

# Nutrient and Light Limitation Effects on Algal Populations in Two Streams



Biology ❖ University of Wisconsin-Eau Claire  
Danielle Mares and Anna Scheunemann, Dr. Todd Wellnitz--mentor

## Introduction

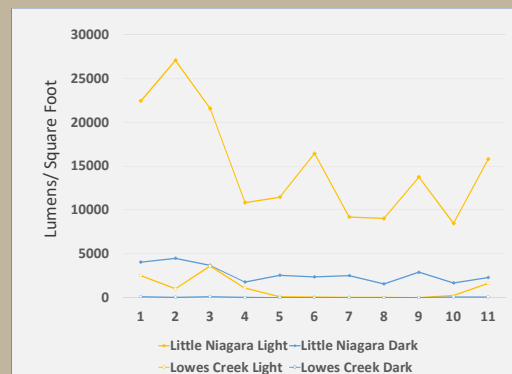
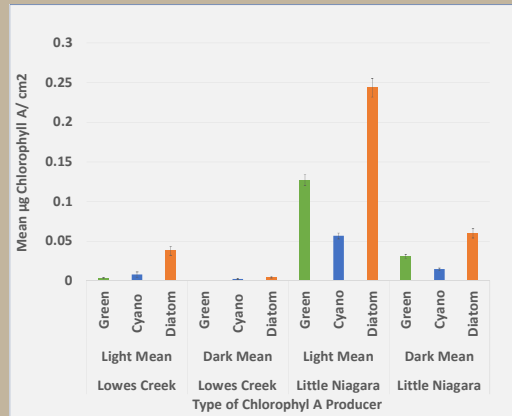
Algal blooms are associated with high nutrient concentrations and can pose problems for freshwater ecosystems, the organisms they contain, and humans that benefit from them. Nutrients that are usually a limiting factor for algal growth such as Nitrogen and Phosphorous can flood streams because they are commonly found in agricultural and urban runoff. In this study we examined how Nitrogen and Phosphorous affected stream algal populations in relation to light availability in two streams: Little Niagara Creek and Lowes Creek. We chose these two streams to compare and contrast the limitation of algal populations in streams draining urban and rural catchments.

## Methods

- ❖ Two floats were constructed to hold 56 vials filled with solutions containing N, P, N+P, or water (controls). The treatments were split evenly between open and shaded sections of the floats.
- ❖ The floats were placed in Little Niagara Creek and Lowes Creek for two weeks.
- ❖ HOBO Data Loggers took measurements of light intensity under both the shaded section and open section of the floats every 15 minutes.
- ❖ Algal biomass was then quantified as chlorophyll-a with a fluorometer.



## Results



## Discussion

- ❖ Our results showed that light significantly affected algal biomass while nutrients did not. There are several explanations for this.
- ❖ This outcome may have been due to the time of year the study was done (October and November). In late fall, days are shorter and light levels are lower, and this may have made light the more important limiting factor. The higher algal biomass we saw of diatoms compared to green algae, and cyanobacteria suggest that the colder season had an effect because diatoms tend to grow more rapidly in the cold.
- ❖ Alternatively, our nutrient-diffusing vials may have malfunctioned and failed to make nutrients accessible to algae.
- ❖ Further testing with different nutrient-diffusing substrates will be done this spring to address these explanations.
- ❖ Next fall we plan to use clay pots instead of membrane filters as our nutrient diffusing substrates. Clay pots have been tested to diffuse nutrients from an agar consistently over a two week period. We plan to conduct the study during September when the waters are still warm and there is light enough to support optimal growth of green algae and cyanobacteria. We also plan on sampling stream nutrient levels and adjusting experimental nutrient levels accordingly.



## References

Carey et. al. (2007). Do Nutrients Limit Algal Periphyton in Small Blackwater Coastal Plain Streams? Journal of the American Water Resources Association. Vol. 43. No. 5

## Acknowledgements

- ❖ Learning & Technology for printing this poster
- ❖ ORSP for funding student research