

BACKGROUND

Song Lake is one of a group of unique kettle lakes, just east of the Finger Lakes, in Northern Cortland and Southern Onondaga Counties, in New York State. The kettle lakes were formed during the same glacial period as the Finger Lakes, and according to the USGS, by the same glacial processes that also formed the Valley Heads Moraine, which is the drainage divide between the St. Lawrence River Basin to the north and Susquehanna River Basin, to the south.

This shallow, 109 acre lake is located in the Town of Preble in Cortland County. Song Lake has no outlet or inlet, but is fed by precipitation, surface water runoff and groundwater. The lack of significant “flushing” for Song Lake is important to understand, as what goes in the watershed stays in the watershed much longer. ¹

Both the surface and subsurface watershed regions have been identified and mapped by Cortland County Soil and Water, with the assistance of the U.S. Geological Survey. Understanding the lake’s interaction with the watershed regions is important in understanding the water quality issues on Song Lake. Since Song Lake is dependent on precipitation and groundwater feed, the quality of the subsurface watershed is just as important as the surface area. ²

The New York State Department of Environmental Conservation classifies the water as Class B, this means that the best intended use for the lake is for contact recreation—swimming and bathing, non-contact recreation—boating and fishing, aquatic life, and aesthetics. Song Lake Property Owners’ Association is a member of the New York State Federation of Lake Associations (NYSFOLA), and participates in their water quality monitoring program called Citizen’s Statewide Lake Assessment Program (CSLAP),

¹ Also referred to as “residence time” or the amount of time the water remains in the lake. Lakes with inflows and outflows, that are part of an active stream system, may have a flushing rate of several times per year, however, according to Peter Black, Professor Emeritus, State University of New York, the average residence time for lakes on the Earth is 21 years. Water Hydrology, Prentice Hall

² For more information on the hydrology of Song Lake and the our neighboring lakes, go to <http://NY.usgs.gov> and download *Hydrogeology of the Tully Lakes Area in Southern Onondaga and Northern Cortland Counties, New York*, Kappel, Miller, and Hetcher; Publication WRIR 01-4166

Song Lake was first sampled as part of CSLAP in 1988, and again in 2007, 2008, and 2009. According to the data collected, the CSLAP report from 2008 states, "The CSLAP dataset at Song Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, **suggests that swimming and contact recreation are stressed by excessive algae and poor water clarity**

The CSLAP report goes on to state: "Based on these data, what should be done to improve or maintain Song Lake? Given the moderately high lake productivity, management of water quality conditions in Song Lake should focus **on reducing nutrient loading to the lake**, through maintaining septic systems, shoreline buffer zones, limited use of lawn fertilizers, **minimizing land disturbances in the near-lake watershed, and localized stormwater management**. The lake association is also advised to minimize introductions of exotic plants and animals from public and private launching areas into the lake, particularly given their abundance in many nearby lakes [bold added]."

Song Lake is experiencing eutrophication, which is defined as "the process, by which a body of water becomes rich in dissolved nutrients from fertilizers or sewage, thereby encouraging the growth and decomposition of oxygen-depleting plant life and resulting in harm to other organisms."³

According to the CSLAP report, "When human activities accelerate lake eutrophication, it is referred to as cultural eutrophication. Cultural eutrophication may result from shoreline erosion, agricultural and urban runoff, wastewater discharges or septic seepage, and other non-point source pollution sources. These can **greatly accelerate the natural aging process of lakes** [bold added], cause successional changes in the plant and animal life within the lake, shoreline and surrounding watershed, and impair the water-quality and value of a lake. They may ultimately extend aquatic plants and emergent vegetation throughout the lake, resulting in the transformation of the lake into a marsh, prairie, and forest. The extent of cultural eutrophication and the corresponding

³ Encarta Dictionary

pollution problems can be signaled by significant changes in the trophic ⁴ state over a short period.

Why is this important? New York State lakes can be affected by a variety of stressors, from acid rain to zebra mussels and almost everything in between. In any given part of the state, some of these stressors are more important than others. For example, there are probably more lakes affected by acid rain than any other pollutant, but these impacts are typically associated with a particular region (the Adirondacks and Catskills) and particular type of lake (small, high-elevation lakes in basins with thin soils and little buffering capacity). But for most lakes in New York, cultural eutrophication represents the most significant source of pollutants and threat to water-quality. As a result, water-quality indicators related to eutrophication comprise the foundation of most water-quality monitoring programs.”

Based on state parameters, Song Lake exceeds the guideline of 0.020 mg/L for phosphorus during the season of its highest use.

PHOSPHORUS and ALGAE

With two years of CLSAP testing, we now know that there is a dramatic increase in phosphorus occurring in the lake during the summer months. These phosphorus increases go hand in hand with the concerns over visible decreases in water clarity, the presence of nuisance algae, and the identified blue-green algae in the lake. As the phosphorus continues to enter the watershed or be re-dispersed into the water through the disruption of the lake sediments, the problem will continue and most likely become worse. As well, the decomposition of the algae will continue to reduce the oxygen levels needed in the lake to adequately support and maintain a healthy fish habitat.

⁴ Trophic state: The root word **trophic** means “of or relating to nutrition. “Trophic state” is a technical term which exams (quantitatively) the nutrient level in lakes, combined with the visual (qualitative) appearance of a lake. The Clean Water Act requires that all lakes of the nation be classified according to their “eutrophic” character, or productivity. For the four defined trophic states see <http://dipin.kent.edu/tsi.htm#A%20Trophic%20State%20Index>

The blue green algae are of particular concern as they have the potential to become toxic. Although it doesn't mean they are toxic now, they can become toxic very quickly: with algae blooms occurring virtually overnight. Their toxic stage is generally while they are in bloom, at that time, these toxins can kill dogs and fish populations, cause serious respiratory problems in humans, severe rashes that can cause scarring as well as having the potential for neurotoxicity. In addition, if circumstances in the lake cause these cells to break open (lyse) without a bloom, the toxic effects can occur. Currently, the conditions that would cause this to occur are still not fully understood. These algae also smell and taste badly.

The Center for Disease Control is working on research to identify the harms more specifically. Because Song Lake has identified the presence of these algae, we have been selected to participate in the NYS Department of Health's toxic algae program. The testing will be added to our current CSLAP procedures. Unfortunately, this does not protect us, but it will provide more information for research and planning.

This information is not intended to be alarmist, but our situation does need to be acknowledged. If we do not have algal blooms, we can continue to enjoy this lake. If we experience blooms, we may end up with a toxic soup.

RECOMMENDATIONS

As good neighbors it is important that we all understand the potential impacts this may have on our overall enjoyment of the lake, our health, the health of the lake habitat and our property values.

From all of our advisors, the key is to reduce the phosphorus coming into the lake especially during the summer months. With help from NYSFOLA and CCSW, we have been looking into several issues that increase phosphorus coming into the lake including: phosphorus from septic, lawn care products, the disruption of the sediment bottom, soil erosion, geese and a possible agricultural input.

Because the phosphorus problem peaks mid summer, the most likely inputs are the increased use of septics as summer resident's return, inputs from lawn care products, and the unsettling of the lake sediments in the shallower parts of the lake. That is not to exclude all the others, but to try to set some priorities.

Septics: If you have not had your septic emptied within the past three years, we ask that you consider calling one of our local providers: Dewey Northrup at 315-696-5691 (Tully), Ted McBride at 607-749-2777 (Homer) or Vogel Septic 607-842-6856 (Truxton).

Lawn Care: Please find a wealth of information in Our Song Lake Watershed, volumes 2, 3, and 6 on best practices for our lake side yards. ⁵

Home Care Products: Be sure to read the label on all home care products to be sure they are phosphate free.

Sediment Disruption: Be sure to follow the boaters and jet skiers lake etiquette guidelines so that the sediment are not be disturbed by these activities. Disturbing the sediments can cause phosphorus that was contained in the lake bottom to be released back into the water, increasing plant (algae) growth.

CONCLUSION

Song Lake is at risk. The water quality tests show phosphorus inputs and algae in the watershed that have the potential to make our lake unswimmable and dramatically kill fish populations.

We can't take the algae out, we can't take the phosphorus out, but we can all participate in best management practices outlined above, to reduce the phosphorus we put in or re-disperse from the sediment bottom back into the water.

This is a small lake, and the actions of a few can indeed make a difference that would impact all of us. As a lake-wide issue we all need to work together.

⁵ If you would like a copy of these newsletters or the boater's etiquette guidelines, please contact one of the Song Lake Watershed committee members: Tarki Heath- 696-5262, Tony George- 696-8045, Gloria Wright- 696-5524 or Marjie Grillo- 696-5963