Quality of Ontario Lakes

How has the water quality of Ontario's inland lakes changed from 2015 to 2022, as measured by total phosphorus and water clarity? What does this suggest about the productivity of Ontario's inland lakes?

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Introduction

Sources to add while citing: https://data.ontario.ca/dataset/ontario-lake-partner & https://files.ontario.ca/moe_mapping/downloads/metadata/opendata/Lake_Partner_Program_metadata_EN2.pdf

This report is based on two datasets sourced from the Ontario Lake Partner Program (LPP) via the Ontario Data Catalog. The LPP conducts annual assessments of water quality in inland lakes throughout Ontario, with data collected by volunteers following standardized provincial protocols. The datasets cover total phosphorus (ug / L) and water clarity measured by seechi depth (m) for numerous inland lakes in the Precambrian Shield region. Each dataset includes geospatial information, site descriptions, collection dates, and metrics pertaining to the water quality. The data was last validated on January 17, 2024 and is updated yearly. Both datasets were last updated on December 31, 2022.

Dataset Description

Variable	Types	Description
Latitude	integer	
Longitude	integer	
Site.ID	integer	
Township	character	
Lake.Name	character	
Site.Description	character	
avg_phos_ug_l	numeric	
phos_is_outlier	character	
phos_date	Date	
secchi_depth_m	numeric	
trans_date	Date	

Purpose

This report aims to address the research question:

How has the water quality of Ontario's inland lakes changed from 2015 to 2022, as measured by total phosphorus and water clarity? What does this suggest about the productivity of Ontario's inland lakes?

By answering this question, this report ultimately aims to provide insight on where the government of Ontario can best address its conservation efforts and the trend of productivity of Ontario's inland lakes.

Background Information

Source (https://foca.on.ca/wp-content/uploads/2012/05/Guide-to-Interpreting-TP-and-Secchi-Data-Complete.pdf)

Water quality, as measured by phosphorus levels and secchi depth, has a major influence on the biodiversity of inland lakes and freshwater streams.

In the vast majority of Ontario's inland lakes, phosphorus is the element that controls the growth of algae. As such total phosphorus concentrations (µg/L) are most aptly used to assess lake nutrient status. Limnologists place lakes into three categories based on their total phosphorus concentrations: oligotrophic (less than 10 µg/L), mesotrophic (10-20 µg/L TP), and eutrophic (over 20 µg/L). Oligotrophic lakes are low in nutrients and rarely have algal blooms. Mesotrophic lakes vary in characteristics and may experience moderate blooms. Eutrophic lakes have high nutrient levels and often suffer from persistent algal blooms.

Source: https://hallshawklakes.ca/featured/secchi-readings/#:~:text=Secchi%20Reading%20and%20Lake%20Nutrient,enric

A Secchi disks are black and white disk used to ascertain water clarity by lowering it into the water and measuring the point at which black and white can no longer be distinguished. Readings of over 5 meters indicate oligotrophic conditions, depths of 3.0 to 4.9 meters suggest mesotrophic conditions and readings less than 2.9 meters signify eutrophic lakes, with higher nutrient levels.