



<https://lakeandpondremediation.com/>

## **About Us Page**

### **Mission Statement**

Lake and Pond Remediation's mission is to serve every customer with professional, courteous, and prompt aquatic management service. We are committed to providing the highest level of environmentally friendly service and leading the aquatic management industry with new, innovative, and cost-effective methods.

### **President/Owner Douglas K. Charles**

Doug Charles is a Professional Biologist, Aquaculturist, Entrepreneur, and Public Speaker. He's been in the aquatic management industry for 35 years with extensive experience in all phases of the aquatic weed control industry, including biological, chemical, and mechanical weed control. Doug founded several aquatic companies, has several inventions to his credit, and is an innovative thought leader in the aquatic management industry. He invented the Airboat Harvester and developed the Triploid Grass Carp Farm in central Florida (Charles Aquaculture, LLC).

### **Environmentally Friendly Service**

Lake and Pond Remediation, Inc. provides professional algae control without heavy metals (copper-based products). It is a little known fact that hundreds of thousands of pounds of heavy metals in the form of copper sulfate and chelated copper have been applied to the water bodies of Florida. It is legal in most cases; however, it is harmful to the environment. Copper collects on the bottom of ponds and does not break down. Over time, it can accumulate and can create a dead zone. Copper has been outlawed in some states and in FWC permitted lakes. Nearly all aquatic management companies in Florida continue to use copper-based products every year because of its low cost. Ironically, many scientists have concluded that copper use actually increases algae and cyanobacteria outbreaks.



## **LAPR's Equipment**

LAPR uses only the well-maintained equipment for aquatic weed control services, including trucks, the innovative Airboat Harvester, LAPR Airboat with spray rig, an Aluminum boat with spray rig, and an efficient truck-mounted spray rig.

## **Triploid Grass Carp Farm**

Family owned and operated in Marion County, FL. Triploid Grass Carp are immediately available to our clients with minimal transport time. Lake and Pond Remediation, Inc. also assists with FWC permitting and fabricates FWC approved fish barriers.

## **Service Reports with Photographs**

Our customers receive a comprehensive and detailed service report within 24 hours of aquatic weed control service. Reports are promptly emailed with photos of your water body to ensure your overall satisfaction.

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## **1. OUR SERVICES**

### **Aquatic Weed Control**

LAPR provides chemical, biological, and mechanical aquatic weed management services throughout Florida and South Georgia. We use only the most environmentally friendly

methods available. Scheduled appointments include a consultation and quotation free of charge.

### **Triploid Grass Carp Farm**

Grass Carp, a non-native Asian weed-eating fish, is a significant ingredient in a comprehensive aquatic weed control program. The Florida Wildlife Commission (FWC) requires a permit for these highly regulated fish. LAPR assists with the process of acquiring permits, and we fabricate barriers that meet FWC requirements.

### **Water Clarification & Phosphorous Control**

Stagnant, shallow, warm water with high phosphates is the ideal environment for noxious algae and blue-green algae to thrive. LAPR uses the most effective and affordable methods available for treating algae. Algaecides are used only when biological and mechanical solutions are insufficient.

### **Fountains and Aeration Systems**

Moving water in lakes and ponds is a strategic component for maintaining a healthy aquatic environment. Aeration remedies a wide range of water quality issues, including weed growth, unpleasant odors, and even insect infestation. LAPR installs, maintains, and repairs floating fountains and aeration systems for aquatic weed management.

## **TESTIMONIALS**

Dave Torregiante  
Deer Lake Homeowners

*Future Clients of Lake and Pond Remediation,*

*I am writing this letter as a recommendation for services provided by Doug Charles and his company Lake and Pond Remediation. We contracted with Doug in February of 2019 to treat our lake for invasive Hydrilla. I found Doug to be highly professional, knowledgeable, and timely throughout the entire process. We had dealt with other companies in the past and had solicited other bids for this current treatment. We found that Lake and Pond Remediation was a third of the other bids we received. We reached*

*out to past customers to gauge their satisfaction and found that they had great results. Our lake is 35 acres in size, treatment began on March 6th, and within three weeks, the Hydrilla was gone. We can now enjoy our lake again without the choking Hydrilla. We will be adding grass carp to the lake to augment the treatment in the next few weeks.*

Sincerely yours,  
Dave Torregiante

Lake Hobbs Homeowners Association

*Our Lake Hobbs and Little Lake Hobbs are 68 acres and 10 acres. Doug Charles and his employee treated our lakes, and in 3 weeks, we saw Great Results of the Hydrilla "disappearing." I saw My Lake bottom for the first time in almost 2 years! After 6 weeks, our Hydrilla was visibly gone everywhere! We followed up with stocking 144 Sterile Carp to be the continuous Cleanup Police, for any Hydrilla that generates from the tubular Hydrilla Roots in the lake's bottom. There was no fish kill, bird kill, animal kill, or any wanted aquatic plants killed during the spray administration. Only the Hydrilla was killed. Now everyone is out swimming, boating, skiing, paddle boarding, and fishing.*

We are Happy!  
Paul Taylor  
Lake Hobbs Homeowner Association

## **2. AQUATIC WEED CONTROL METHODS**

Aquatic weeds are recognized as some of the most challenging weed problems on the planet. One species (*Eichhornia crassipes*, water hyacinth) is listed as one of the world's top ten worst weeds. On a worldwide basis, the most widespread approach to aquatic weed control is mainly achieved through manual or mechanical cutting. LAPR uses a combination of specialized methods that yield fast and sustainable results.

### **Biological Control**

The eco-friendliest method of aquatic weed control is biological control. The stocking of Triploid Grass Carp, a weed-eating fish, is remarkably effective. The fish stocking program consists of four separate services: governmental permitting, installation of a

fish barrier, cleaning the fish barrier, and stocking the fish. Pricing for biological control services is specific to each waterway.

### **Chemical Control**

In specific settings, aquatic herbicides and algaecides' periodic applications to control aquatic weeds and algae are required. Treatment is administered only when necessary and with the utmost professional care. Before treating aquatic herbicides or algaecides, water chemistry tests are usually conducted to ensure appropriate levels for fish and other aquatic life survival.

### **Mechanical Control**

Physically removing aquatic weeds from your waterway achieves immediate results. Manual removal of aquatic weeds may be the first step for the restoration of a lake or pond. A waterway assessment is done to determine the most cost-effective approach on a per-project basis.

### **LAPR Weed Harvester**

LAPR has developed a proprietary Aquatic Weed Harvester mounted on an airboat for dramatic improvement of aquatic weed control. It quickly cuts and removes floating, submersed, and emerged aquatic weeds, including cattails, torpedo grass, Hydrilla, naiad, bladderwort, water hyacinth, water lettuce, and many others. The Harvester launches easily for convenient access to various bodies of water.

### **Algae Control**

The answer for algae control is simple: prevent the environmental conditions in which it thrives. However, the solution for algae control is complex. LAPR implements countermeasures such as aeration systems, pond dies, and flocculation, which are affordable and highly effective solutions for pond and lake management.

## **3. LAKE & POND MANAGEMENT**

### **Storm Water Pond Management**

Pond Water Management refers to the control of aquatic weeds and noxious algae in stormwater bodies, often called retention ponds. Small water bodies in housing developments, business parks, shopping centers, and golf courses are stormwater ponds. These man-made bodies of water are designed by engineers and permitted by water management districts. Stormwater ponds vary in size, depth, slope, and age, which influences how they are best managed.

Stormwater ponds serve three primary functions: flood control, limiting water pollution, and enhancing property values. Pond management plays a direct and significant role in all three.

- Ponds with excess aquatic weeds such as cattails can clog the inflow and outflow of water, which slows percolation resulting in flooding.
- Non-functioning stormwater ponds also cause water pollution by discharging “untreated” stormwater. “Untreated” means the water has not been filtered, and the pollutants have not been assimilated.
- The third function of aesthetics directly impacts the value of nearby properties or an entire neighborhood.

Stormwater management contracts are typically initiated by unsightly conditions such as floating filamentous algae. Stormwater ponds in most of Florida’s developments are incorporated into the landscape as aesthetically pleasing assets appearing like natural lakes and ponds with native waterfowl and fish. LAPR offers a professional aquatic management program specially designed for stormwater ponds, typically consisting of biological, chemical, and mechanical control methods.

Services are provided in intervals of bi-weekly, monthly, quarterly, or on-call. Other services such as floating fountain installation and maintenance, flocculation, mosquito control by larvacide application, and water testing are also available. A free assessment and quotation are available upon request.

## **Large Lake Hydrilla Treatment Program**

### **Hydrilla Treatment Options**

Hydrilla (*Hydrilla verticillata*) is a highly invasive non-native aquatic plant. If a lake becomes infested with Hydrilla, it spreads rapidly. It forms dense vegetative mats on the water's surface, blocking essential sunlight for flora and fauna in the water.

Hydrilla is a submerged plant, meaning its roots are fixed in the sediment at the bottom of the water body. It grows under low light conditions and survives at depths up to 30 feet. Hydrilla produces structures called turions and tubers, which form new plants from root or stem fragments. Waterfowl usually spread these fragments. If the lake is used for boating, fishing, or swimming, hydrilla invasion can significantly reduce residents' or visitors' ability to enjoy their time on the lake.

LAPR's integrated approach, including chemical and biological control methods, is the most successful and cost-effective hydrilla control program available.

The aquatic herbicides selected for hydrilla treatment and its rate depend on the infested lake's environmental conditions. The size of the lake, depth, clarity, pH, water hardness, flow or discharge, water temperature, time of year, other aquatic plants present, and various uses of the lake (such as irrigation, fishing, swimming, drinking, etc.) must be considered for successful treatment.

Thorough knowledge of aquatic herbicides and their compliant use is imperative for effectiveness in treating Hydrilla as well as safety for the environment.

LAPR uses aquatic herbicides with the active chemical ingredients Fluridone, Dipotassium salt of Endothol, and Diquat Dibromide. The trade names for each of these aquatic herbicides are:

- Fluridone — Sonar, Avaste & White Cap)
- Dipotassium salt of Endothol — Aquathol K, Aquathal Super K and Hydrothol 191
- Diquat Dibromide — Reward, Tribune & others

Through years of research and testing, LAPR has determined the above herbicides to be the safest and most effective on the market.

The biological control LAPR has successfully implemented for 27 years is the sterile non-native fish from Asia, the Grass Carp (*Ctenopharyngodon Idella*). This riverine herbivorous fish is the largest in the minnow family. It earnestly prefers Hydrilla over all other aquatic plants for most of its lifespan, making it an excellent and cost-effective biological control. Learn more about Triploid Grass Carp.

#### **4. AQUATIC WEED CONTROL METHODS (*Target: Aquatic Weed Control*)**

##### **The Problems with Algae**

Without algae, there would be no life on our planet as we know it. Algae is the most prevalent and widespread plant on the earth. As phytoplankton, it provides most of the oxygen we breathe and provides food for zooplankton, which is essential to all aquatic food chains.

However, many forms of algae are noxious and even toxic to humans. This article addresses the control of noxious algae and cyanobacteria in freshwater ponds and lakes.

In freshwater waterways, there are three categories of algae: planktonic, filamentous, and cyanobacteria.

- Planktonic algae are one-celled and cause water coloration, usually green.
- Filamentous algae grow in clumps or strings and may be any color, but green is typical.
- Cyanobacteria or blue-green algae have many forms and colors. Cyanobacteria is microscopic, and identification is important because it releases toxins as it dies.

Planktonic algae blooms can be tragically problematic, causing massive fish kills. The algae kill fish by consuming oxygen in the water during the night or cloudy conditions. Typically planktonic algae can be controlled with aeration or natural changes in the bloom's environmental conditions. Planktonic algae is not a typical issue for an aquatic manager.

Filamentous algae can become a significant water management challenge. As more land is developed, water pollution increases from stormwater run-off. Scientists have



documented the rise in the number of filamentous algae blooms. Filamentous algae are caused by high nutrient, warm, shallow, clear, stagnant water. The many stormwater ponds in Florida provide the perfect conditions for filamentous algae to proliferate.

Historically algae are treated chemically, primarily with copper sulfate or chelated copper. Copper, a naturally occurring mineral in waterways in tiny concentrations, turns into a lethal chemical for algae at concentrations of 2 to 3 parts per million.

Unfortunately, copper is toxic to invertebrates, microbes, and even fish. Even worse, copper is a heavy metal that never breaks down. Over time, if copper is used as an algaecide, it creates dead zones at the bottom of lakes and ponds.

Endothall and hydrogen peroxide are very effective algaecides that do breakdown into non-harmful compounds. LAPR uses these products only when biological and mechanical control methods are not practical. Biological and mechanical control methods are preferable since they treat the symptom and the cause. The symptom is the algae, and the cause is high nutrients. When using algaecides, the nutrients are reintroduced into the water body as the algae decay. The cycling of nutrients is the major drawback of using algaecides. Compounding this cyclical problem, the decaying algae feeds a more challenging to control aquatic weed, cyanobacteria.

Cyanobacteria are commonly known as blue-green algae. It is a primitive life form similar to algae and bacteria. Like filamentous algae, it usually starts growing on the pond bottom and eventually floats to the surface after becoming buoyant from the gases it produces. Cyanobacteria often appear to be filamentous algae; however, it takes many colors or forms. Cyanobacteria differ from true algae in several ways.

It is typically more difficult to eradicate chemically. Some forms of cyanobacteria, such as *Lyngbya*, have a nearly impenetrable covering.

Many cyanobacteria release toxins as they die, leading to fish kills, strong unpleasant odors, unsightly films, and even death. Dogs swimming in water with cyanobacteria have been known to die from ingesting cyanobacteria.

Controlling cyanobacteria is challenging. The best method of control is the prevention of the environmental conditions it prefers. Clear, stagnant, shallow, warm water with

high phosphates are ecological conditions in which cyanobacteria thrive. Unfortunately, these conditions are common in Florida stormwater retention ponds.

Countermeasures such as aeration systems, pond dye, dredging, and flocculation have been implemented successfully to prevent the outbreak of cyanobacteria.

- Aeration systems using compressed air with submersed diffusers are frequently effective.
- Pond dye shades the pond bottom, significantly slowing the growth of cyanobacteria.
- Dredging is very effective but expensive.
- Flocculation is a chemical process using aluminum sulfate or bentonite clay to ionically bond to the excess phosphorus in the water. Flocculation has proven to be the most effective and affordable method for treating cyanobacteria.

LAPR provides aeration system installation, pond dye application, and flocculation applications.

## **5. TRIPLOID GRASS CARP FARM**

The biological control LAPR has successfully implemented for 27 years is the sterile non-native fish from Asia, the Grass Carp (*Ctenopharyngodon Idella*). This riverine herbivorous fish is the largest fish in the minnow family. It earnestly prefers Hydrilla over all other aquatic plants for most of its lifespan making it an excellent and cost-effective biological control.

The remarkable effectiveness of Triploid Grass Carp created the need to have these fish readily available to our customers. The sister company, Charles Aquaculture, LLC, was born as a result. This cutting-edge fish farm is centrally located in Marion County, Florida. Surprisingly, Florida has very few fish farms.

Obtaining healthy Triploid Grass Carp of the proper size is challenging for aquatic management companies. The majority of aquatic management companies must purchase Triploid Grass Carp from Arkansas, having them shipped to Florida in large transport trucks. Fulfillment of an order for fish can take several weeks. Transporting fish long distances by truck is extremely stressful because of the confined space, travel time, and oxygen variation from frequent stops during transport.

Triploid Grass Carp purchased from Charles Aquaculture are transported short distances and experience minimal stress. Additionally, the time constraint after the permit is issued by FWC requires prompt stocking of the fish. It is imperative to stock the grass carp in a timely manner, typically after aquatic herbicide application.

A permit from the Florida Fish and Wildlife Conservation Commission (FWC) is required to stock the sterile (Triploid) Grass Carp in Florida. Fertile (Diploid) grass carp are not allowed to be stocked in Florida. The FWC permit requires all discharges from the water body with stocked fish to have fish barriers installed. Fish barriers must allow easy water passage with vertical or horizontal openings no larger than 1.5 inches wide. LAPR fabricates time-proven, all-aluminum fish barriers that meet or exceed FWC permit requirements.

Since each body of water is unique, Doug Charles personally meets with customers to custom design an integrated program for hydrilla treatment and control. A typical approach consists of aquatic herbicide application(s), if necessary, permitting of triploid grass carp, installation of the required fish barriers, and stocking of Triploid Grass Carp. The consultation and proposal are provided at no cost or obligation.

## **5. TRIPLOID GRASS CARP FISH FARM**



### **Intensive Aquaculture Recirculation System**

Our state-of-the-art Triploid Grass Carp Fish Farm incorporates the latest aquaculture technology, including biological filtration, reuse of water, net protected production tanks, close observation of fish, and low-stress collection and transport.



### **Biological Filtration using Green Water Technology**

Biological filtration is accomplished through "Green Water" technology using live phytoplankton recirculated from the interconnected bio-pond into all of the production tanks. The phytoplankton maintains low ammonia concentrations, allowing for triploid grass carp's mass production in small raising tanks. The aquatic plants also play a part in filtration as well as feeding the fish their natural diet.

This "Green Water System" is the fastest-growing type of aquaculture system in the world. It is the most efficient, lowest cost, and the most environmentally friendly. Conventional methods use large pumps with expensive filtration and UV sterilizers, ozone filtration, and large vats of filter media. Green water systems use smaller pumps, aeration, and sunlight to filter the water. Naturally occurring phytoplankton has proven to be the most cost-effective means of filtration too.

Growing phytoplankton in a bio-pond has an additional bonus. Massive populations of zooplankton such as rotifers, copepods, and daphnia feed on the phytoplankton and thrive. Zooplankton is used as a highly nutritious feed for the Triploid Grass Carp fry. Raising fry of any species in aquaculture is challenging. The bio-pond provides an unlimited source of nutritious live food for the fry. The fry are raised in net protected production tanks free from predators. The fry tanks are provided strained plankton-rich water from the bio-pond. The fry at this stage are extremely vulnerable to predation from insects, birds, invertebrates, and other fish. The green water system eliminates almost all predation of the fry until they reach market size.

The growth of duckweed and watermeal in the bio-pond is an additional bonus. The bio-pond grows copious amounts of these water ferns, which are the perfect food for grass carp after the fry life stage. Watermeal is highly nutritious and small enough to fit in the young carps' mouth. The young grass carp prefer the watermeal and devour it. Ground catfish pellets and soybean meal augment the watermeal diet. This feeding regimen yields impressive growth rates. The bio-pond also grows duckweed (also highly

nutritious) at an incredible rate. Duckweed and watermeal both have the capability of doubling their populations daily. Both of these plants are an ideal food for the culture of Triploid Grass Carp farm.

A mechanical feeding system was developed for feeding watermeal and duckweed carefully and efficiently.



### **Environmentally Responsible Reuse of Water**

Water use and reclamation is an essential reality in Florida. Typically, fish farms are required to obtain a Consumptive Use Permit (CUP) from the water management district because large quantities of well water are required. Our farm uses minimal well water because the fish are harvested without draining and refilling production ponds. Our well water use is far below the threshold of CUP permitting.



### **Predation Protected Fish**

All of our triploid grass carp are net protected to prevent predation. Birds of prey, especially ospreys, bald eagles, great blue herons, egrets, and hooded mergansers, can be detrimental to a fish farm crop. Alligators, otters, snakes, and even some insects pose a threat to the fish. We experience zero predation at our farm and conduct absolutely no killing, trapping, or harassing of wildlife.



### **Low-Stress Treatment of Fish**

Stress plays a significant role in any animal's health, especially animals being raised and transported in high numbers. Typically triploid grass carp are raised in large ponds, making them vulnerable to predators causing stress. The common practice of capturing the fish is using a seine net (major stress) and placed in a transport tank in a holding facility for lengthy periods (more stress). Fish are then netted again and placed in containers in transport trucks, usually from out of state. The fish are then confined multiple times for more than 24 hours (potentially critical stress).

Finally, at the stocking destination, they are netted again and stocked. Each handling of the carp creates stress, removes their protective slime coat, and puts them into close proximity to other carp, which are stressed and possibly diseased. Two of the most transmittable grass carp diseases are *Aeromonas* and *columnaris* (bacterial infections) are prevalent in Florida. At our farm, there is no stress from predation, no pond seining, no holding tank after seining, and our transportation is significantly shorter distances (all of which limits stress). Our fish are netted from their grow-out tank and either bagged or transported by aerated transport tanks immediately to their final stocking destination. Because the process is low stress, we use no chemicals, sedatives, or antibiotics during the transportation and stocking process.





### **Fish Size Availability**

Triploid Grass Carp are available at 5 inches to 14 inches in length. Freshwater fish are measured from the mouth to the tip of the tail (pinched). Fish can be delivered or picked up at our farm in Marion County, Florida. A permit from the Florida Fish and Wildlife Commission (FWC) is required for the purchase of Triploid Grass Carp.

## **6. FOUNTAINS AND AERATION SYSTEMS**

LAPR installs various fountains and aeration systems to enhance the health of your waterway and the surrounding environment while providing an aesthetically pleasing, exceptionally effective solution for aquatic weed management.

### **Floating Fountains**



AquaMaster Fountains are of the highest quality, with a wide selection available. LAPR installs AquaMaster Fountains because of the excellent aeration and superior factory warranties back them. The Masters Series features over 30 spray patterns, and the Celestial Fountains series provide 10 spray choices.

### **Aeration Systems**



Aeration addresses and solves a wide range of water quality issues related to excess algae and weed growth, bottom-sludge build-up, unpleasant odors, and insect infestation. AquaMaster has an excellent selection of quality aerators.

### **Fixed Based Fountains**



An elegant and convenient option for many waterscape designs is the AquaMaster Fixed Base Water Feature Fountain. Fixed Base Water Feature Fountains beautify an area and are remarkably economically. They are designed for smaller water features and pond applications.

All of the Fixed Base Water Feature Fountains we install are constructed of stainless steel and include a first nozzle choice from the Masters Series® floating fountain spray patterns.

### **Volcano II & HydroMax Fountains**





The Volcano II and the HydorMax are high performance, low profile, floating surface aerator systems, which produce astonishing aeration results due to their high GPM pumping rates and oxygen transfer capabilities.

### **UltiMax Aeration System**



A unique horizontal circulation system for aeration at or below the surface is available in a mixer, aspirator, surface float, or fixed base versions.

### **AquaAir Ultra Diffused Aeration System**



Dissolved oxygen levels increase throughout the entire water column by using bottom-mounted diffusers. The AquaAir Ultra Diffused Aeration System uses super fine micro-bubble technology to create the highest diffuser oxygen transfer rate available today, producing superior aeration, circulation, and destratification.

### **Promotions and Referrals**

To be determined

### **Monthly Newsletter**

Click the button below to receive our informative monthly newsletter to keep up to date on aquatic weed control, innovative products, and treatment options.

### **Frequently Asked Questions**

Weeds are weeds. We get it—aquatic weed discussions are usually about removal and control.

We understand your questions about aquatic weed control, and we think we can help. Below are the questions most frequently ask.

## **8. CONTACT US**

We're glad you're here!

Please call us with any questions or to arrange a consult/estimate appointment.

352-595-8863

Toby Sorrels

[www.tobysorrels.com](http://www.tobysorrels.com)