

## Theme 3, Project3.3.4

# Calibrating the zooplankton body-size spectrum to serve as an indicator of lake characteristics and environmental perturbations

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## Abstract

The size spectrum is the distribution of organisms across a range of organism size. It reflects size-dependent ecological and physiological processes that govern the energy flow and biomass distribution in aquatic ecosystems. Perturbations, such as overharvesting fish populations and eutrophication, which alter the flow of energy within a community should be captured by the parameters that describe the shape of the community size spectrum. Zooplankton are an important link between primary phytoplankton production and fish in lakes. Thus, the zooplankton community size spectrum has the potential to be used as an indicator of environmental perturbations affecting higher and lower trophic levels. Zooplankton size spectral parameters from 640 lakes across Ontario will be linked to data on climate, invasive species, basin morphometry, productivity, contaminant accumulation levels, and fish harvest rates. Multi-frequency hydroacoustic surveys are being evaluated as an alternative method of characterizing zooplankton size spectra that is more time and cost effective than traditional sampling approaches. Characterization of lake ecosystems by their zooplankton size spectra could provide a comprehensive and robust tool to monitor the health of aquatic ecosystems.

**Keywords:** size spectrum, parameters, zooplankton, hydroacoustic, perturbation, lake characteristics, indicator.

**Geographic Location:** 640 lakes across Ontario, Canada

## How does your project link to Canadian aquatic ecosystem services?

If zooplankton size spectral parameters respond in a consistent and predictable manner to environmental perturbations, they can be used as a tool to detect changes in the capacity of

lake ecosystems to deliver services such as the sustainable harvests of fish that support recreational and commercial fisheries.