

Responses of epilimnetic phytoplankton to experimental nutrient enrichment in three small seepage lakes

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Abstract. This paper describes the responses of three epilimnetic phytoplankton communities to experimental nitrogen and phosphorus enrichment as compared to the phytoplankton community in a fourth, unmanipulated, lake. Increased nutrient inputs increased total phytoplankton biomass, primary productivity, chlorophytes, cryptomonads and species turnover rates in all three enriched lakes; cyanobacteria increased in two of the three enriched lakes. However, nutrient addition also led to declines in previously dominant dinoflagellates and chrysophytes, and in species diversity. At the species level, there were large changes in community composition from year to year in both enriched and reference lakes, suggesting that phytoplankton community composition is highly dynamic even in the absence of enrichment. Overall, changes in total biomass, productivity and species diversity were consistent among the enriched lakes, while changes in species composition differed due to variation in the physical, chemical and biotic environment of each lake. This suggests that aggregated variates are more useful for quantitative prediction of nutrient effects, while species responses can be used to signal qualitative differences in environmental conditions among lakes.
