

SPRING 2019

AquaticsⁱⁿBrief



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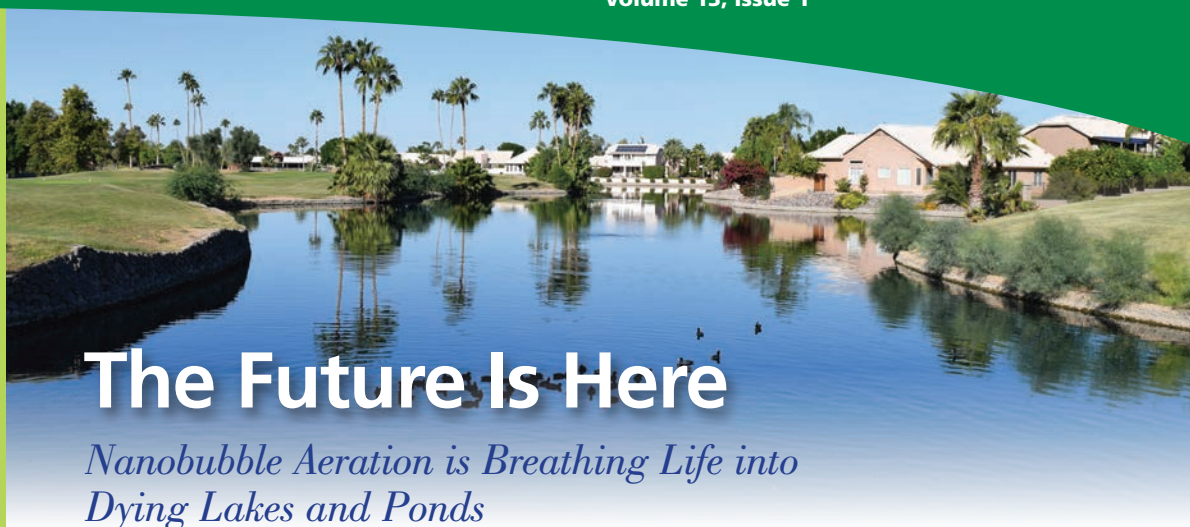
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SOLITUDE
LAKE MANAGEMENT®

**A Full Service Lake, Pond,
Wetland and Fisheries
Management Company**



The Future Is Here

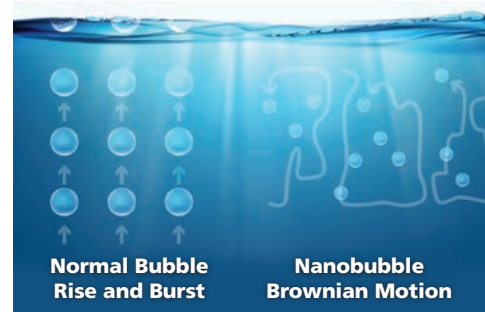
*Nanobubble Aeration is Breathing Life into
Dying Lakes and Ponds*

By **Bill Kurth, Director of Lake Management, Florida**

Each year, the news is filled with headlines warning of invasive species, harmful algal blooms and dangerous cyanobacteria (blue-green algae) plaguing our lakes, ponds and waterways. As urban development, pollution and natural habitat loss continue to rise, our aquatic ecosystems suffer from nutrient loading and poor water quality as a result. In the past, many communities relied solely upon the application of EPA registered algaecides for the safe eradication of stubborn and harmful algae blooms. However, more recently, many are seeing lasting results with the addition of proactive and natural management techniques. This year, a new technology will give us another choice for the management of stubborn algae blooms and improvement to water quality.

Nanobubble aeration is a premium innovative technology designed to exceed the capabilities of traditional lake and pond aeration systems by providing up to 79,000x more oxygen! Put simply, nanobubbles are like traditional aeration systems on steroids. Produced by compact on-shore generators,

these ultra-fine bubbles are completely invisible to the eye and about 1 million times smaller than ordinary bubbles. As a result of their tiny size, nanobubbles have no natural



Credit: Molear

buoyancy and do not rise to the surface of the water and burst like you might expect. Amazingly, they remain within the water column as long as to 2-3 months, providing unparalleled oxygenation to struggling lakes and stormwater ponds.

The benefits of a continuously oxygenated lake or pond are enormous. First, oxygen is a key player in the battle against undesirable nutrients by facilitating the conversion
Continued on page 2

Biochar: A Natural Solution to Safely Filter Excess Nutrients

By **Erin Stewart, Aquatic Biologist and Regional Manager, Colorado**

The use of biochar is an emerging technology in nutrient management. Nutrients such as phosphorus and nitrogen, in suitable quantities, are necessary for aquatic ecosystems to flourish. However, excess nutrients introduced to lakes and ponds through human impact, leaf debris and stormwater runoff can lead to the growth of nuisance plants and algae blooms. Restoring balance to a lake or pond plagued with water quality issues, or proactively preventing these issues, can be naturally achieved with the latest technology in nutrient management: biochar.

Biochar is produced from wood products processed in a high heat, low oxygen environment to create a highly porous, carbon-rich substrate. The physical structure and ionic properties of the biochar create an affinity to absorb contaminants. Independent laboratory testing of contaminated water has shown significant removal of nutrients, heavy metals, hydrocarbons, volatile organic compounds (VOCs) and even suspended solids by the introduction of biochar.

Biochar is processed into particles from fine powder to chip size, so the best way to introduce it to the water is in permeable socks or bags that contain the product but allow water contact. These bags can be suspended in the water column or installed in racks or structures where water is most likely to flow through or past the material. Over time, the bags absorb nutrients, suspended solids or other unwanted substances from the water until all binding sites and pores are filled. Depending on water quality, the socks may remain active for up to two years. After they are used, the bags can be reused as an amendment to enrich water retention and nutrient concentration of soils and other landscaping.

Since biochar is produced from renewable resources and can be produced from wood that would otherwise be burned for fuel or trash, the use is considered green and could help reduce greenhouse gases and carbon emissions. And while testing is still in the initial phases, applications of biochar may be

the next revolutionary and eco-friendly water treatment to come to the market.

Lakes and ponds with moving water are excellent candidates for the use of biochar because the flow will naturally circulate nutrients for absorption by the socks. Waterbodies without water movement would benefit from pairing biochar with the installation of diffused aeration, a submersible circulating pump or fountain to achieve faster and more consistent results. Think biochar could be a good fit for your lake or pond? Our freshwater management experts are prepared to analyze your waterbody and create a custom nutrient management plan to help restore balance in your aquatic ecosystem. ■



SOLitude team preps Biochar bag for installation

Biochar at 1200x magnification.

Credit: Biochar Now

The Future Is Here *Continued from front cover*



Before

After

of phosphorus to forms that do not sustain algae development. Excess nutrients can easily enter lakes and ponds in the form of grass clippings, lawn fertilizers, trash and droppings from dogs, geese and other wild-

life. The presence of oxygen also helps to balance pH and other related water quality parameters that encourage the growth of fish, native organisms and beneficial phytoplankton — rather than detrimental bacteria like E. Coli and cyanobacteria species that can be toxic to humans and wildlife and are believed to contribute to degenerative diseases such as ALS, Alzheimer's and Parkinson's.

Another amazing benefit of nanobubbles? In addition to engulfing an entire aquatic ecosystem in concentrated oxygen, nanobubbles are negatively charged and, therefore, attracted to positively charged organic matter in the water column. When they connect with positively charged metals and pollutants, including dangerous cyanobacteria toxins, nanobubbles cause them to implode, holistically cleansing the wa-

terbody from the inside out.

SOLitude Lake Management is the first environmental firm to research and advance this technology for large-scale freshwater management applications through continuous research and development with select manufacturers and regulatory agencies. The technology doesn't necessarily replace regular proactive management strategies, but it is truly one of the missing pieces to the puzzle of sustainable freshwater management. We're excited to shepherd this new technology into the freshwater management realm and look forward to further enhancing water quality in your waterbody and throughout the world. ■



Oxydation of Algae

Credit: Homeport

CASE STUDY: New, Highly Selective Herbicide Used to Eradicate Variable Milfoil in New England Recreational Bay

By **Peter Beisler, Environmental Scientist, New England**

Variable milfoil (*Myriophyllum heterophyllum*) is a highly invasive exotic plant that is threatening our freshwater ecosystems. If left unmanaged, it not only has the ability to impair ecological balance, but will readily spread throughout a waterbody and to surrounding waterbodies, as it can easily be transported by heavy downstream water flow and on the boats and trailers of unsuspecting boaters.

SOLitude has been managing variable milfoil for quite some time in Back Bay, a 34-acre bay located on Lake Winnepesaukee in Wolfeboro, New Hampshire. The relatively shallow bay serves as a valuable resource to the surrounding community by providing excellent fish and wildlife habitat, as well as recreational opportunities, such as fishing, boating, wildlife viewing, a competitive water skiing tournament and a designated model sailboat racing area.

Variable milfoil was treated eight times in Back Bay since 1991, with seven of those treatments occurring between 2005 and 2015. Some degree of diver hand pulling and suction harvesting also occurred annually, beginning in 2008. Last year, we decided to take a new approach to management of the bay—and we saw some rather incredible results.

Taking a different approach to combat this invasive plant, the SOLitude team decided to utilize ProcellaCOR, a new aquatic herbicide. ProcellaCOR, highly selective to milfoil, required much less product to be applied compared to past treatments.



Variable milfoil under water

The management approach involved treating the entire Bay (34 acres) with a properly concentrated dose of ProcellaCOR, which is designed to quickly and specifically target the invasive plant species. The herbicide application was made in early to mid-September 2018.

SOLitude hired an independent, NELAC-accredited laboratory to collect and analyze water samples for herbicide residues following the treatment, in accordance with Special Permit conditions. During the post-treatment inspection there was no viable milfoil found in the Bay. Additionally, no adverse impacts to non-target plants or other aquatic organisms were observed directly in or immediately adjacent to the treated areas during the post-treatment survey.

While preventative measures are the preferred management approach, if possible, success of this treatment demonstrates a new and exciting long-term management strategy that can be employed throughout the country in areas where this highly invasive plant has already taken over. ■



Variable milfoil

Mesh Barriers Proving to be a Game Changer in Erosion Control and Bank Stabilization

By J. Wesley Allen, Environmental Scientist and Regional Manager, Mid-Atlantic

As any experienced Lake and Pond Manager will tell you, when someone calls about an issue at their waterbody, it is usually already severe. Typically, this is the case when we arrive on a site to look at an erosion issue on a lake or pond embankment or slope.

Erosion is a natural process caused by wind, water, weather, poor design, cultural impacts like mowing and recreation, or simply an aging aquatic ecosystem. These erosion issues are all exacerbated by human disturbance. Unfortunately, erosion can also negatively affect your lake, stormwater pond, canal or coastline by causing loss of habitat and property value, nutrient loading, reduced storage volume and waterbody depth, and excess runoff. Over time, erosion can lead to the formation of trenches and gullies and can become a serious danger to the public.

There are many ways to correct erosion with rip-rap, bulkheads and other hard armoring systems, and in certain situations, they may be the preferred option. In my experience, reestablishing the embankment utilizing vegetation, whether turf

grass for recreation or native vegetation for habitat, has always been an excellent way to stop erosion and enhance a lake, fishing pond or stormwater management facility. There are several Green Technology Best Management Practices that can help stop erosion and establish vegetation, but a lot of them have a shorter life-span or planting restrictions. Fortunately, there is a solution available for both the immediate and long-term stabilization of shorelines and hillsides, as well as the creation of a living shoreline.

SOLitude Lake Management has partnered with SOX Erosion Solutions to offer the latest technology in erosion control. The patented SOX system provides an innovative, environmentally friendly solution to immediately stop shoreline and embankment erosion and create a natural foundation for vegetation. The SOX system is made from a combination of ecofriendly, biodegradable burlap fabric and heavy-duty knitted mesh. It can be filled with organic compost or pond sediment, which complements SOLitude's hydro-raking and dredging services. After the SOX system is filled,



Before



After

it is secured to the embankment and can be immediately planted with native beneficial buffer plants, sodded, or seeded through the mesh and fabric layers.

Our team has used several different products throughout the years, but the SOX system is certainly creating excitement! It provides immediate stabilization while effectively filtering and buffering run-off water, removing harmful contaminants and benefiting waterways and water quality, all the while providing a great planting platform and long-lasting erosion control. ■

Research and Experimentation Leads to Fertilization Best Practices in Fisheries Management

By Ben German, Fisheries Biologist

Scientific inquiry is often the driving force behind innovation, and continuing to analyze and fine-tune our management strategies helps us deliver the best service possible to our clients. Fisheries managers often use fertilization (or productivity manipulation) to increase the biological productivity of a lake or pond. The increase in nutrient concentrations spurs algae production, resulting in increased biomass at ascending trophic levels of the food web. In other words, more food equals bigger fish. Fertilizing has been a proven strategy for quite some time, but recent insights into nutrient ratios, and how to properly manage them, is bringing consistency to the process of producing trophy Largemouth Bass.

The primary nutrients responsible for driving biological productivity are nitrogen and phosphorus (N & P). The ratio between these two important nutrients can help to determine the extent and type of biological productivity that results.

When it comes to increasing biomass to help grow fish, not all algal productivity is good. Oftentimes, when fertilizing a fishery, cyanobacteria (also known as blue-green algae) can become abundant. These microscopic algae can produce toxins that are harmful to fish, humans and other wildlife. One important char-

With routine water quality monitoring, we can make calculated and informed adjustments aimed at ensuring optimal water quality conditions that favor green algae production.

acteristic some members of this undesirable group of algae share, that green algae do not, is the ability to fix atmospheric nitrogen. This means that so long as phosphorus is available, cyanobacteria can thrive, even if nitrogen is limiting.

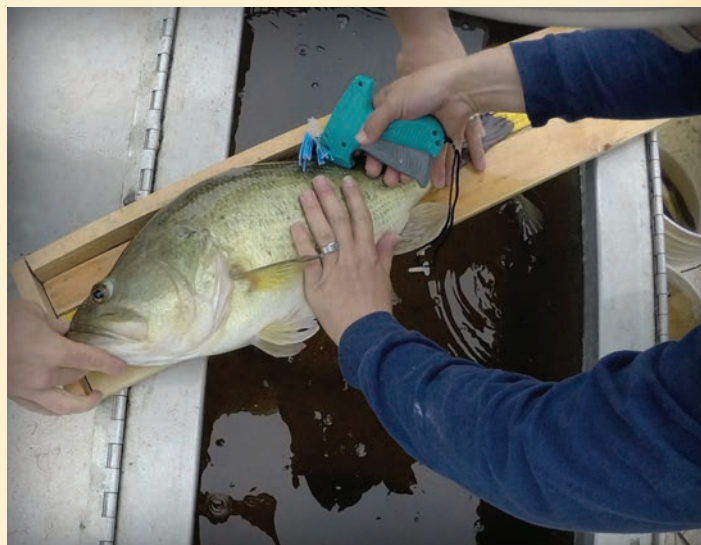
By contrast, the desirable fish-growth-promoting green algae that fertilization seeks to propagate need an ample supply of nitrogen (in addition to phosphorus) in order to grow. By keeping the N:P ratio in the optimal range for green algae, cyanobacteria blooms can be minimized — even in a nutrient enriched environment, since with the proper N:P ratios the green algae have a much easier time competing with blue-green algae.

Establishing a sound monitoring program is key, as it provides the foundation for us to implement practices such as adding phosphorus, mitigating phosphorus or adding nitrogen as needed. If any cyanobacteria do pop up, SOLitude manages them with targeted treatments designed to have minimal impact on the desirable green algae.

Through research and experimentation, SOLitude's fisheries professionals are learning to use this nutrient ratio as a tool instead of facing it as a challenge. With routine water quality monitoring, we can make calculated and informed adjustments



Routine water quality monitoring and testing provides us with data to make proper adjustments to N:P ratios.



Largemouth Bass are weighed, measured and tagged to record productivity data over time.

aimed at ensuring optimal water quality conditions that favor green algae production. One of the ways we accomplish this is by observing traditional parameters such as dissolved oxygen, alkalinity and pH, in addition to key nutrient concentrations (nitrogen and phosphorus) and comparing these results with the observed algal species comprising the bloom over time. The ultimate goal of this management approach is the maintenance of a productive and healthy aquatic environment, optimized for beneficial algae, to promote growth of trophy Largemouth Bass. ■

SOL SPOTLIGHT

Marc Bellaud President

CELEBRATING
25 Years



Congratulations to Marc Bellaud, who just completed his 25th year in the lake management industry! After graduating from the University of Vermont with a degree

in Biological Sciences and a concentration in natural resources, Marc worked for two non-profit organizations before joining Aquatic Control Technology (now SOLitude Lake Management). He started as a Field Biologist, and his responsibilities expanded as the company continued to grow. He was named SePRO Applicator of the Year in 2006 and was later promoted to company President in 2013. Throughout his career, Marc has been actively involved in advancing the science of the aquatics industry as a good steward and widely-respected thought leader. Cheers, Marc, to 25 amazing years and many more to come! ■

Ben German Fisheries Biologist

NEW SOL
SHOUT OUT



Ben German is a Fisheries Biologist who joined the SOLitude team in September 2018. Ben is based out of SOLitude's Shrewsbury, MA office. He specializes in fisheries

management, water quality monitoring and analysis, aquatic plant identification and the study of invertebrate communities. Ben earned a Bachelor's degree in Fisheries and Aquaculture from SUNY Cobleskill, as well as a Master of Science degree in Lake Management from SUNY Oneonta. We're excited to have someone as knowledgeable and experienced as Ben join our team! His expertise in fisheries management will be invaluable as we continue to expand our progressive fisheries management techniques throughout the Northeast and Mid-Atlantic. ■

Becky Snyder Regional Administrator



Becky Snyder is SOLitude's 2018 Heart & SOL Award winner, which recognizes the individual who goes above and beyond in personal volunteering and displays a true commitment to making their local

community, and the world, a better place. In 2018, Becky logged a total of 117.5 volunteering hours, participating in an array of volunteering events throughout Massachusetts. She followed her passion for empowering young girls through the International Order of the Rainbow for Girls, an organization that first sparked her interest in volunteering when she became involved as a child. Becky encouraged donations and her team's participation in local outreach events through her regional SOLitude Volunteer Team Captain position and played a pivotal role as the Outreach Coordinator for The SOLution program for the second half of 2018. Congratulations Becky! ■

NEW SOLs It is our pleasure to introduce and welcome our newest colleagues.

Marcos Ansaldi

(Benicia, CA) Aquatic Specialist

Dawn Bachelor

(Benicia, CA) Business Development Consultant

Sarah Bevier

(Virginia Beach, VA) Culture and Development Assistant

Ysabella Bhagroo

(Virginia Beach, VA) Digital Marketing Specialist

Matt Bovard

(Oxford, PA) Aquatic Specialist

Briana Crockett

(Virginia Beach, VA) Project Specialist

Mike Dillon

(Washington, NJ) Regional Sales Manager

Scott Dye

(Orlando, FL) Aquatic Specialist

Steven Gniadeck

(Shrewsbury, MA) Regional Administrator and Client Relations

John Guffey

(Fort Myers, FL) Aquatic Specialist

Jay Gurule

(Fort Myers, FL) Aquatic Specialist

Nick Hanna

(Manassas, VA) Environmental Scientist

Josh Hendrix

(Tyler, TX) Aquatic Specialist

Blane Hite

(Tampa, FL) Aquatic Specialist

Dane Holmes

(Tyler, TX) Aquatic Specialist

Anthony Internicola

(Manassas, VA) Business Development Consultant

Charles Leaton

(Virginia Beach, VA) Aquatic Specialist

Zach Luttrell

(Tyler, TX) Wildlife and Fisheries Scientist

Lauren Malinis

(Benicia, CA) Aquatic Specialist

Patrick Mefferd

(Bryan, TX) Regional Manager

Tyler Prichett

(Shrewsbury, MA) Aquatic Specialist

James Rullo

(Shrewsbury, MA) Aquatic Specialist

Alyssa Serignese

(Virginia Beach, VA) Marketing and Events Coordinator

Nick Viles

(Orlando, FL) Business Development Consultant

AND A SPECIAL WELCOME TO OUR NEWLY ACQUIRED AQUATIC SYSTEMS TEAM IN FLORIDA!

Before and After Showcase

Nanobubble Aeration



SOX Erosion Solutions Installation



Filamentous Algae Treatment



Check Us Out

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

March 22

Central Florida Chapter of
Community Associations Institute's
Annual Community Associations
Day and Tradeshow
Kissimmee, FL

April 4

Colorado Parks & Recreation
Association Park Workshop
Greenly, CO

April 11

South Gulf Coast Chapter of
Community Associations Institute's
Trade Show & Expo
Ft. Myers, FL

April 12

Central Virginia Chapter of
Community Associations Institute
Trade Show and Education Expo
Richmond, VA

April 12

Massachusetts Congress of Lake
and Pond Associations Annual
Meeting (MA COLAP)
Westborough, MA

April 14-16

Northeast Fish & Wildlife
Conference
Groton, CT

April 25

Virginia Apartment and
Management Association
Conference and Tradeshow
Norfolk, VA

May 3-4

New York State Federation of Lake
Associations Conference (NYSFOLA)
Lake George, NY

May 6

Aquatic Weed Control Short Course
Coral Springs, FL

May 9

Pennsylvania and Delaware Valley
Chapter of Community Associations
Institute's Annual Expo
King of Prussia, PA

May 30-31

New Hampshire Lakes Congress
Meredith, NH

2018 Accomplishments through

The SÖLution

3,577

Hours volunteered
by colleagues, family
and friends

\$81,595

In donations
including goods and
in-kind services

13,310

Pounds of trash
collected

31,840

Plastic containers
recycled

Thank you to our colleagues, family members,
friends, clients and vendor partners who
helped create a better world in 2018!

Learn how you can be part of The SÖLution:

solitudelakemanagement.com/solution



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2844 Crusader Circle, Suite 450, Virginia Beach, VA 23453
Email: inquiries@solitudelake.com • Fax: 888.358.0088

Services and Consultation Offered Nationwide

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- Water Quality Restoration
- Fountain & Aeration Systems
- Algae & Aquatic Weed Control
- Fisheries Management
- Water Quality Testing
- Bathymetric Studies
- Biological Augmentation
- Mechanical Harvesting
- Ultrasonic Algae Control

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BBB RATING: A+

Letter from the President: How SOLitude is Leading the Industry through Innovation, Technology and Research

The 2018 season marked my 25th year working in lake and pond management. Even though many might agree that advancement in our industry has been significant over that period, I would still contend that much more needs to be done. Continued population growth and development, combined with the impacts of climate change, are stressing our water resources beyond their limits. Invasive and nuisance aquatic plants continue to spread at alarming rates despite aggressive monitoring and management efforts, while the risks to human health posed by harmful algal blooms (HABs) are downright scary. We must take action now to preserve our waterways for future generations.

I am proud to be part of such a talented team of professionals that is committed to



re-shaping the future of lake management. We are continuously evaluating new technologies to see if they have a fit in our industry, while at the same time trying to better optimize existing tools. SOLitude regularly partners with manufacturers involved in research and development. We are continuously involved in numerous field trials and demonstration projects utilizing new technologies across the country. We are also fortunate to have several colleagues that have trained under industry leading experts and we remain actively engaged with ongoing research efforts by universities and lead industry researchers.

All of us at SOLitude have committed to innovation being one of our core company values. We strive to find proactive management solutions that provide lasting improvements by addressing the source of the problem and not just treating the symptoms. One of our principal goals is to provide better solutions for our clients and to leave lakes and ponds in better shape than we found them. In this issue of *Aquatics in Brief*, we're excited to share some of the latest innovations and technologies that are helping us achieve this goal.

Sincerely,

Marc Bellaud
President, SOLitude Lake Management