

Skaneateles Lake Harmful Algal Bloom 2017

During mid-September 2017, Skaneateles Lake experienced its first documented harmful algal bloom (HAB). The formation of the bloom was noted by lake residents and shortly thereafter (on September 20) UFI conducted a survey of the lake. UFI documented the depth and spatial extent of the HAB using a state-of-the-art FluoroProbe instrument. A brief summary of the survey results is presented here.

WHAT IS A HARMFUL ALGAL BLOOM (HAB)?

Most algae are harmless, but exposure to toxins and other substances produced by harmful algal blooms (HABs) can make people and animals sick. HABs can impact drinking water, cause discolored water, floating scums, and unpleasant odors that can reduce the value of a lake or river. HABs are sometimes called blue-green algal blooms despite the fact that blue-green algae are actually photosynthetic cyanobacteria.

FLUOROPROBE

Chlorophyll-*a* is a measure of algal biomass (how much algae is present) in surface waters. The FluoroProbe is a very sensitive instrument used to measure chlorophyll-*a* in water that can also differentiate between various types of algae, including cyanobacteria (or blue-green algae; BGA). The FluoroProbe was deployed at multiple locations in

Skaneateles Lake to document the depth and extent of the HAB (Figure 1). Results indicated higher concentrations in shallow waters at the northern end of the lake.

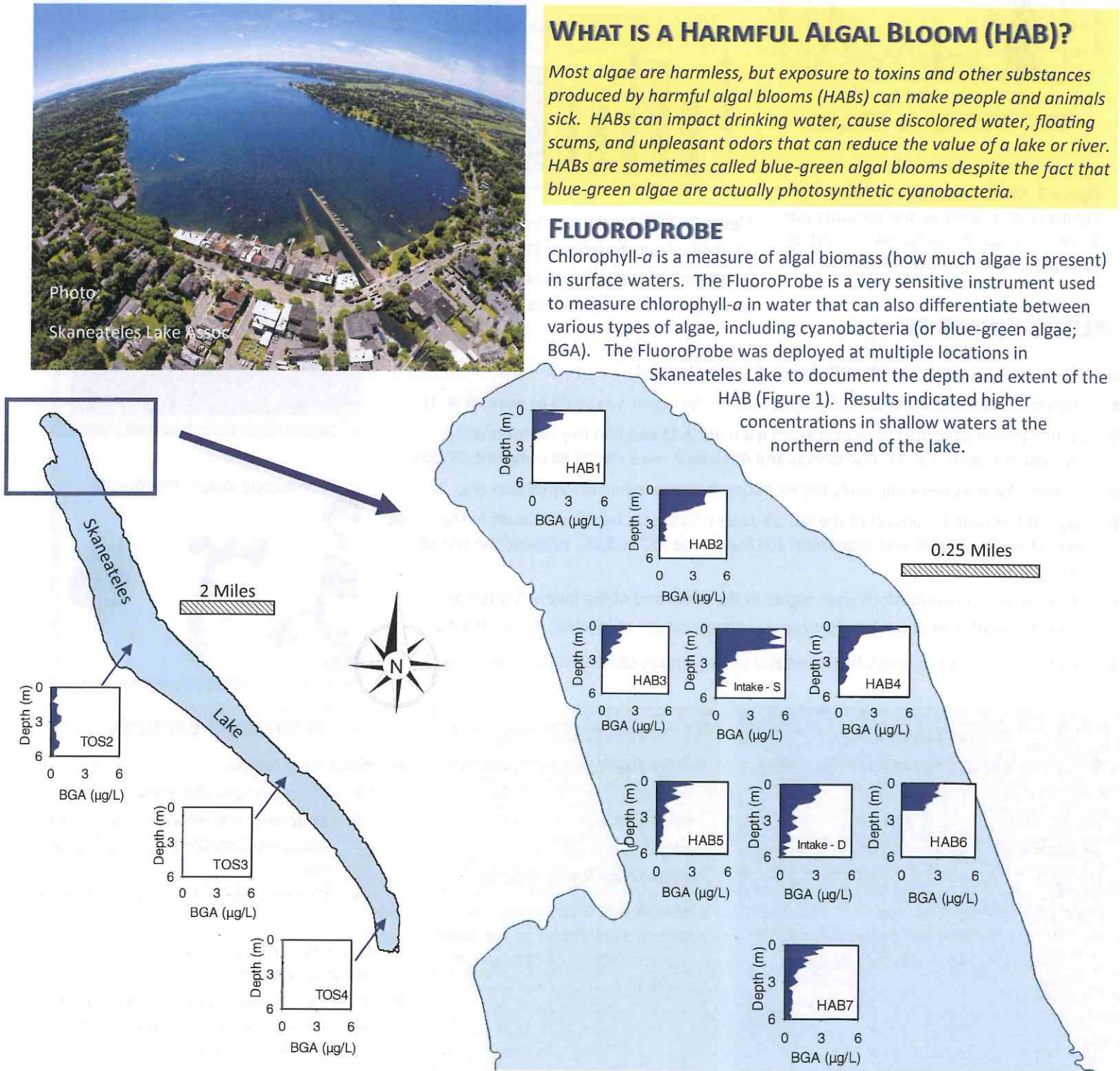


Figure 1. Sampling locations and FluoroProbe results for cyanobacteria concentrations (bluegreen algae; BGA as Chl-*a* equivalents) in Skaneateles Lake on September 20, 2017 for the main axis of lake, (left) and north end of lake (right). Other supporting analyses are on Page 2 of this document.



The Upstate Freshwater Institute, a nonprofit 501(c)(3) organization located in Syracuse, NY, has been monitoring and managing lakes since 1981. UFI has conducted research on lakes, reservoirs, and rivers throughout New York State. You can reach us at (315) 431-4962. A portion of this work was funded by NYSDEC.

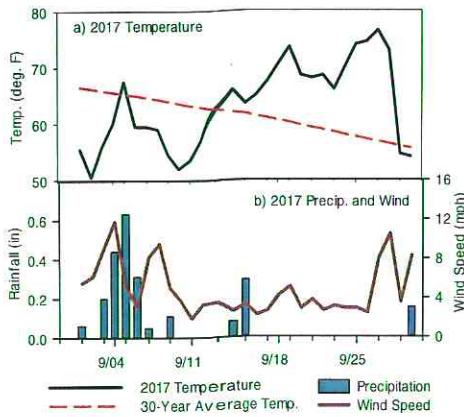


Figure 2. Meteorological conditions during the HAB: a) daily air temperature and 30 year average air temperature, and b) daily precipitation and wind speed.

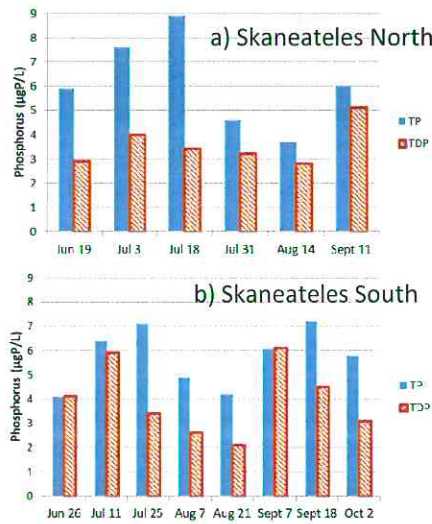


Figure 3. 2017 Total phosphorus (TP) and total dissolved phosphorus (TDP) at the a) north end of Skaneateles Lake and b) the south end of Skaneateles Lake (CSLAP data).

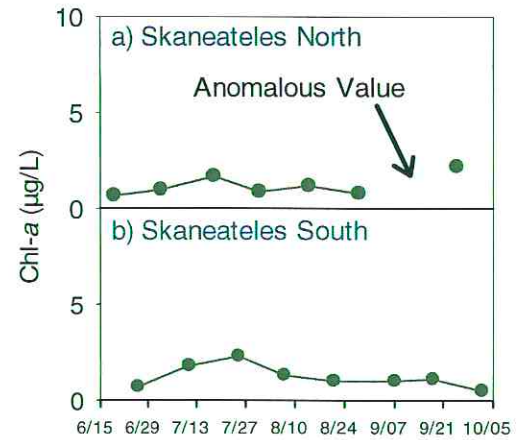


Figure 4. Chlorophyll-*a* concentrations during 2017 in the a) north end of the lake, and b) in the south end of the lake.

SALIENT FINDINGS

- The Skaneateles HAB was identified in mid-September 2017
- Highest concentrations of cyanobacteria were in the upper 3 m (10ft) of water (Fig. 1)
- Cyanobacteria concentrations decreased from north to south in the lake during the September bloom (Fig. 1). Microcystis and Anabaena were identified using microscopy
- Air temperatures were unusually higher during the second half of September (Fig. 2)
- July 2017 ranked 5th rainiest of the last 38 years resulting in significant runoff to the lake. However August and September 2017 were the 31st and 36th driest of the last 38 years
- Chlorophyll-*a* concentrations were higher in the north end of the lake in September, while the south end of the lake had higher concentrations in July (Fig. 4, CSLAP data)
- The HAB dissipated as winds increased and temperatures decreased (late Sept.; Fig. 2)



CAUSES

The exact causes of HABs are not fully understood. However, potential triggers for HABs include:

- Excess nutrients (usually phosphorus)
- Sunlight and warmer temperatures
- Calm water (low-wind)
- Selective feeding and nutrient recycling by dreissenid (zebra and quagga) mussels

HABS SIGNS

Harmful algal blooms may appear as:

- Spilled paint
- Pea soup
- Streaks on the surface
- Floating clumps
- Scum/Mats Colors: green, blue-green, yellow, brown, red, or white

HARMFUL EFFECTS

- **HEALTH — Toxins**
 - ◆ Affect humans and animals
 - ◆ Problems with nervous system, liver, skin, gastrointestinal, respiratory system
 - ◆ Consumption of toxins can be lethal to animals
- **ENVIRONMENT** - Can impact fish and other aquatic organisms
- **ECONOMIC** - Impacts tourism and recreational businesses, decreases property values and increases drinking water costs

The **Upstate Freshwater Institute** is a nonprofit 501(c)(3) organization located in Syracuse, NY and has been monitoring and managing lakes since 1981. UFI can help you tackle the difficult challenges affecting the health of your lake and offer insights into your management options. UFI is staffed with environmental professionals specializing in lake chemistry, biology, engineering and water quality modeling and management. You can reach us at (315) 431-4962 if you would like to discuss assistance in evaluation of your lake's water quality, development and conduct of monitoring programs, or development of restoration strategies. UFI operates a NYS DOH ELAP certified water quality laboratory.