### PONDERINGS A simple guide to a healthy pond

### Hi,

This publication, originally written in 2016, is intended to assist anyone who lives on and/or owns a pond in St. James Plantation. It's an attempt to provide information, advice, and other resources to help you manage the health of your pond. It's also supposed to be readable, interesting, and occasionally even humorous – though I guess you'll be the judge of that. What we're trying to do here is create an ecosystem in St. James that is vibrant and thriving. To do that, we're going to need everyone's help. This document is just the start of an ongoing effort to continue to make our community's ponds something really special. Read on to see how you can help. So now it's <u>2020</u>, and while most things in our ecosystem have remained the same, a few things have changed. So here goes.....

#### POND OWNERSHIP:

At first blush, this looks pretty simple. If I live on a pond, I must own it, or at least part of it. If my neighbors and I surround the pond, it must be our "private pond", right? Well, not so fast, as Lee Corso says. It turns out that pond ownership is a pretty complex subject. But, you ask, why should I care who owns it? Well, because with ownership goes maintenance responsibility, and gives us guidance as to who to speak with if we have questions about the pond. So, here's the breakdown on pond ownership/management in St. James:

POND OWERSHIP / MAINTENANCE RESPONSIBILITY				
Owner	Number	Percent	Acreage	Percentage
POA	142	56.8%	99.226	55.3%
TROON	79	31.6%	64.295	35.8%
DEVELOPER	4	1.6%	4.88	2.7%
ARBOR CREEK	7	2.8%	3.75	2.1%
PRIVATE	8	3.2%	1.798	1.0%
TOWN	3	1.2%	0.49	0.3%
CONDOS	5	2.0%	1.0	0.6%
SB SANITARY DISTRICT	2	0.8%	4.0	2.2%
TOTAL	250	100%	179.439	100%

The first thing that strikes me is how many ponds there are – who knew? The second thing that is surprising is that there are so few actual "private" ponds. Your pond is probably owned or managed by one of three entities, Troon, the POA, or the developer. Once you sort through all that, you'll know who to speak with if problems arise. Always remember, though, that the Ponds Committee is always ready to consult with you, regardless of pond ownership.

#### POND DESIGN AND CONSTRUCTION:

Right now I can hear you saying, "Wait a minute. I'm looking right at my pond. It's already built. Why would I need to know about design and construction?" Well, it turns out that the design and construction of your pond have a lot to do with its health. Interestingly, most of the ponds in St. James were built to provide dirt to build lots – not surprising. Other ponds were built to provide irrigation to the golf courses. Some were built purely for the aesthetic value. The purpose of the pond may have an impact on its design. For example, if a pond was built to provide irrigation, it probably has some form of water "make up", for times when rainfall just doesn't fill the pond sufficiently. Most of the ponds are simple "dig and fill" propositions, where the builder digs a big hole and Mother Nature does the rest. And, a few ponds are actually stream fed, where a natural water source replenishes the pond. In each case the design affects the level of the pond, and how it reacts to drought and downpour. A key thing that is constant in all of our ponds is that they are all fed, to some degree, by groundwater – carrying with it everything that it can pick up. All this is important because it will affect some planting and fish stocking decisions that we will discuss later.

Regardless of ownership and purpose, some basic design concepts apply. Ponds like ours are generally 6-8 feet deep, with a 1/3 slope on the banks. Both of these sets of

numbers are important. If the pond is too shallow then you will see explosive weed growth. If the pond is too deep, then you may see fish populations suffer because of oxygen deprivation. If the slope of the bank is too steep you may experience erosion – not good for the pond or you. You paid good money for your lot – hate to see it go into the pond. While you can't do a lot about the depth of your pond, there are a number of things you can do to control erosion. Again, while I hate to keep teasing you, we'll get to that in a minute.

You may be interested to know that the Ponds Committee of the POA, with the assistance of our ponds maintenance contractor, is working on a mapping of a number of ponds in St. James. This will help us understand the depths and contours of these ponds, which will help us better understand how to keep them as healthy as possible and allow us to pass that knowledge on to you. (Local companies may be a valuable resource to you as you manage your pond. We'll provide more information about them at the end of this document.)

So far we've only dealt with the pond, not what surrounds it. As it turns out, that's actually as important as the pond itself. Let's assume that the banks of your pond have the requisite 1/3 slope. So, what? Well, on that slope you need to consider something called a "Riparian/or Vegetative Buffer". Sounds really technical and complicated, doesn't it? Actually, it's pretty simple. The basic idea is that you need to build a vegetative "filter" between all the herbicides, insecticides and fertilizers that you put on your lawn and your pond. The illustration below shows how the "Riparian/or Vegetative Buffer" fits into the ecology of the pond's bank.



So, a buffer, and all of the other ecosystem above helps keep your pond clean. If you don't have this protection, all of the chemicals we mentioned earlier go straight into the water. Once there it does some nasty stuff – kills fish, kills turtles – and worst of all, grows tremendous algae, which makes your pond look ugly and smell even worse. The technical term for this phenomenon is "Eutrophication". Sounds very complicated but it's actually an ancient term. Translated from the Sumerian, it means, "Your stinky pond is dead." Here's a helpful table that simplifies this and provides a slightly more scientific background.



At the end of this publication, you will find a document listing the sorts of plants that are recommended for your "Riparian Buffer". They were chosen for their hardiness in our ecosystem, their beauty and their color. This document, "Native Plants for St. James Buffer Zones" was created by Ponds Committee member, Vicki Fuhrmann, and is constantly being updated with new selections.

But what if your bank is steeper than recommended? The most promising solution to this problem is a product called "Coir Logs" (also known as "coconut logs"). Made from the fibers of coconut trees, the logs come in various lengths and widths – to fit each individual pond bank profile. They are easily installed and form an excellent foundation for plantings, both in the logs themselves and behind them. Once installed, the logs slowly decompose, leaving behind a beautiful bank, filled with flowering plants. Here is a series of pictures that illustrate what these unique logs can do. The first is a "before" picture, which may look a lot like the bank of your pond. The second shows the actual installation of the logs and the plants. The final

photo shows the finished product – pretty incredible transformation, don't you think?







## WATER QUALITY

OK, let's assume we've solved all your design problems with the sides and bottom of your pond. Now let's deal with the stuff that goes inside – water. Most ponds have one of several sources of water. They can be fed by groundwater runoff from a larger area. They can be fed by a stream, from either above or below ground. They can also be fed by a well. In our area, because of the fact that we are at or maybe even slightly below sea level, they can just magically appear when you dig a hole in the ground, being replenished by rain. Some ponds, particularly those used for irrigation (like golf course ponds) may actually be fed by all of the above sources so that their level remains constant enough to enable the irrigation for which they were built.

Water quality can be strongly affected by its source. In our area, surrounded by wetlands, you can get runoff from these swamp-like areas that may dramatically affect water quality. What exactly are we measuring to determine quality? The first is simple – turbidity. That's just how clear your water is. In our area most of our ponds will be dark, colored by the abundance of pine forests and their decomposing bark and needles. Don't confuse this with turbidity. Think of turbidity as muddy. Your pond may be quite dark, but also quite clear. Turbidity usually means that some sort of erosion is happening causing soil to suspend in the pond. Eventually

this will cause the pond to fill in, so you need to get to the bottom of this quickly. (Pun slightly intended.)

Other measures include things like pH, alkalinity and dissolved oxygen. They measure how acid or base your pond is and how much oxygen is available in the water, which will impact things like plant growth and fish reproduction. (Turns out that fish need a pH close to 7 in order to reproduce – sort of like Marvin Gaye music for fish.) The POA is currently doing pond testing through their Pond Maintenance Contractor. All POA ponds are visited at least once a month and tested throughout the year. Your pond may have already been tested. To find out if this is the case, or to arrange for initial testing, please contact the POA.

You don't have to be a chemist, though, to understand the most important measure of water quality. It's not what is in the pond - it's what we put in it. Every time you fertilize your lawn or spray for weeds or insects, you are funneling dangerous chemicals into the pond. The single biggest concern is the phosphorous that is a principal ingredient in most lawn fertilizer. (It's the big "P" in the formula for the fertilizer.) When this little beauty gets into the pond, it starts a reaction that leads to algae overgrowth, covering the pond with thick green slime that endangers fish and wildlife and can literally kill a pond. In fact phosphorus is considered so dangerous that its use as a lawn fertilizer is actually banned in many states. Unfortunately for our ponds, it is still available in our state. Please check any products you use, and talk with your lawn service people to find safe alternatives. It's a good investment in the health of your pond.

Some other common sense sorts of things can go a long way toward improving and maintaining pond health. Some people, not used to living on a pond, may see it as a very convenient dumping ground for all sorts of things, including lawn clippings, garden and yard waste, pet droppings, food leftovers and, incredibly, motor oil and fuel. Any and all of these things are extremely harmful to your pond. Please call Security to report any dumping incidents to the POA. Your pond is a beautiful natural asset – not a trash can. If you and your neighbors would like to test your pond water for metals, pesticides, herbicides, or other elements, please see the Resources Section at the end of this guide for a testing laboratory that can provide this service.

In 2016 the POA commissioned a group they called the Tiger Team to study water quality in all of the ponds in St. James. (This team had representatives from the POA and its Ponds Committee, the town of St. James and its Stormwater Committee, and Brunswick County Utilities.) After months of excellent work and analysis, they published three reports. These reports are available on the POA website As a result of this effort, the POA has initiated a routine testing program, focusing on key ponds which are either recreational in nature (think fishing or sailing), historically troubled, or which have an impact on the larger water system. If you have an interest in these results, or wonder whether your pond is among those being tested, please contact the POA.

### PLANTING IN YOUR POND

So now you have a clean, beautiful pond. Let's see what we can plant in and around it to make it even better. As I said earlier, the Ponds Committee has developed a list of plants that do well in our climate. These plants range from fully aquatic, that is, planted right in the water, all the way up the bank. One interesting thing to keep in mind is the eventual height of the plants. What you want is an attractive border for your pond without obscuring your view. When you review the list of potential plants keep this in mind. Also consider color – let your inner artist take over.

One word of caution here before you start planting. There are a number of so-called "invasive species" which might be problematic if you introduce them. A couple of these should be pretty familiar to you and even might sound like a good idea - waterlilies and cattails (hats off to the POA publication). While these guys look nice, they are also extremely aggressive. Unless they are the only plants you want, you should avoid them. There are other species that are actually weeds – you don't introduce them, they introduce themselves. One tough one that we've been fighting lately is "Spike Rush" – a fast growing, hard to kill monster. If you see this in your pond, please call the POA immediately. I have included in the Resources Section a couple of reference articles that can help you identify noxious weeds and other invasive species.

The drawings below are a sample of a project that was completed on the Woodlands Circle pond. The design includes all native plants that are designed to thrive in the various ecosystems of the pond's bank. They were also chosen for color and height, so that the view of the pond is not obstructed. Lots to think about when doing these projects, which is why it's important to consult with the Ponds Committee.



### WILDLIFE

So, this is why you wanted to live on a pond. You probably read "Walden Pond" in school and always dreamed about communing with nature. Good old Thoreau probably didn't prepare you for the sort of thing that goes on night and day in your backyard. News Flash – these critters eat each other – all the time. While the Great Blue Heron may be an elegant addition to your yard, he is not exactly fish friendly. He's not there for a social visit. He's there for a meal. There is a natural balance to all of this, but we need to know a little about how this ecosystem works if we are going to help out when needed. There is only one "apex predator" in this system, and that is you. You have the unique ability to control this environment but it's not always easy.

Let's start with the "Big Guy"- the ALLIGATOR. After you, he's the king of the hill in your pond. In our area alligators don't grow to their full potential. Most of ours will top out at about 6-8 feet, about half of what they can become in South Carolina or Florida. While he is a completely fascinating glimpse into our dinosaur past, having existed on earth in one form or another for approximately 180 million years, he is also the most dangerous of your pond inhabitants. Normally alligators ignore humans, and actually flee from them most of the time. You can alter this behavior by committing the ultimate sin – feeding the alligator. Once you do this you not only diminish his natural fear of you, you also create an association between humans and food.

Assuming you're not suicidal, and don't feed your guy, what else should you worry about? First, alligators are not the voracious feeders you may have thought. Because of their cold- blooded nature, they eat only rarely - once a week or less. They also eat mostly slow prey that get too close and linger too long. While fish form a part of their diet, they mostly prefer warm- blooded mammals. So, dog owners should take care if a gator makes your pond his home. Clearly children should not be allowed to play near ponds where alligators have been sighted. Some homeowners have built fences, or other structures to protect against alligators. Finally, if an alligator becomes aggressive, or is simply too scary for you, you can call the POA for assistance. While the POA does not personally trap or relocate wildlife, they can put you in touch with the North Carolina Department of Wildlife, who will assess the situation, and take appropriate action.

SNAKES are the second most dangerous neighbors. Interestingly, while most of our snakes are harmless, non-poisonous fellows who actually help manage the rodent population, this area is home to a number of poisonous serpents. The most common ways to differentiate between the two is head shape and body shape. For the most part poisonous snakes have a large triangular shaped head and a thicker body.



The best advice is simply to give all snakes a wide berth and to be cautious when in their favorite environments – heavy weeds and brush. Several snake repellants have been advertised but there is no real evidence that any of them really work. Again, best advice is to put as much distance as you can between you and them.

BIRDS are the most prevalent and perhaps most beautiful pond inhabitant. Most of the birds who frequent your pond are excellent fishermen. The Great Blue Heron and the Snowy Egret are the real "eye candy" of the pond. They stalk your banks, picking off small fish and minnows that form the majority of their diet. The size of their throats restricts the size of the prey, so your larger fish are probably safe from them. Cormorants and Anhingas are the prehistoric looking guys who are diving in the pond. They are very efficient predators who can do significant damage to fish populations in a short time. The most exciting and elegant predator is the Osprey. These large black and white, eagle-like creatures circle high in the sky, diving into the pond to capture some of your larger fish. Luckily, they don't take large numbers, so simply enjoy them.

A number of other birds populate wetland areas like ponds. Most of these are insect eaters and help maintain those populations. Guys like the Red Winged Blackbird love your pond. Ducks and geese almost go without saying. They are the "Field of Dreams" guys. "If you build it, they will come." Generally speaking the ducks cause very little harm and are adorable. The geese, on the other hand, while pretty high on the attractiveness scale, can be a major annoyance. They love the new plants you placed on the bank and then reward you with waste products that are unsightly, unsanitary, and stinky. The only thing I've seen that can work against them is a dog. They will avoid ponds whose owners also own dogs. Just exercise caution with the dog if alligators may be present.



Snowy Egret

Great Blue Heron



Osprey

Another "Field of Dreams" guy is the TURTLE. They have an amazing "nose" for water and will find any pond that provides the requisite food and shelter. There are essentially two types of turtles in our ponds. The first general category is what I

would call common pond turtles. There are a number of varieties of these, too numerous to list here. But, they all share a common characteristic – they are vegetarians for the most part, though they will eat other things occasionally. I actually have a neighbor who feeds his turtle sliced cured ham. (Love to see that turtle's cholesterol numbers.) For the most part though, they stick to the vegetation at the pond's edge. This can be a problem when attempting to cultivate aquatic plants to beautify the bank. It appears that the coconut logs discussed earlier can present a physical barrier that protects the plants.

The other species of turtle, the snapping (or alligator) turtle is a little trickier to deal with. He's a carnivore, living on the fish, frogs and other small animals in or near the pond. Although he probably won't do significant damage to these populations, he is a dangerous addition to your ecosystem. Avoid handling him at all costs. They have extremely long necks and can reach your fingers from about any angle. The easiest thing is to simply avoid him.



Snapping Turtle

**Common Pond Turtle** 

One of the most efficient fish predators is the OTTER. A pair of these cute little guys can devastate a pond's fish population over a long weekend. In Virginia, a pair of otters killed over 100 trout at a trout farm in two days. They actually didn't eat most of the fish – just killed them and threw them on the bank. Here in St. James we haven't really seen otters having a negative impact. Besides, their inherent "cuteness" makes it really hard to hate the furry little fellows.

Other mammals may cause occasional problems. BEAVERS are not found in great numbers in our area, but have been sighted. While they are generally harmless they can do some damage to vegetation and love to live up to their reputation as great dam builders. Muskrats are a smaller mammal, but can damage your pond by burrowing into the dam, which can weaken its structural integrity.

The last little guy we need to consider is the DRAGONFLY. In addition to being the ultimate natural drone, the dragonfly is a mosquito-eating machine. The more of these boys in your area, the better life will be for everyone, except the mosquitos. Interestingly, the POA's pond maintenance contractor, in addition to their standard

pond maintenance services, releases dragonfly larvae in the ponds they service, hoping to augment their population numbers and control mosquitos. Pretty cool if you ask me.

## FISH STOCKING

Much of what we have been talking about has had some connection to fish in your pond. Technically, only a small number of the ponds in St. James are stocked with fish. (Largemouth Bass, Bream, Sunfish, and Minnows. At one time catfish were also stocked, but that is no longer recommended.) Most of this has been under the direction and control of the Ponds Committee of the POA. The stocking has been concentrated in ponds with significant public access for fishing. Some privately owned and "neighborhood" ponds have also been stocked by their owners. The only other conscious stocking has been the addition of grass carp by the developer, Troon or the POA. These carp were stocked to try to control weeds.

But if you are a big "Jurassic Park" fan, you will know that nature will always find a way. So, there are fish in many ponds that just magically appeared. Usually these fish were dropped in there by birds. Remember the elegant Osprey? Well sometimes he gets a little clumsy and drops his prey. Other birds may accidently transport fish eggs from pond to pond. Occasionally, a well-meaning, but misguided resident attempts to stock a pond by doing his own version of catch and release, where you catch somewhere and release somewhere else. This is often a recipe for disaster, creating an imbalance in the fish population that could be dangerous for the pond. By the way, this practice is strictly prohibited in St. James.

If you own a pond and you are interested in stocking it in the correct way – providing the best balance of fish to guarantee a productive pond - the Ponds Committee of the POA has developed "Resident Pond Stocking Guidelines". These are available on the POA website. The Committee can also provide water testing to determine if your pond can maintain a healthy fish population. Pond stocking is a community effort. That is to say, this is something that you and your neighbors should agree on – something you should talk about to make sure that everyone understands and is willing to participate in the effort, including the costs associated with the project. Also, depending on the ownership of the pond, various approvals may be required. You should check with the Ponds Committee before you proceed. The Ponds Committee can also provide you with the names of reputable local vendors who can provide the fish you need.

One interesting aspect of stocking a pond is the math associated with the food chain that creates healthy growth in fish. Actually, it's pretty stunning when you look at it. Let's assume that you've always wanted to catch a really large bass, and you've decided that stocking your own pond is the shortest path to success. Take a look at the chart below.



Boggles the mind, doesn't it. It's surprising that the whole thing works – just another look at the amazing ecosystem of your little pond.

Once the pond is successfully stocked, it's time for fishing. My grandchildren absolutely love fishing – right up to the point of putting worms on the hook or taking fish off. That's where I come in. If you are interested in fishing in your pond, or in one of the several ponds stocked and maintained by the Ponds Committee, please go to the POA website and download the latest edition of the "Fishing Guidelines". It includes everything you need to know to be a successful and ethical angler. To prove my assertion that kids love fishing, I have included a couple of pictures of our annual "Fishing Derby", which is held at Woodland's Park pond. It is always a huge success, with over 150 children attending each time.



Annual Youth Fishing Derby

So, that's all I know. But that's not the end of your education. The Ponds Committee has come up with a new idea to help keep us all informed and up to date. This summer they will be publishing "POND VIEWS". It's an email-based way of keeping up with developments associated with pond management in St. James. You can sign up for this through the POA website, and automatically receive the very latest news about our ponds. Keep your eyes open for the kickoff of "POND VIEWS". There should be more on this in "What's Up St. James" (WUSJ).

Now here are some resources created by people with a much greater grasp of the art and science of pond management. Hopefully this publication will have spawned (pun intended) an interest in the pond ecosystem in St. James. Good luck with your journey.

## HELPFUL POND MANAGEMENT RESOURCES

The following links should be helpful to SJP residents, both as sources of pond management products and services, and as resources for learning about pond management. This list is constantly being updated.

# **General Pond Management**

The <u>NCSU Pond Management Guide</u> is the "bible" of recreational pond management for N.C.; also watch the <u>NCSU Pond Management Video</u>.

The <u>NCSU Fisheries Extension</u> Web Site offers much useful information covering a wide range of topics including pond management, aquatic weed management, etc. Click on "<u>Special Topics</u>" for information on topics such as aeration, habitat improvement, and liming.

The <u>NCSU Aquatic Management Web Site</u> offers basic information on the management of pond vegetation; see in particular the publication "<u>Weed</u> <u>Management in Small Ponds</u>."

The <u>Pond Boss Magazine</u> Web Site provides a wealth of information on a wide range of pond management topics. Query their <u>Forums</u> for answers to particular questions you may have.

Pond Buffer Zone Plants located on the POA website.

# Area Fish Suppliers

<u>Southeast Pond Stocking</u> is located in nearby Currie, NC and has stocked several St. James neighborhood ponds. Ask them about their <u>Spring Pond</u> <u>Stocking Special</u>.

<u>Foster Lake & Pond Management</u> has stocked several POA-recommended community fishing ponds.

## Pond Fish Food Supplier

Scott's Farm and Family at 4718 Main St, Shallotte, NC.

## Artificial Fish Habitat Supplier

<u>Pond King Inc.</u> offers a good online selection of <u>artificial fish habitat products</u>, among other pond management products and services.

## Aquatic Plant Suppliers

The NCSU Cooperative Extension Services publication "<u>Native Plants for Coastal</u> <u>NC Wetlands and Retention Ponds</u>" describes the variety of native wetland plants in N.C.

You may want to contact <u>Sam Marshall</u> directly at <u>sam\_marshall@ncsu.edu</u> or Agriculture Technician <u>Tom Woods</u> at <u>tom woods@ncsu.edu</u>. Tom can be helpful with non-aquatic plant selections for controlling erosion above the pond's edge. Residents are encouraged to order plants early in the spring as many nurseries grow the plants for the season based on the volume of orders they receive. It is also helpful for pond residents to combine orders to get quantity discounts.

Recommended aquatic plant suppliers include:

Mellow Marsh Farm located in Siler City, N.C.

Lumber River Native Plants located in Gibson, N.C.

<u>Charleston Aquatic Nurseries</u> located in Johns Island, S.C. This nursery accepts minimum orders of 100-200 plants; for small orders, contact their affiliate <u>Maryland Aquatic Nurseries</u> in Jacksonville, Maryland.

Wetland Plants, Inc. (Coastal Plain Nursery) located in Edenton, N.C. propagates wild-type native wetland plants and sells in larger quantities.

## Pond Maintenance Supplies and Services

<u>Dragonfly Pond Works</u> was awarded the POA three-year pond servicing contract starting in 2016. They were recently renewed through 2021. Dragonfly performs most of the services shown in this Resources section for the POA but find it difficult with their busy schedule to perform these services for residents. However, they welcome questions from residents related to pond care and fish stocking.

Southeastern Pond Stocking offers pond management services in addition to fish stocking.

<u>Foster Lake & Pond Management</u> offers a wide range of pond management <u>products and services</u>; the POA contracted FLPM for fish stocking in 2015.

<u>Solitude Lake Management</u> is located in Virginia Beach and offers comprehensive <u>lake and pond management</u> strategies, integrated <u>fisheries</u> <u>management</u>, water quality testing and monitoring, and a wide range of <u>additional services</u> designed to restore and preserve ecological balance in the aquatic resources we manage.

<u>Eco Depot</u> offers <u>biodegradable coir logs</u> and other erosion control and pond landscaping products.

<u>Green Resource Coastal</u> in Shallotte, NC offer coir logs along with several other erosion control products.