

Aquatics **in** Brief

Volume 11, Issue 3

Inside:

Page 2

Nuisance Aquatic Plant Highlight: Watermeal

Page 3

Adaptive Management of a Prominent Recreational Fishery

Page 4

Join Us in Being Part of The SOLution

The SOLution Event Spotlight: Steinhauer Pond Restoration

Page 5

New SOLs

Page 6

The Vectors of Invasive Phragmites Spread and Methods for Effective Control

Page 7

Before and After Showcase

Check Us Out...

Page 8

Ponder These Thoughts



The Importance of Properly Sized Aeration

By Greg Blackham, Aquatic Specialist

Choosing the correct aeration delivery system for your lake or pond is one of the most important decisions you will make for the long term health and balance of your waterbody. Regardless of how big or small your waterbody is, the goal of an aeration system is to evenly spread an adequate amount of dissolved oxygen throughout the entire water column. Lakes and ponds naturally receive dissolved oxygen from several sources, most notably plant respiration and atmospheric surface mixing. This input of oxygen should be equal to or greater than the demand of the aquatic ecosystem. The entire ecosystem of the water needs that dissolved oxygen, whether at the very bottom of the food chain for microbial decomposition, or at the top for bass and other predator fish. In most cases, it is discovered that the oxygen supply is lacking due to nutrient pollution or other stresses caused by people and land development.

To determine what type of oxygen delivery method or aeration system is appropriate, the waterbody needs to be looked at

from several angles. Many online resources recommend aeration systems based on only one or two aspects of the waterbody. To find the best aeration solution, several fac-



tors should be considered: 1) overall acreage of the lake or pond, 2) average water depth, 3) maximum water depth, 4) shape of the waterbody, 5) proximity to electricity, 6) desired aesthetics, 7) noise tolerance, 8) water quality. The more information we have, the better we can determine how to spread the dissolved oxygen throughout the entire lake or pond. For example, a small shallow round-shaped pond has dramatically different needs than a large spider-shaped lake with deep holes
Continued on page 2



A Full Service Lake, Pond, and Fisheries Management Company

Nuisance Aquatic Plant Highlight: Watermeal

By **Amanda Mahaney, Aquatic Biologist**

“**W**hat is that green scum on the surface of my pond?” Is this a question you have asked yourself before? If so, further investigations are in order. It may not be “green scum” after all, but rather a tiny plant called watermeal, with no roots, stems or “true” leaves. By simply rubbing this tiny, pale green plant between your fingers, it will most likely resemble cornmeal.

Watermeal prefers slow-moving or stagnant, nutrient-rich waterbodies and is frequently found among its closest relative, duckweed (*Lemna spp.*). Although it is commonly used as a food source and camouflage cover for wildlife, it can easily develop dense mats when proper conditions allow for it. Sunlight penetration necessary

for plant growth and oxygen concentrations essential for the health of underwater wildlife can all be negatively affected by concentrated growth of watermeal and duckweed.

There are multiple management techniques suggested to control problematic levels of watermeal. These techniques include physical controls through the use of skimming nets, habitat modifications by means of outflow structures, nutrient remediation and herbicide applications. The implementation and success of these techniques depends on the size and flow of the affected waterbody. Your aquatic management professional will help determine the best possible approach to managing your lake or pond’s watermeal concerns. ■



The Importance of Properly Sized Aeration *Continued from front cover*

and sandbars. It is highly recommended that a bathymetric study be completed prior to any aeration project. A bathymetric study shows the depths and contours of the waterbody, and helps with determining the type of system(s) needed, along with the proper placement of those systems. An undersized aeration system can actually be more detrimental than no aeration at all. Therefore, taking the approach that a little is better than none is ineffective. This approach often leads to more available nutrients and bacteria forms that can hurt the ecosystem, potentially exacerbating harmful algae blooms and odor issues.

There are many different types of lake and pond aeration systems out there, but we will only touch on the ones that are the most common and effective.

Bottom diffused aeration systems rely on a land based compressor pushing air along weighted tubing to stations placed around the bottom of a waterbody. These stations contain membranes that diffuse the air into small bubbles that rise up to the surface in

a cone formation. This water from the bottom usually has less dissolved oxygen than is necessary for all the microbial action taking place at the sediment water interface, and for this reason it needs to be pushed to the surface. When the bubbles reach the surface, atmospheric oxygen attaches



to the water and spreads out horizontally over the water surface and mixes with surface water in a wide radius from where each diffuser station is located. This aeration method works best with deeper water. In waterbodies with areas less than 4 feet deep, other options should be considered.

In lakes and ponds with shallower depths, an effective aeration tool may be

a surface spray or fountain style aerator. A floating fountain can move a lot of water throughout the day, effectively adding atmospheric oxygen to the water and then circulating it throughout the water column. In smaller ponds, a single aerating fountain can add oxygen to the entire waterbody if sized correctly.

When dealing with more complicated lake and pond shapes with variable depths, a combination of aeration delivery systems may need to be implemented. For example, a lake that is overall fairly deep, but with several shallow fingers that open up into small lagoons may need a combination approach. A bottom diffused system for the wide open area, surface spray fountains in the lagoons, and horizontal mixing devices in the skinny fingers would spread dissolved oxygen throughout the entire water column and prevent any “dead zones” from being created. No matter how oddly shaped your waterbody is, there is a way to get the right amount of oxygen circulated; you may just need to get a little more creative! ■

Adaptive Management of a Prominent Recreational Fishery

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



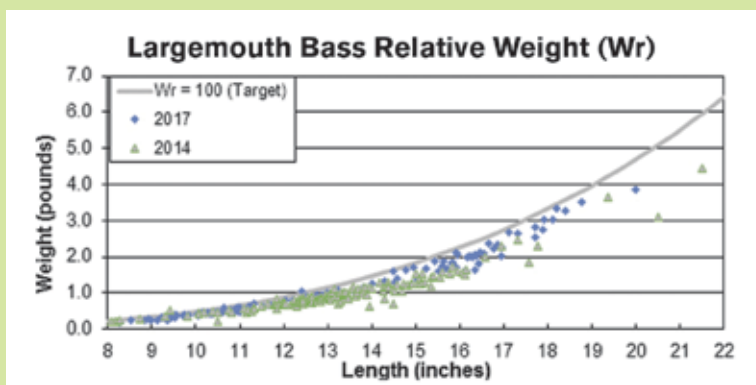
Lakes and ponds contribute substantially to society by providing recreational opportunities, water supply, flood control and power generation. These multiple purposes often challenge lake managers as different stakeholders have different goals and expectations. Successful management of fisheries resources requires a thorough understanding of fish populations, fish habitat and the users of those waterbodies.

Lake Monticello is a 352-acre recreational lake in central Virginia that was impounded in the late 1960s. This private community is home to approximately 13,000 residents who desire that Lake Monticello has a healthy and sustainable fishery. An initial fisheries assessment of the water quality, habitat and fish populations was conducted in 2014 to determine the current status of the fishery.

An adaptive management process was used at Lake Monticello, which began with stakeholders clarifying their goals. Then, using the data from 2014, fisheries biologists developed and implemented strategies over the next three years. A follow-up assessment of the fish population was conducted in 2017 using electrofishing along with age and growth analysis. This assessment allowed managers and stakeholders to evaluate the efficacy of the work that had been done and develop new strategies. Five strategies were critical in achieving the goal of a healthy and sustainable fishery.

1. Communication with stakeholders was vital to develop the goal of creating a sustainable and healthy fishery.

- 2.** Lake Monticello lacked the proper habitat to sustain a healthy fishery, and the installation of artificial fish cover greatly improved the habitat complexity. Electrofishing results in 2017 detected more Largemouth Bass in the newly-added fish cover than at areas without cover. The creation of habitat also benefits anglers as it can concentrate Largemouth Bass and improve catch rates.



- 3.** Lake Monticello lacked aquatic vegetation, which provides habitat for aquatic insects, snails and freshwater shrimp — which in turn supply food for fish and waterfowl. Aquatic plants are also a vital part of the complex system of chemical cycling in a lake, and can influence oxygen supply in the water. Pickerelweed was planted in shallow areas to help improve the lake's habitat and provide nursery areas for juvenile fish.
- 4.** Bluegill are typically the most important food source for Largemouth Bass, but their low abundance was having a negative effect on the fishery. To enhance the Bluegill popu-

lation, adult Bluegill (> 5 inches) were stocked. Three fish feeders were also installed to support Bluegill growth and health.

- 5.** Despite liberal harvest regulations, most Largemouth Bass anglers practice catch-and-release, which leads to over-abundant populations and slower growth rates. At Lake Monticello, the creel restriction was changed to a 15-inch maximum length limit (fish < 15 inches can be harvested; fish > 15 inches must be released) to encourage harvest of the abundant and younger fish and thus improve growth rates. Since 2014, the proportion of Largemouth Bass that are > 15 inches has more than doubled and fish weights have improved significantly.

The adaptive management approach employed at Lake Monticello was key to improvements seen during the past several years. Stakeholder values informed the goals of the fishery and the technical strategies employed to meet those goals were developed by trained fisheries staff. The recent fishery assessment shows that five ongoing strategies improved the fishery. For Lake Monticello to maintain the goal of a healthy and sustainable fishery, continued improvements to Largemouth Bass and Bluegill populations are necessary as well as continuing to enhance fish habitat. Open communication between stakeholders and fisheries managers must also be maintained. ■

Join Us in Being Part of The SOLution

Throughout the year, SOLitude staff members contribute their time to environmental protection and restoration projects, and recently led or participated in more than a dozen environmental events across the nation in honor of Earth Day and Arbor Day. Our employees, family members and friends volunteered a total of 223 hours of their time to help collect 3,180 pounds of trash and debris, complete the first step of a beneficial shoreline restoration project and install 2,000 native wetland plants in local communities throughout the country.

1. The Southeastern Virginia team participated in the Lynnhaven River NOW cleanup and Keep Norfolk Beautiful Day. They also spearheaded a trash cleanup near SOLitude's Virginia Beach office and installed 80 feet of oyster castles along the shoreline of the Little Creek Watershed.



2. SOLitude's Charlottesville, VA office helped lead a trash cleanup with the Rivanna Conservation Society. The 13-person crew focused on the Riverview Park area and filled an entire work truck with 30 bags of trash, including a suitcase and a bucket full of concrete.



3. The Mid-Atlantic team took part in the DNREC Beach Grass Planting at Cape Henlopen State Park. During this event, they helped install 2,000 native wetland plants along swales in Talley Day Park in New Castle County, DE, in partnership



with the New Castle County Department of Special Services.

4. Our New Jersey team took part in the Musconetcong Watershed Association's Annual Spring River Cleanup for the second year in a row, dedicating a total of 33 volunteer hours to the cause.
5. The New England office helped clean trash along Lake Street Park and the Blackstone River in Massachusetts. Team members also led a group of Boy Scouts on a trail cleanup, and volunteered to judge the annual Water Science Fair at Wells Memorial School in Harrisville, NH.
6. In North Carolina, team members attended the Haw River Clean-Up-A-Thon where they picked up 23 bags of trash along the floodplain.



The SOLution is a company-wide program that encourages the company and all employees to strive to "create a better world" through volunteerism, community outreach, sustainability and environmental consciousness. ■



We would love to partner with you in being part of The SOLution! To join us at an upcoming event, or to share your organization's volunteer efforts with us, reach out to your SOLitude representative or visit solitudelakemanagement.com/solution for more information.

The SOLution Event Spotlight: *Steinhauer Pond Restoration*

SOLitude team members from the Mid-Atlantic joined forces with 30 students from Maple Shade High School to conduct a voluntary restoration project at Steinhauer Pond in Burlington County, NJ. Environmental Scientist and Senior Business Development Consultant John Phelps provided ongoing educational expertise for the project, which was awarded 1st place in the Philadelphia Zoo's "UNLESS" competition to raise awareness about environmental issues. Throughout the spring, the students, led by Biology teacher Carmen Fucco-Lynn, raised funds for their cause and participated in pond cleanups to



clear the site of debris and begin to improve water quality. The project culminated in May, when the students spearheaded a community bulb planting to enhance the waterbody with beneficial buffers used to protect the pond's banks and attract native species to the area. SOLitude's Director

of Marketing Tracy Fleming and Business Development Specialist Shane Edwards provided additional guidance at the event. After the plants have a chance to grow and thrive, SOLitude will offer more guidance and education to help the students effectively stock the pond with native fish in 2018. ■

New SOLs

In each issue, staff members from SOLitude are highlighted. It is our pleasure to introduce you to the incredibly talented members of our team and give you insight into the vast array of knowledge and experience they offer.

Erin Stewart
Aquatic Biologist
Denver, CO



Erin Stewart is an Aquatic Biologist working out of SOLitude's Denver, CO office. She has managed lakes and ponds in the region since 2008, and has worked on several prominent projects, including the management of cyanobacteria in drinking water reservoirs and recreational lakes in Colorado. Erin graduated from Seattle's University of Washington with a Bachelor of Science degree in Biological Oceanography.

Todd Prater
Aquatic Scientist
Georgetown, DE



Todd Prater is an Aquatic Scientist with more than a decade of industry experience. He has a special focus on implementing environmentally sound lake and pond management programs. Todd also has an extensive background in the crop protection industry. Todd received his Bachelor of Science degree in Agriculture and Natural Resources from the University of Delaware.

John Maday
Environmental Scientist
Shrewsbury, MA



John Maday is an Environmental Scientist serving SOLitude's New England region. When it comes to restoring ecological balance in his clients' waterbodies, he is focused on providing sustainable and cost-effective management solutions. John began his industry career as a summer intern with SOLitude and joined full time after earning his degree in Environmental Science from Clark University in Worcester, MA.

Jason Emmel
Fisheries Biologist
Charlottesville, VA



Jason Emmel is a Fisheries Biologist based out of Charlottesville, VA. As a member of the Fisheries team, he utilizes a range of management services, including electrofishing, habitat enhancement, fish stocking and water quality monitoring to help clients achieve their unique fisheries goals. Jason graduated from Virginia Tech with a degree in Fisheries Science and is currently pursuing his Master's.

Clay Stabley
Aquatic Specialist
Nashville, TN



Clay Stabley is an Aquatic Specialist working out of the Nashville, TN office. Clay began his industry career in 2005. He has managed complex ecosystems across the south for more than a decade and enjoys being a knowledgeable resource for clients. Prior to joining the industry, Clay served as a US Army Senior Operations Sergeant for 20 years and retired from Fort Campbell, KY 101st Airborne Division in 2005.

Mariah Pohl
Communications Specialist
Virginia Beach, VA



Mariah Pohl is a Communications Specialist working from SOLitude's Virginia Beach office. As part of the Marketing team, she is responsible for executing the company's communication and public relations strategy, and works with media outlets and editors to highlight key company projects. Mariah graduated from Centre College in Danville, KY, with a degree in Cultural Anthropology and a minor in Creative Writing.

Shane Edwards
Business Development Specialist
Hackettstown, NJ



Shane Edwards is a Business Development Specialist based out of SOLitude's New Jersey office. He is responsible for helping the team build relationships with new partners and maintain existing relationships with current customers. Shane graduated from William Paterson University in Wayne, NJ, with a Bachelor of Science degree in Business Management.

Jennifer Bonzani
Business Development Specialist
St. Louis, MO



Jennifer Bonzani is a Business Development Consultant at SOLitude. She is focused on helping expand the company's national footprint by building relationships with business partners and new clients. Jennifer has more than a decade of experience in business development and graduated from Lindenwood University in St. Charles, MO, with a Bachelor of Science degree in Business Administration.

The Vectors of Invasive Phragmites Spread and Methods for Effective Control

By **Richard Ruby III, Aquatic Biologist**

Species become classified as invasive when they invade areas outside of their native range, upset the natural community they have invaded and cause considerable damage to either the ecology or economy of an area. *Phragmites australis*, or common reed, is a plant that most definitely meets all of these criteria. Native to Europe and Asia, invasive Phragmites is an aggressive colonizer of a variety of wetland habitats across the United States. Once established, the plant's growth habits allow it to quickly out-compete most native species, ultimately creating a dense monoculture which reduces species richness and overall habitat value. As a result of these invasive characteristics, Phragmites has become a significant threat to freshwater and coastal wetlands across the country.

Whether managing established Phragmites colonies or endeavoring to prevent its introduction, it is critically important to understand the plant's methods of reproduction and dispersal. Phragmites is spread through several means, called vectors. The natural reproduction of Phragmites is accomplished in three ways: by seed, rhizome fragmentation and the use of stolons. Seeds can be spread by the wind, wetland birds, surface currents and wave action as well as on recreational and construction vehicles. Expansion through the development of stolons (lateral vegetative growth of the stem), also allows for very rapid spread of the infestation. Rhizomes, the underground root structures of the plant, when fragmented through land disturbance or other natural processes such as erosion, have the potential to become re-rooted in any suitable area they are deposited. ATVs and construction vehicles can also be vectors of rhizomal spread if the root debris is not removed when leaving a Phragmites infested area.



Successful Phragmites control can be achieved by employing several methods. Experience and the use of specialized equipment are vital when managing this species given the sensitive nature of the environments that it colonizes. However, like any other non-native plant control project, the first step is an assessment of the infestation. Fully understanding the extent of the growth, the bordering and intermixed native plant assemblage and the general terrain are essential to the development of a successful management plan.

Once the overall scale of the infestation is determined, the proper application of aquatic labeled herbicides is often the most effective and least disruptive means of achieving sustained long-term control. Given the remote and sensitive nature of the environments that Phragmites colonizes, it is often necessary to employ the use of specialty low ground-pressure amphibious track vehicles to access and manage these plants. Herbicide applications and operation of this specialized equipment should only be undertaken by a trained and experienced professional.

Post herbicide application, cutting and mulching of the Phragmites culms is often beneficial in accelerating the rate of native plant recolonization. The removal of the dead stalks, which can in many cases be over 15 feet tall, allows improved sunlight exposure to the marsh deck or wetland floor that facilitates germination of the dormant native seed bank. Eliminating this considerable plant biomass also facilitates improved identification and access of Phragmites regrowth that will require follow-up control measures in subsequent years.

Although successful Phragmites control is a multi-year endeavor, 3-5 years of annual management typically yields a greater than 95% reduction in the infestation and, more importantly, successful re-establishment of a native plant-dominated assemblage. ■

Before and After Showcase

Excellence in Water Quality Treatments



Location: Hampton, VA
Surface Area: .3 acre community pond
Primary Target: Spyrogyra, filamentous algae
Restored By: Derek Johnson, Lake Management Scientist



Location: Glenwood, MD
Surface Area: 1 acre private pond
Primary Target: Parrotfeather
Restored By: Jason Luce, Lake Management Scientist



Location: Magnolia, TX
Surface Area: .25 acre private pond
Primary Target: Bushy pondweed, chara, filamentous algae
Restored By: Matthew Ward, Biologist

Featured Mechanical Harvesting Project



Location: Mendon, MA
Surface Area: Treated 1 acre of 85 acre lake
Primary Target: Buttonbush, water lily
Restored By: SOLitude Mechanical Team

Check Us Out

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

July 21
North Carolina Chapter of Community Associations Institute Annual Conference and Expo
Raleigh, NC

August 3-6
The Virginia Leadership Retreat
Hot Springs, VA

August 10
Austin Chapter of Community Associations Institute Conference and Expo
Austin, TX

August 20-24
147th Annual Meeting of the American Fisheries Society
Tampa, FL

September 18
Rocky Mountain Chapter of Community Associations Institute Mountain Conference & Tradeshow
Vail, CO

September 27
Dallas Fort Worth Chapter of Community Associations Institute Expo and Tradeshow
Plano, TX

October 3-6
Colorado Parks and Recreation Association Annual Conference
Keystone, CO

October 4
Houston Chapter of Community Associations Institute Tradeshow
Houston, TX

October 5
South Carolina Chapter of Community Associations Institute Annual Community Associations Day and Trade Show
Columbia, SC

October 12-14
Pond Boss Conference & Expo
Montgomery, TX

October 14
Long Island Chapter of Community Associations Institute Annual Tradeshow
Melville, NY

October 18
Tennessee Chapter of Community Associations Institute Annual Tradeshow
Nashville, TN

October 18
New Jersey Chapter of Community Associations Institute Annual CA Day and Trade
Edison, NJ

Volunteer of the Quarter: Greg Blackham

We're pleased to name Greg Blackham as our Volunteer of the Quarter for the first quarter of 2017! Greg's enthusiasm and passion infects those around him and his level of productivity is greatly appreciated by the organizations that he supports. He spent 15.5 total hours volunteering and participated in four team events during the first quarter through the Food Bank of Delaware in Milford, the Central Delaware Habitat for Humanity and the DNREC Beach Grass Planting event at Cape Henlopen State Park. In addition to his own volunteering efforts, Greg has also encouraged his friends and family members to join in each of his efforts, adding 28 volunteer hours to The SOLitude's annual goal of reaching 2,500 volunteering hours for the year. ■





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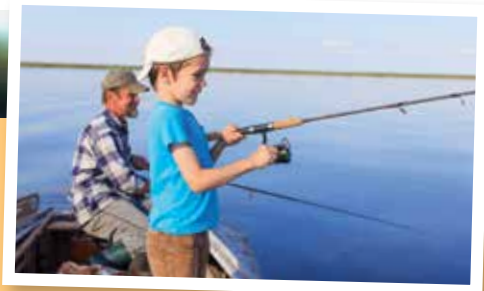
Ponder These Thoughts

SOLitude Lake Management wants your lake or pond to be prepared for warm weather. With this in mind, we recommend that you consider the following during the summer months:

- Warm summer weather seems to bring out the best and the worst in ponds. Although pond algae and aquatic weeds seem to be more abundant at this time of year, a year-round maintenance plan is the best way to ensure a healthy pond all year long.
- Reduced flows and warmer water temperatures increase the potential for Harmful Algae Blooms (HABs), which can be a threat to the environment as well as the health of humans, pets and wildlife. If you experience blue-green surface scum or suspect an increase in

microscopic algae growth, contact one of our biologists.

- Summer is the perfect time to think about pond aeration. The warmer water temperatures can be detrimental to the overall health of your pond. Increase oxygen, reduce stagnation and stratification, and prevent algae, mosquito breeding, fish kills and many other water quality problems with a properly-sized aeration system.
- Mosquitoes can ruin summer fun. Think about stocking your pond with juvenile Bluegill, Fathead Minnows and other small fish that help to control mosquitoes. This, along with beneficial buffer plants and proper aeration, can help eliminate a potentially big problem.



- Remember to respect the natural vegetative buffer around the lake and never mow all the way to the water. Also, be sure to keep clippings and other debris out of the water as this adds nutrients and spurs algae growth.
- Summer months = Good fishing! Maintain your fish habitat with good water quality and cover. Consult our experts if you have questions about proper maintenance of your fishery.
- Plan a Labor Day fishing event in your community. Be sure your pond is stocked with easy-to-catch fish, like Bluegill, Largemouth Bass and Catfish, and have a fisheries biologist tag some fish to allow for special prizes.