

Limnological features and models of chlorophyll-*a* in 30 lakes located in the lower Mackenzie River basin, Northwest Territories (Canada)

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ABSTRACT

*Limnological variables from 30 lakes situated along the proposed Mackenzie Gas Project pipeline route in the Canadian Northwest Territories were examined. Sampled lakes were shallow ($Z_{max} = 1.5\text{-}30\text{ m}$; mean depth = 6.6 m), generally nutrient poor (TP often $\leq 10\ \mu\text{g L}^{-1}$), and alkaline (mean pH = 8.2). Floodplain lakes located within Arctic-tundra watersheds tended to have higher conductivity and major ions (Na, Cl, Ca, SO_4) concentrations relative to non-flooded Arctic-tundra or forest-tundra lakes, reflecting differences in vegetation, elevation and most importantly, proximity to the Mackenzie River. The first two axes of a principal component analysis explained 56.1% of the variance in the environmental data. Variables most strongly associated with the first principal component axis were latitude, elevation, dissolved oxygen, temperature, conductivity and turbidity while the second principal component axis represented gradients of nutrients and Chlorophyll-*a* (Chl-*a*). Factors affecting Chl-*a* varied among the different ecological zones. This study provides reference data for future monitoring of potential effects of development and warming in the Arctic.*

Key words: limnology, climate change, Mackenzie River basin, phytoplankton, nutrients, multivariate analyses
