NSERC Canadian Network for Aquatic Ecosystem Services

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Managing cumulative ecosystem risk in Lake Erie from nutrient contributing stressors in the Grand River watershed

Jason Igras, MSc student
Western University
igras.uwo@gmail.com

Supervisor
Irena Creed, Western University

Abstract

The Great Lakes Water Quality Agreement has played a significant role in the management of nutrient contributing stressors within the Great Lakes basin. However, recent and recurrent nisance algal blooms pose an increased risk to human health and aquatic ecosystem services in Lake Erie. This presents a unique opportunity to evaluate the current regulatory framework frm an integrated science and management perspective. In this study, we apply an Ecosystem Risk Management framework along with Bow-tie risk assessment and Bayesian network analysis (BNA) methodologies to identify areas for enhancement within current regulatory measures that are managing nutrient contributing stressors and their consequences in the Grand River watershed. The Bow-tie approach provides a simple, qualitative way of assessing risk while considering the regulatory control measures around it. Nested in the Bow-tie, BNA models cause and effect relationships of different management decisions and ecosystem responses and will depend on the Soil and Water Assessment Tool, as well as a review of the literature and expert elicitation for indicator dynamics and network design. The research objective is to identify and improve the vulnerabilities in the current regulatory framework and provide an enhanced science-policy integrated approach to environmental management.

Keywords: Eutrophication, Grand River Watershed, Risk Management, Models, Bayesian, Nutrients

Geographic location: Grand River watershed of Southern Ontario

How does your project link to Canadian aquatic ecosystem services?
Nutrient loading and subsequent algal blooms in Lake Erie pose an increased risk to aquatic ecosystem services provided by Lake Erie. By assessing the cumulative effects and managing the nutrient contributing activities in the Grand River Watershed, we can reduce the likelihood and magnitude of this risk in the Lake Erie.