

Investigating the Correlation Between Algal Bloom Biodiversity, Spatial Distribution and Abiotic Aquatic Conditions in Missisquoi Bay, Lake Champlain



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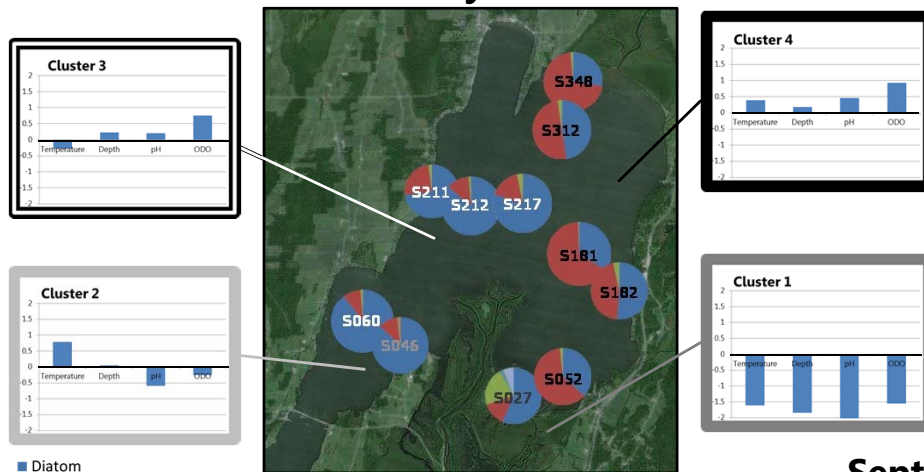
Introduction and Methods

Modern accelerated climate change is stressing the complex interrelationships between biota and its physical environment and demanding the rapid acclimation of biota. Eutrophication of temperate freshwater lakes is one such process that is generally being accelerated by climate change due to increasing annual average temperature and precipitation, often resulting in seasonal harmful algal blooms such as that found in Missisquoi Bay, the northernmost region of Lake Champlain. Although an annual event, the bloom is neither spatially or temporally uniform within the bay. This study documents how the variation in water qualities at 11 discrete sites in the bay influence the biodiversity and competition of the algae over the course of the bloom event. Each site was visited three times: during the pre bloom, peak bloom, and post bloom. Temperature, depth, pH and dissolved oxygen content were recorded through the water column, and phytoplankton samples were taken from the surface. The biovolume of each genus was calculated using a FlowCAM© fluid imager and hierarchical clustering analysis was used to group sites with similar community composition. The standardized values of the water quality parameters of these clusters were graphed relative to the bay's average readings for that sampling day to illustrate which parameters correlate to biological community structure.

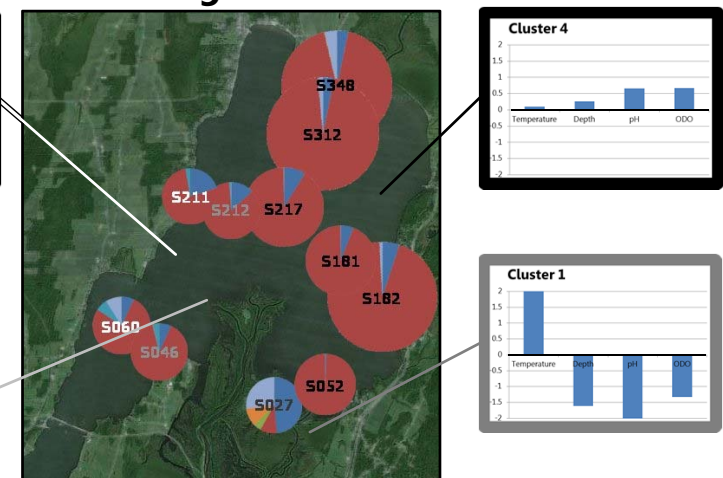
Acknowledgments

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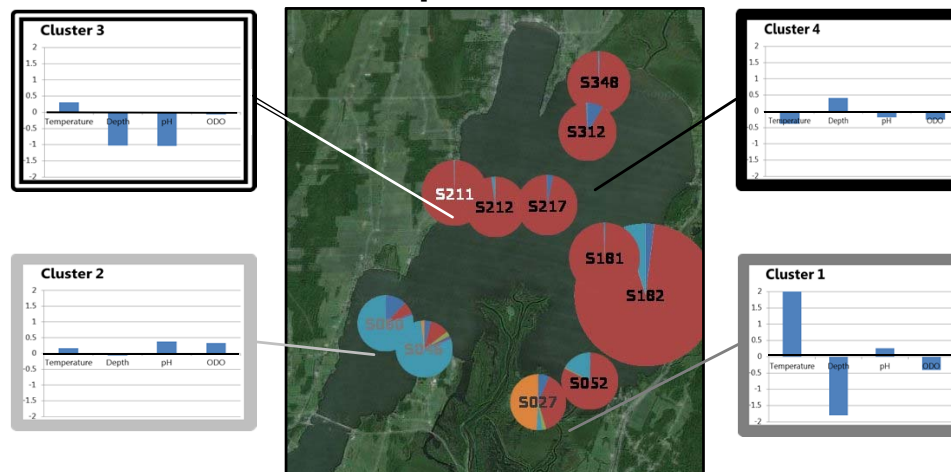
July 16



August 20



September 29

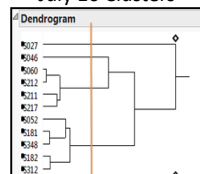


- Diatom
- Cyanobacteria
- Chlorophyceae
- Cryptomonas
- Dinoflagellates
- Chrysophyceae
- Euglenophyceae
- Charophyceae

Figures

- Colors in pie graphs correspond to algae genera listed on the left.
- Shade of site labels and bar graph borders correspond to site clusters.
- Size of pie graphs correlated with total algae biovolume

July 16 Clusters



Summary

- Cyanobacteria are dominant in the north and west by the peak of the bloom.
- S027 remains the most diverse, most likely due to its proximity to both the Missisquoi River estuary and a wetland.
- Sites in the southwest also showed extraordinary diversity changes most like due to their proximity to water exchange between the Bay and the Main Lake.
- Biodiversity trends are more prevalent spatially than in the comparison of abiotic factors alone.