

1/CYANO-HAB Basics for Song Lake

Most algae are harmless, but exposure to toxins and other substances produced by harmful algal blooms can make people and animals sick. HABs are sometimes called blue-green algal blooms even though they can be various colors.



This is a picture of a Harmful Algal Bloom on the North

Shore of Song Lake (October 8, 2015). The toxin results were very high in microcystin, exceeding the limits of safety for human contact, as set by the World Health Organization. In the years between 2011 and 2019 Song Lake had at least one toxic shoreline bloom per year, with seven documented occurrences in 2017, two in 2018 and four last year.

CAUSES, PREVENTION & RESPONSE Scientists do not fully understand the exact causes of HABs. While they occur most often in waters high in phosphorus and/or nitrogen, that is not necessarily the case in Song Lake. Over the years of water quality testing, our nitrogen levels have been low and while phosphorus does sometimes spike (mid-summer), it is not typical of most high cyanobacterial lakes. In Song Lake, the most likely reason for seasonal spikes in phosphorus is from internal loading. This means that in the lake there is a resuspension of sediments carrying phosphorus back into the water column. These disturbances can be caused by bottom eating fish (carp), boat traffic, storms and wave action.

From the DEC: It can be hard to tell a harmful bloom from a non-harmful algal bloom, so it is best to avoid swimming, boating, fishing or other recreation in discolored water that looks like it might have a bloom. Avoid eating fish caught from areas with a bloom. Never drink, prepare food, cook, or make ice with untreated surface water, even if there is no visible bloom.

IF CONTACT OCCURS • Rinse thoroughly with clean water. • Stop using the water. • Seek medical attention if vomiting, nausea, diarrhea, skin, eye or throat irritation, allergic reactions or breathing difficulties occur. • Report your symptoms to your local health department or the NYS Department of Health. • Take care to remove algae from pet fur.

If you suspect a bloom, please call either Carl (315-696-5963) or Tarki (757-876-2198) so we can grab a sample for testing.

Take a picture immediately and send it to songlakeassociation@gmail.com and we will share it with the experts.

The cyanobacteria that have been positively identified in Song Lake include Mycrocistis, Dolichospermum, and Woronichinia. These are described in detail by the [EPA Here](#) .

2/ Phosphorus

We all agree that potential sources of phosphorus include septic systems, geese and stormwater runoff. Here are reports, with relevant data, we have compiled over the years.

a/ Data from CSLAP – Song Lake has participated in the NYSFOLA/DEC Citizen’s Statewide Assessment Program beginning in 1988. Song Lake’s phosphorus has decreased in lake water

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samples over the years and does not have the phosphorus levels expected of a strong HAB lake.

Data from 2019 is available at this link:

<https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:d0e0359f-017e-495b-99dd-d2e4bdf502eb>

Archived reports available at: <https://nysfola.org/wp-content/uploads/CSLAP/cslrpt18songl.pdf>

b/ Data from Contaminates of Emerging Concern Study, 2018, with Syracuse University, SUNY ESF, NYSFOLA CSLAP and Upstate Freshwater Institute can be found here:

<https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:c59114f5-1a81-4040-afb2-c268f759e97d>

No Pharmaceuticals were detected, however, pesticides, herbicides, UV Blockers, and vulcanization accelerators (from rubber), were detected indicating stormwater and recreational use issues. Phosphorus in this study too indicated levels below 14 micrograms/liter through the summer.

d/ Internal Loading Study with NYS DEC in 2017 link here:

<https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:cf0c0f3a-0d8f-4953-b4d1-8197b6edb304>

– Correlates with modeling from the WIP below. DEC analysis summarized: Finally, these estimates suggest that internal loading is sufficiently high (up to 40% of the overall phosphorus load) to require some measures of internal loading reduction to significantly reduce phosphorus levels in Song Lake. However, the lake would not likely be considered a candidate for nutrient inactivants under the existing regulatory system being established in New York, since the overall phosphorus levels in the lake do not exceed the New York state TP guidance value of 20 ug/l. It is also not known if the TP migration from hypolimnion to epilimnion occurs at a time when the lake may be susceptible to HABs; the seasonality of the load in 2017 (this study) may have been atypical due to the cool late summer and unusually warm September weather.

e/ Watershed Implementation Plans: In 2017, Song Lake developed mini WIPs through a Chesapeake Bay Technical Capacity Grant and working with Princeton Hydro, LC, SU-Environmental Finance Center, Cortland-Onondaga Federation of Kettle Lake Associations, and Cortland County Soil and Water District. That report, with modeling for phosphorus loading, can be found here: <https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:fcbc2bce-0c0d-4579-a1d2-d69475d8bef0>

At this writing, Song Lake has encouraged shorescaping on personal properties. Slopes that are not managed for stormwater runoff, will continue to contribute to the lake sediments and phosphorus going into the lake. Proper boating activities (motorboats in the deep water area only, see map below), will also reduce disruption and resuspension of the phosphorus in the sediments.

f/ Watershed Management Plan from 2019: The State of the Lake Report and Comprehensive Management Plans for Song Lake, Crooked Lake and Tully Lake. This three year study working

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with SUNY Oneonta, presents detailed information on our lake, and two other Kettle Lakes. That
report can be found here:

<https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:d10d4c2e-89f9-412c-9688-845e54a24c9b>

The Song Lake Management Plan begins on page 124.

3/ SPLOA Septic System Incentive Program – This program has been in operation since 2011.
Details can be found here; http://www.songlakewatershed.org/Page_10.html

4/ Other Factors:

Geese – They were abundant this year and well beyond the carrying capacity of our small lake.
We are looking into ways to mitigate their nesting in 2020.

<https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:80c3f1ea-8a8a-4726-8dce-ddcde3a9828b>

Increasing Temps: Our water temperatures are climbing as seen in our CSLAP data over the
years. This is a factor of warming air temperatures, less ice, and more sunlight penetration due to
water clarity after the introduction of zebra mussels in 2017. It is not controllable and all
indications are that warming will continue. This will lead to changes in the lake ecology overall,
including reduced oxygen levels, placing the current native fish and plants at risk.

Zebra Mussels – huge impact in many ways. Prof. Kim Schultz and Prof. Lars Rudstam
research. Professor Schulz presentation slides on mussels related to HABs can be seen here:
https://s3.amazonaws.com/assets.cce.cornell.edu/attachments/45527/HABsMusselTalkforOnondagaCCE_16June2020.pdf?1592402646

Years of Triploid Grass Carp- The overall negative impact of the grass carp is explained in
Stradder Caves report (see f above), page 129. The NYS DEC declined our application to restock
grass carp last year.

5/ SLPOA Planning

Using all of this relevant data, The Song Lake Property Owners Association implemented the
following short term and long term plans to address weed growth in 2019. It is important to note
as well that all of our abundant plants, while a nuisance, are native weeds. See Stradder Caves
report (see f above), page 93.

In June, 2020, the association officially purchased the small weed harvester and is currently
renovating and refitting to launch this summer.

<https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:6c6f6217-2d4a-4ede-bf26-b3a85de521e0>

From 2008 onward, the SLPOA formed a rapid response team with CSLAP training and
experience in appropriately citing and reporting HABs.

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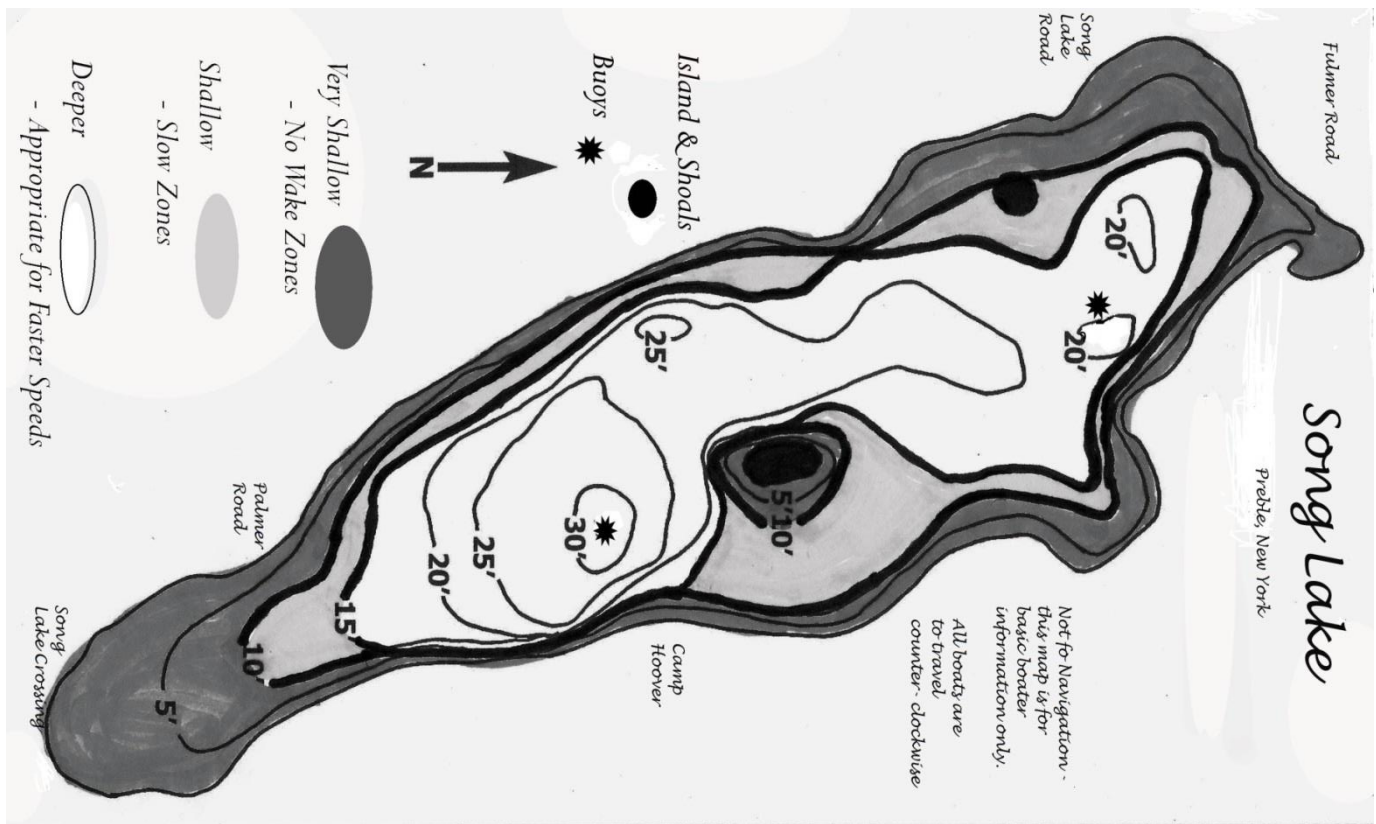
We have an EPA funded microscope and camera to send pics to iNaturalist scientists for confirmation of identification.

With close ties to SUNY-ESF and frequent interactions with both Dr. Greg Boyer's lab and Upstate Freshwater Institute (one of the few ELAP certified labs in the area), we are able to take samples and have those tested for toxicity as needed.

We work with the Finger Lakes PRISM program to identify invasive species:
<http://fingerlakesinvasives.org/>

Conclusion:

Song Lake, like all the freshwaters of the world, is facing compounding anthropogenic influences. Song Lake has data from years of study. We have the science and the stewards who understand the basics of lake dynamics, and Song Lake in particular. The current increase in cyanoHABS across the world has even the most experienced scientists baffled. Our experiences on Song Lake are not unique.



Respectfully Submitted by Tarki Heath
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President Cortland-Onondaga Federation of Kettle Lake Associations)