The South Florida Aquatic Plant Management Society

The Hydrophyte

Volume 13 Issue 4 4rd Quarter 2009

Inside This Issue

Invasive Marine Algae Alert!

Florida Dept. of Environmental Protection - (772) 873-6590

Anyone who observes the presence of this marine algae, Caulerpa brachypus, in the Indian River Lagoon or offshore waters are advised to contact the FDEP office above with the following information:

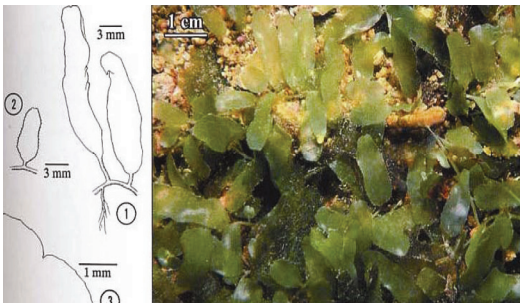
- Exact or approximate map location (GPS coordinates would be appreciated)
- Is algae rooted or floating?
- If rooted, what is the water depth where found?
- What is the approximate growth coverage (how much bottom area is it covering?)
- What is the approximate height (how high above the bottom is it growing?)
- Collect a 6 inch long sample and save in plastic baggie on ice for delivery to FDEP office

Background

The marine algae, Caulerpa brachypus, is a non-native species, originating from the Pacific Ocean. It may have arrived either in ship bilges, or discarded by aquarium hobbyists. The algae, therefore, has no known natural enemies in Florida waters, and can spread rapidly, overgrowing upon native bottom dwelling organisms and damaging the ecosystem. It is fueled by nutrients from sewage, stormwater runoff, and groundwater discharge. Scientists have recently observed it encroaching over large areas of coral reef around Palm Beach County. It now has the potential of spreading northward into the marine environments of Martin and St. Lucie counties.

- This non-native algae should not be confused with its native counterparts that do occur naturally in Florida waters. The reverse side of this bulletin provides a description for both the non-native invasive and a similar native Florida species.
- This non-native algae should not be confused with short native seagrasses. Algae lack leaf veins whereas seagrass blades have veins.

IDENTIFICATION



(diagram, photo and description adapted from Caribbean Reef Plants 2000 Littler & Littler)

Non-native algae - Caulerpa brachypus. Features include:

1. Oval shaped leaf blades, that are about 3-5 mm wide ($^1/_8$ -¼ inch) and 1-3 cm long (½- 1 ½ inch)
2. Younger, shorter leaf blades have toothed edges
3. Tips of older, longer leaf blades usually have a tiny notch at tips

Leaves grow off creeping runners (as shown in diagram on left). The leaf blades are paper thin, lime green and delicate, sometimes transparent. Due to the delicate nature, the algae often entangles along bottom structures, or may be found drifting. The algae can grow in shallow seagrass beds, in open sandy areas, or attach onto rocks. It can also grow in deep water, to about 30 m (90 ft).

Florida native algae - Caulerpa prolifera. Features include:

1. Dark green, oval shaped leaf blades, that are about 15 - 25 mm (1½ -2 inches) and 6 - 15 cm long (2½ - 5 inches)

Similar to the non-native algae, the leaves of this native species also grow off creeping runners, as seen in diagram on right. The leaf blades can be thin and delicate, but become thick and leathery with age, as seen in the photo. Often, a secondary blade will grow out of the center of the parent blade, as seen encircled in the foreground of the photo.

This algae is naturally found in shallow seagrass beds of the Indian River Lagoon areas. It can also grow in deep water, to about 15 m (45 ft).

(diagram, photo and description adapted from Caribbean Reef Plants 2000 Littler & Littler)

President's Message

According the calendar fall has started but it seems, as usual, in South Florida that someone failed to inform our local weather. This summer has been difficult in terms of temperature, rainfall and the unrelenting growth of weeds. Herbicide consumption has escalated to keep up with the increase of aquatic growth, straining already tight budgets. Despite the longer days and hotter weather, this summer has highlighted exactly why what we do as applicators is so important.

A concern brought up at a recent meeting, is that there is very little understanding of and appreciation for the importance of waterway management. The work of applicators is more than just for aesthetics. Our system of lakes, wetlands and canals has functioned very well through the heavy rains this summer thanks to our efforts. We are well aware how fast these structures can become overwhelmed and their effectiveness compromised. Rectifying a neglected waterway, on the other hand, is a slower process and storms do not wait.

One only needs to look to neighboring Georgia to see the recent loss of life and property that can occur from flood waters. Our society has a voice that reaches both the general public as well as the regional government. With that voice we can help to show that the work of aquatic applicators is as important, in South Florida, as firefighters, and rescue workers. Don't sell yourselves short. Your efforts, sweat and dedication make life here possible.

As summer eventually relents and our workloads become a bit more manageable with cooler weather; take the time to appreciate what you've accomplished. Be proud of the work you've done, and let people know what you do and what it means for them. If we're to be appreciated it ultimately falls to us to let people know WHY we are an indispensable part of the equation here in Florida.

Be safe out there.

Stephen Montgomery
SFAPMS President 2009

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The Francis E. "Chil" Rossbach Scholarship Fund

Funds from the scholarship are used to help defray costs for students taking classes related to the study of aquatic environmental sciences or related areas. The scholarship is open to anyone, and all are encouraged to apply. Applications will be accepted through the year and the scholarship awarded when a suitable candidate is found. Money raised by the Society throughout the year partially goes to fund this scholarship, the intent of which is to promote the study of aquatics. If you are interested in applying for the scholarship, please contact Scholarship Committee Chairperson Mandy D'Andrea 954 382.9766 for an application.

Aquatic Plant Management Inc.

Technician Wanted

Habitat Restoration company seeks qualified professionals. Suitable applicants will possess a pesticide applicator license, have extensive knowledge of herbicides, some mechanical ability, and a clean driving record. Also, it would be helpful to have knowledge of native and non-native plant species. There will be an outstanding pay and benefits package for the right individual - it could be you! Call Al Suarez at (954) 444-1379 to apply.

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The Benefits of Fish Stocking to your Community

South Florida provides some of the best freshwater fishing opportunities in the world. Condominium sites are now designed to include recreational areas which contain ponds, lakes, wetland areas and stormwater retention basins. Many condominium associations support angler groups and clubs.

Fish stocking programs are offered by many lake management companies. A balanced, healthy fish population can help to absorb nutrients in the water, control noxious weeds, insects and other aquatic pests. They can also provide a recreational asset for residents. Two classes of fish are commonly stocked. These include sportfish such as largemouth bass, bream and channel fish, and biological control agents including mosquitofish, which consume mosquito larvae and weed-eating triploid grass carp. Sportfish are generally stocked in the spring, when a greater variety of fish are available. Biological work fish may be stocked year round.

Advantages of commonly stocked fish species are described as follows: The largemouth bass is the most popular game fish in the United States. The Florida largemouth bass holds many game fish records. Southern bass live an average of seven years longer than their northern brothers. The benefits of bass include their consumption of insects and tadpoles, which help to control frog and toad populations.

Bream grow successfully in small ponds, large lakes and canal systems. They are easily adaptable to almost any climate and are found throughout the United States. They can be supported with commercially available food pellets and often create resident enjoyment at lakeside feeding stations.

Channel catfish eat many types of foods and scavenge lake bottoms. This helps to “clean” the aquatic ecosystem. Maximum weights attained by channel catfish exceed 25 pounds. Catfish can be caught with baits such as nightcrawlers and chicken livers.

Triploid grass carp are a sterile, biological weed-eating fish. They must be permitted for stocking by the Florida Game and Fresh Water Fish Commission (GFC). Carp feed on many of the undesirable, exotic weeds that have become dominant in many of Florida’s waterways. Hydrilla, an exotic plant rated as the state’s number one nuisance, is on the grass carp’s preferred diet. Stocking rates are determined by the GFC.

Mosquitofish have desirable eating habits. They are known to eat their body weight each day in mosquito larvae. Gambusia (mosquitofish) have been introduced throughout the world to aid in the natural control of mosquitoes, especially where malaria and yellow fever are a threat. Gambusia bear their young alive, breeding throughout the summer.

Healthy fish populations are dependent on a balanced aquatic ecosystem. An important component of the aquatic community is aquatic plants. Native aquatic vegetation provides an essential habitat for fish foods such as insects and invertebrates, and provides shelter for juvenile fish.

South Florida lakes are an often overlooked, valuable resource. Other than providing stormwater retention areas, lakes provide an aesthetic focal point for many communities.

Written by Dawn Hill – Allstate Resource Management

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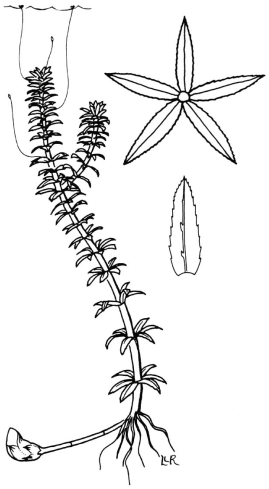
Triploid Grass Carp For Aquatic Plant Control

The Triploid Grass Carp

Most people are surprised to learn that the grass carp is actually a very big minnow! It is a member of the largest group of fishes, Family Cyprinidae, which also includes such well-known examples as the goldfish and the golden shiner. It is an exotic species, not native to Florida but moved here by man from its original range in China and Siberia. The grass carp legally stocked by FWC permit are triploid grass carp. They have been genetically manipulated under closely-controlled hatchery conditions to have three sets of chromosomes instead of the normal two. This renders these fish incapable of reproducing—an important precaution in case stocked fish accidentally gain access to an area they were never intended for. For this same reason, the triploid grass carp is not considered an established exotic species (having a permanent population), even though it is quite common in many water bodies. Without restocking, every population will eventually die out. This is the only other legally-stocked exotic fish in Florida besides the peacock bass. The fish can achieve 56 inches in length and 75 pounds in weight, although much smaller fish are most effective for vegetation control. Grass carp will often school together. The dorsal fin of feeding individuals can sometimes be observed sticking out of the water.

What Grass Carp *Will* Eat



Hydrilla, Southern Naiad, Pondweed, Chara (Musk-Grass)

Grass carp are strictly vegetarian. Their popularity for vegetation control stems from their taste for certain plants often considered troublesome from a lake management perspective. Illustrated to the left are some of the most preferred aquatic plants that grass carp will consume:

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Triploid Grass Carp For Aquatic Plant control

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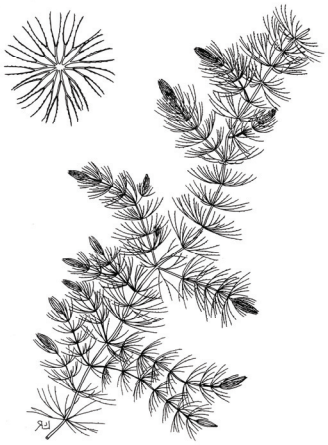
What Grass Carp *Might* Eat



Coontail, Eel Grass, Fanwort, Hygrophylla

There are some plants that triploid grass carp have only a moderate preference for. For these species, grass carp can still provide effective control if none of the more preferred species are present. Usually, some chemical control is still needed, and triploid grass carp may need to be stocked in higher numbers to have a noticeable effect.

What Grass Carp *Won't* Eat

Water Hyacinth, Water Lettuce, Filamentous Algae, Cattail

If one of the plants below is what ails your lake, then chemical control is probably your only option. Triploid grass carp rarely eat these species.

How It's Done

Triploid grass carp will also control some other species of plants, but those listed are among the most common. The first step in the process is to determine what species of plant (or plants) are involved. It is very important that you correctly identify the plants that you want to control before stocking triploid grass carp. Otherwise, you will probably be wasting time and money. Once you have determined that the plants involved can be controlled by grass carp, you will need to apply for a Triploid Grass Carp Permit. An online application is available (http://myfwc.com/License/FreshwaterPermit_grasscarp.htm). In order to obtain the permit, culverts leading out of the water body in question may need to be grated to prevent grass carp from escaping beyond the permitted area. Once approved, the permit will allow stocking of an appropriate number of fish for the situation. The triploid grass carp will have to be purchased from a supplier (http://myfwc.com/freepermits/tgc-internet/tg_vendorlist.asp). In most situations, the plants being controlled should be chemically treated to eliminate them as much as possible prior to stocking the grass carp. Once introduced, the grass carp should provide "maintenance control" of the remaining vegetation. Note that grass carp are small when stocked and may not have a discernible effect for up to a year. Therefore, plan for any necessary chemical control until then. Once the fish grow large enough to be effective, regular monitoring and occasional chemical control—or stocking of additional fish—may be needed to maintain control of the vegetation within the system.

NOTE: Grass carp are illegal to possess without a FWC permit. Any grass carp caught by anglers must be released unharmed.

Article - John Cimbaro- Florida Fish and Wildlife Conservation Commission
Graphics - Ted Walke

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Limnology 101

A complete understanding of fish requires not only a knowledge of the many aspects of biology of the fish itself, but also study of the world it lives in and how that world affects it. While marine biology has a long history, the specific study of freshwater bodies is a rather new science only about 100 years old, and is called ***limnology***.

Water itself is the most basic and obvious component of freshwater habitats. However, the "big picture" proves fresh water to be a surprisingly rare and precious commodity. Of all the water available on planet Earth, approximately 98% is salt water. Of the remaining 2% that is actually fresh water, it is estimated that the vast majority is tied up in groundwater and the polar ice caps. In the end, only about 0.01% of all the world's water exists in livable freshwater habitats such as lakes and rivers! Unlike marine waters such as oceans and seas, this limited supply of fresh water occurs in separated and isolated habitats: individual and distinct lakes, ponds, rivers, and streams. Being small and isolated, fresh waters are also more vulnerable to change and alteration. So freshwater organisms must have many adaptations for survival that set them apart from their saltwater counterparts.

For simplicity, the rest of our discussion will center on lakes. Of course, there are all kinds of lakes, formed by a variety of forces ranging from glaciers to meteorite impacts to man-made constructions. No single criteria exists for classifying them all. However, one useful measuring tool for categorizing lake types involves the stages an individual lake may pass through in its "lifetime".

A young (***oligotrophic***) lake will have few nutrients entering it from the surrounding environment, will have a low level of biological productivity, and therefore contain a relatively sparse population of plants and animals.

A middle-aged (***mesotrophic***) lake will contain moderate levels of nutrients and plant and animal life. Some sedimentation will begin to occur as plants and animals in the system die and their remains settle to the lake bottom.

An old (***eutrophic***) lake will have high levels of nutrients and very high productivity of plant and animal life. Lake Okeechobee is a well-known example.

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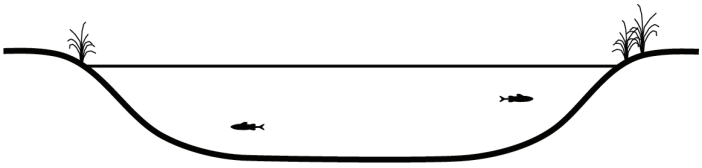
Limnology 101

Continued from page 7

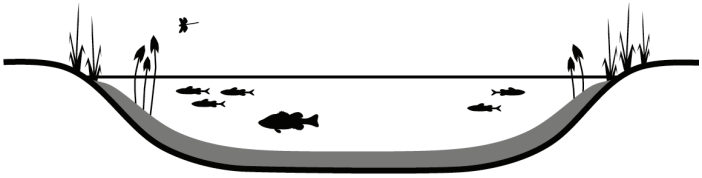
While the eutrophic lake may seem the best because it contains numerous plants and animals, such a state is actually a sign that the lake is nearing the end of its life-span.

As biological productivity increases to its highest levels (***hypereutrophic***), organic sediment from all these plants and animals accumulates on the lake bottom at a faster and faster rate. The lake becomes shallower, its shore-lines encroach on the open water, and eventually the lake becomes entirely filled in and turns into a terrestrial system. This process can take hundreds of years (so don't throw away your Okeechobee maps just yet) and is labeled ***succession***.

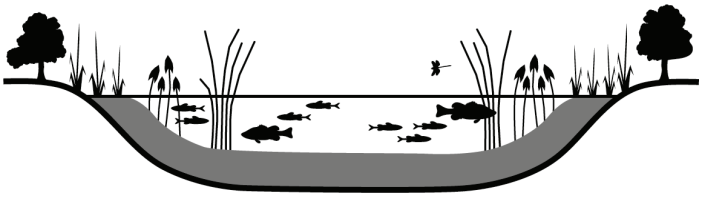
Oligotrophic Lake



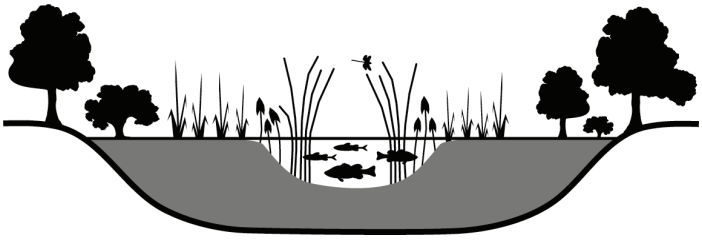
Mesotrophic Lake



Eutrophic Lake



Hypereutrophic Lake, well on its way to becoming a terrestrial system



Article & Graphics by John Cimbaro

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WATER QUALITY

NUTRIENT LEVELS

Every living creature needs nutrients. This applies not only directly to the fishes themselves, but also to the foods (both plant and animal) that fish eat, as well as the plants fish depend on for habitat. Nutrient levels affect plants and algae most directly, so most of our discussion on nutrients will deal with those organisms.

1) Nitrogen — This nutrient is one of the most important. In fact, the level of nitrogen in a lake is often the criteria used to determine a lake's ***trophic state*** (see Issue 22 for discussion). Sources of nitrogen include stormwater runoff into lakes that washes soil nitrogen into the water; atmospheric nitrogen that certain algae can convert to solid form for their own use; and in some cases even sewage and agricultural runoff. However, for a typical southeast Florida lake the largest source of nitrogen may be the fertilizer used to keep lakeside banks looking green and perky. This applies in particular to lakes found in residential areas and parks.

While nitrogen is necessary, too much can be a problem. Signs of too-high nitrogen levels include cattail proliferation in a lake as well as algae or algae blooms. For lakes in areas that receive fertilization, it is recommended that a fertilizer-free "buffer zone" be maintained around the lake to prevent unnecessary fertilizer runoff into the water. A strip of 25-50 feet is usually good, depending on how steeply the banks are sloped and how much runoff enters the lake. Since fertilizer will still be washed down the banks toward the lake, the "buffer zone" itself will receive adequate nutrients over time. Also, taking care to avoid overfertilization in the areas where fertilizer is applied will also help reduce unnecessary nutrient input into a lake.

2) Phosphorous — Home gardeners already know that in addition to nitrogen, phosphorous is one of the other important components of fertilizer. Phosphorous is just as important as nitrogen to algae and plants. Sources of phosphorous in lakes are similar to those for nitrogen: soil erosion and runoff, fertilization, and wastewater or stormwater runoff.

Phosphorous levels are more likely to be too low in a lake than nitrogen levels. For this reason, phosphorous is sometimes introduced into lakes deliberately as a fish management strategy in order to increase algae and plant growth in otherwise sterile waters. However, most south Florida lakes already have sufficient levels of phosphorous. Going one step further, too much phosphorous has similar symptoms to nitrogen overload: algae blooms and overabundance of cattails. In southeast Florida lakes, too much phosphorous is more likely to be the problem than too little.

OXYGEN

The amount of dissolved oxygen (DO) in water is critical to the survival of fish. While water itself is made up of oxygen (attached to two hydrogen atoms as H2O), dissolved oxygen refers to "free oxygen", or O2, dissolved in the water. This is what fish "breathe". Low DO levels are the leading cause of native fish kills in our area (kills involving exotic fishes are usually cold-related). Factors that can limit or reduce the level of oxygen in water are warmer water temperatures which reduce oxygen-holding capacity; lack of oxygen-producing plants in a water body; or cloudy weather that reduces the amount of sunlight for plant photosynthesis. In addition, under low-light conditions the same algae that normally photosynthesize oxygen may change their metabolisms to actually start using up oxygen. The best way to maintain healthy oxygen levels in a lake is to have at least 25% plant coverage by native and desirable plant species. A more artificial method is to install an aeration system using a blower pump and airstone banks placed on the lake bottom. Fountains, while popular and attractive, only generate limited oxygenation of surface water in the immediate area.

Some fish need more oxygen than others. Cold-water species such as trout and salmon, for example, have high oxygen demands (6 parts per million DO) and would be among the first fish to succumb during the onset of a low-oxygen kill in a northern lake. Bass and sunfish have moderate oxygen demands (4 ppm) and would be the next fish to die off if oxygen levels continued to drop. Catfish require only 2 ppm DO and could survive for brief periods even if oxygen levels began bottoming out. A handful of fish, such as gar and bowfin, can actually take oxygen directly from the atmosphere and could still survive for a time even if DO levels approached 0.

Article - John Cimbaro- Florida Fish and Wildlife Conservation Commission

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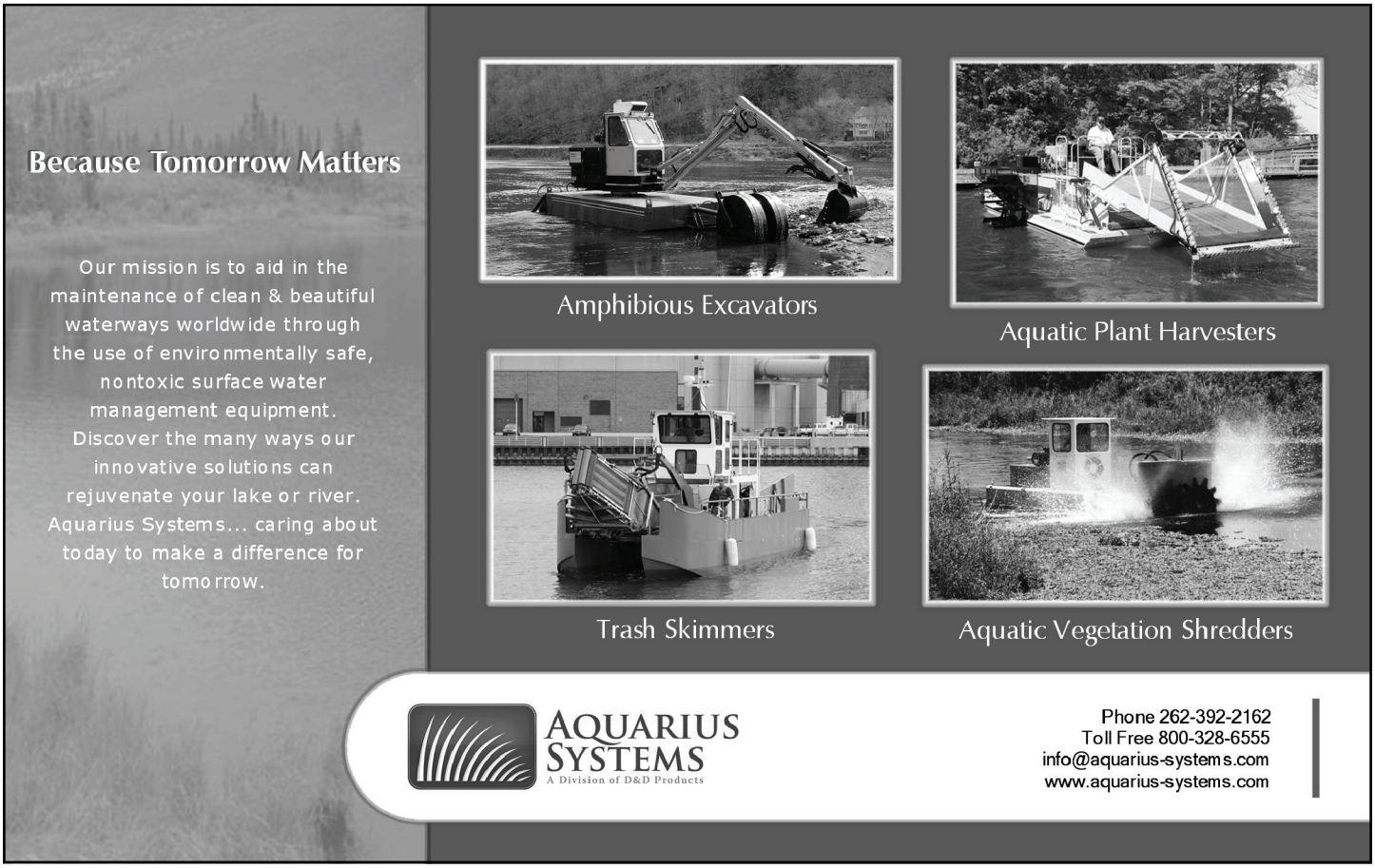

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