



Aquatics **in** Brief

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Autumn is Buffer Zone Maintenance Season

By **Adam Harrow, Environmental Scientist**



With the coming fall season it is important to take a closer look at the vegetation, or buffer zone, surrounding your water body. A proper buffer zone is important in order to regulate excess nutrients and maintain proper nutrient cycling. The type, size, and location of the vegetation that you allow to grow in that buffer zone can have a direct impact on your water body's health. More specifically for this time of year, the amount and distribution of the woody vegetation should be of concern. Proper maintenance can include selective removal through physical or chemical means.

Woody vegetation can destabilize banks, dry out soil, and add large amounts of unwanted nutrients to your water body. This can lead to the growth of unwanted aquatic plants and add to the build-up of organic sludge at the bottom of your water body. Trees, shrubs, scrub brush and other woody vegetation found in buffer zones should be managed and removed. Due to their hardy nature they can be extremely difficult to control. As the fall season approaches many woody plant species slow down their growth and start preparing to shed leaves. Selective removal at this time can be favorable for next year's growing season.

Selective removal by physical means is most effective if concentrated on those larger woody plants such as established trees or large shrubs. After being allowed to grow for several seasons, chemical treatments of large woody plants can be costly and ineffective. Large root systems and built up natural defenses are two reasons why. By physically removing certain woody plants, one can completely remove a nutrient source without allowing it to re-enter the nutrient cycles of your water body. Once removed, beneficial grass species can fill in and prosper.

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

20 Seasons

By **Ethan Chappell, Aquatic Specialist**

For five years of my life, my morning commute came in the form of a canoe. Six or seven strokes (depending on wind and boat traffic) and I had crossed from my small cottage to the service dock and gear locker. A clove hitch with a half hitch secured my parking space and a short walk up the trail to my office found the coffee pot. I found myself in a piece of raw nature, surrounded by the city thriving just under its nose. Through dumb luck and happenstance, I fell into a position and a location where 20 seasons would teach me about the life of the lake.

As it was, I could hardly bring myself to record the hours I spent SCUBA diving, much less the random observations of any given day. "Ah, more diving... less writing," said the 20-something male. Being immersed in the work and beauty of the underwater environment was quite fulfilling on its own. I did manage to keep crude records of events, changes, little things that appeared to be different from day to day and season to season. At first, I only kept these records in my head or on scraps of paper. Then I began to write on a large desk calendar I kept in the office (near the coffee pot). Awkward as it was, I would wrestle out the previous year's calendars and look back at the observations and records. I needed a journal.

My filing system, or lack there of, was difficult to access but the information I had gathered was valuable "data." Had I known that the first-hand experience of the resident caretaker would

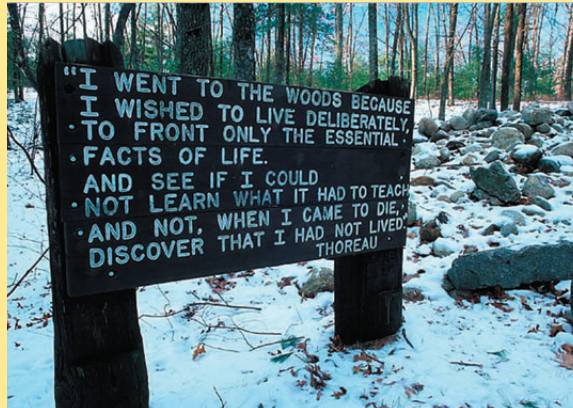
become an irreplaceable tool in the long term lake management plan; I might have taken better notes. I might also have stored them further from the coffee pot.

There is really no one that knows a pond or a lake better than those that live on it. I encourage you to keep a record of events, changes, seasonal visitors, residents, plants, and anything usual or unusual that presents itself. A record of things like air temperature, water temperature, rainfall, drought, blooms, die offs, treatments, recommendations, and of course, anecdotes, and oral histories. All of this can prove priceless down the line in terms of managing a lake or pond and the enjoyment that comes from an understanding of its many secrets.

Perhaps one of the more famous examples of this type of writing comes from naturalist Henry David Thoreau. In *Walden* he describes the need to record his observations.

"The scenery of Walden is on a humble scale, and, though very beautiful, does not approach to grandeur, nor can it much concern one who has not long frequented it or lived by its shore; yet this pond is so remarkable for its depth and purity as to merit a particular description."

Pond prose may not be your style and pond poetry may prove difficult, but somewhere between a coffee stained calendar and an American classic lies a valuable tool in the management of your lake or pond. ■



Buffer Zone Maintenance Continued from cover

Selective removal through chemical means can be useful in removing medium to small size woody vegetation that is mixed in with desirable grass species. The reason being is that certain herbicides can be applied over the entire buffer zone and will only control woody vegetation. This allows one to perform a blanket treatment without having to manually target specific plants. By selectively removing these plants now, they are not allowed the time to develop to reproductive maturity and establish extensive

root systems. It also minimizes the need for continued trimming of the buffer as only the desirable, low-growing plants will remain.

Putting together a maintenance plan which can include one or both of these methods can be vital to your water body's health. Though woody vegetation can sometimes be aesthetically pleasing, it can also cause on-going water quality issues. Each fall season one should look to further establish and maintain an ideal buffer zone. ■

What's that Snake in the Water?

By **Shannon Junior, Aquatic Ecologist**

Back in the days when I worked for a pond construction company, one of my crew members told me that he needed some help identifying a snake that they had found on the job site. He said it was a water snake, and thought it was a cottonmouth. I asked if he had taken pictures of it, but instead he presented me a burlap bag with the snake inside. Its head was smashed, and its body had been neatly cut into several pieces with the blade of a shovel. As an ecologist and lover of wildlife, the site of the demolished snake left me heartbroken and speechless. It was a large, beautiful and HARMLESS northern watersnake. All I could think of to say was, "That is NOT the way to identify a snake!"

This case of mistaken identity is not unusual. There are some very vague similarities in coloration and pattern between northern watersnakes (*Nerodia sipedon*) and cottonmouths (*Agkistrodon piscivorus*), and they also somewhat resemble copperheads (*Agkistrodon contortrix*). However, when seen side-by-side, the snakes do not actually look that similar. And unlike cottonmouths and copperheads, Northern watersnakes are non-venomous and harmless to humans if left alone. Unfortunately, though, misidentification results in more watersnakes being killed each year than venomous snakes.

Unless you live in the southeastern corner of Virginia near the Dismal Swamp or farther south, then it is unlikely that you will see a cottonmouth in the wild. They are not found in other parts of Virginia or anywhere farther north. These venomous semi-aquatic snakes are also known as "water moccasins". When threatened or harassed, they will coil up and open their mouths wide to expose their fangs and the white interior of their mouths, which is why they were given the name "cottonmouth" — although hopefully you will not have the opportunity to witness this phenomenon up close! Again, though, they only exhibit this behavior when approached, and would much prefer to use their venom for hunting prey than for defending themselves against humans.

The other unfortunate look-alike for the northern watersnake is the copperhead. However, copperheads are terrestrial snakes, and prefer upland habitats such as rocky, forested areas to aquatic habitats. Their range is more widespread than that of the cottonmouth, and they are found throughout most of the eastern U.S. as far north as Massachusetts. Copperheads are responsible for many of the snakebites to humans reported each year, but



Northern Watersnake



Copperhead



Eastern Cottonmouth

they are rarely fatal. Most bites occur when people accidentally step on or touch the snakes because they are so well camouflaged with their surroundings. When disturbed, copperheads emit a musk that smells like cucumbers.

Northern watersnakes are not venomous or aggressive. They are beautiful! They are brownish-gray snakes with broad blotches and crossbands on their backs with varying degrees of red, yellow, and white. The juveniles are brightly colored, but the colors become more subdued as the snakes age. They are frequently seen basking on rocks or stumps near lakes, rivers and streams. They are active both during the day and at night, and eat small fish, amphibians, crustaceans, and even small mammals. They have been known to "herd" tadpoles with their body and eat them. They will flee from confrontation if given the chance, but may bite repeatedly if cornered. The bite will bleed a lot because of the anticoagulant saliva, but is not poisonous. Again, though, even a cute little chipmunk will bite a human to defend itself!

Watersnakes can be easily distinguished from cottonmouths and copperheads by the shape of their heads. The poisonous snakes have triangular shaped heads that are much wider than their "necks", whereas the watersnake has a round head that's narrower than its body. Cottonmouths and copperheads are pit vipers, and have discernable pits on top of their noses – though you might not want to get close enough to observe that characteristic! The venomous snakes also have yellow eyes with vertical slits for pupils, similar to cats' eyes. Watersnakes have round eyes with round pupils. And when seen in the water, a cottonmouth swims with most of its back protruding from the water, while the watersnake swims with only its head visible.

Unless you live in the southeastern corner of Virginia near the Dismal Swamp or farther south, then it is unlikely that you will see a cottonmouth in the wild.

If you are lucky enough to see a snake in or near the water, it is most likely a northern watersnake. The best thing to do is to quietly observe it from a distance if you're interested, or walk the other way if you're scared. It will not chase you or strike at you unless it feels threatened. And always remember, the best way to learn about wildlife is to arm yourself with knowledge, not the tip of a shovel! ■

Nutrient Knowledge:

Best Practices for Nutrient Reduction When Living Near a Pond

By **Greg Blackham, Aquatic Specialist**

Controlling the amount of nutrients entering into a lake is the single most critical factor in sustaining long term water quality. Nitrogen and phosphorous are the most likely pollutants to compromise the overall health of a lake. As people continue to develop land, the numbers of natural occurring filters decrease. Large areas of impermeable surfaces can channel staggering amounts of pollutants into a lake. We as a people have an environmental responsibility to protect our lakes and watersheds. There are many simple practices we can adopt to dramatically reduce pollution.

Vegetative buffers around a lake and at various intervals in the path of moving storm water not only control erosion but can uptake and filter out many of the nutrients before they reach open water. Controlling the volume and speed at which storm water moves can limit the amount of nutrients, mainly phosphorous, eroding from the soil and rocks. All types of creative barriers and filters can be constructed, with organic measures being preferable. Use your imagination!

Most people use three times as much fertilizer as they actually need, and a lot of lawns do not need any phosphorous added at all. Simple soil tests can tell if the soil already contains enough phosphorous for a healthy lawn. Choose a fertilizer that is organic and has a slow release formulation. Use caution when applying fertilizer next to impermeable surfaces such as sidewalks, driveways, roads, etc.

Dispose of oils, paints, and other hazardous material at appropriate locations. Clean up after pets as much as possible. Fix leaks from all motor vehicles immediately. Do not let anything but water enter the storm drains. Follow pesticide labels strictly and use sparingly. If possible, wash vehicles on the lawn or other permeable surfaces. Utilize compost for grass clippings, leaves, and other yard debris. Sweep up dirt and debris from driveways and sidewalks as opposed to hosing them off.

Cutting back on the amount of water used is another way to protect water resources on a larger level. It lessens the load on water treatment plants with discharge to the watershed. A lot of the pollutants escape the treatment sites in various forms and can still impact the water quality of nearby ponds and lakes.

Using these small tips, we can make a huge difference! ■

The Benefit of Fish Cover

By **Dave Beasley, Fisheries Biologist**

Aesthetics is the primary goal of many pond owners. Unfortunately most ponds become overwhelmed with unsightly vegetation if they are left unmanaged. Many species of aquatic plants are beneficial to the aquatic community, but most ponds are shallow which can result in plants taking over the entire pond. To effectively control vegetation in shallow ponds we often need to eradicate the plants. Often the unwanted plants are the primary source of protection for small fish. As we eradicate the plants, we take away hiding places for small fish. As a result, these small fish often become an easy meal for their predators.



Whether trying to maintain a balanced pond with a healthy ecosystem, or looking to reduce mosquito larva populations, it is important to have refuge for small fish. Proper hiding places will give small fish a better opportunity to survive long enough to reproduce, resulting in well-needed recruitment. Unfortunately, this important process can be disrupted when eradicating vegetation in ponds. An ideal way to help fish populations maintain balance while meeting the goals of aesthetics and pond health is to provide small fish with additional sources of cover. The most efficient and long-term solution is to use material that will not decompose over the course of a couple years and is designed to harbor small fish. Using concrete, rock and pvc materials, pond owners can provide small fish with proper refuge to thrive without the need for vegetation. Two manmade product lines that provide good cover are the Fishiding products and the Honey Hole products. Depending on goals, each type has advantages. Man made structures are a great tool that should be considered when maintaining a balanced ecosystem or a large population of small fish to consume mosquito larvae. The greater number of small fish within a pond, the healthier the ecosystem and the fewer mosquito larvae that will make it to adulthood. ■

National Pollutant Discharge Elimination System (NPDES) Permits for Use of Aquatic Pesticides

By **Mark A Heilman, Ph.D., Aquatics Technology Leader, SePro Corporation**

What does this all mean for my pond or lake? In the last year and a half, you might have heard rumblings about some new permit system for managing weeds, algae, and other pests in your pond, lake, or other small water body. One of those funny acronym deals that get thrown around with other acronyms until your head is spinning faster than the reel of your best fish rod after a hit by a big fish. What does NPDES really mean? Will it impact my ability to have a balanced water body without nuisance algae and weeds that detract from property values, recreation, and other water uses?

Well, the basic answer is unfortunately YES but exactly how remains to be determined. NPDES will affect how our nation's waters are managed with aquatic pesticides. NPDES is a regulatory framework that attempts to reduce discharge of pollutants and improve water quality per the legislative mandate of the Clean Water Act (CWA). The NPDES system was designed to regulate the discharge of pollution from point sources such as factories. These efforts have improved our nation's water ways for future generations. Where things get sticky is where the NPDES system under the CWA conflicts with another piece of legislation—the Federal Insecticide, Fungicide, and Rodenticide Act—that has historically regulated use of pesticide products such as the aquatic herbicides and algaecides we have today. The two regulatory frameworks—CWA and FIFRA—fundamentally approach use of pesticides in radically different ways. Under NPDES-CWA, chemical pesticides are considered simply as one of many forms of pollution, despite generation of detailed scientific data rigorously reviewed by US EPA (Environmental Protection Agency) to support their FIFRA registrations. In the simplest terms, FIFRA registration considers both risk and benefit for use of a pesticide, while the CWA considers only risk from pesticides as potential pollutants.

In early 2009, a federal district court ruled that aquatic pesticides should be immediately regulated under the NPDES system of CWA. After some discussion between EPA and the court, a two-year stay of the court decision was put in place. Today, an April 9, 2011 date exists for EPA and NPDES-authorized US states to have an active NPDES permit in place for use of aquatic pesticides. EPA and states are developing a general permit system where one permit administered by the EPA or a specific state covers pesticide discharges for all regulated entities, in this case those making pesticide applications (for example, professional aquatic applicators) or responsible for decisions to use pesticides in a given body of water (associations, municipalities, and even private citizens).

EPA recognizes the major impact it can potentially have on these various entities that effectively and safely utilize FIFRA-registered aquatic products today but will acknowledge its own challenges in trying to reconcile different regulatory mandates and philosophy without creating undue regulatory burdens. EPA released a draft NPDES pesticide general permit in early June, which was followed by a 45-day public comment period. All who have followed the NPDES issue closely expect changes in the original draft, however the specific content of the final permit expected by the end of 2010 and ultimate impact on aquatic plant management remain difficult to predict.

All components of a possible NPDES general permit will add to the total cost of control operations at a given site and it is difficult to conclude how the permit will improve use practices beyond FIFRA compliance. Aquatic weed and algae management will be impacted by implementation of an NPDES permit system. The degree to which NPDES will increase the cost of management depends on details of final permit requirements.

So, what to do today? Consult with your professional applicator, industry



The NPDES system was designed to regulate the discharge of pollution from point sources such as factories.

representative, or other knowledgeable source and be informed on NPDES and its potential effects on your management needs. Reach out to your state and federal legislators and make sure they have this issue on their radar amidst the many controversial issues we hear about every day in the news. Ask them to seek a resolution that allows aquatic pesticides to be effectively used according to sound science developed for EPA-approved use labels and not immediately be considered pollutants with disregard for the benefits of their use. Be prepared for potential increased cost of management activities due to this additional regulation. While professionals involved in aquatic plant management will do all they can to avoid this scenario, the additional efforts needed for NPDES compliance must be reconciled.

In conclusion, be ready for change and don't be caught off guard on this issue. The weeds and algae will be growing no matter the regulations in place and will need timely, effective management under any new permit system. ■

Mark A. Heilman, Ph.D., Aquatics Technology Leader, SePRO Corporation.

Pond Succession: The Life of a Pond

By **Kyle Finerfrock, Environmental Scientist**

Ponds have a lifespan. When a pond is formed, either by man or Mother Nature, it immediately, like all living things, begins to expire. As grim as that might seem, it's the way nature works. The lifespan of a pond is determined by how fast it "fills in". The natural succession is for a pond to turn into a bog, then a bog into a field, then a field into a forest. However, with proper maintenance, the pond will remain a pond as long as possible. Without proper maintenance, care, and dredging, all ponds will naturally follow this path.

Ponds are a dynamic, ever-changing environment. Plants and animals are constantly living, growing, reproducing, and dying within the habitat. The pond is a collection basin for the watershed that surrounds the pond. A pond's purpose, especially stormwater ponds, is to collect water, sediment, and anything else that makes its way to the pond and act as a filter. Young ponds function well and generally do not have a great deal of organic build up. However, they may be able to support algae life. When algae dies, it decomposes into organic matter and becomes food for more algae to grow. This organic matter accumulates on the bottom of the pond and begins to decrease depth. Keep in mind that leaves and grass clippings that enter the pond also increase the amount of organic matter in a pond, decreasing depth more rapidly. When enough organic matter builds up, plants begin to

A pond's purpose, especially stormwater ponds, is to collect water, sediment, and anything else that makes its way to the pond and act as a filter.

grow in the pond. First, floating and submersed plants grow. At this point in the pond's life it can support other life like fish, amphibians and reptiles. All these organisms continue to add organic matter to the pond. Then, emergent plants begin to grow. By this time, the pond is mature and has a build up of organic and inorganic sediment on the bottom. Sediment will continue to fill in the pond causing the water depth to decrease over time until a swamp or bog is formed. Continuing on with this succession, the bog will eventually dry up and become a field. With more time the former pond area (now a field) will begin to support trees and will eventually become a forest.

Maintaining and executing a proper maintenance plan for your pond will keep your pond alive and healthy. Most of the ponds Virginia Lake Management maintains are likely not to become a forest. Many of the ponds we manage are part of communities and must be maintained to ensure proper function as part of a stormwater system. The life process described in this article is what would happen if a pond was to be abandoned and left alone to let nature take its course. Just like we, as humans, stay healthy by taking care of our bodies, we help to extend our lives for many years. With proper maintenance, you can extend the life of your pond beyond its natural lifespan and enjoy the pond environment for many, many years to come. ■





Watermeal: The World's Smallest Flowering Plant May Be Growing In Your Pond!

By **Lee Abernathy, Environmental Scientist**

Watermeal, *Wolffia spp.*, is the world's smallest seed bearing plant. It is less than 1 millimeter, light green and free floating. Watermeal is also rootless. In calm lakes and ponds that have little wave action, it will form very dense colonies that are often confused with duckweed or algae. Many times it will also be present where duckweed or mosquito fern are also found.

One of the main problems with controlling watermeal is its size. Watermeal easily sticks to birds, allowing for it to be transported effortlessly between multiple bodies of water. Its size also makes it difficult to treat. Due to its size the most effective way to treat watermeal is with systemic herbicides. Foliar applications with contact herbicides produce mild results, but are not a long-term solution because it is difficult to make contact with each of the tiny plants.

When it comes to systemic herbicides for watermeal treatment, the options are limited. Currently, there are only two products on the market that are effective on watermeal; Sonar A.S. and Galleon. Sonar A.S. is available for immediate uptake into the target plants and can remain active for up to 90 days. Galleon is relatively new on the market and once in the

water body it inhibits plant growth and will cause plant death over period of 60 to 120 days. While having different active ingredients, both products work slowly and require a certain sustained concentration in the body of water. Neither of these products are harmful to fish or other wildlife. Keep in mind that when using these products, they do take an extended period of time to achieve effective control of watermeal.

A third product, Clipper, which should be reaching the market soon, has shown great results in field trials conducted by Virginia Lake Management and others. Clipper works rapidly in water and needs to be sprayed evenly over the entire water body to achieve the best control of the plant. This product could prove to be the most effective to treat watermeal once it receives final registration from the EPA and is available on more than an

experimental use basis.

While it may seem like watermeal has taken over your pond, remember that there are options available and Virginia Lake Management can help control this plant. However, patience is required, as this is quite possibly the most difficult aquatic plant to control. ■

Watermeal easily sticks to birds, allowing for it to be transported effortlessly between multiple bodies of water.

"Pond"er These Thoughts

Virginia Lake Management wants you to be prepared for the Autumn season and all of the wonderful cool weather it brings. With this in mind, we recommend you consider the following tips as you enjoy the fall months on your lake or pond:

- Fall is a good time to think about repairing and maintaining the areas around your lake. Be sure to trim the buffer zone and make certain that it is free of any woody vegetation. Repair any eroded areas around your lake before they become major issues. Erosion repair can easily be done in the fall months when you can overseed and apply an erosion blanket to allow for soil stabilization until the new seed germinates.
- Fall is budget and planning season in most communities and households! Along with your contract for annual maintenance, be certain to contact our office about scheduling a bathymetric study of your pond. This will allow for proper budgeting and repair of any physical problems with your pond and its related structures.
- If your pond has a fountain, fall is the perfect time to schedule an Oil and Seals change service which should be performed every three years. Call today to schedule!
- While sprucing up lawns in the fall, it may be tempting to over-fertilize. However, it is best to limit the amount of fall fertilization in all communities with stormwater ponds
- If you live on a lake, blowing leaves and other yard debris may end up in the water. Try to keep leaves, clippings and other debris out of the water as this adds nutrients which could lead to the growth of algae and other unwanted vegetation.
- For those of you who live in the colder climates, you may desire removal and winter storage for your fountain. If so, this should be completed by early December. ■



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