AquaticsinBrief



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A Full Service Lake, Pond, and Fisheries Management Company

Controlling Dangerous Toxic Cyanobacteria

By Derek Johnson, Certified Lake Manager and Fisheries and Wildlife Scientist

xcessive cyanobacteria growth has become a serious nuisance and concern in our lakes and ponds across the nation. Commonly referred to as blue-green algae, they are best known for their blooms that have the appearance of spilled paint. Blue-green algae can grow quickly when the water is warm and enriched with nutrients. There are many different species, but the most commonly detected is Anabaena, Aphanizomenon, Microcystis, and Planktothrix. However, multiple species can create a bloom in a waterbody, and the dominant species can change over the course of the season.

Many species of blue-green algae have evolved to control their buoyancy. As the availability of light and nutrients change with the time of day and weather conditions, an algal cell is able to move up and down water depths. At night, when there is no light, cells are unable to adjust their buoyancy and often float to the surface, forming a surface bloom. This means that a bloom can literally appear overnight and stay on the surface until wind and waves are able to scatter the cells throughout the waterbody and dissipate the bloom.

Common concerns associated with bluegreen algae are taste and odor compounds

and toxin production causing drinking water contamination. An "earthy" odor emanating from a waterbody is indicative of the compound, geosmin. Some of the more dangerous compounds that could potentially be produced are neurotoxins (nerve damage), hepatoxins (liver damage), and endotoxins (skin irritants). Toxins are naturally produced chemical compounds within the cells. When the cells are broken open, the toxins are released into the water. This could result in a substantial concentration of the toxins in the water and lead to health issues in humans and surrounding wildlife. Even when the bluegreen algae is no longer visible, toxins may be present for some period of time. The only way to determine if these toxins are present is to have water samples collected and analyzed in a laboratory.

There are no quick fixes for the control of blue-green algae once they appear in a lake or pond. Using an algaecide and water quality enhancer in the early stages of a bloom may help to limit the growth and help mitigate excessive nutrients in the waterbody. Eventually, by reducing the overall amount of nutrients within a waterbody, bloom frequen-*Continued on page 2*

Toxic Cyanobacteria

Continued from front cover cy and intensity may be reduced. However, it may take a long time to effectively change the nutrient concentrations in a waterbody. Inputs from the watershed that enter a lake or pond every year will lead to large amounts of phosphorous in the sediment. The nutrients will continue to serve as a source of food for the bluegreen algae and lead to future, potentially larger, blooms. There are phosphorous binding compounds that can be applied to your waterbody to help reduce the available "food source" for algae.

Another approach to prevent the nutrients from becoming available to the blue-green algae is the installation of submersed aeration. Adding oxygen at the bottom of a lake or pond will act as the glue that will help bind the nutrients (phosphorous) to the iron in the sediment and keep it inaccessible to the blue-green algae.

SonicSolutions technology, which uses sound waves at a specific vibration frequency to disrupt the cell walls of the algae (similar to how an opera singer can shatter a glass by using their voice), can also be used. In essence, the sound waves will cause the algal cells to shrivel up without breaking apart and releasing the potentially dangerous toxins. This may be a safe alternative in certain situations where a large die off of blue-green algae would be dangerous due to the simultaneous toxic release.

SOLitude Lake Management has the tools, experience, and expertise to help prevent and control a potentially dangerous blue-green algae bloom. Educating residents and managers to use best management practices can also promote awareness and minimize a bloom: using lawn fertilizers only where truly needed, preventing yard debris (e.g., leaves, grass clippings, etc.) from washing into storm drains and waterbodies, and planting native vegetation along shorelines of lakes, ponds and streams are just a few examples. Precautions should always be taken when there are blue-green algae present in a waterbody and residents should wait for a bloom to dissipate before going in or near the water.

Phosphorus Management Techniques

By Dominic Meringolo, Senior Environmental Engineer

e all get old... and so does your waterbody. In addition to sediment, lakes and ponds can build up a stock of nutrients, particularly phosphorus. Higher levels of phosphorus will generally increase the severity and frequency of algal blooms and also favor growth of potentially toxic cyanobacteria (blue-green algae) species. Ideally, you would dredge the waterbody to remove the collected nutrients and sediment, but what if that is not a feasible option? Built-up or "legacy" phosphorus can release back into the water (referred to as "internal recycling") and, along with new phosphorus from inflowing water, both can contribute to chronic algae blooms.

For most lakes and ponds, it is not feasible to reduce phosphorus levels sufficiently through surrounding watershed management alone. The contribution from internal recycling of phosphorus often makes it impossible to reach water quality management goals. A well designed water quality restoration program will address both watershed and internal sources of phosphorus.

Phosphorus is most often the limiting nutrient for algae growth, or in other words, is in the shortest supply as compared to other growth regulating factors. While treatment with algaecides will help in the short term, there are also options available to proactively manage blooms by reducing the amount of phosphorus available for algae growth. Treatment with Phoslock or aluminum sulfate (alum) will bind with phosphorus in the water, and at higher application rates, will also bind the potentially available phosphorus in the sediment. How long the benefit will last depends on how much new phosphorus enters the pond, and whether a high enough rate was applied to handle the relative contribution of internal recycling.

Phoslock is a technology that uses modified bentonite clay infused with lanthanum (natural element). Upon application to the water, the lanthanum is released from the clay matrix and quickly binds with phosphorus which then settles to the bottom. Unused lanthanum which settles to the bottom is then available to bind with any phosphorus being released from the sediment. If incoming phosphorus is high, periodic or higher dose treatments may be required.

Alum is a similar technology that is used to bind phosphorus in the water and sediments of lakes and ponds. Instead of lanthanum, the application of alum releases aluminum which then forms a polymer ("floc") that binds with phosphorus and also captures solids and organic material suspended in the water. Alum is commonly used in drinking water treatment plants to settle out suspended materials before distribution to homes and businesses. Like lanthanum, unused floc settles to the bottom where it's available to capture phosphorus being released from the sediment.

It is important to have some information about the water and sediment quality in your lake and pond prior to implementing a phosphorus management strategy. It's also good to know a little about the volume and the quality of the incoming water. This data will help to determine the dose and frequency of treatment best suited for the conditions. For smaller ponds with high flows, it's likely that more frequent, low dose applications will be best. For larger ponds with slowly flushing water, a single treatment may last for the season or even multiple seasons. In large lakes, where the incoming water quality is good and most of the phosphorus loading is due to internal recycling, a properly planned treatment can have the potential of improving water quality and reducing nuisance algae growth for 20 years or more!

In addition to Phoslock and alum, there are several other products that may be utilized to provide water quality enhancement and control of nuisance algae, such as SeClear and bacterial/enzyme additives. We are always considering all such options for our clients, but if you have questions or are interested in a water quality assessment and phosphorus management services for your lake or pond, please contact our professionals at solitudelakemanagement.com/contact or call 888.480.LAKE.

Electrofishing Private Waters and Implementing a Fisheries Management Plan

By David Beasley, Fisheries Biologist and Director of Fisheries *and* Aaron Cushing, Fisheries and Wildlife Biologist and Environmental Scientist

re you looking to improve or maintain a balanced, healthy fishery? Perhaps your goal is a trophy fishery? Either way, you can benefit greatly from electrofishing.

Electrofishing is a fish sampling tool used to gather fish population data, allowing managers to make accurate decisions and improve pond management techniques. Using an electrofishing boat, the electric field produced affects a small area of water in front of the vessel where fish are momentarily stunned and safely collected with dip nets. The question most people ask when they hear about electrofishing is: "Doesn't that hurt the fish?" Surprising to most, the process is safe and harmless to fish. Once netted from the water, the fish are placed into a live well on the boat where

they quickly recover and start swimming around. Once safely on board, length and weight data is recorded, observations are made, and fish are released without harm back into their environment. If desired, fish can be marked with PIT tags or Floy tags to determine growth rates when recaptured in the future. The data collected during electrofishing provides insight into current and future issues,



12" 13" 14"

Length (inches)

15"

giving pond managers the needed facts to make a fishery productive and keep it productive. In addition to collecting data, undesired species of fish or overpopulated size classes of predators can be removed from the waterbody.

10" 11"

For owners looking to enhance a fishery, an initial study will provide the needed information to make improvements. The frequency in which a waterbody has an electrofishing study completed is directly related to the goals for the waterbody, the available budget and how long it takes to implement key management recommendations. Those who want a balanced, healthy fishery should consider electrofishing every one to five years while those who want to create and maintain a trophy fishery, or want to make big improve-



ments in a relatively short period of time, will require electrofishing once or twice annually.

Fisheries that are in great shape require management just as much as fisheries in poor shape if the goal is to maintain a great fishery over time. Designing and following a Fisheries Management Plan (FMP) allows lake and pond owners as well as biologists to stay ahead of potential issues. Using electrofishing as part of a proactive management approach is key to the success. FMPs are designed based on the waterbody's characteristics as well as the goals, timeline, and budget of each individual lake or pond owner or community. While electrofishing allows biologists to track changes in the fishery, a number of other things are often recommended in a FMP to achieve those goals: Fish feeders and fish stocking to boost the forage base are often combined with selective predator harvests to improve the predator to prey ratio. Submersed aeration

is often installed to improve water quality and can be teamed with liming and fertilizing to increase a waterbody's productivity.

A private fishing club in central Virginia that implemented an FMP for their 85 acre lake in 2010 serves as a great example of how electrofishing and a management plan can improve a fishery. Following several meetings with club members, a long-term budget and strategy was approved including electrofishing, bluegill stocking, selective bass harvesting, fertilizing, water quality monitoring, and adding a few fish feeders. After just five years, the forage base has greatly increased and the number of large fish caught by anglers has steadily risen, with an annual percent of largemouth bass caught over 16 inches increasing from 9.8% to 40%. The number of bass greater than five pounds has also steadily increased, from 16 fish in 2010 to 48 fish in 2015.

Whether you are monitoring a fish population and adjusting strategies, or taking your first look under the surface, electrofishing and a Fisheries Management Plan are keys to successfully managing your fishery. Remember, it is always easier and less expensive to maintain a high quality fishery than to fix a broken one. Contact a professional fisheries biologist today to grow large, healthy fish for all to enjoy.

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Volunteer Spotlight: SOLitude's 2015 Volunteer of the Year

OLitude Lake Management named Ann Marie Dori, Marketing Project Coordinator, as the 2015 Volunteer of the Year. And in recognition of her incredible volunteering efforts last year, SOLitude made a charitable donation of \$3,000 to Lynnhaven River NOW in her name.

Ann Marie Dori spent 191 hours volunteering in 2015 and also encouraged friends to join her efforts, totaling an additional 105 volunteer hours for the year. She volunteered for a number of organizations throughout Southeastern Virginia including the Virginia Beach SPCA, Lynnhaven River NOW, Virginia Peninsula Foodbank, Surfrider Foundation and FiXiT Foundation.

You can find Ann Marie at the Virginia Beach

SPCA satellite cat adoption center every Monday night caring for adorable kittens and cats who are awaiting their forever homes. Over 142 cats were adopted from the center in 2015, thanks in part to her help and commitment. Ann Marie also

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You can find Ann Marie at the Virginia Beach SPCA satellite

cat adoption center every Monday night caring for adorable kittens and cats who are awaiting their forever homes.

pledged to clean up her neighborhood in the Ocean View area of Norfolk and collected bags of trash and debris from the land and shorelines of the Chesapeake Bay during weekly excursions. She heavily supported a local organization, Lynnhaven River NOW, by joining their monthly environmental community cleanup events and helping with their annual fundraiser / educational fall festival.

Every year, SOLitude Lake Management staff earns points for their volunteer time and, based on the amount of points earned, the company then rewards them with a donation to a non-profit of their choice. Ann Marie directed her \$3,000 donation to Lynnhaven River NOW, a non-profit organization headquartered in Virginia Beach, VA that is focused on restoring and protecting the Lynnhaven River.

Pam Northam, Communities Coordinator at Lynnhaven River NOW, expressed her gratitude. "Thank you so very much for your incredibly generous gift. Because of you, teachers and students will have fun and engaging watershed education opportunities throughout the year. Your support means adding to our successful oyster restoration program, growing more than 63 acres of sanctuary reef and restoring our precious waterways."



Ann Marie Dori (left) directed her SOLution reward and donation as Volunteer of the Year to Lynnhaven River NOW in Virginia Beach, VA. She and Tracy Fleming (center, left), SOLitude's Director of Marketing, present the donation check to Lynnhaven River NOW's Pam Northam, Communities Coordinator, (center, right) and Emily Bodsford, Pearl Home and Pearl Faith Programs Assistant (right).



In addition to her personal outreach efforts, Ann Marie Dori is responsible for leading the company's volunteer and community outreach program, The SOLution. In 2015, the SOLitude team collectively volunteered 1,453 hours and donated

over \$38,000 in cash and services.

"Ann Marie has taken The SOLution to new heights and continues to inspire us all with her never-ending dedication to supporting and improving her local community," said Marc Bellaud, President of SOLitude Lake Management. "We admire Ann Marie's commitment and passion to make the world a better place."

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. SOLitude's company leadership feels it is important to not only be good stewards of the environment, but also to fulfill company core values to "take action and be accountable" and to "protect and respect nature."



To participate or share a non-profit's goals for consideration in The SOLution, contact info@solitudelake.com or visit www.solitudelakemanagement.com/solution.

NewSOL

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

Q Where did you grow up and how did you get to where you are today, professionally?

A I grew up in the small town of Harrisville, New Hampshire, with an appreciation for clean lakes and environmental stewardship. While fascinated with plants and water, I was not fully aware of environmental action until I attended high school environmental science classes. I studied at the University of New Hampshire, graduating with a Bachelor of Science degree in Marine, Estuarine and Freshwater Biology and minors in Wetland Ecology and Music. During college, I travelled to Grenada for a tropical coastal plant ecology course which pushed my interest towards wetland ecology. After graduating in 2015, I took an internship for the New Hampshire Department of Environmental Services Aquatic Plant Management program, which led me to SOLitude Lake Management.



Brea Arvidson Aquatic Biologist

Q What were you the most proud of throughout your schooling/career?

A During the summer of 2014, I self-motivated a research project on the occurrence and photoresponse of Nostoc, an under-researched colonial cyanobacteria. I received two college grants to pursue the research and presented my findings at two undergraduate research conferences. My research advisor, Al Baker, and I are in the process of publishing.

Q What are your overall responsibilities and what excites you most about your work?

A I am one of four dedicated biologists on SOLitude's Biology Team. In the winter months, I assist with the permitting process for our numerous projects in the coming season. While in the field during our peak season, I conduct in-depth surveys and monitoring for invasive and nuisance plants. I am excited for the aquatic plant control I will be instituting throughout our regions this year. Far too many of our lakes are tolled by urbanization and have become an eyesore for tourists and environmentalists alike.

Q Where can we find you when you're not working? What activities do you enjoy most? A Outside of work, I fill my time with kayaking, playing multiple music genres and instruments, contra dancing, and doing crafts (crocheting, knitting and cross-stitching).

SOLitude Locations

OLitude Lake Management is consistently adding new staff and office locations to better serve and exceed the expectations of our growing clientele throughout the United States. Below is a list of all of our current locations with professional staff servicing all of your lake, stormwater pond and fisheries management needs:

Arkansas Little Rock: 888.480.5253

Colorado Denver: 888.480.5253

Delaware Georgetown: 302.329.7664 Newark: 302.329.7664

Maryland Gaithersburg: 240.780.2053 Massachusetts

Shrewsbury: 508-885-0101

Mississippi Jackson: 888.480.5253 Missouri Steele: 888-480-5253

New Jersey Hackettstown: 908.850.0303 Mt. Laurel: 856.254.2039

New York Oneonta: 607.433.2484

North Carolina Charlotte: 980.248.2979 Raleigh: 984.444.2548

Pennsylvania Avondale: 484.727.8918 **South Carolina** Charleston: 843.640.0064

Tennessee Nashville: 888.480.5253

Texas

College Station: 979.279.2946

Virginia Charlottesville: 434.218.7829 Fairfax: 540.371.4382 Newport News: 757.591.8780 Richmond: 804.525.9088 Virginia Beach: 757.689.8890

YOUR LAKE

Win a FREE Lake Makeover!

Are you aware of a nonprofit's lake or pond that is unhealthy and in dire need of ecological restoration? Are recreational activities limited due to nuisance algae and aquatic weeds?

Submit your photos and story to info@solitudelake. com for the chance to win a FREE Lake or Pond Makeover! Join us in being part of The SOLution.

In support of Earth Day (April 22) and Arbor Day (April 29), join us in being part of The SOLution. Become a new follower of any of our informative social media pages or blog during the month of April and we will plant a new tree for you!

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www.solitudelakemanagement. com/blog

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Effectively Controlling Nuisance Aquatic Plants

By Jeff Castellani, Director of Mechanical Operations

echanical aquatic weed harvesting — there's no complicated dose calculations, no water use restrictions, and no sophisticated scientific theories, just a technique so direct and effective that even your grandfather would approve of it. This proven and time tested management principle should be the very foundation of aquatic plant management in areas where treatment is not desired.

Mechanical aquatic plant control has been employed in the US for over a hundred years, resulting in almost every conceivable type of equipment engineered for a specific purpose. However, the one design that has survived the near continual evolution of this strategy has been that of the aquatic weed harvester. In fact, aquatic weed harvesting equipment has remained virtually unchanged for more than 50 years. These machines consist of a paddle wheel propelled barge equipped with an adjustable sickle-bar cutting head and mesh conveyor system. This simple yet effective design allows these machines to efficiently collect the cut target aquatic vegetation, and access shallow water areas where problematic plant growth

often occurs. These machines are produced in various sizes, offering an array of different cutting widths and on-board storage capacities.

Although not always correctly applied throughout the years, mechanical harvesting can be a very effective aquatic plant control technique when used in the right situation. Most frequently, harvesting is employed in the management of annual seed propagating species like water chestnut (*Trapa natans*). Harvesting these types of plants prior to the development of viable seeds can prevent target plant reproduction, eventually results in long-term control of the unwanted plant infestation. In addition to the control of seed propagating plants, harvesting can be used to provide immediate and area specific relief of nuisance plant growth and can often be used in waterbodies where conditions preclude the use of aquatic herbicides.

Not only does mechanical harvesting represent an alternative non-chemical management technique, but it is also a very useful component of a larger integrated aquatic plant management program. The ancillary benefit of plant biomass removal can be used to slow the accumulation of organic sediments derived from the annual decomposition of plant material. Additionally, removing dense aquatic vegetation purges the nutrients from

the lake system, which is an essential component of any long-term restoration plan. Area selective harvesting can lastly be employed to manage habitat structure for fisheries or other wildlife without significantly altering the vegetative assemblage.

SOLitude Lake Management has long supported mechanical harvesting and, in fact, owns and operates one of the largest fleets of contract harvesting equipment in the country. SOLitude has both large (H10-800) and small machines (H5-130) to address an array of projects, ranging from a 100 acre removal effort of water chestnut in Lake Champlain in Benson, Vermont, to a three acre removal effort of water lily (Nymphaea spp.) for a private landowner. We have seen similar success in controlling retention ponds in order to maintain their function and water storage capacity. SOLitude is currently managing a large water chestnut infestation in six retention ponds and two channels for a large mall in Connecticut. Through the continual mechanical management of these areas, the ponds will be appeased of nuisance plant growth and the associated organic

matter buildup in the ponds' sediment layer.

Often times, the success of both large and small harvesting projects is dependent upon accessibility and efficiency of the shore-based disposal operation. Depending on the target plant species and the density of the target growth, these types of projects can sometimes yield in the range of 8-15 tons of wet vegetation biomass per acre. Given these high plant volumes, it is critically important to identify suitable shoreline off-loading site(s) as close as possible to the designated work area and have appropriate equipment available to keep the operation moving. In order to facilitate efficient plant disposal, SOLitude has invested in a variety of specialty equipment, such as high-speed transport barges and shore-based conveyor systems.

Mechanical harvesting offers a variety of underutilized benefits for lakes and ponds with invasive aquatic plant growth or systems with just a simple overabundance of native species. The removal of plant biomass and associated nutrients not only provides immediate relief of problematic aquatic plants, but also addresses one of the underlying causes of unbalanced plant production. We encourage you to contact SOLitude's Mechanical Operations team to see how the original "green" aquatic plant management technique can help to improve the condition of your waterbody.

Before and After Showcase **Successful Aquatic Weed and Algae Treatments**

Surface Area: 360 acres Primary Target: Fanwort and Variable Watermilfoil Restored By: Michael Lennon, Senior Biologist

Location: Aberdeen, MD Surface Area: 0.95 acres Primary Target: Filamentous

Restored By: Jason Luce, Certified Lake Manager and Fisheries & Wildlife Scientist

Location: Beaverdam, VA Surface Area: 0.60 acres Primary Target: Watershield Restored By: Brent Weber, **Environmental Scientist**

Before

Before

Before

Location: Fort Mill, SC Surface Area: 0.90 acres Primary Target: Filamentous Algae and Duckweed Restored By: Trent Nelson, Aquatic Specialist

Check Us Out...

April 6

2016 New Jersey Invasive Species Conference – Hillsborough, NJ

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North Carolina Chapter of **Community Associations Institute's** Annual Conference & Expo Greensboro, NC

April 14

Pennsylvania and Delaware Valley Chapter of Community Associations Institute's Annual Expo – Philadelphia, PA

April 22

Rocky Mountain Chapter of **Community Associations Institute's** Spring Showcase & Trade Show Denver, CO

April 29-May 1

New York State Federation of Lake **Associations Annual Conference** (NYSFOLA) – Hamilton, NY

May 4-7

2016 Community Associations Institute's Annual Conference and Exposition – Orlando, FL

May 20-21

2016 New England Chapter of the North American Lake Management Society and the Massachusetts **Congress of Lake and Pond Associations Annual Meeting** Marlborough, MA

June 4

Chesapeake Bay Foundation's 28th Annual Clean the Bay Day Various Locations

Restoring Balance and Enhancing Beauty with Aeration

ountains and aerators are water guality management tools for lakes and ponds that increase the dissolved oxygen level and initiate a natural clean-up process to address water quality issues such as algae build up, aquatic weeds, bottom sludge, foul odors, insect infestation, and water stagnation. Their use is a natural and environmentally sustainable

strategy for maintaining an aesthetically pleasing and healthy body of water.

SOLitude was recently recognized as the third largest distributor of AguaMaster aerators and fountains in the world. Some of our clients' treasured properties are featured throughout the 2016 AquaMaster Calendar, photographed by our talented scientists:

Kyle Finerfrock, Environmental Scientist: Aqua-Master 25HP Celestial Series Aeries fountain in a commercial property lake in Suffolk, VA

Brent Weber, Environmental Scientist: Aqua-Master 3 HP Masters Series Lakewood fountain in a residential community stormwater pond in Williamsburg, VA

Derek Johnson, Certified Lake Manager and Fisheries and Wildlife Scientist: AquaMaster 5 HP Masters Series Lakewood fountain in a residential community in Williamsburg, VA

Want helpful pond and fisheries management tips all of the time?

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- Bathymetric Studies
- Biological Augmentation
- Mechanical Harvesting
- Ultrasonic Algae Control

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Ponder These Thoughts

OLitude 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 spring months:

- Have your lake or pond's water quality professionally tested. Find out early in the season if there is an imbalance or increased nutrient load in the water.
- Be patient if you notice spring algae or green water. Once your waterbody has established a balance, either naturally or with assistance from the SOLitude Lake Management Annual Management Program, algae will clear up.
- Put a natural and effective integrated mosquito management plan into place for your community with surveillance, monitoring, minnow or bluegill stocking and other control methods.
- Examine basin inlet(s) and outlet(s) to ensure devices are obstruction free and operational. Schedule an annual inspection.

- If your lake or pond's vegetative buffer was not trimmed last fall, spring is also a good time to remove dead vegetation from the buffer, setting the stage for healthy growth.
- Spring is the perfect time to enhance your waterbody's buffer with supplemental plantings. Beneficial flowering plants will add color and character to your property.
- Be sure your lake or pond is stocked with easy-to-catch fish such as bluegill, largemouth bass and channel catfish and plan a successful summer fishing event in your community.
- Spring is an ideal time for a fisheries biologist to assess the health of your fishery, using an electrofishing vessel to provide a strategy to keep your fishery healthy.
- Consider Hydro-Raking as an effective alternative to costly dredging for area-selective removal of nuisance, rooted vegetation and to clear accumulations of bottom muck and debris.

MappingNetwork.