

Cayuga Lake Algae Growth

Summer of 2015

Background:

DEC Region 7 and Albany staff and the Cayuga County Department of Health received complaints about excessive benthic (bottom dwelling) and beached algae growth piled up, specifically on the northeastern shoreline of Cayuga Lake near Honoco Road in the town of Aurora. DEC Albany staff contacted a number of residents, and one resident expressed a willingness to take pictures and collect a sample of the algae for further evaluation. DEC Albany staff provided materials- bottles, gloves, cooler, shipping labels and sampling instructions.

Sampling Results:

Algae samples were collected by this resident on 8/17/2015 from the shoreline of Cayuga Lake at a representative site exhibiting strong visual evidence of an algae bloom with noxious odors. The sample was sent to SUNY ESF and analyzed microscopically and for algae content on 8/18. The preliminary results from the sample confirmed the presence of an algae bloom that was dominated by green algae. The green algae was not identified to species level, but based on the visual evaluation, it is likely that the offending species was *Cladophora*, a moss-like, filamentous green algae, or *Spirogyra*, sometimes referred to as “frog spit”. These blooms often start on the bottom and move to the surface as they accumulate gas bubbles during photosynthesis.

The sample had very little blue green algae, or cyanobacteria, the only freshwater algae/bacteria demonstrated to produce

toxins. This suggests that risk for recreational users is greatly reduced, although contact with any blooms should be avoided if possible, since any algae blooms may harbor small insects or can exhibit physical characteristics that can create minor rashes with repeated contact. Algae toxin analysis for approximately 30 different algal toxins is underway, and may take up to a week or two to complete, but it is not anticipated that any of these analyses will identify any elevated contact risk, based on the very low blue green algae levels in the sample.

Discussion:

Filamentous algae blooms usually represent a low health risk for lake users, but they can often create significant recreational and aesthetic problems, and the odor from decaying algae can be overpowering for nearby and downwind residents and lake users. Given the absence of blue green algae species and the low risk for high toxin production, the primary outreach focus can shift from public notification to evaluating causes and potential solutions to the bloom “outbreaks”.

Causes:

The cause of *Cladophora* and other filamentous algae blooms is not well understood. Most algae blooms are triggered by a variety of environmental factors. Many of the factors leading to blooms occurred in recent weeks in Cayuga Lake. Record rainfalls of over 12 inches in June caused excessive nutrients (fertilizers for the blooms) from lawns, farms and shoreline

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erosion to wash into the lake. With rising air and water temperatures over the last few weeks, it makes ideal conditions for algae to grow and thrive. Failing or poorly functioning septic systems can also contribute dissolved nutrients, particularly at sites with small or shallow leach fields that are close to the lake. Algae can also pile up along the shoreline in locations where wind concentrates algae and water circulation is poor, although benthic filamentous algae blooms may be more likely to have originated “locally” than blue green algae blooms. So the presence of the green algae blooms is entirely consistent with the recent heavy rains and runoff and warmer weather, but it is possible that local conditions- poor circulation, nearby nutrient and runoff sources, wind-driven algae movement, etc.- may be exacerbating the problem.

Since the problem was at least partially derived from weather driven events, these bloom conditions may not be a common recurrence, at least to this extent (recognizing that some filamentous blooms are regularly reported at the lake). However, potential local sources of nutrients, particularly stream and shoreline erosion, septic, and upland agricultural and residential fertilization and runoff, should continue to be evaluated as contributors to these conditions and any future blooms at this site. These would represent longer-term solutions to the cause of the problem. Future monitoring and public outreach under the authority of the Cayuga Lake Watershed Network will help to develop long-term solutions to these local problems.

Control:

Prevention of future blooms should focus on controlling the source and cause of the blooms, and minimizing nutrient and sediment inputs, as summarized above, will form the foundation of prevention measures. Actions that can be initiated by local residents include septic management, planting and maintaining shoreline buffers to trap nutrients, reducing erosion, not feeding waterfowl, and other measures discussed in the DEC publication Diet for a Small Lake: A New Yorkers Guide to Lake Management, available on the DEC website at <http://www.dec.ny.gov/chemical/82123.html>. Chapter 9 of this publication discusses a number of nutrient mitigation measures.

However, it is recognized that some lake residents will seek more immediate relief from excessive algae growth. Any immediate control measures that require permits from the Agency would not likely be instituted (evaluated, funded, permitted, and conducted) before these conditions are expected to improve with a return to more normal and seasonal weather conditions over the coming weeks. However, for those residents looking to conduct their own control of excessive algae, there are a number of local management actions that could be considered, most of which will likely be more relevant for responding (early) to any future blooms. Most of these are discussed in Chapter 8 of Diet for a Small Lake.

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Barley straw has been used by lakefront residents in a number of locations around the state to address excessive algae growth. It is usually applied to address suspended algae, including cyanobacteria, but filamentous algae. The exact mode of action has not yet been determined, and neither success nor failures have been well documented. However, this control strategy is relatively inexpensive and not expected to result in negative environmental impacts. An expected application rate would be approximately one 40lb bale for 0.1 acre (or about 50ft x 100ft stretch of shoreline). Barley straw may be available through the Cayuga County Soil and Water Conservation District

(<http://www.cayugaswcd.org/products.html>) or in direct conversation with local farmers. The practical application of barley straw is also discussed at length in the Lake and Pond Management Guidebook from Steve McComas (2003)- this publication can be found in some libraries or on-line.

Physical removal of filamentous algae can involve nets and floats or booms. The algae generally does not stick to nets, but the large mass of material can quickly become unwieldy. McComas reports that two people can remove a 0.1 acre area in about 90 minutes, filling as much as eight wheelbarrows. Nets developed for this can be found on-line and generally cost \$2-4 per linear foot. Algae removal can also be accomplished by lake rakes, sewer vacuum trucks, and other devices, or removed by hand. Harvested algae should be deposited away from the shoreline, and is often best removed

in stages to allow dewatering and to prevent significant decomposition.

Aeration increases water circulation and can help to reduce odors associated with algae breakdown. There are a number of aeration or circulation devices, similar to the devices used by lake residents to prevent dock damage in the winter that may help to reduce bloom occurrence. This may require a permit from DEC; for more information, contact the DEC environmental permits staff in the Cortland office at 607-753-3095.

Chemical control includes the use of algicides. The two most frequently used algicides are formulations of copper and hydrogen peroxide. Both classes of algicide are restricted use products that require a licensed applicator and permit from the DEC regional pesticides permit office in Cortland (607-753-3095). The DEC permitting office can provide a list of licensed applicators that work in the area.

FOR FURTHER INFORMATION CONTACT:

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