SUMMER 2019

AquaticsinBrief

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SOLITUDE LAKE MANAGEMENT®
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The Toxic Algae Crisis: Steps We Can Take to Stop It

By **Greg Blackham, Aquatic Specialist**

Cyanobacteria, often referred to as blue-green algae, are changing the way providers of eco-friendly consulting services approach algae management in lakes and ponds. Harmful Algal Bloom (HAB) treatments reached an all-time high in 2018. HABs have the potential to be highly toxic and can severely impact the health and well-being of all nearby humans, pets and wildlife. The devastating effects of harmful algal blooms have been witnessed repeatedly throughout the US over the past 10 years. There is no area of the country that is safe from the threat of HABs, as two recent catastrophes from very different parts of the country have shown us. We can, however, learn from these natural ecological disasters and implement proactive management strategies to help avoid them in the future.

Toxic algal blooms have plagued Florida's largest freshwater lake, Lake Okeechobee, over the past several years. Cyanobacteria cover almost the entire lake each summer and transform the beautiful aquatic ecosystem into a thick green pea-soup color. Most of the HABs found in the lake produce toxins that are very dangerous to humans, fish and other wildlife. Cyanotoxins also are capable of becoming airborne, meaning contact with the water is not the only means of exposure. The polluted waters of Lake Okeechobee are not just contained to the lake; they pollute everything downstream including

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What We Can Learn...

Continued from front cover

the St. Lucie River and Caloosahatchee River. Eventually, these systems dump the toxic algae along Florida's east and west shorelines, polluting these once beautiful tourist destinations with a thick brown sludge that severely limits access to swimming and fishing.

Massive harmful algal blooms don't just occur in warm regions of the south. Many people are familiar with Lake Erie and remember the media attention around the massive blue-green algae outbreaks of 2011 and 2015. Yearly blooms of cyanobacteria on Lake Erie not only threaten local wildlife and people that come into direct contact with the water while utilizing the lake, but also threaten all of the towns and cities, like that of Toledo, Ohio, that use the lake as a source of drinking water.

Much scarier than the acute effects of cyanotoxins are the growing connections between blue-green algae and neurodegenerative diseases such as ALS, Alzheimer's disease and Parkinson's disease. Studies have found a direct link between these diseases and BMAA, a nerve toxin produced by cyanobacteria. The blue-green algae capable of making BMAA are ubiquitous and can be found in almost any waterbody, even those as small as a stormwater pond or ditch.

What is causing this explosion of recent toxic algae growth? Many factors contribute to algae growth, including temperature, sunlight and carbon dioxide, but nutrients are the main differentiator between a balanced waterbody and a disaster. Nutrient pollution caused by urban growth, industrial development and agricultural waste is making its way to our water resources. Fertilizers and pollutants from residential lawns and commercial turfgrass flow to our lakes, ponds, waterways and, eventually, bays and oceans. Concentrated stormwater runoff is now diverted and funneled into waterbodies that were never meant to process so many nutrients. Wetlands, which once served as natural nutrient "filters," have been displaced by roads, sidewalks and other impervious surfaces. The result is unhealthy and unbalanced aquatic ecosystems.

Proper identification of HABs is crucial, and can be confirmed through water quality tests that are carefully assessed by a professional lake manager. Water quality testing can reveal the species causing the bloom and confirm whether or not toxins are present. SOLitude utilizes in-house, state-of-the-art laboratory analysis to reveal potential water quality imbalances that can encourage HABs to develop.

Once identified, steps can be taken to proactively minimize the issue and prevent future algal outbreaks.

Proactive management strategies have proven very effective at limiting the negative effects of nutrient loading. A large percentage of nutrient pollution stems from poor cultural habits. As individuals, we can do our part by cleaning up pet waste, reducing fertilizer use (or switching to phosphorous-free products), improving our recycling habits and properly disposing of grass clippings and leaves.

Proactive lake management strategies should also be implemented. Creating a living shoreline of beneficial native plants around lakes and ponds further protects them from erosion and runoff. And the installation of submersed aeration systems or floating fountains helps provide an oxygen-rich aquatic environment, which leads to improved water quality.

Waterbodies that have suffered from unbalanced water quality for many years may require more impactful restoration tools. Ecologically-friendly products like Phoslock and Biochar can be applied to the water column to "de-activate" undesirable nutrients, thus preventing them from potentially fueling the growth of aquatic weeds or algae. Physically removing nutrient-rich muck and sludge from lake bottoms using a mechanical hydro-rake can help provide the same benefits, while "turning back time" on the aquatic resource to facilitate increased water volume and depth. Integrating new technologies is also key to eradicating and preventing cyanobacteria. For example, nanobubble aeration treatments are a new and innovative solution proven to kill algae and restore water quality.

As an aquatic management professional who has managed lakes and ponds for nearly 15 years, I can assure you that a proactive approach combining preventative cultural practices and restorative measures in polluted waters is the most effective and least costly approach. Reducing the frequency at which severe Harmful Algal Blooms occur is certainly achievable. We need not wait for the next algae catastrophe to strike; let's stop it first. ■

CASE STUDY: Nanobubble Aeration Transforms a Golf Course Lake in Bonita Springs, FL

By **Andy Nott, Aeration Services Manager**

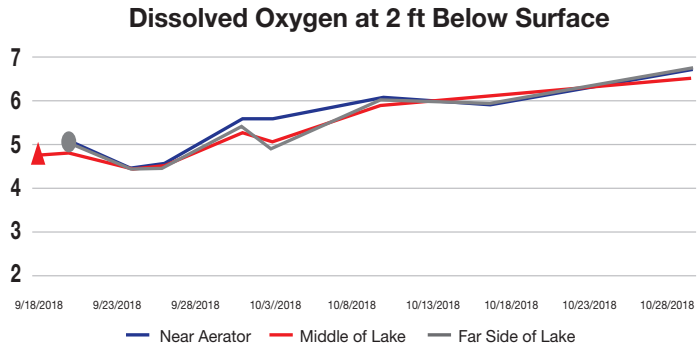
Nanobubble aeration treatments offer a premium lake management tool that is EPA-registered to naturally control algae by providing unparalleled direct and lasting oxygenation of the waterbody. One such lake that greatly benefitted from the infusion of these tiny bubbles is located in a large development district in Bonita Springs, FL. This 1.3-acre lake was persistently plagued by multiple species of algae—including filamentous green algae and potentially toxic cyanobacteria (blue-green algae). The pond is located adjacent to a golf course and has multiple homes around its perimeter, making water quality restoration a priority. Historically, the 8 ft. deep lake underwent extensive algaecide treatments with little long-term success.

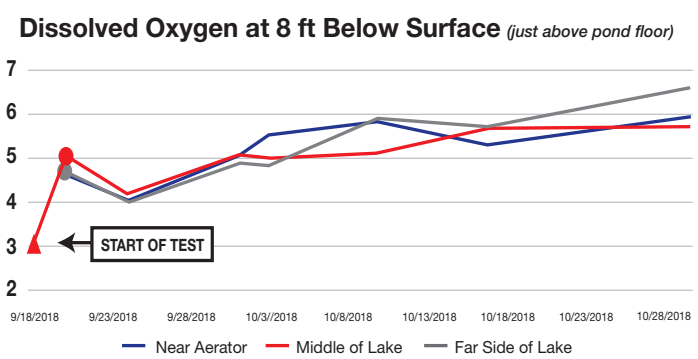
Due to difficulties faced with the use of conventional control measures, the lake was deemed a candidate for control using new nanobubble aeration treatments. Nanobubble technology is designed to exceed the oxygenation capabilities of traditional aeration systems. Nanobubbles produced by on-shore generators are about 400 times smaller in diameter than human hair and 1 million times smaller than ordinary bubbles. As a result of their microscopic size, nanobubbles have no natural buoyancy and remain within the water column for extended periods of time, allowing them to provide an incredible amount of oxygenation to a waterbody.

The nanobubble aeration device ran from August through November of 2018, with a few intermittent down times. The device uses a 7.5 HP pump to circulate water from the lake while injecting beneficial nanobubbles into the water column. Algaecide treatment was discontinued to allow for an objective measure of success. Within 2 weeks, there was no visible algae on the surface of the lake and the algae on the lake bottom was observed to be dying off. The algae remained absent from the lake during the entirety of the test.

Dissolved oxygen (DO) measurements taken before and during the test indicated that the DO had risen over 50% in the water just above the lake bottom. The nanobubbles also diffused into the organic muck, providing oxygen for aerobic bacteria.

Based on the average of the algaecides used to treat the lake prior to the test, approximately $1,000 was saved in algaecide costs alone. This does not include the additional labor and equipment savings. Residents agreed that the lake looked better than it ever had and were ecstatic about the results. ■





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Are My Fish Healthy? Key Steps to Achieve a 'Healthy' Fishery

By **Vic DiCenzo, PhD, Fisheries Biologist**

Whether you use your lake or pond for boating, bird watching or fishing, everyone can agree that they desire a healthy waterbody, especially one with healthy fish. But what constitutes a healthy fishery? What signs would indicate that a fishery is unhealthy and what approaches could improve an impaired fishery? The health of a fishery can be interpreted in several ways, and the recommended management approaches may vary depending on your ultimate goals.

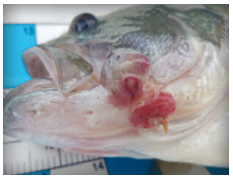
Goal: A Balanced Fishery and Large, Healthy Bass

Fisheries managers often describe a healthy fishery as one in which the predator-prey ratios are balanced. This assumes that a sufficient amount of prey (Bluegill, Shad, Shiners, etc.) exist to support predators (often Largemouth Bass) so that they maintain adequate size, growth and condition. Indicators that suggest a fishery is unbalanced could include high catch rates of small fish, a reduction in the maximum size of fish caught or fish that appear significantly underweight.

The first step to achieving a balanced fishery is an assessment of the water quality as well as the fishery. At SOLitude, we utilize professional water quality testing and in-house, state-of-the-art laboratory analysis to determine all aspects of water quality. An electrofishing survey allows us to collect fish population data to assess the current state of your fishery and health of your fish. Based on results, improvement strategies may include vegetation management, habitat improvements, fish stocking, fish feeding and selective harvest of predators.

Goal: Absence of Fish Disease

The most common way to classify fish as healthy is if they are free of disease. Generally, it's easier to prevent disease rather than treat it. Fisheries biologists prevent disease through water quality management, providing suitable habitat, maintaining fish abundance at appropriate levels and requiring that any fish introductions come from a disease-free source.



Signs that could indicate unhealthy fish include open sores, lesions and skin discoloration, as well as signs of stress which could be indicated when fish swim near the surface or shoreline. Depending on the cause and severity of the fish health issue, a variety of approaches can help improve the situation including restocking healthy fish, implementing a harvest plan to avoid overcrowding, managing nutrients and algae in the waterbody, improving water quality through aeration and maintaining proper amounts of desired aquatic vegetation.

Goal: Fish that are Safe to Eat

While most US waters do not contain dangerous levels of contaminants, some waters and fish may cause concern. Contaminants such as mercury, polychlorinated biphenyls (PCB's) and Kepone are the most common in U.S. waters and are monitored by governmental agencies to protect the public from exposure. Contaminant levels in private waters are not as well understood, which is why routine water quality testing and monitoring are highly recommended.

Reducing contaminant levels before consumption can be done through removing skin and fat, then cooking it on a grill or rack, allowing fat to drip away.

A healthy fishery can mean different things to different people. But despite your definition, ensuring that you have a healthy fishery requires a basic understanding of your pond's water quality and fish community to identify factors that could improve overall fish health. ■


Pickerelweed


Arrowhead/Duck Potato


Irises


Swamp Milkweed


Water Smartweed

TOP 5 PLANTS
for Establishing a Beneficial Buffer Around Your Lake or Pond

Native sedges, rushes and buffer vegetation serve an important purpose in the protection of aquatic ecosystems. When native plants are allowed to grow 3-5 feet from the shoreline, they help stabilize sediment, prevent erosion and filter excess nutrients and debris. Flourishing vegetation can also help attract desirable wildlife and insects, like dragonflies, which feed on mosquitoes, while deterring pets, livestock or undesirable animals, like geese, from entering the waterbody.

It's important to consult with your lake management professional before introducing a new species to your waterbody, but most regions in the United States can benefit from the addition of the following plants:

Pickerelweed — Northeast, Mid-Atlantic, South, Northwest

This perennial plant is known for its glossy spiked leaves and violet-blue flowers that attract beneficial insects like bees, butterflies and dragonflies to the area. The beneficial plant also provides valuable cover for fish and waterfowl. Pickerelweed can be planted in 1 to 12 inches of water, with mature plants growing up to 4 feet tall.

Arrowhead/Duck Potato — Nationwide

Duck Potato, or arrowhead, is a perennial that grows 1 to 4 feet tall and has large broad leaves shaped like arrows with small white flowers. The plant has strong roots, allowing it to survive through wide variations of water levels and chemistries. The underground tubers produced by this plant are a preferred food source for many duck species.

Irises — Nationwide

This clumping plant exhibits violet-blue flowers with yellow-based sepals that emerge on sturdy stalks among tall sword-like leaves. Growing 2 to 3 feet in height, Irises thrive in swamps, marshes, and on wet shores, especially in standing water. They are a hardy species that is resistant to being eaten by waterfowl and other animals.

Swamp Milkweed — Nationwide

This plant has slender leaves and deep pink flowers clustered at the top of a tall, branching stem. Milkweed grows 2 to 6 feet tall in swamps, thickets and along wet shorelines. Its flowers attract and provide food for butterflies—especially monarchs.

Water Smartweed — Nationwide

Water Smartweed features dark green, shiny leaves and pink flower stalks with bright clustered blooms. Water Smartweed can grow in many different habitats, including ponds, streams and marshes. The beneficial plant grows up to 6 inches tall and helps prevent erosion while providing a food base for waterfowl.

To learn more about the best native plants to use in your beneficial vegetative buffer, contact your local aquatic management specialist. ■

Earth Day Recap: Being Part of The SOLution

In the month of April, SOLitude's team completed numerous nationwide trash clean-ups and environmental projects that focused on preserving the health and beauty of our local communities. SOLitude's 2019 Earth Day efforts were completed in Colorado, New York, Texas, Florida, Delaware, Missouri, New Jersey, Virginia, North Carolina, Massachusetts and Pennsylvania. With the help of 40 colleagues, family and friends, our team was able to collect upwards of 1,250 pounds of trash and planted 400 trees! Through our combined volunteer efforts, our team made a positive impact on our community and earth.

Join the fun and help support your local community this summer and fall! We encourage our clients, vendor partners, family and friends to be part of The SOLution. If you would like to share a non-profit's goals for an upcoming event, or join the SOLitude team at a future volunteer day in your area, visit www.solitudelakemanagement.com/volunteer or email TheSolution@solitudelake.com. ■

LOVE YOUR MOTHER

Love Your Lake: Now Accepting Nominations

SOLitude is accepting nominations for free lake and pond makeover services through the company's Love Your Lake program. The annual initiative aims to support non-profit charities and foundations in dire need of recreational lake and pond restoration. Nominate your local non-profit charity or foundation by emailing TheSolution@solitudelake.com. ■

Find Us On YouTube!

At SOLitude, we are always looking for new, exciting ways to educate the public on lake, pond and fisheries management. We are thrilled to announce our expanding YouTube channel where you can find a series of educational videos that feature new technologies like nanobubble aeration and management methods like hydro-raking. Subscribe to our YouTube channel and gain access to our educational video vault! ■

https://www.youtube.com/SolitudeLakeManagement

Before and After Showcase

Eurasian Watermilfoil Treatment

Bob Revolinski, Aquatic Biologist, Regional Manager, Arizona

Nuisance and Invasive Vegetation Removal

Peyton Woods, Aquatic Scientist, Georgia

Spadderdock Treatment

Kris Land, Aquatic Specialist, Florida

NEW SOLs

It is our pleasure to introduce and welcome some of our newest colleagues.

Craig Goddard
Aquatic Specialist
Shrewsbury, MA

William Grant
Aquatic Specialist
Shrewsbury, MA

Joseph Left
Aeration and Fountain Specialist
Lehigh Acres, FL

Zachary Cartwright
Fisheries Scientist
Virginia Beach, VA

Noel Browning
Aquatic Biologist
Denver, CO

Jay Bagley
Assistant Regional Manager
Nashville, TN

Cody Sims
Aquatic Specialist
Fort Myers, FL

Joshua Jones
Business Development Consultant
Dallas, TX

Joseph Cromer
Aquatic Specialist
Fort Myers, FL

Check Us Out

SOLitude will be participating in the following events over the coming months. Come visit us!

June 19
Institute of Real Estate Management (IREM) Atlanta
Atlanta, GA

July 14-18
Western Aquatic Plant Management Society Meeting
San Diego, CA

July 25-28
Community Associations Institute's (CAI) Annual Virginia Leadership Retreat
Hot Springs, VA

August 2
North Carolina CAI Conference and Expo
Wilmington, NC

August 15
Greater Nashville Apartment Association Expo
Nashville, TN

August 23
Arizona Association of Community Managers Trade Show
Glendale, AZ

September 12-13
North California CAI Legal Forum
Oakland, CA

September 16
Rocky Mountain CAI Mountain Conference and Expo
Vail, CO

September 18-20
Special District Association of Colorado Annual Conference
Keystone, CO

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- Erosion Control & Bioengineered Shorelines

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ACCREDITED BUSINESS
BBB RATING: A+

For every 30 new social media followers this year, SOLitude will help provide clean water to one person in need for the rest of their life.

Help us reach our annual giving campaign goal of providing **100 people** in need with access to clean water by liking our social media channels: **solitudelakemangement.com/social**

The SOLution
creating a better world

charity: water
SUPPORTER

For every new follower this year, we'll donate $1 to charity: water, where 100% of those donations go to bringing clean water to people in impoverished countries.