



# Aquatics **in** Brief

Volume 11, Issue 1

## Inside:

Page 2

**Utilizing Bathymetry to Budget for Future Repairs and Dredging**

Page 3

**Restoring Fiske Pond through Mechanical Harvesting**

Page 4

**Creating a Better World through The SOLution**

Page 5

**New SOLs**

Page 6

**Drinking Water Reservoir Management Zebra Mussels**

Page 7

**Before and After Showcase Volunteer of the Quarter Check Us Out...**

Page 8

**Ponder These Thoughts**



## "Cover" Your Waterbody

*How to Create a Better Aquatic Habitat for Your Fish*

By **Paul Dorsett, Fisheries Biologist and Territory Leader**

**T**here's an old adage that states, "Ninety percent of fish live in ten percent of the water." This statement has more truth than most realize. Fish move throughout their environment for a variety of reasons including spawning, optimizing their temperature, feeding, and avoiding predators. For "lie in wait" predators and many baitfish species, these movements are mostly relegated to being in or around the desired cover at varying depths. The availability of quality cover and the fishes' desired depths will determine which 10% of the aquatic environment the fish choose to live in at any point in time. Therefore, placement of the right amount of cover at the appropriate depths should be a major objective of a lake or pond owner's habitat improvement projects.

For the purposes of this article, I'll limit discussion to the non-living cover that can be placed in a waterbody to provide cover for your fish. The first consideration in choosing cover type is the physical make-up of this cover with respect to its suitability for both forage fish and predator species. Baitfish

tend to prefer large dense cover that offers the tight interstitial spaces and volume needed to protect them from predators. Larger predator species, however, prefer less dense cover with larger interstitial spaces that provide them a place to "loaf" while they await prey to make "their last mistake."

Cover also provides substrate for periphyton. Periphyton is a general term used to describe the community of bacteria and invertebrates that live on most underwater surfaces. Periphyton are not only important as a food source for your fish but also play an important role in improving water quality and competing with undesirable algae for nutrients. While all forms of cover will provide a substrate for periphyton, the quantity of periphyton is directly proportional to the surface area of the structure on which it grows.

Since periphyton grow best on firm materials you should choose materials that will be long lasting. Artificial structures constructed for this purpose are made of high density plastic material, which, when placed underwater

*Continued on page 2*



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

# Utilizing Bathymetry to Budget for Future Repairs and Dredging

By **Kevin Tucker, Chief Executive Officer**

If you live in a planned community governed by a Homeowners' Association (HOA), are part of a lake association, own commercial developments, belong to a golf club, are a member of a recreational club, or you are a board member or manager for any of the above, you are likely familiar with the need to maintain a reserve and replacement budget. In many cases, it is a statutory requirement.

Reserve Studies are a great tool to help prepare stakeholders for significant future repair and replacement expenses. They often uncover items that might not have been top of mind if left unaddressed, but would pose a significant financial risk to the group. In most cases, the Reserve Specialist preparing the report is able to identify very accurate estimates for the expected life of your physical assets, as well as the corresponding costs for making significant repairs or replacing them as their expected life comes to an end.

As valuable as these studies can be for those whose responsibilities include managing a lake or pond, we find that they are typically missing one key piece of information... Dredging! In many cases, dredging will be the single largest expenditure a community or development will ever face and we want you to be prepared.

Most planned communities, commercial developments and golf courses have stormwater lakes or ponds incorporated into

their overall development designs. These stormwater management facilities are designed to collect all stormwater flowing in from the community's impervious surfaces such as roofs, sidewalks, and streets. In doing so, all of the sediment, grass clippings, leaves, fertilizer, other organic matter, and pollutants contained in this stormwater will be collected and settle to the bottom of the pond.

This is good news for our streams, rivers, bays, and oceans, as these lakes and ponds filter runoff water and help ensure that only clean water is discharged into our natural waterways. However, it creates what could ultimately be a costly maintenance headache. What do you do when your lake or pond has enough accumulated sediment and organic matter that it needs to be dredged in order to continue to function properly?

Although Reserve Studies do typically address the potential need for dredging, they are not necessarily accurate or specific to your particular site. Every waterbody is unique, and the demands put on each system will vary based on the size of the overall watershed, weather conditions, landscaping and fertilization practices, and level of ongoing annual lake and pond management activities.

If you want to accurately evaluate the current sediment accumulation in your lake or pond, and project forward to when it will need to be dredged, and how much it will



cost to do so, there is only one choice... bathymetry.

Bathymetry is the process whereby the surface of the lake or pond is plotted using GPS lake mapping technology, and each of the GPS points recorded is correlated to the corresponding depth of the waterbody at that specific point. After collecting thousands of surface points with their associated depths, a three dimensional model of the bottom of the lake can be developed. With this information, the current maximum storage capacity (volume) of the waterbody can be quantified and compared to original design plans to determine how much of the original storage capacity has been displaced by the accumulation of sediment and organic matter. We can then determine the anticipated cost to dredge, or if dredging is not needed now, project forward to when it will be needed based on the sedimentation rate calculated from the information gathered.

All lakes and ponds will need to be dredged at some point... are you prepared? ■

## “Cover” Your Waterbody

away from damaging UV rays, can last several decades. Scrap construction materials can also be used as cover. Preferred scrap includes used concrete, cinder block piles, and old or damaged culverts. Natural varieties of structure that work well in ponds include large rock, certain varieties of cut trees such as cedar or juniper, and many varieties of hardwood trees. Trees with soft wood such as willow and pine decompose quickly, relative to hardwood varieties, and are not recommended for use as fish cover.

*Continued from front cover*

Ease of handling and the equipment available for placement should also be considered when choosing your cover material.

Unlike humans, fish utilize their environment to optimize their body temperature. Water temperature changes far more vertically in the water column than it does horizontally. For that reason, fish move vertically in the water column to maintain their temperature at their desired level. Therefore, cover should exist in all depths of the lake or pond. Dense cover should be located

closer to shore where smaller fish and bait-fish hang out while less dense cover should be placed in deeper water. Incorporating diversity into the type and placement of your structure will offer your fish suitable habitat for all seasons.

Finally, don't overdo structure. Ten percent coverage of your waterbody is plenty to support most cover-reliant species. And when it's time to go fishing, you'll know which ten percent of the pond your fish are spending their time in! ■



# Restoring Fiske Pond through Mechanical Harvesting

By **Jeff Castellani, Director of Mechanical Operations, and Emily Walsh, Environmental Scientist**

**F**iske Pond is a 67-acre waterbody located in Natick, Massachusetts within the Lake Cochituate sub-basin of the Sudbury River Watershed. Nestled in an urban area outside of Boston, Massachusetts, Fiske Pond was traditionally enjoyed by the community for recreational activities such as fishing and canoeing. Unfortunately, these leisurely activities became increasingly limited due to the dense mat of

**Due to the competitive nature of invasive Water Chestnut, it was decided that mechanical and physical removal, via harvester and hand pulling, was the proper management approach for the removal and eventual eradication of the nuisance aquatic weed from Fiske Pond.**

invasive Water Chestnut (*Trapa natans*) that has proliferated since 2004. By 2008, the infestation had established a monoculture covering over 40 of the 67 acres, leading to major biological and recreational concerns. At this time, the Department of Conservation and Recreation (DCR) contacted SOLitude to initiate a management program.

Due to the competitive nature of invasive Water Chestnut, it was decided that mechanical and physical removal, via harvester and hand pulling, was the proper management approach for the removal and eventual eradication of the nuisance aquatic weed from Fiske Pond. Mechanical harvesting was an ideal management option due to the machine's mobility and capability to remove plants from the water's surface with minimal disturbance to the sediment below. This option was more attractive than herbicide applications because it removed the plant biomass and prevented the dense mat of vegetation from decaying, releasing nutrients back into the water column and contributing to further eutrophication of the pond.

On July 21, 2008, SOLitude began harvesting, supplemented with hand-pulling efforts along the shoreline. The 2008 harvesting effort lasted 24 days and yielded a total of 225

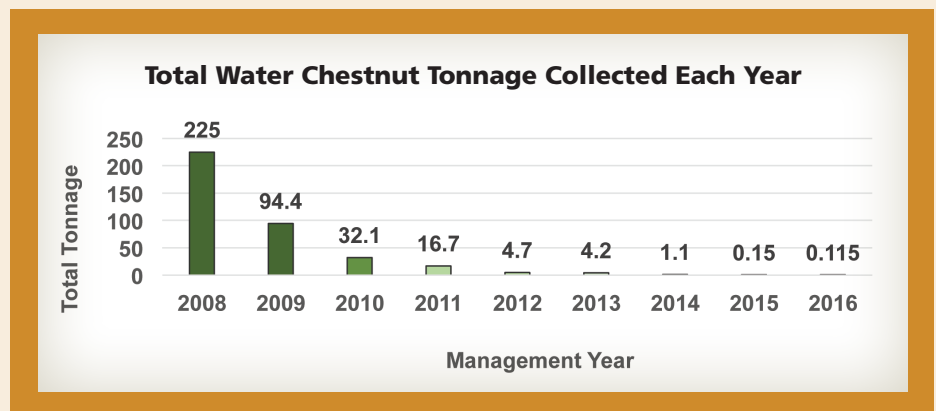


tons of plant material. The DCR was thrilled with the results and deemed the project a success. One DCR official commented, "Fiske is looking great. The project seemed overwhelming at first, but the guys did a great job."

Since Water Chestnut is an annual plant, with seeds viable for 12 plus years, the harvesting process has been repeated each year to continually diminish the seed bed to elimination. The past nine years of harvesting have consisted of three years of aggressive mechanical removal (2008-2010), three years of limited mechanical removal (2011-2013) and three years of solely hand harvesting due to low densities and coverage (2014-2016). Since the project began, the total annual Water Chestnut plant tonnage removed has continually decreased each year. When SOLitude started in 2008, there was a total of 225 tons collected (approximately 4.5 million plants) compared to 0.115 tons collected (2,300 plants) in 2016.

The past nine years of mechanical and physical management at Fiske Pond have nearly eliminated the Water Chestnut, which now only sporadically occupies 2.8 acres of the original 40-acre infestation. The renewed open

water space now provides habitat for native flora and fauna to re-populate, as well as increases water flow and dissolved oxygen levels within the waterbody. Hand harvesting for the limited amount of Water Chestnut will continue for several years until it is completely eradicated. The Fiske Pond Water Chestnut management project is a true success story; balance has been restored to the aquatic ecosystem and the community is once again enjoying canoeing and fishing in the pond. ■



# Creating a Better World

**W**ith so many challenges and obstacles facing the world today, we have made it a company mission to be part of The SOLution. Through community involvement, volunteerism, activism, outreach and environmental consciousness, we continue to improve our local communities and make a difference. We invite you to join us in becoming a part of The SOLution. Whether you follow us on our social media pages, where we pledge to donate to a great cause on your behalf, join us at the Foodbank, help clean up a community park, volunteer at a youth fishing event, or inform us about a non-profit's lake or pond that is in need of our donated services, we welcome you to join us in creating a better world! [www.solitudelakemanagement.com/community](http://www.solitudelakemanagement.com/community)

Our community outreach program, The SOLution, had another AMAZING year in 2016! Here is a brief look at the impact this program had on local communities in 2016:

## Company SOLutions



Even though we are a growing national company, we remain committed to supporting our local communities. Each office plans team volunteering events throughout

the year, and we also pursue our own volunteering passions:

- The Foodbank's Backpack Program
- Grass and Tree Plantings
- River, Bay, Lake and Beach Clean Ups
- Dog and Cat Adoption Events
- Fishing Tournaments and Outdoor Kids' Events
- Lake Restorations for Veterans and Disabled Children

## Little GOBBLERS

Through our Little GOBBLERS program, we were able to provide 228 under-



resourced families with a Thanksgiving turkey or grocery store gift card to purchase needed food and supplies. The program supported 21 elementary, middle and high schools from Massachusetts to South Carolina to Texas. The SOLitude teams also donated time to the Virginia Peninsula Foodbank, the Foodbank of Delaware, the Worcester County Food Bank in Massachusetts, and Food for Others in Fairfax, Virginia to assist in preparing thousands of bags of food for under-resourced families during the holiday season.

## HOLiday Cheer

We continued our partnership with B-Strong Foundation this holiday season to assist families with children who have been diagnosed with cancer at The Children's Hospital of Philadelphia (CHOP). We also supported the Shriners Hospital for Children in Springfield, MA, and the Children's Hospital of the King's Daughters



in Norfolk, VA. SOLitude donated \$1,550 total to these hospitals in toys and games, which increased \$10 for every new social media follower we received in the month of November.

Our "HOLiday Cheer" families that we adopted this year live in Pine Hill, NJ, Fort Plain, NY, and Madison, VA. These families, which include eleven children in total, were selected by SOLitude staff, clients and faculty at local schools based on nominations showing



a true need for additional HOLIDAY Cheer and financial support during a very trying time. Employees on the SOLitude team generously purchased items from the children's wish lists to help bring Christmas morning smiles.

We also supported several under-privileged children throughout the communities we serve by donating to Toys for Tots in Massachusetts, along with donating Christmas turkeys and toys to 50 families with elementary-aged schoolchildren in Virginia. ■

## The SOLution Stats for 2016:

- Dollars Donated: \$42,550**
- Hours Volunteered: 2,288**
- Under-Resourced Families Helped: Over 7,700**
- Forever Homes Found For Dogs and Cats: 247**
- Trash Collected From Cleanup Efforts: 9,121 lbs.**
- Plastic Pesticide Containers Recycled: 22,442**
- Recycled Cardboard, Plastics & Paper: 1,076 cu. yds.**
- Good Feelings Created: Immeasurable!**

A special thank you to the SOLitude family, our clients and vendor partners and social media fans for supporting The SOLution and our ongoing initiatives to help create a better world. Join us in being "part of The SOLUTION" in 2017!

To learn more visit: [www.solitudelakemanagement.com/solution](http://www.solitudelakemanagement.com/solution)

The **SOL**ution  
creating a better world



# 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.

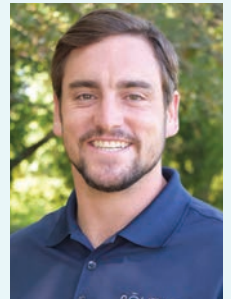
**Dylan Kwak**  
*Wildlife and Fisheries Biologist*  
Bryan, Texas

Dylan regularly works with clients throughout Texas to control aquatic vegetation, maintain healthy fisheries populations, and conduct water and soil sampling. Dylan earned his Bachelor of Science degree in Fish, Wildlife and Conservation Biology from Colorado State University in Fort Collins, CO.



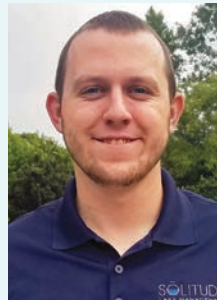
**Alex Harrison**  
*Wildlife and Fisheries Scientist*  
Bryan, Texas

Alex is responsible for vegetation control, water quality monitoring, fish stocking and fish surveys for customers across the state of Texas. He enjoys monitoring the natural processes in aquatic ecosystems, as well as interacting with them to help maintain overall system health and balance.



**Jackson Minnich**  
*Wildlife and Fisheries Scientist*  
Newport News, Virginia

Jackson joined the team after graduating from the University of Tennessee with a bachelor's degree in Wildlife and Fisheries Science and a minor in Forestry. At SOLitude, he works directly with clients to help restore ecological balance to their waterbodies.



**James Lacasse**  
*Environmental Scientist*  
Shrewsbury, Massachusetts

James works with clients in the southern New England region and regularly performs vegetation surveys to help identify nuisance aquatic plant species that may be detrimental to the ecological balance of lakes and ponds. He performs aquatic, marsh and upland applications to help control invasive species.



**Daniel Hood**  
*Wildlife and Fisheries Scientist*  
Salem, Virginia

Daniel's role at SOLitude is to provide clients with sustainable solutions utilizing the most current environmental technologies. He previously worked for the South Carolina Department of Natural Resources (SCDNR), where his duties included water quality sampling and analysis as well as fisheries management services.



**Jessica Ferguson**  
*Aquatic Technician*  
Bryan, Texas

Jessica supports general operations and may very well be the first person you speak to when you call SOLitude's Texas office. She also assists in the field and works directly with clients to help them achieve their lake, pond and fisheries management goals.



**Dustin Vassar**  
*Business Development Consultant*  
Bryan, Texas

Dustin is responsible for helping the team build relationships with clients in Texas as SOLitude continues to grow. Prior to joining SOLitude, he worked out of Irving, Texas as a Business Performance Advisor and provided small businesses with human resources and business solutions.



**Kelly Wilson**  
*Regional Administrator and Client Relations*  
Georgetown, Delaware

Kelly assists staff with contract writing, proposals and scheduling. She is one of the first points of contact for clients, and is focused on providing exceptional customer service. Before joining SOLitude, Kelly worked with Kent Conservation District as an Urban Conservationist in Kent County, Delaware.



# Drinking Water Reservoir Management

By **Shannon Junior, Aquatic Ecologist and Senior Business Development Consultant**

**W**e are fortunate in the United States that our country has the technology and resources to provide clean and palatable drinking water to our citizens. However, the recent catastrophic situations in Flint, Michigan earlier this year and in Lake Erie in 2014 have reminded many Americans that this is a privilege that we should not take for granted. And while the lead crisis in Flint was caused by human negligence and could have been prevented, the ongoing cyanobacteria blooms in Lake Erie are due to a much more complicated process of phosphorus pollution and water quality degradation.

Cyanobacteria were previously identified as blue-green algae due to their ability to photosynthesize, although they are actually prokaryotic and more closely related to bacteria than algae. Now commonly referred to as harmful algae blooms (HABs), cyanobacteria blooms are particularly problematic when they occur in waterbodies that are used as a source for drinking water utilities. Not only do cyanobacteria excrete compounds such as 2-Methylisoborneol (MIB) and geosmin that cause unpleasant tastes and odors in the water, but they also have the potential to produce cyanotoxins that can be harmful to humans, pets and wildlife.

There are many management strategies that can be used in the watershed, the reservoir, the canal system, and the treatment plant to address the issues caused by cyanobacteria in drinking water. Many of these treatment methods are not feasible or cost-effective and cannot be easily implemented. Watershed management practices such as reducing agricultural and urban runoff are costly and difficult to implement when the sources are not under the direct control of the water managers. Standard in-plant water treatment processes can be effective in removing cyanobacteria and their associated toxins, but the removal of MIB and geosmin compounds to non-detectable levels requires more expensive alternatives. In



*Before*



*After*

*Application of an all-in-one algaecide and water quality enhancer significantly reduced cyanobacteria in this 104-acre drinking water reservoir and improved the taste and odor of the resulting drinking water.*

most cases, the treatment of cyanobacteria blooms in the source water is the most cost-effective approach for improving drinking water quality.

One of the most important features of a source water protection program is a robust algae monitoring effort. Water samples should be collected at multiple depths, and the algae species should be identified, classified and enumerated. A monitoring program will allow resource managers to anticipate when a bloom is developing, and a site-specific algal density action threshold can be set to trigger when an algaecide treatment should be performed using a product approved for use in potable water. Treating blooms early before significant biomass accumulates may prevent taste and odor issues from developing in the water, and will minimize the quantity of algaecides required for long-term management. This approach is also safer since it reduces the risk of dissolved oxygen crashes after treatment, especially during the hot summer months

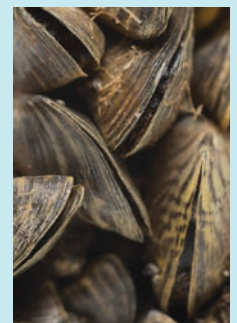
when cyanobacteria blooms are the most prevalent.

Another strategy that is widely implemented for source water algae control is nutrient mitigation. Products that directly inactivate phosphorus, such as alum and lanthanum-modified bentonite, can be used to help improve the water quality in reservoirs and minimize the conditions that are conducive for cyanobacteria blooms. Nutrient mitigation applications can either be performed all at once, or phased over multiple years depending on site specific conditions, the product selected for treatment, and the goals and budget of the stakeholders.

SOLitude works extensively with drinking water resource management professionals to preserve, protect and restore the quality of source water reservoirs. We are ready to help with the development and implementation of monitoring programs, action-threshold based algaecide treatment programs, and nutrient mitigation strategies. ■

## Zebra Mussels: *Tiny Invaders Causing Big Problems*

**H**ighly invasive zebra mussels are a growing threat to our freshwater lakes, ponds and rivers. Zebra mussel populations, first reported in the Great Lakes, are now found in at least 28 states. These tiny invaders adversely affect phytoplankton and zooplankton populations, kill native mussels, ruin fish spawning areas, damage structures, and clog water supply pipes and facilities. In fact, there are estimates that zebra mussels have cost communities and businesses as much as \$5 billion since being discovered in the U.S. in 1988. While research into prevention and eradication continues, there are some proven management strategies currently available. Contact the professionals at SOLitude Lake Management to discuss how we might be able to help with your zebra and quagga mussel management efforts. ■





# Before and After Showcase

## Excellence in Water Quality Treatments



**Location:** Denver, Colorado  
**Surface Area:** 23.5 acre municipal park lake  
**Primary Target:** Filamentous algae, sago pondweed  
**Restored By:** Chuck Rodosevich, Aquatic Specialist



**Location:** Bel Air, Maryland  
**Surface Area:** 0.5 acre stormwater pond  
**Primary Target:** Fragrant white water-lily  
**Restored By:** J. Wesley Allen, Environmental Scientist and Territory Leader and Gavin Ferris, Ecologist



**Location:** The Woodlands, Texas  
**Surface Area:** 40 acre private community lake  
**Primary Target:** Coontail, duckweed and lotus  
**Restored By:** Logan Cowan, Aquatic Technician



**Location:** Nashville, Tennessee  
**Surface Area:** .35 acre private pond  
**Primary Target:** Filamentous algae, duckweed  
**Restored By:** Brent Weber, Environmental Scientist and Territory Leader

## Featured Mechanical Harvesting Project



**Location:** Newton, Waltham and Weston, Massachusetts  
**Surface Area:** Harvested 96 acres of the Charles River  
**Primary Target:** Water Chestnut  
**Restored By:** Jeff Castellani, Director of Mechanical Operations

## Check Us Out

**S**OLitude Lake Management will be participating in the following events over the coming months. We encourage you to come see us!

**January 10-12**  
**18th Annual Northeast Aquatic Plant Management Society Conference**  
Portsmouth, NH

**January 12**  
**South Carolina Chapter of Community Associations Institute Annual Community Association Day and Trade Show**  
Charleston, SC

**January 25-27**  
**Colorado Water Conference (CWC) Annual Convention**  
Denver, CO

**February 25**  
**Washington Metro Chapter of Community Associations Institute Annual Conference and Expo**  
Washington, DC

**March 1-2**  
**Pennsylvania Lake Management Society Conference**  
State College, PA

**March 5-7**  
**The Virginia Water Conference – Virginia Lakes and Watershed Association**  
Richmond, VA

**March 11**  
**Southeastern Virginia Chapter of Community Associations Institute Annual Community Associations Day**  
Virginia Beach, VA

**March 18**  
**Connecticut Chapter of Community Associations Institute Annual Conference Tradeshow and Education Expo**  
Plantsville, CT

## Volunteer of the Quarter

### Congratulations to our Volunteer of the Third Quarter, Vincent Giordano!

Vincent volunteered an impressive 58 hours in his community during the third quarter of 2016, with the majority of his efforts focused on working with the Future Farmers of America (FFA) to support local schools through agricultural education and leadership development. Vincent was instrumental in making the FFA's annual fundraising event, the Warren County Farmers' Fair, in New Jersey, a huge success. He volunteered his time during each day of the nine-day event, helping with a wide variety of tasks including running a car show, working a hot balloon race, and wrapping gift baskets. Vincent is a valued member of the SOLitude team and we admire his dedication to supporting his community. Congratulations, Vincent! ■





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**Aquatics**inBrief **WINTER 2017 | Volume 11, Issue 1**

**Ponder These Thoughts**

**S**OLitude Lake Management wants to be certain that your lake or pond is prepared for 2017. With this in mind, we recommend that you consider the following during the winter months:

- Review your lake and pond budget and replacement reserve funds to ensure that funds are available for bathymetry to determine if and when you will have a need for hydro-raking or dredging.
- Evaluate your waterbody to determine if you need to add aeration to meet your management goals and objectives for 2017, and don't forget to schedule annual maintenance and service for your existing fountains and aeration systems this winter.
- Think ahead to spring and pesky mosquitoes. Keep them at bay by setting up an Integrated Mosquito Management plan to include surveillance, source reduction, larviciding, fish stocking, monitoring and more.
- Consider installing a SonicSolutions algae control device prior to spring to help prevent the onset of algae blooms as the weather warms.
- If you have not been maintaining the vegetative buffer along the shoreline and the sloped areas adjacent to your lake or pond, schedule thinning of the vegetation in these areas.
- Failure of your stormwater pond is never an option. A structural inspection can ensure your pond is functioning properly.



- Start working on your 2017 fisheries goals! Have a Fisheries Biologist devise a custom Fisheries Management Plan that works within your budget and timeframe.
- Consult with a Fisheries Biologist to set the groundwork for an annual youth fishing tournament or environmental education day.
- Consider long-term, sustainable solutions through nutrient remediation or biological augmentation.