The Effects of Land Use on Phosphorus and Benthic Macroinvertebrates in the Lake Champlain Basin

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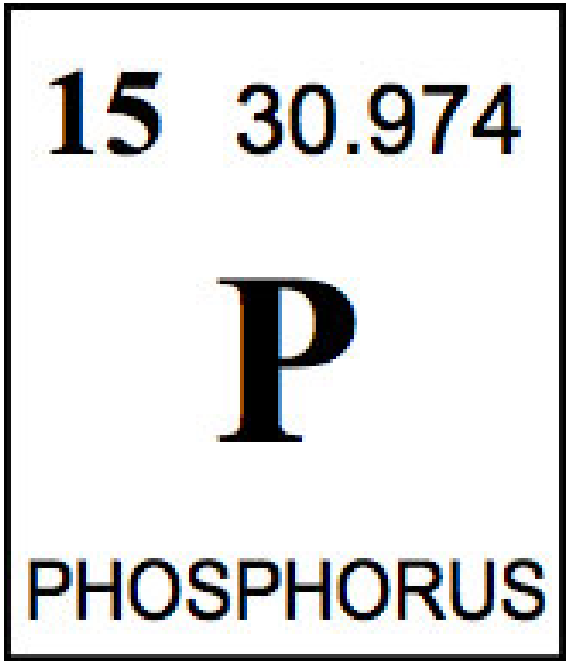
Overview

- Why phosphorus?
- Introduction
- Methods
- Results
- What does it all mean?
- Future of Lake Champlain

Why Phosphorus?

- Summer 2010
- Human interaction
- Larger ecosystem



http://annarborchronicle.com/wp-content/uploads/2010/04/phosphorus.jpg

Introduction

- Cultural eutrophication
- Agriculture
- Storm water run-off
- Urbanization

http://www.clf.org/wp-content/uploads/2011/01/champlain7.jpg

Methods

- Water and macroinvertebrate samples taken on site
- Habitat and site assessment
- Ascorbic acid method
- Taxonomic classification using standard keys

Results

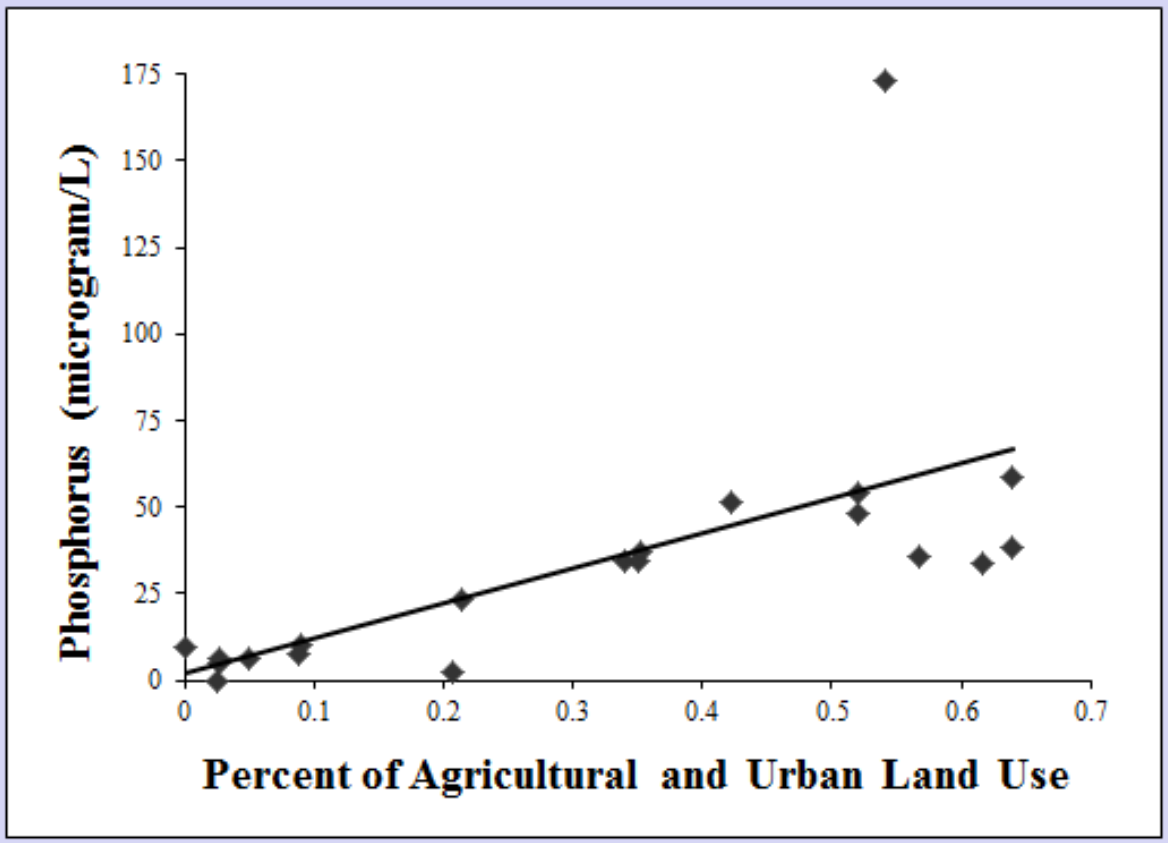


Figure 1. The concentration of Phosphorus levels as they correspond to agricultural and urban land use. The increasing percent land use is mirrored by an increase in phosphorus levels in the streams; *p*-value = .002, highly significant correlation.

Results

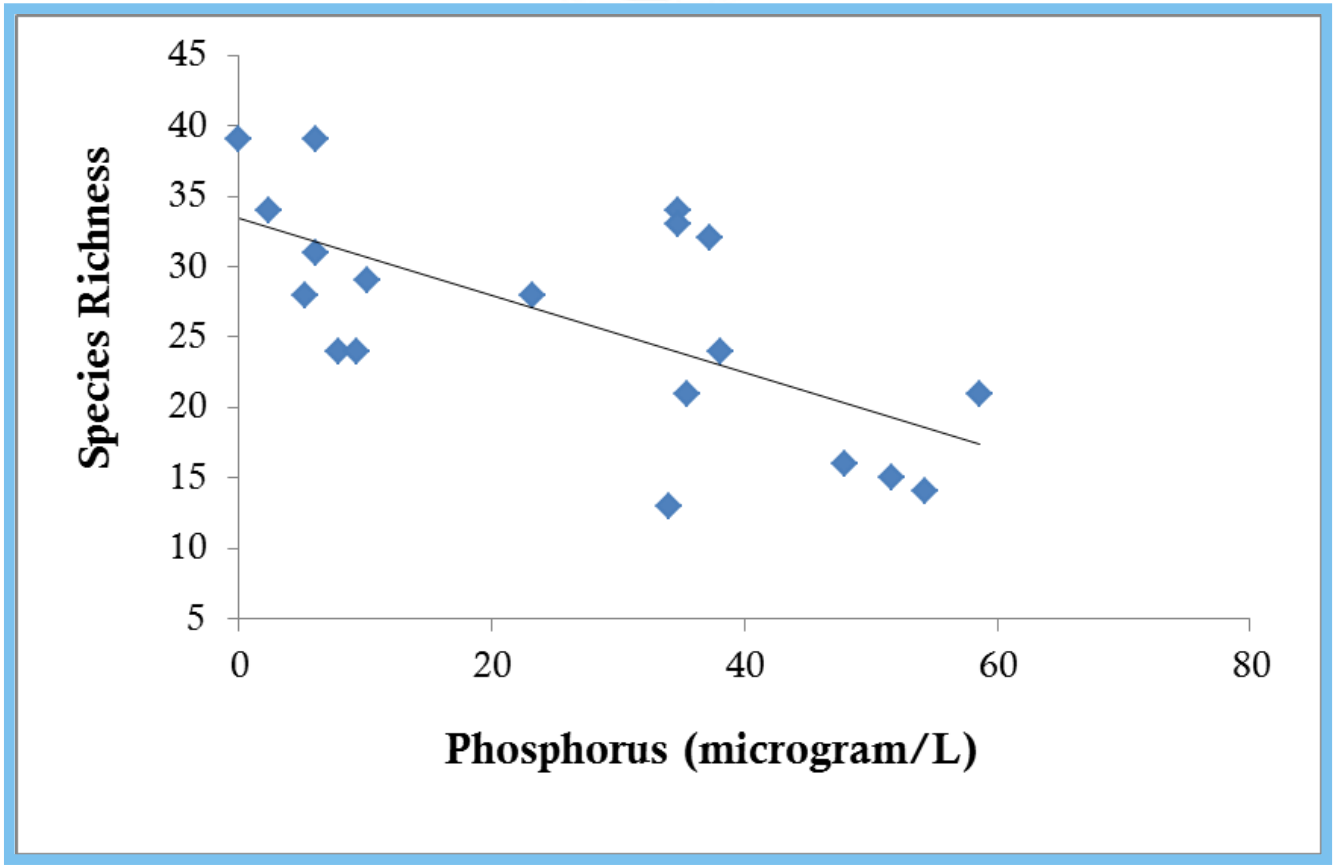


Figure 2. The amount of phosphorus, measured in micrograms per liter, and its effects on species richness. R-square: 0.44.

Results

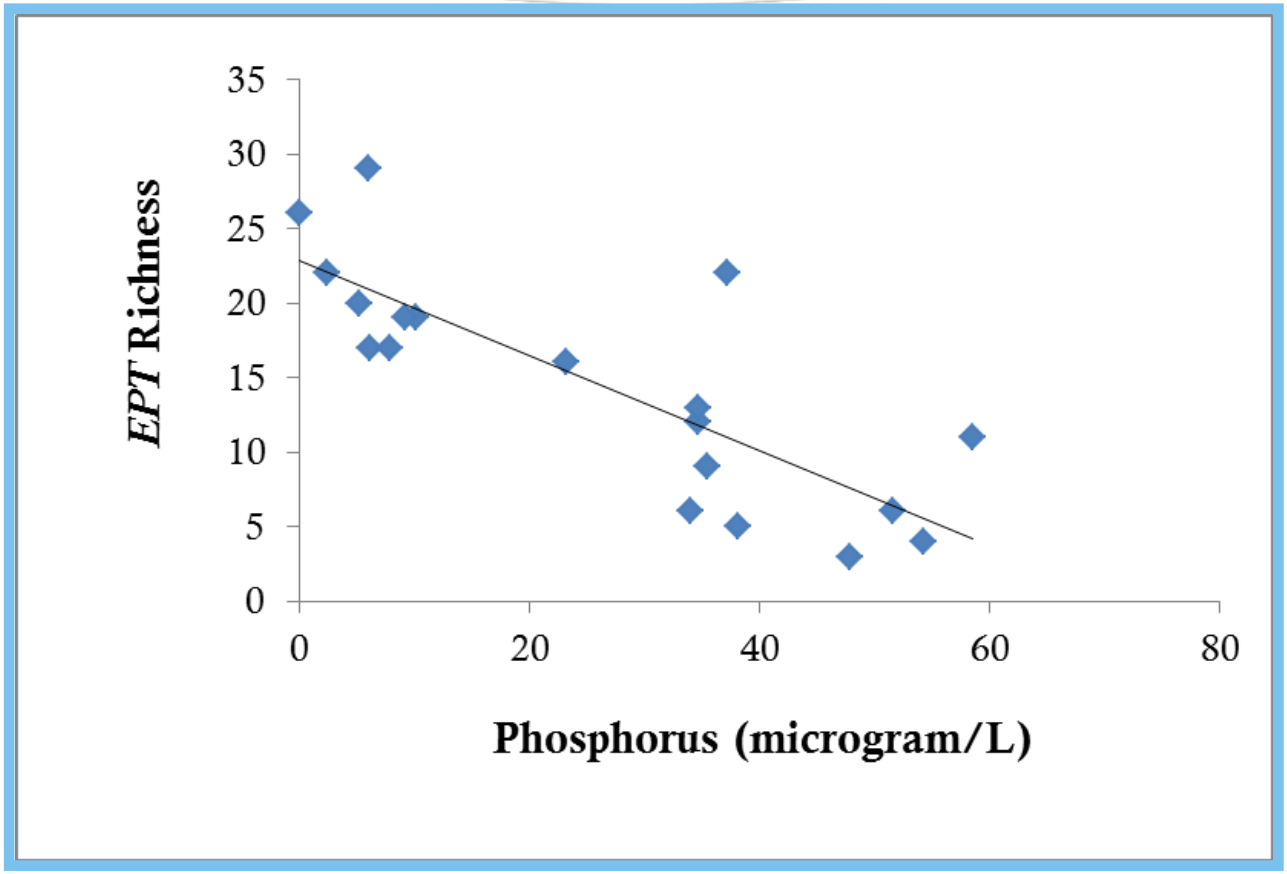


Figure 3. The amount of phosphorus, measured in micrograms per liter, and its effects on the sensitive *EPT* richness; R-square: 0.65.

Results

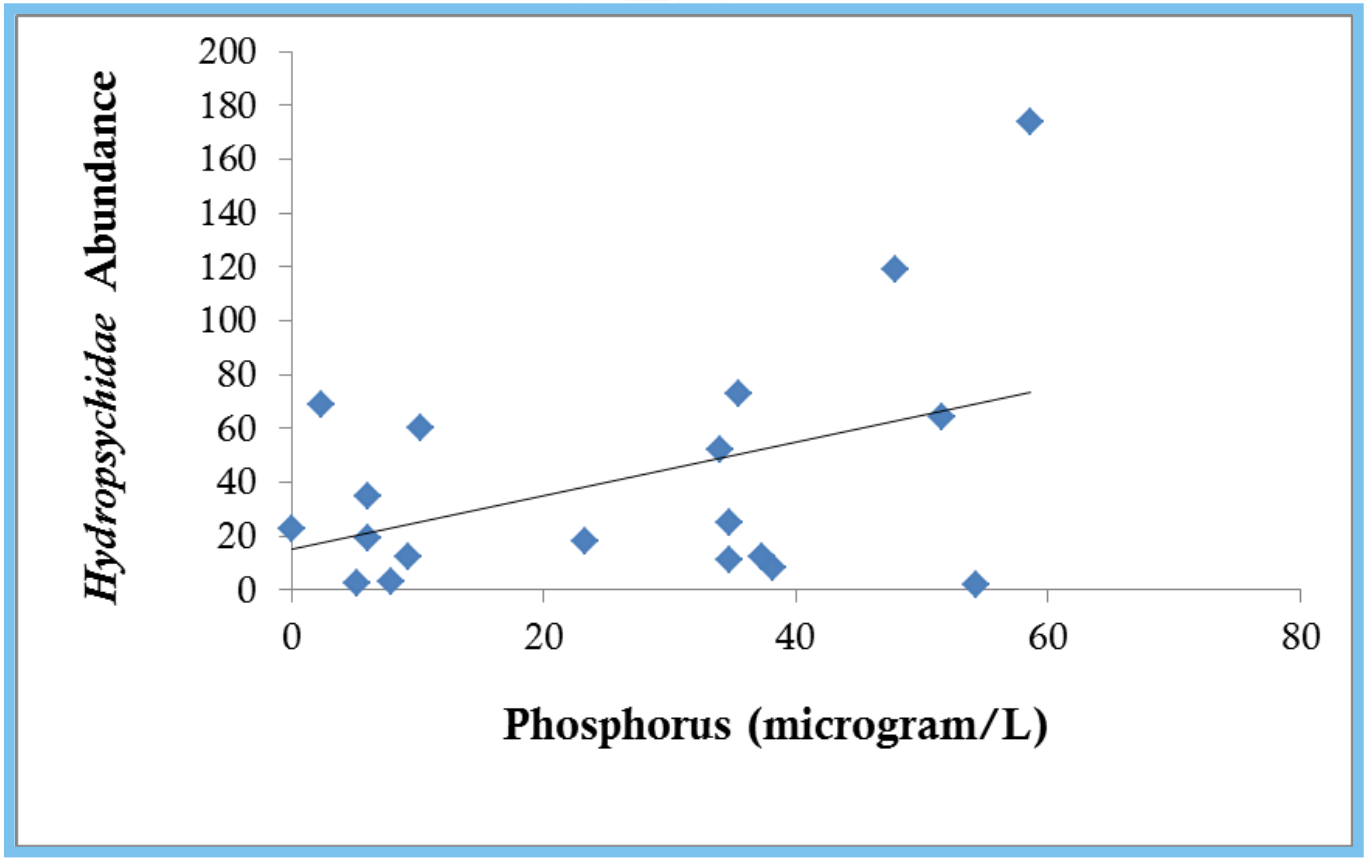


Figure 4. The amount of phosphorus, measured in micrograms per liter, and its effects on the tolerant *Hydropsychidae* abundance; R-square: 0.19.

What do these data mean?

- Land use = Phosphorus
- Diversity, sensitive species, tolerant species
- Monitoring
- Lake heath support

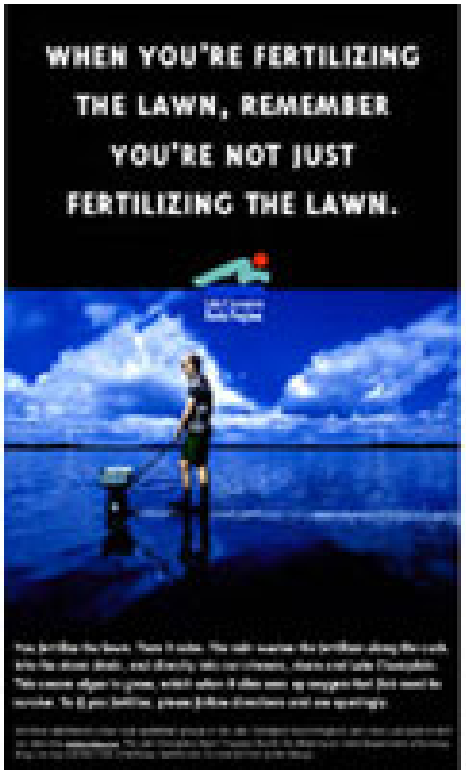
Future of Lake Champlain

- Lake Champlain Basin Program

http://www.lcbp.org/kid.htm

ecHO
LEAHY CENTER FOR LAKE CHAMPLAIN

http://www.echovermont.org/



http://www.lcbp.org/posters.htm

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- EPSCoR Streams Project

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Questions?

http://www.google.com/imgres?q=lake+champlain+champ&hl=en&biw=1350&bih=889&tbm=isch&tbnid=8OetwAInI2d9ZM:&imgrefurl=http://www.maldenyachtclub.org/blog/%3Fp%3D451&docid=gNgKpjjpiys4vM&imgurl=http://www.maldenyachtclub.org/blog/wp-content/uploads/2009/07/champ.jpg&w=310&h=293&ei=vEptT5aKO-Lf0QGb-OTsBQ&zoom=1&iact=rc&dur=0&sig=111925582015610214025&page=2&tbnh=160&tbnw=169&start=39&ndsp=39&ved=1t:429,r:12,s:39&tx=129&ty=111

Literature Cited

- Hasler, Arthur D. "Cultural Eutrophication Is Reversible". *BioScience* 19 (1969): 425-431. Print.
- Page, Candice. "Farming on the lakeshore poses a pollution dilemma". *The Burlington Free Press*. 20 Sept. 2010. Web. 02 Oct. 2010.
- Merritt, R.W., K.W. Cummings, and M.B. Berg. *An Introduction to the Aquatic Insects of North America*. Iowa: Kendall Hunt Publishing, 2008. Print.