



Aquatics **in** Brief

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Summer Surprises

By **Greg Blackham, Aquatic Specialist**

As summer arrives, many changes take place in your pond, some drastic and others more subtle. The water temperature is quite warm in the upper layers of water closest to the surface; and, if your pond is shallow, the entire water column is warm. All types of aquatic life thrive in this climate: aerobic bacteria, anaerobic bacteria, plants, and most of all algae.

Summer is the easiest time of year to gauge the contamination level of your pond. The spring algae gives way to more competitive and sometimes toxic algae. Blue-green algae, which actually appears in a lot of

Oxygen can be scarce in very warm water as plants and organic matter decompose and bacterial activity heightens.

different colors, despite its name, rears its ugly head. Algae colonize so rapidly that even if you have some type of management in place for your pond, it may not be enough. Most ponds are polluted with excess phosphorous, which is the limiting nutrient in blue-green algae production.

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

Annual Inspections *By John Phelps, Environmental Scientist*

My family and I recently moved into a residential neighborhood in southeastern Pennsylvania which, when completed, will consist of 181 single-family homes. Developed over 300 acres, it features nicely wooded and rolling-meadow open spaces with a variety of traditional stormwater basins and best management practices (BMPs). Like many new communities, ours has a Homeowners Association (HOA). The HOA is responsible for the care and management of our common open spaces, including our stormwater facilities, which are manmade structures that help reduce flooding, slow down water flow and clean contaminants from water.

When I signed the deed to my house, I entered into an agreement as a partial decision maker and owner of those open spaces. Being a professional in stormwater facility maintenance, I know what to look for in my



Bioswale



Annual inspection



Dredging

The first steps to becoming a proactive steward of a community-owned stormwater facility include, at a minimum, conducting an annual inspection.

neighborhood's stormwater management facilities to ensure they are functioning properly, especially when it rains. I know how to tell if they are receiving the correct annual maintenance and can oversee that they work correctly for a long time. Most residents of homeowner associations probably don't know the structural components of bioswales, whether or not they are working properly, or how much sediment in the retention basin is too much sediment. Most communities, including mine, need a stormwater facility maintenance professional.

The first steps to becoming a proactive steward of a community-owned stormwater facility include, at a minimum, conducting an annual inspection. An annual inspection of your stormwater facility is not only a good idea but, in many states, is now a local or state requirement. In the past few years, new legislation has strengthened the National Pollutant Discharge Elimination System for the better. Eventually new laws may require annual maintenance for privately owned stormwater facilities that will be enforceable by local or by state agencies. By abiding, not only are you doing your part to prevent sediments and pollutants from entering waters of the U.S., but a proactive

management approach to inspecting and maintaining your stormwater facility will definitely save you money over time. Speaking from experience, I know that remediating stormwater facilities that have been neglected and poorly managed can cost tens of thousands of dollars...much more than would have been the case if proper preventive maintenance had been performed annually.

Before conducting an annual inspection on stormwater facilities, there are just a few questions that must be answered:

1. How does your stormwater system function?
2. What type of facility do you have?
3. Where does water enter the facility and where does it exit or discharge into an adjacent stream, wetland or other stormwater facility/system?
4. Does your facility retain, detain or infiltrate stormwater?
5. What structural components make up your facility, what is their age

and of what material are they made? A copy of the facility's construction plan is very helpful. If you don't have a copy of your facility's construction plan, your local municipality should be able to help.

Having a management plan, including an annual inspection, can provide valuable information when putting together long-term maintenance budgets for facility care. Knowing that you have older steel piping that corrodes and breaks down faster versus newer poly pipes is invaluable when trying to predict when those components will need repair or replacement. Understanding that your facility is an engineered structure designed to typically accumulate 1 inch of sediment a year is an extremely important detail to know when making plans to fund future dredging. Dredging a pond will, in time, become something that needs to be done, and knowing "when" is the key to budgeting. Without proper care, eventually your pond will accumulate too much sediment, greatly reducing its carrying capacity and quite possibly causing failure, in a catastrophic way, during the next 100-year storm. Inspecting your stormwater facility annually will identify concerns before they get too costly to correct.

As with any maintenance practice, I encourage you to document your inspection work. Use a developed inspection sheet from the conservation district, or have a stormwater professional provide a detailed, comprehensive annual inspection report. After a couple years of data, you will see the seasonal stresses and trends within your facility and your HOA or Maintenance Corporation can better budget for annual and long-term maintenance. Also, when you get a compliance letter from your local stormwater authority, having documented inspection and maintenance information will go a long way to show regulators that your neighborhood stormwater facility is being inspected and maintained appropriately. ■

Summer Surprises

Continued from cover

Midges, Midges Everywhere and Not a Fly Swatter in Sight!

By **Matthew Phillips, Aquatic Biologist/Environmental Scientist**

Raise your hand if you have been hanging out around a pond when all of a sudden, there has been a swarm of pesky little critters that has suddenly swarmed around you, getting in your eyes, nose and even mouth. What are these things and where did they come from and why are they “attacking” you? Don’t worry, they aren’t “attacking” you, they are just your friendly non-biting midge, bringing all of his friends to say, “hello.”

Midge is a very common term used to describe several families of insects in the order Diptera. While the majority of these insects are non-biting, the family Ceratopogonidae does contain the ones that like to bite. Many of you might refer to this group as “no-see-ums” or “punkies.” However, the rest of the families in Diptera don’t like to bite. Most midges are aquatic during their larval stage with the family Chironomidae being one of the most prolific.

Chironomidae are so diverse and numerous, that many experienced biologists have difficulties identifying them. In fact, some can only be keyed out using the male species, while it takes DNA testing to correctly identify others. There are believed to be over 10,000 different Chironomidae species worldwide. Around the country they have a wide array of common names from “lake flies” to “muckleheads”

to “chizzywinks.” They are often called “blind mosquitoes” because the males typically resemble and are often mistaken for mosquitoes.

Larval stages of Chironomidae can be found in almost any aquatic or semiaquatic habitat, including rotting vegetation, soil, and in sewage and artificial containers. They form an important fraction of the macro zoobenthos of most freshwater ecosystems. They are often associated with degraded or low biodiversity ecosystems because some species have adapted to virtually anoxic conditions and are dominant in polluted waters. Larvae of some species are bright red in color due to a hemoglobin analog and are often known as “bloodworms”. Because of their large numbers, almost everything eats Chironomidae. Frogs, newts, bats, birds and even other insects eat them and many fish species rely on them as their primary source for food.

Adults can be pests when they emerge in large numbers and can seem to be found everywhere. Like most insects, they are attracted to body heat and CO₂, so humans tend to be one of their favorite spots to gather. They are usually in highest numbers in late spring and early summer so if you are spending some time around a pond, use a bug spray, candles, or even a fan, set on low. Like other insects, midges can’t fly into the wind. Happy Summer! ■

Summer is also the time when you may discover you have an invasive submerged aquatic plant. All spring long these silent invaders have been creeping upwards, and come summer they have reached the surface to flower. After they flower, large masses of dead material will float to the surface and hang around through the winter, eventually decomposing and feeding the growth of new plants and algae.

Fish can also struggle during the warmer months. Generally there is a lot more food circulating through the chain, which can fatten them up nicely, but the bigger they get the more dissolved oxygen they need. Oxygen can be scarce in very warm water as plants and organic matter decompose and bacterial activity heightens. A strong summer thunderstorm can be a catalyst for a fish kill, as the water turns over and the fish get trapped in hypoxic sections of the pond.

Towards the end of summer you may see a surge of planktonic algae. This can look like pea soup or if it is thick enough may even have the look and feel of latex paint. A moderate amount of planktonic algae is not necessarily a bad thing and will usually subside on its own as temperatures start to cool in the fall. It can be unsightly, though, and give the pond a very “scummy” look. Problems with too much planktonic algae can usually be balanced with a healthy dose of beneficial bacteria. Your pond already has some beneficial bacteria, but more may be needed, especially in polluted ponds, or ponds with an abundance of nutrients.

As long as you stay proactive with the management of your pond, it can maintain its spring beauty through the heat of the summer months. Even with management, though, algae can grow so fast in the summer that you might find yourself playing catch up from time to time. ■

New SŌL

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



Chuck Seacrist,
Aquatic Biologist/Ecologist

SŌLitude Lake Management is pleased to welcome Chuck Seacrist, Aquatic Biologist and Ecologist to our staff. Chuck will be based in the company's Fredericksburg, Virginia office and will be primarily responsible for lake and pond maintenance in Central Virginia, Northern Virginia, Maryland and Western Pennsylvania. He will help to serve our growing client base in these regions.

Chuck has over 13 years in lake and pond management. He holds a B.S. in Biology with a minor in Physics from Glenville State College and has completed 36 hours in Aquatic Ecology from Marshall University. Prior to joining the SŌLitude team he worked for SePRO Corporation, an industry leader in aquatic herbicide manufacturing and aquatic weed research. He participated in research for lake management techniques, qualitative and quantitative surveys of plant species on lakes and worked with bathymetry mapping tools to map lakes for biovolume and plant biodiversity. He is a Certified Aquatic Pesticide Applicator in VA, NC, SC, WV, MD, DE, PA, NJ, and FL, a certified BMP Stormwater Inspector and a member of the Florida Aquatic Plant Management Society.

"Chuck's breadth of knowledge across aquatic plants, research, and having been a lead technician with SePRO will be of great service to our customers and to SŌLitude," said Owner and President, Kevin Tucker. "We are glad to have him as part of the team."

Chuck enjoys the outdoors and being inspired by the little things in life. He has a deep appreciation of nature and the preservation of it which flows over in his other interests in art, writing and music. He also enjoys hunting, fishing and hiking. Most of all, he enjoys the time spent with his wife and two children. ■

SŌLitude Shares Experience

At the beginning of April, SŌLitude's owner Kevin Tucker visited his alma mater, James Madison University, to speak to an entrepreneur class from the College of Business through the Net Impact program, a non-profit organization that connects students, colleges, and universities with entrepreneurs and working professionals to promote leadership and shared learning.

Kevin described to the students how he used his management degree from JMU and time spent in Harrisonburg, VA in starting his business and becoming an entrepreneur.

"I have a passion for the outdoors, especially water. That's one reason I started this business," Kevin told the students. "Overall, my experience at JMU was wonderful, and prior to having a child, I thought JMU was one of the best things that happened to me."

He recalled that in the first few years of his business, he did everything.

"Ingenuity and hard work can help you succeed even if you don't have much venture capital," he says.

He advised the students to think big, think about where you want to be in five years, ten years, and twenty years. He also reminded the audience that relationships are key, noting "We focus on maintaining strong relationships with our clients. We don't compete on price; we take care of our customers."

Kevin left the group with this thought: "If you stop innovating, I don't think you have a chance." ■



Poor Little Shubunkin

By **Shannon Junior, Aquatic Ecologist**

As an animal lover and an ecologist, this is a really embarrassing story for me to tell – it is the epitome of “what not to do” for wildlife and our aquatic environment. It all started when my husband and I raised some largemouth bass fry as an experiment in our 55-gallon fish tank. A couple of the feeder fish had escaped capture and remained in the tank after we released the bass, so we became the proud parents of two feeder goldfish. A few months later, I won a shubunkin goldfish at a trade show, and he also joined the household. We kept our little goldfish family for almost 7 years. Alas, though, goldfish grow fairly quickly, and at over 8 inches long, our 3 became oversized for the tank and the water quality began to decline. We had grand plans of building a water feature where they could live, but we soon realized that it wasn’t going to happen within a reasonable timeframe, and the fish really needed a larger habitat with better water quality.

This is where it gets embarrassing. My husband convinced me to release them to our neighbor’s pond, where they would have all the space that they needed. While goldfish are originally native to China, they have been so widely introduced throughout the U.S. that there are established populations in water bodies of all states but Alaska. We used to capture them frequently in our trawls when I was doing my graduate research on the Potomac River. I was able to justify that it would be ok to release them into a pond by convincing myself that they would probably be able to survive, and that I wouldn’t be causing any great ecological harm.

So we scooped them into a bucket and performed a tempered release into the neighbor’s pond. We watched for a half an hour while they gained the confidence to venture out of the bucket to explore their new environment. They almost immediately started nibbling at some algae, and did not seem at all disturbed when the bluegill came up to check them out. I was able to walk away feeling confident that my fish were happy in their new home.

My mistake was going back to check on them a couple of hours later to see if they would still be hanging out in the same area. That was when I saw the half eaten carcass of my adorable little shubunkin floating near the shore. It was unmistakable that it was him. He was always my favorite, with his fancy coloring



Northern Snakehead



Parrot Feather



Water Hyacinth

and his fat little belly. It was horrible to think that he had met such a brutal fate, probably getting munched on by a snapping turtle or a largemouth bass.

As an ecologist, I know that it is never a good idea to introduce a species into an environment where it does not naturally exist. In the case of my goldfish, their bright coloration made them ill-equipped to blend into the surroundings and to escape the large predators in the pond. That was unfortunate for them, but is actually the opposite of most situations. In many cases, non-native species may be so adaptable that they are actually able to out-compete native species, and they can cause severe harm to the aquatic environment. There are numerous exotic animal and plant species that have invaded our local water bodies, many of which were purposefully or accidentally introduced by humans. The aggressive Northern snakehead fish has become widely established in the Potomac River watershed. Genetic testing of many of the fish has shown that there have

The moral of the story is that plants and animals should never be released into the natural environment without first consulting an expert.

been at least 5 separate introductions, known to be from both food production and aquarium sources. Nuisance aquatic vegetation species such as hydrilla, parrotfeather and creeping primrose were also introduced via the aquarium trade, and are some of the most invasive and persistent plants that we encounter in our business. At one of the ponds that we manage, a homeowner thought the water hyacinth in her water garden might be a nice addition to the community stormwater pond, at least until it took over the entire water surface. That’s not the way we like to get new clients!

The moral of the story is that plants and animals should never be released into the natural environment without first consulting an expert. In some cases, such as with goldfish and koi, the introduction could be totally harmless under certain conditions. In other cases, though, the results could be devastating. Please feel free to contact us if you would like assistance with a fish stocking program or a beneficial vegetation plantings plan to ensure that you are installing the appropriate species. ■

The Amazing American Eel

By **Gavin Ferris, Ecologist**

Recently, while surveying some ponds and canals that feed into a tidal inland bay, I noticed some small slender creatures swimming about. They were no more than three inches long, and swam with whip-like bodies that wiggled about as fast as anything I've ever seen. They were young eels, probably tiny females though science isn't sure about that yet, making their way upstream after what can only be described as an incredible journey.

The American Eel (and it's very similar European cousin) is one of the most remarkable fish in the world. While many species like Salmon and Shad swim into freshwater to breed and live the rest of their lives in the ocean, these eels do the exact opposite. Eels, the females at least, swim up our rivers at a young age, then live in fresh water for 10-30 years. We used to think that male eels never left coastal areas, but now we think that population density might drive sex determination. In short, we don't know what causes an eel to be male or female. We do know that females can reach lengths in excess of five feet, while males rarely reach past three. We also do not know what triggers an eel to decide it's time to breed, as some do this at less than ten years of age while others remain in our rivers until they are above thirty, but we do know what happens when they do.

From ponds, lakes, rivers, and streams across North and South America, from Greenland to Brazil, eels make their way downstream to the ocean and all the way to the Sargasso Sea, near Bermuda. There they breed, and die. Larval eels make their way back to the east coast without guidance from their parents, and not necessarily going to the same river its parents may have come from. An eel from Georgia might mate with an eel from Maine, and any offspring that survive the journey may wind up in Newfoundland, Florida, and Venezuela.

Eels have a remarkable ability to get around obstacles. Dams, hydroelectric plants, and fountain debris screens seem to make no difference to them. If your pond feeds into a stream or river in the Eastern US, even if only by a stand pipe protected by a grate, there is probably at least one of them in your pond, though you are unlikely to ever see it. Eels have even been known to cross small distances of otherwise dry land during heavy thunderstorms. They are, however, highly secretive and nocturnal.

It is the secretive nature of eels, combined with some unique physiology, that have made them difficult to study. We really know next to nothing about them even though they are extremely common. To me, that is what makes them one of the most interesting creatures I have ever had the good fortune to see. ■



Life as a Lamprey

By **Gavin Ferris, Ecologist**

You may have read recently that Sea Lampreys from the Great Lakes were shipped to England to be made into a traditional lamprey pie for Queen Elizabeth to partake of. Sea Lampreys are invasive in the Great Lakes, and even in their native habitats are somewhat nasty creatures as they parasitize larger fish and feed on their blood.

Lampreys are an eel-like fish, with long boneless bodies. Their head is comprised mostly of a circular, suction cup shaped mouth equipped with sharp, rasping teeth. With this unique adaptation they are able to attach quite firmly to a larger fish, scrape it just enough to cause bleeding, and feed off of its blood. I apologize for this unpleasant imagery. Blood-sucking oceanic parasites are in fact not the topic of this article. Rather, I want to tell you about a harmless but fascinating fish that may be in your pond or at least in the streams and rivers into which your pond water flows.

A distant cousin of the Sea Lamprey, several species such as the Mountain Brook Lamprey, the American Brook Lamprey, and the Chestnut Brook Lamprey are adapted to live in habitats with few or no fish large enough to sustain a parasite like the Sea Lamprey. Not only are they smaller than their sea-going cousin, they don't feed on other fish at all.

Larval brook lampreys, like all other larval lampreys, live in the mud. They are blind, eyeless in fact, and feed only on organic matter in the sediment. In the spring, responding to the first warm rains, individuals that have matured enough morph into adults that resemble scale models of Sea Lampreys. The difference is, these lampreys have far fewer teeth than their parasitic cousins, and much of the rest of their digestive system is undeveloped. These fully adult fish do not feed on other fish, or on anything at all. They live just long enough to breed and die: about six days at the most.

Many species have developed many strategies for surviving in habitats with little food. Lampreys may have the simplest and most ingenious strategy of all. They just don't eat. ■



Lampreys are an eel-like fish, with long boneless bodies.



Is My Pond Balanced?

By **David Beasley, Fisheries Biologist**

Ponds and lakes come in all shapes and sizes, each with unique characteristics setting them apart. One similarity amongst many of them is they have two fish species in common; Bluegill and Largemouth Bass.

Bluegill are normally the primary forage fish and they are well designed for that purpose. Bluegill spawn over the course of the spring and summer. During this time hundreds of thousands, or even millions of young bluegill serve as a food source for other fish, mammals, birds, reptiles, amphibians, invertebrates and even insects. It is safe to say that Bluegill play a vital role in the ecosystem.



Largemouth Bass are the other species found in most water bodies. Largemouth Bass are often the top predator fish. They reproduce in the spring once water temperatures reach the upper 60's and have thousands of young. As a result, they have a tendency to overpopulate. Largemouth Bass are aggressive predators who require a great deal of food to grow, consuming around 10 lbs of fish to grow one pound. Multiply 10 lbs by the number of bass you have in your pond and you will often find that you need thousands of pounds of smaller fish in your pond to simply put 1 lb of growth on each of the bass.

In our service area, most of the ponds and lakes are not naturally fertile. Fertile ponds with mineral rich water have the ability to maintain plankton populations. Plankton are small organisms that serve as the base of the food chain. The lack of plankton results in a poor base to the food chain. As a result the small Bluegill don't grow quickly and end up being eaten while they are still very small; and, as a result, the predator fish are unable to get the food needed to grow.

Breaking this negative cycle can be done in several ways, but the most practical method is to reduce the number of mouths to feed. Actively harvesting bass on an annual basis will allow the remaining bass along with the other wildlife using the pond to have a chance to prosper. Harvesting bass is often required in the process of maintaining a healthy, balanced, prosperous pond that all walks of nature can better utilize and enjoy.

If you are interested in establishing a more balanced ecosystem in and around your pond, please feel free to contact us to discuss the different ways to identify if a water body is out of balance and also learn more on the different ways to correct a pond that is out of balance. ■

Introducing the S̄OLutions Initiative

We are part of the S̄OLution!

We believe that by being good stewards of the environment and good corporate citizens, we can have an enormous impact on the environment, our communities, and positively affect our neighbors...furry, scaled, and feathered included! The S̄OLutions Initiative is a company wide program to encourage volunteerism, activism, and fund-raising both inside and outside of the workplace. Together with our co-workers or individually with our families we are working with children, helping animals, cleaning up our watersheds, and feeling great about our work.

Send Us Your S̄OLutions

Please join us in being part of the S̄OLution by lending a hand to your favorite cause and letting us know about your endeavors. Please email how you or your company is part of the S̄OLution and we may just post it on Facebook or in our next newsletter. Email Kim at kniesel@solitudelake.com. Be sure to include photos too!

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Ponder These Thoughts

Solitude Lake Management® wants you to be prepared for the summer season. With this in mind, we recommend you consider the following tips as you enjoy the warm summer months on your lake or pond:

- Warm summer weather seems to bring out the best and the worst in ponds. Although 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.
- Summer is the perfect time to think about aeration. The warmer water temperatures can cause changes to the health of your pond. Increase the oxygen and help keep the aquatic life happy with a new aeration system.
- Mosquitoes can ruin summer fun. Think about stocking your pond with minnows or other fish that help to control the mosquito population. This, along with larvicides and proper aeration, can eliminate a potentially big problem.
- Living on a lake brings responsibility. Remember to respect the natural 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! Make sure you maintain your fish habitat with good water quality and cover. Consult our experts if you have questions about proper maintenance of your fishery. ■



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