Chautauqua Lake

Jane Conroe

My Poor Little Lake

By Scott Kishbaugh and Karen Stainbrook

Jane and Doug Conroe call Chautauqua Lake home. Not as a place to receive mail or store stuff, but as a special place to dream of a future, build memories, and protect everything they hold dear. Yet Jane often refers to Chautauqua Lake as "my poor little lake," and laments that "she [the lake] needs our help." Jane and Doug often speak about how much "she" has given to those who love her—and that it is time to help her.

Across the state, some lakes like Chautauqua are showing colors caused by algal blooms. Some of these blooms may appear light green, blue-green, have white streaks, or can look like paint spills or pea soup, and they indicate a problem. Though algae are one of the first essential building blocks of all life in lakes, in excess they can create a host of issues, from generating an off-putting color to presenting significant health risks for those who swim in or drink untreated water.

Harmful Blue-green Algae

Algae blooms color the landscape throughout the world, and are not new to lakes and rivers. Harmful blue-green algae have existed for at least 3.5 billion years, and blooms have killed fish as well as a wide range of mammals, from elk to manatee.

Not all blue-green algae blooms produce toxins. However, exposure to any blue-green algae can cause negative health effects, specifically if people and animals come into contact with dense blooms, swallow them, or if they inhale airborne droplets. For some people, direct contact with a bloom may cause allergic reactions such as irritation of the skin, eyes, nose, throat and respiratory tract. Swallowing water with blue-green algae blooms or

toxins can cause nausea, diarrhea and vomiting; reports suggest that ingesting water with high levels of blue-green algae toxins over long time periods can affect the liver and nervous system.

Children and pets are most susceptible to toxins associated with harmful algal blooms (HAB) because their behaviors are more likely to place them in contact with dense blooms. Additionally, children weigh less, which means they are more likely to be affected by a smaller amount of toxin. Dogs can magnify their exposure because in addition to drinking contaminated water, they can ingest it when grooming after wading. Algae nerve toxins likely killed dogs in Lake Champlain in 1999 and 2000, and were suspected in dog deaths elsewhere in New York in 2012.

Blooms also affect lake ecosystems by reducing oxygen levels, which can result in fish kills and prevent the growth of beneficial algae. Luckily, there have been no reports of people becoming sick from eating fish caught during a bloom. To help reduce any potential risk, anglers can limit their consumption of fish organs, and rinse and/or freeze fillets before cooking. The New York State Department of Health (DOH) also recommends avoiding eating fish caught from areas with water that looks like thick paint or pea soup.

While HABs can cause problems with our waters, studies to date indicate that public water treatment systems effectively remove algal toxins. In fact, there haven't been any human illnesses in New York that could be attributed to drinking algae-tainted water.

David Barnard

Some lakes across New York suffer from blooms of harmful algae.

Blooms: Then and Now

Some New York lakes have historically been plagued with blooms, but recently, government officials are fielding more complaints about surface scums and heavily discolored water. In 2013, a National Wildlife Federation survey turned up reports of blue-green algal blooms in at least 150 waterbodies in 21 states—more than one-third were in New York, which has a large number of lakes and one of the most active monitoring programs.

In Chautauqua Lake, the Conroes first observed persistent late-summer blooms during the 1970s. Back then, the blooms were isolated, but now blooms are visible at more locations along the north basin shore and have spread throughout much

William Borla, Chautauqua Co. Dept of Health & Human Services

Blue-green algae blooms may have the appearance of spilled paint or pea soup.

Blue-green Harmful Algae Blooms (HABs)

- Blue-green algae are photosynthetic bacteria (cyanobacteria) that are naturally present, in low numbers, in lakes, ponds and rivers.
- Excess nutrients, warm temperatures, and other environmental conditions promote the growth of blue-green algae, forming visible, dense build-ups (blooms) that discolor the water or form surface scums.
- Some types of blue-green algae produce toxins that can be harmful to people and animals. These blooms are collectively called blue-green harmful algal blooms.
- The first official report of dead livestock associated with a blue-green algae bloom occurred in Australia in 1878. The suspicious death of a Wisconsin swimmer in 2005 may have been due to blue-green algae exposure in a golf course pond.

of the southern basin. In addition, green water now extends into November, even coloring winter ice.

The NYS Department of Environmental Conservation (DEC), DOH, and the NYS Office of Parks, Recreation and Historic Preservation are working together to identify and respond to blue-green algae concerns. DEC and DOH have collected information about blooms for the last several years, and are conducting research to evaluate the risks to public health and the environment. Much of this information is collected by volunteers from the Citizens Statewide Lake Assessment Program, a lay monitoring program run by DEC and the NYS Federation of Lake Associations.

Dealing with HABs

Just as "location, location, location" is the mantra for realtors selling homes, "phosphorus, phosphorus, phosphorus" is the mantra for lake managers and DEC when addressing HABs. As phosphorus is the primary "fuel" for an algal bloom, large persistent blooms are generally limited to lakes with high phosphorus content.

DEC evaluates data to determine how much phosphorus is too much. In waterbodies affected by algal blooms, DEC identifies the sources of phosphorus entering the lake. Phosphorus can enter the water from septic systems, stormwater, municipal wastewater treatment plants, agriculture and waterfowl. DEC regulates some of these sources of phosphorus, such as municipal wastewater treatment plants and stormwater.

The solution seems simple: Reduce phosphorus and blooms go away. But reducing phosphorus is complex and can be costly. In addition to phosphorus levels, many other factors, such as water depth, wind, nitrogen content, and "good" algae removal by zebra mussels can trigger or concentrate blooms. Blooms often come and go in lakes, sometimes showing up only in the morning or afternoon, sometimes staying for weeks. They can move within a lake or linger like a green cloud.

Jane Conroe

People love swimming in NYS lakes and ponds, but should avoid any areas with an active blue-green algal bloom.

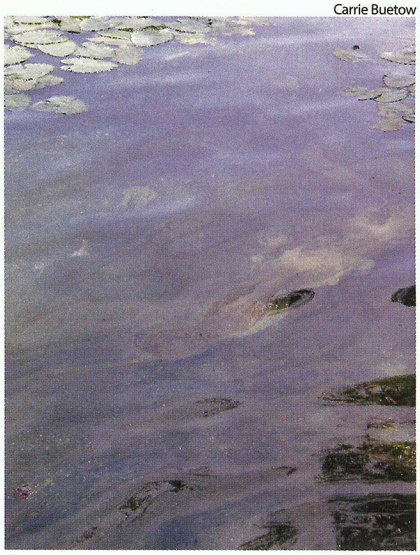
While DEC, DOH and their partners work to understand how HABs develop, both agencies are focused on public awareness and safety. DOH closes regulated beaches where an HAB is visually identified. This is a proactive approach that deals with sensitive individuals and the transient nature of blooms.

Throughout the summer, the public can view a list of lakes with current blooms on DEC's website (see "Additional Resources" sidebar). DEC and DOH recommend avoiding contact with floating rafts, scums and discolored water. The best advice is: If you see it, avoid it and report it!

Take Action and Reduce Blooms

Everyone can help keep our lake systems healthy. Proper care of septic systems, limiting use of fertilizers, and planting shoreline buffers can have profound effects on an adjacent water body, and can limit nutrients that fuel HABs. Local government plays a role, through zoning and development decisions. A helpful reference for lake users is the publication *Diet for a Small Lake* (available online at **www.dec.ny.gov/chemical/82123.html**), which includes information on the ecology, monitoring and management of lakes and watersheds throughout New York.

Carrie Buetow



Blue-green algae blooms can look different in every lake.

In Chautauqua Lake, the solutions are neither clear nor simple. The Chautauqua Lake Association and the Chautauqua Watershed Conservancy lead the effort to identify what is literally a clearer path. Their many partners include the county Department of Health and state Office

of Parks and Recreation, which actively monitor conditions and close public swimming beaches when appropriate. DEC oversaw a study that identified the sources of phosphorus entering the lake.

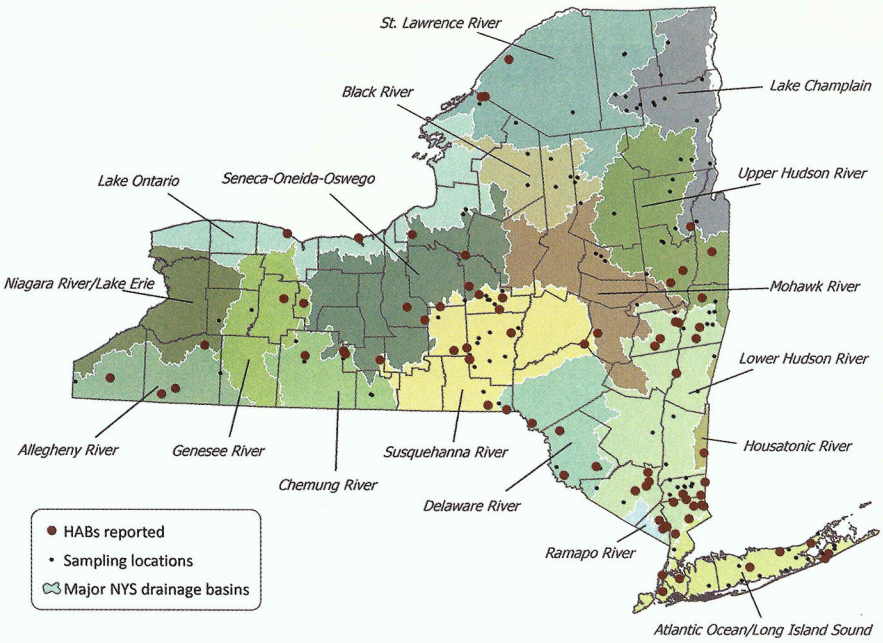
It is tempting to seek a magic bullet—a simple and cheap solution—but the algae did not start blooming yesterday and will not stop blooming tomorrow. It is important for overwhelmed lake residents to realize that each action makes a difference, but bloom management can only work when government, organizations, and individuals roll up their sleeves and work together.

Future of Blue-green Algae in New York

Are blue-green algae blooms getting worse? A *Conservationist* article in 1985 suggested a relatively low level of concern about blooms, mostly because "people are not prone to drink or swim in water covered with blooming algae." Our evaluations and DOH protocols show that the precautionary message implicitly heeded in 1985—avoiding blooms and highly discolored water—still applies today.

However, with global climate change resulting in warmer air and water, more drought and extreme storms, and with more nutrients to feed blooms, the problem with blue-green algae blooms is likely to worsen. Nutrient and algae levels currently appear to be increasing in many lakes. Blue-green algae are known to thrive in warmer conditions, and the longer ice-free seasons experienced over the last 100 years is allowing these blooms to start earlier and last longer.

So what does the future hold for Chautauqua Lake? The Conroes are optimistic. They are continually energized by a lake community frustrated by blooms but fiercely and passionately loyal to their home. They are also encouraged by many lake residents stepping up to give back to the lake that has given them so much. These blooms may be just the latest lake problem that demands great effort but offers great opportunities for lasting improvements. The local community, DEC, DOH and others have worked on this issue for years, and are committed to finding a solution.



The accompanying map shows locations where blue-green algae blooms were confirmed or strongly suspected in 2013, and additional sampling locations where blooms were not found.

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Editors Note: DEC and the editors would like to thank DOH staff for their assistance on the above article.

Additional Resources

DEC posts Blue-green Algae notices on its website at www.dec.ny.gov/chemical/83310.html that show locations of current blooms. The site is updated weekly, and includes a map to help swimmers, parents, and pet owners make informed decisions before recreating. Note: The notification system is only as good as the information it contains. Blooms may also occur in locations not reported to DEC; please report any suspected blooms at www.dec.ny.gov/chemical/77118.html.

Be sure to visit DOH's blue-green algae webpage at http://bit.ly/1mZGiCw for further information. Also, don't forget to sign up for DEC's Division of Water's newsletter *Making Waves* to receive weekly updates on blue-green algae bloom notices; visit http://bit.ly/1ignXz7 to sign up.