

## Theme 1, Project 3.3

# Investigating how fish community size structure will change under a climate change drought scenario

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## **Abstract**

Climate change science predicts that changes in rainfall patterns within Canada will lead to sustained droughts in some regions, reducing the amount of terrestrial run-off, which will decrease the amount of dissolved organic carbon (DOC) entering lakes. Such a reduction in DOC is predicted to alter lake characteristics (e.g. turbidity and thermal structure), and will ultimately impact the resident fish community. However, the way in which this impact will manifest is difficult to predict due to the complexity of natural systems. This project aims to begin addressing this knowledge gap by identifying how the structure of a freshwater fish community will respond to a decrease in lake DOC concentration. To address this question, a before-after-control-impact watershed experiment was initiated in 2010 at the Experimental Lakes Area. Hydroacoustic surveys have been conducted each summer from 2010-2016. Data collected are being used to construct size-spectra, which represent energy flow through a community as a function of organism size. Size-spectra are often negative linear relationships, and monitoring of the slope and intercept can indicate when changes in community structure have occurred. This study will aid resource managers and policy makers in decisions regarding how to best support Canadian lake ecosystems that are expected to experience future droughts due to climate change.

**Keywords:** Climate change, drought, DOC, lakes, fish communities, size-spectra

**Geographic Location:** The Experimental Lakes Area, Kenora, Ontario, Canada

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

The fact that climate change is occurring, and will continue to occur into the future, is no longer a debate. By investigating how the structure of a freshwater fish community will be impacted by a predicted climate change drought scenario, resource managers and policy makers will be better equipped to make appropriate decisions when planning for the protection of aquatic ecosystem services into the future.