

INFLUENCE OF FISH, AGRICULTURE, AND BIOME ON ALGAL ABUNDANCE IN SHALLOW LAKES¹

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We measured algal abundance in 72 shallow lakes across 2 biomes (prairie and deciduous forest) in western Minnesota during July 2005-06. We also determined type of fish community and fish biomass present in each site, and used Geographic Information Systems to estimate the proportion of agriculture and other cover types within each lake's watershed. We used a model-selection approach to assess the relationships between algal abundance and a) biome, b) proportion agriculture and other cover types at the watershed scale, c) lake and watershed morphometry, and d) relative biomass of benthivorous + planktivorous fish. Our best models included terms for biome, benthivorous + planktivorous fish biomass, and extent agriculture, and explained 66% and 48% of the variance in algal abundance during 2005-06, respectively. Model averaging reflected stronger influence of fish biomass and biome than proportion of agriculture. Our results indicated that management of Minnesota's shallow lakes should include management of fish populations along with surrounding land use.

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