

# Zooplankton Biodiversity and Productivity in Lake Champlain

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## Background and Introduction

Biodiversity is crucial to resilient ecosystems. Because plankton form the base of the food webs of lake ecosystems, researching plankton diversity is imperative. Biodiversity is linked to productivity. If there is a curvilinear relationship between resource heterogeneity and productivity in lakes, “consumer biodiversity should be maximized at intermediate environmental productivity levels where species adapted to both high and low resource heterogeneity can co-exist” (Barnett et al., 2007). Lake Champlain is a particularly interesting location for this research because of the varying productivity levels throughout the lake.



Figure 1 *Mesocyclops edax*, a copepod commonly found in Lake Champlain. Credit: University of New Hampshire Center for Freshwater Biology.

## Hypothesis

Zooplankton biodiversity is maximized at intermediate lake productivity.

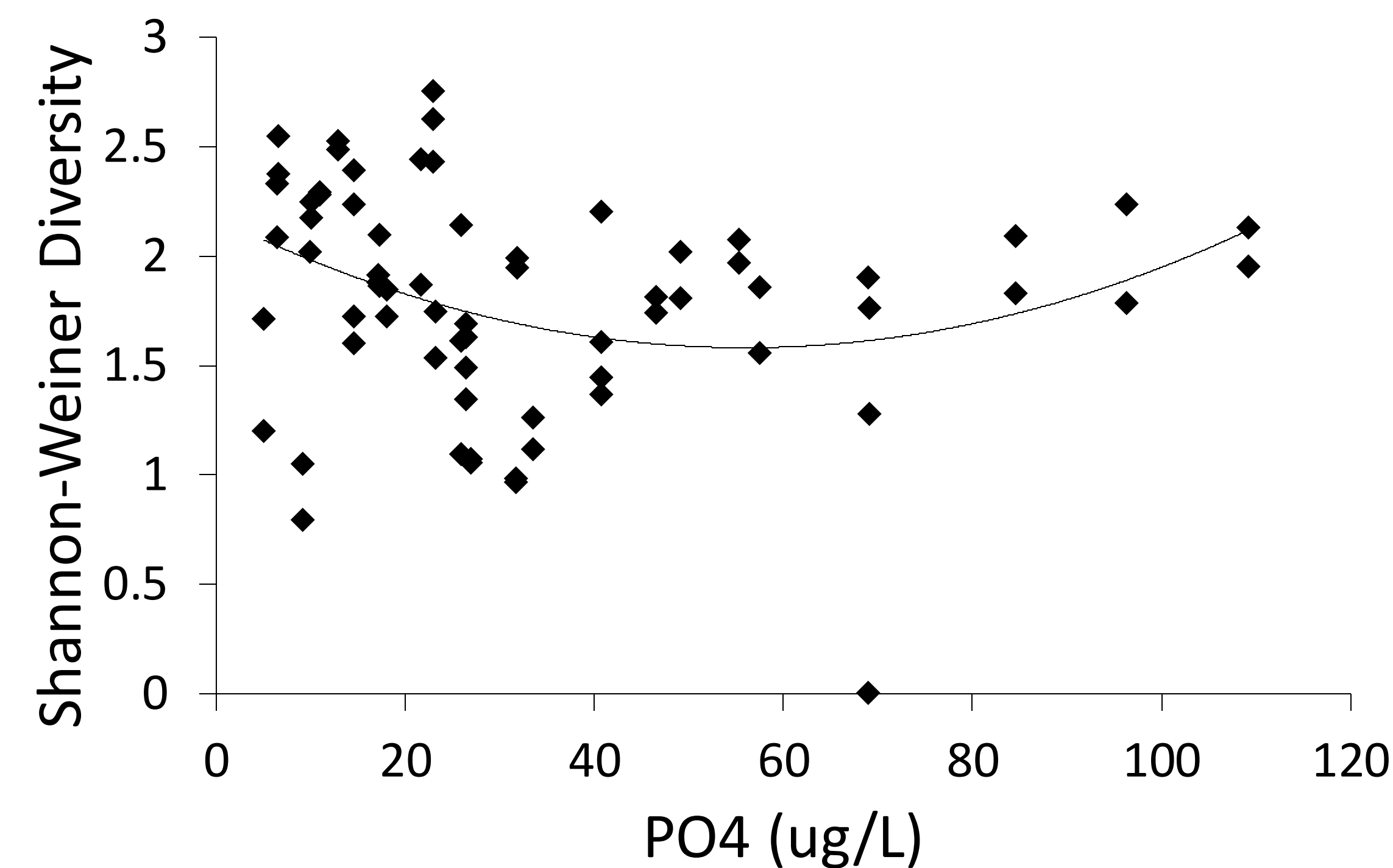


Figure 2 Phosphorous levels and zooplankton biodiversity in three Missisquoi Bay sites, April – October 2014.

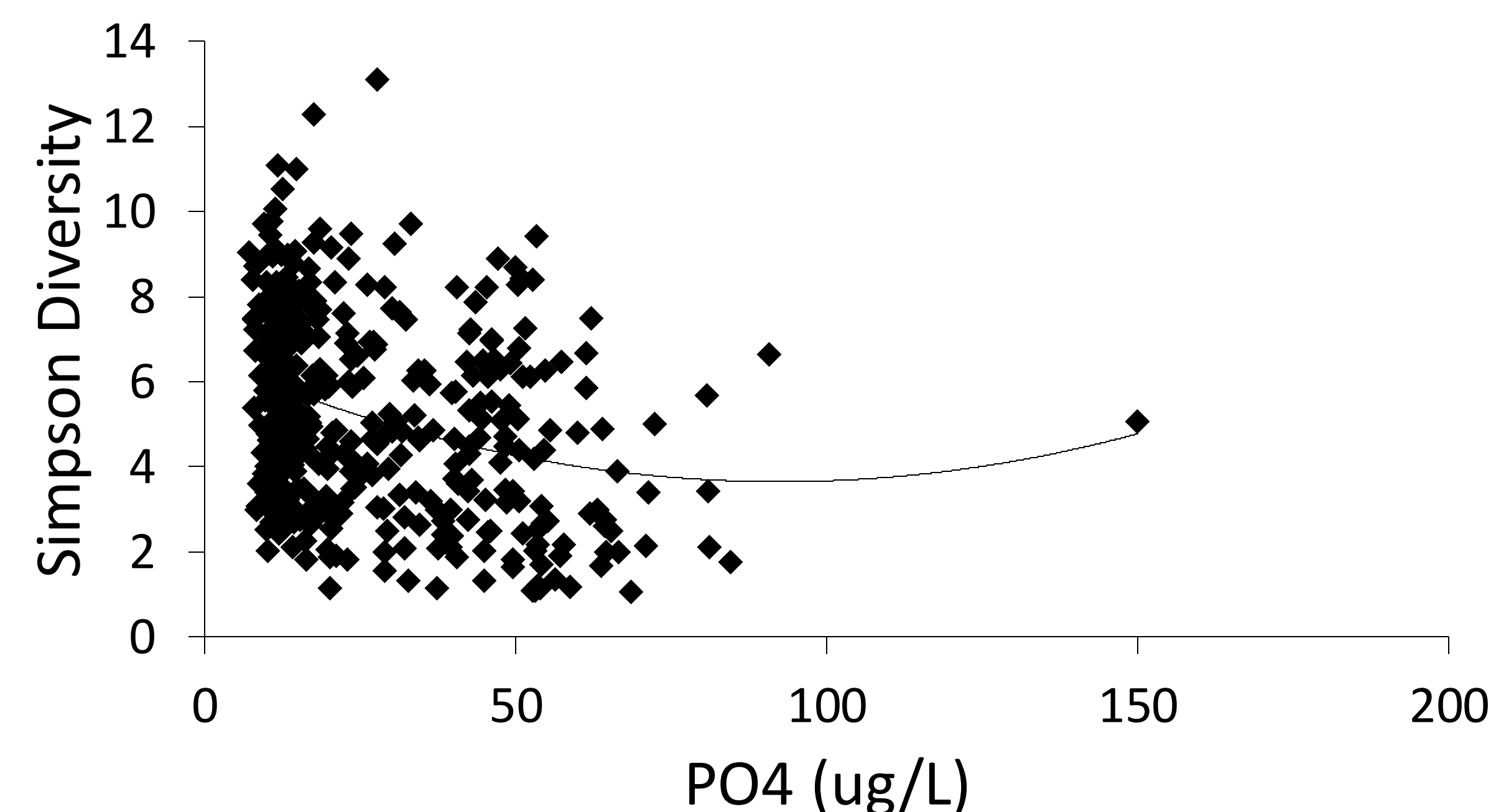


Figure 3 Phosphorous levels and zooplankton biodiversity in sites throughout Lake Champlain, 2006 – 2010.

## Methods

The hypothesis was tested at two scales. For long-term, lake-wide information, zooplankton data from the Lake Champlain Long-Term Monitoring Program from 2006 – 2010 was analyzed. For higher-frequency, shorter-term, smaller-scale data, zooplankton samples were collected from Missisquoi Bay each week during the summer of 2014. Both the Shannon-Weiner diversity index and the Simpson diversity index were used to assess biodiversity. Total phosphorous was used as the indicator of productivity. An  $r$  squared test was used to assess the correlation between productivity and zooplankton biodiversity.

## Conclusions

No significant correlation between productivity and zooplankton diversity was found. Figures 2 and 3 suggest that biodiversity was minimized at intermediate productivity levels. However, in Missisquoi Bay, biodiversity peaked in the middle of the summer of 2014. It is possible that there was some error in the data compilation or analysis that caused unexpected results. More research is needed to investigate the relationship between Lake Champlain’s zooplankton biodiversity and productivity.

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