Metadata

Field	Value
Title	Spatial distribution of water quality and phytoplankton in the Upper Manitoba Great Lakes
	Abstract
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Keyword Vocabulary URL	https://polardata.ca/pdcinput/public/keywordlibrary
Theme	
Title	Air Temperature
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Title	Nutrients
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Title	Particulate matter
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Field	Value
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Related Resources 1	
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Data and Resources

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URL	https://canwin-datahub.ad.umanitoba.ca/data/publication/59f21fb1-a707-4202-afca-9e85507b4d9d/resource/e7eec970-7a4e-4e5f-b56e-de729ff6e205/download/herbert_claire_2025.pdf
Name	Spatial distribution of water quality and phytoplankton in the Upper Manitoba Great Lakes

Field	Value
Description	Freshwater eutrophication in Canada poses significant threats to ecosystem health and community wellbeing, particularly in large lake systems like the upper Manitoba Great Lakes (uMBGL). Lakes Winnipegosis, Waterhen, and Manitoba form a critical buffer system within the Nelson River watershed, processing nutrients before they reach Lake Winnipeg and ultimately Hudson Bay and the North Atlantic Ocean. Despite their importance, these lakes remain severely understudied, with minimal spatial and temporal data available about nutrient dynamics and phytoplankton communities. This knowledge gap hinders evidence-based management decisions necessary to protect these valuable freshwater resources from eutrophication driven by modern challenges such as land use management and accelerated climate change. This study provides the first spatially comprehensive, multi-year assessment of offshore water quality in the upperMBGL system. Over three open-water seasons (2016-2017), I collected and analyzed physical, chemical, and biological data across multiple basins to: (1) characterize in-situ offshore biogeochemical and physical conditions; (2) examine spatial and temporal variation through geostatistical analysis; and (3) document phytoplankton diversity and distribution patterns. Results indicate that all three lakes are consistently mesotrophic to eutrophic. Nutrient concentrations generally increased from north to south in both Lakes Winnipegosis and Manitoba during the open water season. Filamentous cyanobacteria dominated summer phytoplankton biomass in both lakes, while cyanobacterial picoplankton dominated by abundance. Significant differences between years and basins suggest limited inter-basin mixing and differential impacts from local land use. This research establishes a critical western science based baseline for understanding water quality dynamics in the Upper Manitoba Great Lakes system, and highlights the urgent need for continued monitoring, community-engaged research, and the weaving of traditional ecological knowledge with western science approaches to ensure these lakes can continue functioning as effective nutrient buffers for Lake Winnipeg.
Format	PDF
Resource Category	documents

Related Datasets

Field	Value
Title	Morphometric Data for Lake Manitoba
URL	https://canwin-datahub.ad.umanitoba.ca/data/dataset/lmb-bathym