

Are disturbances to Canada's boreal aquatic ecosystems cumulative downstream of forest management activities?

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Project Team

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Abstract

As a global leader in the export of forest products, Canadian forest managers are tasked with balancing exploitation of one of the country's most cherished natural resources with maintaining a high standard of forest ecosystem integrity. Despite environmental protection guidelines for forest management established by the Canadian Forest Service, legacies of ecosystem degradation persist, many of which are specific to aquatic environments. In response, my research will observe the impact of forest management (timber harvesting, road construction, pesticide use, etc.) of northern hardwood stands on boreal streams of the Batchawana River watershed, north of Sault Ste. Marie, Ontario. The study area is grouped into four catchments, each with three progressively downstream sampling sites, that have been subject to a gradient of harvest intensity in the last 10 years. Metrics of impact used to compare ecosystem health among sites include changes to water quality, microbial and benthic macroinvertebrate community structure, leaf-litter decomposition capacity, sediment deposition rate, and trophic magnification of methylmercury within stream food webs. Furthermore, this study will include an assessment of whether or not impacts to stream health are spatially cumulative (i.e. act collectively over a spatial range) downstream of forestry activities, an analysis that has received relatively little scientific attention despite its requirement under Canadian environmental assessment legislation.

Keywords: forest management, cumulative effects, stream order, trophic magnification, boreal stream, macroinvertebrate, mercury

Geographic Location: Batchawana River watershed, Ontario, Canada

How does your project link to Canadian aquatic ecosystem services?

A comprehensive and predictive understanding of the cumulative effects associated with forest management is critical to managing healthy future forests and provisioning of their aquatic ecosystem services, such as flood control, water filtration, habitat for wildlife, etc., for both human and non-human uses.