NSERC Canadian Network for Aquatic Ecosystem Services

Theme II, Project II-1 Assessing the Impacts of Forest Disturbance on Aquatic Ecosystem Services through Predictive Modeling of Benthic Community Composition and Hydrologic Indicators

Kristin Daoust, MSc student
University of Guelph
kmdaoust@uoguelph.ca

Project team

Paul Sibley, University of Guelph, supervisor
Dave Kreutzweiser, Canadian Forest Service, collaborator
Irena Creed, University of Western Ontario, collaborator

Abstract

Our present understanding of the effects of natural and anthropogenic disturbance in forested landscapes is largely based on watershed physical, chemical and biological indicators that have been developed independently of any knowledge of the relationship between them, and rarely in the context of the aquatic ecosystem services (AES) to which they are linked (e.g., water quality). In this study, we will use a combination of field measurements and modelling to develop predictive relationships between physical (e.g., discharge, peak/low flow) and chemical (e.g., pH, conductivity, major nutrients) properties and benthic invertebrate community composition (BICC) of forested headwater streams, as indicators of AES. Initially, we will focus on the Batchawana watershed in north central Ontario which contains a gradient of disturbance ranging from undisturbed (reference) to intensively harvested and a long history of research focusing on ecohydrological questions that has generated an excellent dataset of ecohydrological measurements. In the second phase, working with NRCAN-CFS and Parks Canada, we will apply the resulting model(s) to explore relationships between physicochemical indicators and biological responses across watersheds for which information on BICC has been collected. By defining the relationships between physicochemical and biological indicators of AES, we hope to provide forest managers/policy makers with the information required for making effective monitoring and forest management decisions aimed at ensuring sustainability of forest-based AES.

Keywords: Aquatic macroinvertebrates, forest disturbance, forest management, hydrologic indicators

Geographic Location: Lower Batchawana Watershed, Batchawana ON, Canada

How does your project link to Canadian aquatic ecosystem services?

The aquatic ecosystem services provided by streams are potentially being altered by forest disturbance in the Batchawana watershed. This project aims to investigate the extent of this change by using a combination of biological, hydrological, and chemical indicators to asses the health of the aquatic ecosystems and in turn the aquatic services they provide.