcolm Knapp Research Forest, British Columbia, Canada

How does your project link to Canadian aquatic ecosystem services?

My project will help to understand how forest harvesting (important economic activity in Canada) affects aquatic ecosystem services such as biodiversity, clean water supply and stream productivity.