

Chlorophyll A Levels In Song Lake

Do the variations in chlorophyll a levels in Song Lake indicate different regions for sampling?

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Introduction

Song Lake is located in the town of Tully, NY. It is a small, private, kettle lake that is mostly groundwater fed. Song Lake is mesotrophic and is a closed system lake. The lake is not stocked by the state, and is managed by the Song Lake Property Owners Association (SLPOA).

In a report released by SLPOA in 2009, there was some concern about the lake becoming eutrophic and possible cyanobacteria blooms. Chlorophyll a levels can be used as an indication of possible algal blooms. Therefore, sampling chlorophyll a levels around the lake provides a great method for monitoring the lake for potential blooms.

During the 41st Song Lake Watershed Planning and Environment Committee Meeting, Patrick Reidy stated that there was uncertainty in the current chlorophyll a readings. It is important that more chlorophyll a data are collected to eliminate uncertainty.

Hypothesis

Due to regional differences in the lake, more than one site is necessary for understanding lake conditions.

Objective

The purpose of this study was to find out if there were any significant differences in Song Lake concerning chlorophyll a levels that would determine whether the CSLAP sampling site was sufficient or if more sample sites were necessary to determine lake conditions.



Methods

On Saturday November 5 2011, water samples (100mL) were collected from 20 different sites using a Van Dorn. Chlorophyll a was extracted using the acetone method. Fluorometer readings were taken and converted to micrograms/Liter.

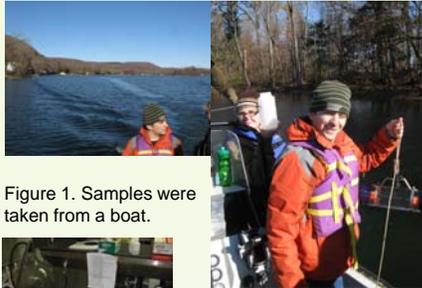


Figure 1. Samples were taken from a boat.



Figure 3. Filtration device

Figure 2. Van Dorn was lowered to 1m depth at all sites.



Figure 4. Samples were collected from the 20 sites seen above.



Figure 5. A GIS map of chlorophyll a throughout the lake.

Table 1. Chlorophyll Summary Table

	CSLAP	Lake Mean	Lake Range	Minimum	Maximum
Chlorophyll a (ug/L)	6.17	7.99	16.94	4.96	21.9

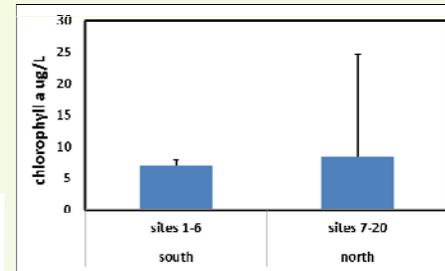


Figure 6. Differences between mean chlorophyll a (ug/L) in northern sites and southern sites. The southern sites have lower and less variable chlorophyll concentrations. (t-test; p=0.12)

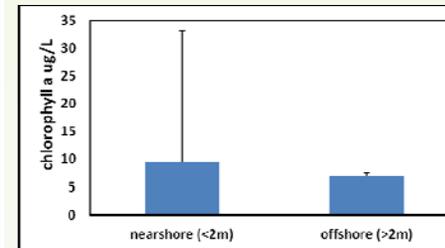


Figure 7. Differences between mean chlorophyll a (ug/L) in near shore and offshore sites. The near shore sites have higher and more variable chlorophyll concentrations. (t-test; p=0.10)

Discussion

The research shows that there are regional differences in chlorophyll a levels at Song Lake. It supports the hypothesis that site 6, the CSLAP site, is not sufficient in examining the entire lake. The CSLAP site had one of the lowest amounts of chlorophyll a out of the twenty sites sampled. Site 10 had an extremely high level of chlorophyll a. Mesotrophic lakes tend to have chlorophyll a levels between 3 and 11ug/l. Site 10 had a reading of 21.9 ug/l, a measurement to be expected in a eutrophic lake. The average chlorophyll a levels in the central region of the lake were much higher than the average off the rest of the lake. Northern sites had a non-significant trend towards higher chlorophyll levels, which are also more variable. Likewise, near shore sites had more variable chlorophyll levels than off shore sites, and had a non-significant trend towards higher concentrations.

Conclusion

The data and analysis indicate that the optimum amount of sites to sample would be multiple sites that cover the entire lake both spatially and in shallow and deep sites in order to properly monitor the chlorophyll a levels due to the very high variability in the different regions of Song Lake. The CSLAP site had one of the lowest levels of chlorophyll a. Site 10 is the most important site to sample given the concerns about eutrophication. The high level of chlorophyll a at site 10 could indicate nutrient loading, or a possible bloom. If sampling had to be restricted to a minimum, sites 2,6,10, and 16 should be done, at the least.

References

41st Song Lake Watershed Planning and Environment Committee Meeting Minutes
Lakelist.nysfola.org
Songlakewatershed.blogspot.com
www.songlakewatershed.org

Acknowledgments

1. Thank you Dr. Schulz and Steph!!!!!! ☺ ☺ ☺
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