



The South Florida Aquatic Plant Management Society

# The Hydrophyte

Volume 27 Issue 3



## Highlights

**Marine Predators Take Bite  
Out of Climate Change**

**Alligators are the Engineers  
of the Wetlands**

**PREDATOR VS THE ALIEN  
Whiteflies are now being found  
on aquatic plants!**

**The Impact of Adjuvants in  
Aquatic Applications**

## President's Message

First thing I must take a moment and thank the fine folks at Lee County Hyacinth and Mosquito Control District for hosting our last meeting. We missed those of you that were unable to attend this meeting and hope to see you on September 28. Colleen is working diligently on the next location and program so stay tuned for more details.

It has been a hot one out there with high temperature records every day and it isn't even August yet. The weeds are growing, the algae are exploding and all of the applicators going as hard as they can to stay ahead of it. Let's remember to stay hydrated and keep our skin covered from the sun.

Before you know it will be October and time to attend FAPMS in St Pete. If you are planning on attending you can hop over to FAPMS.org to register and click on the link to book a hotel room. Until the next time let's all stay safe out there!

James Boggs - President  
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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 throughout the year and the scholarship awarded when a suitable candidate is found. Money raised by the Society during the year partially goes to fund this scholarship, the intent of which is to promote the study of aquatics. For an application, please go to [www.sfapms.org](http://www.sfapms.org).

**Cover Photo:**  
**Allstate Resource Management**



# Marine predators take bite out of climate change

By: JoAnn Adkins | FIU NEWS

When it comes to mitigating climate change, marine predators could be a key factor.

Coastal habitats full of vegetation, including seagrass beds, salt marshes and mangroves, are some of the best absorbers of atmospheric carbon dioxide, according to FIU marine scientists Mike Heithaus and James Fourqurean. Coastal habitats bury carbon 40 times faster than tropical forests. These same habitats are believed to store as much as 25 billion tons of carbon, making them the most carbon-rich ecosystems on the planet. Yet, when the predator population is low, these areas fall victim to overgrazing and sediment disruption. The findings were published this week by Nature Climate Change.

Many of the world's oceans are experiencing significant declines in predator populations due, in large part, to overfishing. Without adequate numbers of predators, grazers, such as turtles, are left to roam and devour vegetation freely, also disturbing sediments and soils. This is of particular concern considering that sediments are excellent at storing carbon.

“People typically think of predators and people as being in conflict,” said Heithaus, who also serves as the dean of FIU’s College of Arts & Sciences. “But the presence of marine predators is good for us in many ways. They help to preserve ecosystems that support human uses like fisheries. And the evidence continues to stack up that their contributions to the long-term stability of these ecosystems can help mitigate climate change through preserving carbon stores.”

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In the past 50 years, land-use changes, climate change and other factors have resulted in the loss of as much as 50 percent of the world's vegetated coastal habitats. The effects can be seen throughout the world. In Cape Cod, Mass., hundreds of years worth of carbon stocks have been lost due to the overfishing of predatory fish and crabs. The grazers devoured much of the carbon-storing vegetation, leading to marsh die-off and major erosion. The high rate of predator loss means Cape Cod marshes have lost about 17,000 tons of carbon dioxide storage capacity per year, equivalent to the annual emissions of about 3,000 cars.

"Scientists and policy makers around the world are just beginning to understand the importance of carbon stored in coastal vegetated habitats to climate policy," said Fourqurean, an international advocate for the Blue Carbon initiative — storage of carbon in seagrasses and other coastal habitats. "This new study highlights how fisheries practices have a surprising and strong impact of the stability of the coastal carbon stores. In effect, fishing activities can influence the rate of global climate change."

The FIU team, along with scientists from Utah, Australia and the United Kingdom, conduct much of their research in Shark Bay, Australia, where pristine conditions have left the area's food web largely intact. Here, the team found areas where predators are most active also account for some of the most active carbon storage — as much as 60 percent greater than in areas where the threat of predators is low. Similar findings have been recorded in locations throughout the world.

While the study focuses on vegetated coastal habitats, the authors argue the results are likely indicative of effects on a variety of other marine habitats including kelp forests, coral reefs and open oceans. Strong conservation efforts and stricter fishing regulations of top predators could be the key in protecting a major resource in carbon storage for the entire planet. Heithaus points out that such endeavors could be a win-win — helping to break the cycle of extinction while also defending the planet against climate change.



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# Alligators are the engineers of the wetlands

By: Christine Calvo | FIU NEWS

**Alligators radically change the ecosystem around them to make the best of seasonal changes in water levels – and that’s a good thing for wetlands.**

A new study recently published in the *Journal of Animal Ecology* shows alligators do more than just care for themselves when they create alligator ponds. They create a habitat for other organisms and move nutrients around. The research, led by FIU alumnus Bradley Strickland, now a postdoctoral researcher at Virginia Institute of Marine Science, is the first to show alligators act as “engineers” in their ecosystem by altering nutrient cycling and keeping the ecosystem healthy.

When the alligators dig holes to fill with water, they give fish and wildlife refuge from falling water levels in the dry season. These ponds, in turn, provide the alligator with a steady supply of food and a place to mate.

To maintain their ponds and keep them from filling in with vegetation, alligators use their snouts, claws and tails to move sediment and nutrients around. This disturbance enriches the soil, with alligator ponds showing higher nutrient levels compared to what was found in surrounding marshes.

Strickland, along with FIU researchers Mike Heithaus and Peter Flood, Jeffrey Kline from Everglades National Park, Frank Mazzotti from the University of Florida, and Joel Trexler from Florida State University, found the alligators’ extricating movements also can prevent communities of organisms made up of bacteria and fungi from forming in large mats over the area.

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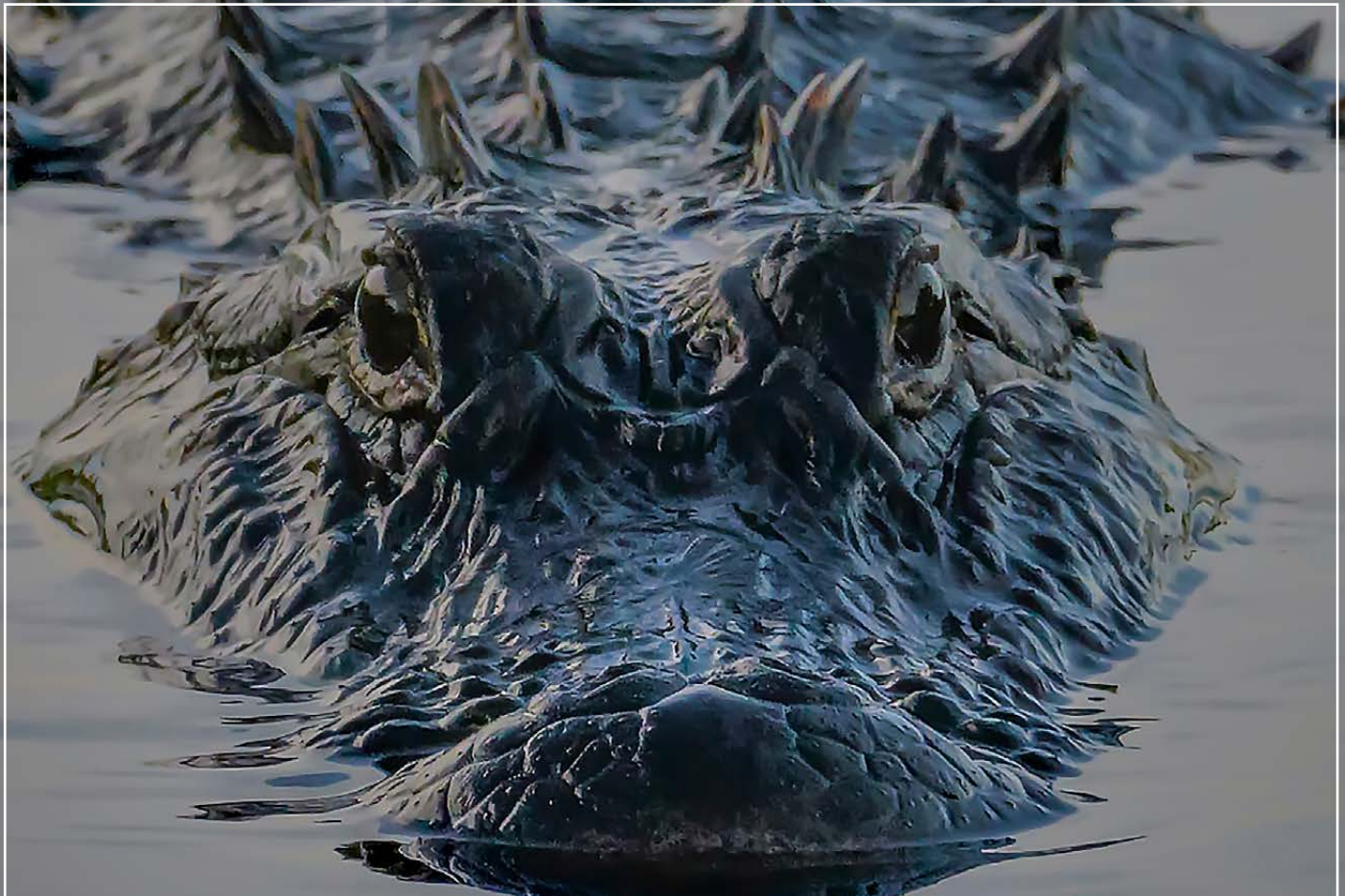


Researchers sampled 10 active American Alligator ponds, five in each of the Everglades National Park's Shark River Slough and Taylor Slough - the two major drainage basins of freshwater through the Everglades to the Gulf of Mexico. They collected water, particulate organic matter, plants and animals across different habitats at each site, including the ponds themselves.

"Understanding the diverse ecological roles of predators like crocodylians will ensure that we have the knowledge to protect our ecosystems in the future," Strickland said.

Alligators have only recovered from near extinction in the past 50 years, but their ecosystems remain under threat from human disturbances and climate change. This latest research adds to the growing evidence of the many ways predators preserve the health and stability of entire ecosystems. Nearly 10 years ago, FIU researchers, led by Heithaus, were the first to identify the roles sharks serve in maintaining the health and biodiversity of coral reef and seagrass ecosystems. Though their roles are different, alligators have proven equally important as ecosystem engineers.

"This is another example of the important role predators can play in their ecosystems in addition to eating prey," said Heithaus, who also serves as executive dean of the FIU College of Arts, Sciences & Education. "Often predators are some of the first species to be hurt by human activities, so it is essential that we find ways to protect and even restore their populations."





## Grilled Florida Spiny Lobster Rolls

Recipe from Fresh From Florida  
Florida Department of Agriculture and Consumer Services

### Ingredients

---

1 pound Florida spiny lobster meat, grilled and chopped

Florida Romaine or Butter lettuce, shredded (or your favorite lettuce)

½ cup Florida celery, chopped

Rolls, split in half

2 green onions, chopped

½ cup mayonnaise

1 tablespoon prepared Dijon mustard

1 teaspoon lemon juice

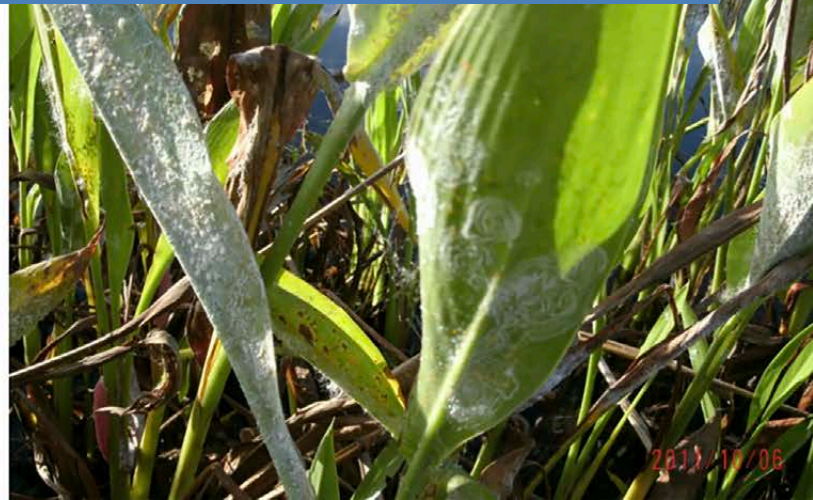
1 teaspoon Worcestershire sauce

Sea salt and fresh ground pepper, to taste

### Preparation

---

Heat grill to medium-high. Cut the lobster tail in half, leaving the lobster meat in the shell. Season with salt and pepper and grill for 2-3 minutes per side or until meat is no longer translucent. Remove from shell to cool and cut into bite-size pieces. Combine the mayonnaise, mustard, lemon juice, Worcestershire, celery, salt and pepper, mix thoroughly. Gently fold in lobster meat. Fill rolls with lobster mixture and garnish with green onions. Serve chilled.



## PREDATOR VS THE ALIEN

### Whiteflies are now being found on aquatic plants!

By: Rose Béchard-Butman; Certified Arborist

There are no EPA approved Insecticides for Aquatic use. What should we do? IPM (Integrated Pest Management) is a fairly new term. So is biocontrol. There really is nothing new about these practices. Predation and parasitism are the scheme of nature. Since the beginning of time, the food chain is a pyramid of how things work naturally. The game remains the same. Eradicate the pests which harm the plants before the plants are destroyed.

Often when new pests arrive, they can reach very high populations and can be extremely damaging. After several years, the impact can be naturally reduced.

It is very important to understand the importance of natural enemies and the need to focus on long-term, biologically based management. Softscapes, has been releasing predators as a green option to the whitefly invasion. Our goal is to get the best control with the least amount of damage to the environment.

Change is difficult to accept and utilizing biological control can be misunderstood. Insecticide sprays can wipe out beneficial insects and must have contact to be effective. Protecting natural enemies is very important so they are not also killed while trying to control the target pest.

Protecting natural enemies is a critical component in long-term control!

#### RUGOSE SPIRALING WHITEFLY *aka Gumbo Limbo Spiraling Whitefly*

#### A New Whitefly in South Florida



Adults on the underside of a palm leaflet

UF UNIVERSITY OF FLORIDA  
IFAS Extension



## “The Alien”

(Insect is believed to originate from Central America)

This is not the same whitefly (Ficus whitefly) that is currently causing defoliation and branch dieback of Ficus in south Florida. This new whitefly is a large, slow moving insect capable of infesting a wide range of landscape plants including our native trees and shrubs. White spirals on the underside of leaves are a sure sign of spiraling whitefly. Infested plants can become covered with a white, waxy substance.

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0.33	1.00	1.14
0.50	1.50	1.70
0.67	2.00	2.26
0.83	2.50	2.84
1.00	3.00	3.40

These insects typically feed on the underside of leaves with their “needle-like” mouthparts. Whiteflies can seriously injure host plants by sucking nutrients from the plant causing wilting, yellowing, stunting, leaf drop, or even death.

The sticky honeydew that they excrete can accumulate on cars, pool decks and patio furniture from infested trees overhead. The black sooty mold is what grows on the insect’s honeydew.

Whiteflies do not have a hibernation period; winter weather will generally reduce their numbers. The female lays about 200 eggs on the underside of the leaves, the eggs hatch and the nymphs quickly start to feed on the sap of the plant in cottony colonies. When mature they develop wings and fly off onto other plants to lay their eggs.

## “The Predators”

The “predators” such as ladybugs (beetles) and Lacewings, feed on white fly larvae as they do aphids. Broad spectrum or persistent insecticides often kill a high proportion of predators and parasites, especially when applied as a foliar spray .

Don’t expect biocontrols to act quickly. They usually don’t. They have to acclimate to their new surroundings, locate their food or their hosts and then act. Especially when dealing with parasitoids-versus predators.



Photo credit: Tony Lanza;  
Nature Photographer

Predators eat the pests but Parasitoids often have to mate first, then lay eggs in the pests before results can be expected. Patience is required.

The ladybeetles released to control the whitefly at Softscapes are *Delphastus catalinae*, they are native to Florida. Ladybugs, as they called by the masses, are voracious predators.

The orange/red, black-spotted beetles are recognized the world over. They are considered an aphid predator. However, as most beetles are very opportunistic and will eat pests other than aphids: mites, insect eggs, whitefly larvae, etc

Aside from watering the site before releasing them in the evening, there are other things you can do to ensure that the maximum number of beetles stick around. Flowering, pollen producing plants are a big plus. Pollen isn’t the only thing these beetles will eat. They will also consume the honeydew!



The other Predators we released are the Green Lacewings ,*Chrysoperla* spp.: *C. carnea* and *C. rufilabris*

They are aggressive aphid predators that have an appetite for other soft-bodied pests as well, such as white fly. These nocturnal predators come in three major forms: eggs, larvae and adults. The eggs are useful when you’re in no great hurry to get rid of the pests.

The larvae are useful for the quick cleanup. The adults, being nomadic, are useful in plant, tree and scrub applications. The larvae are the only predatory form of this insect. Like the ladybeetles, they can tackle a great number of aphid species.

Moreover these predators eat outside of their aphid-preference diet to enjoy other soft-bodied pests: scale insect immature stages, including mealy bugs and whitefly.

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For Aquatic use there are no approved insecticides. Even natural Neem oil is not recommended for aquatic use. The use of Predators can be the environmentally sound long term solution for aquatics.





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# The Impact of Adjuvants in Aquatic Applications

**By: Michael F. Schoo and Lucía G.I. Marshall, PhD, Biosorb Inc.,  
5988 Mid Rivers Mall Drive, Suite 124B, St. Charles, MO 63304-7119 USA.**

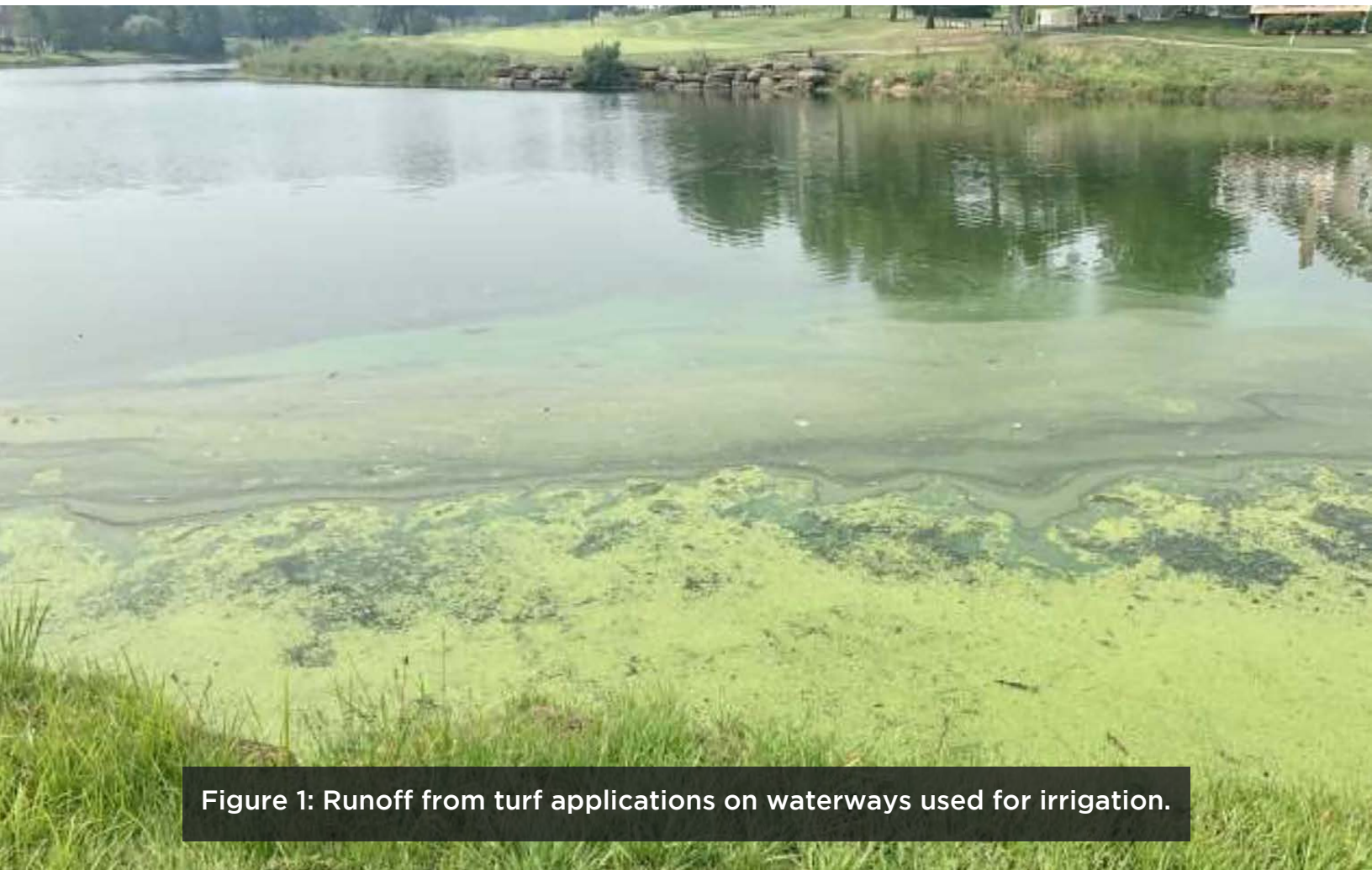
Modern spray applications rely on various inputs to maximize aquatic weed and algae control including agrochemicals with adjuvants. While these products play a vital role in cleaning waterways, it is essential to consider their potential environmental impact. In this article, we will explore the concept of environmental chemical load resulting from the use of spray adjuvants, understand its implications, and discuss strategies for responsible and sustainable practices.

One of the major factors to consider is the half-life and dissipation rate of materials in waterways making applicators aware of the potential accumulation after continuous applications.

To make waterways safer, we should strive to minimize the accumulation of materials that negatively impact the health of our environment.

Accumulation of adjuvants can be seen in spray applications near lakes, as shown in Figure 1. Phase separation is clearly demonstrated by the striation of oils, surfactants and dyes on the water surface, without full control of duckweed and algae.

Some of these adjuvants do not biodegrade rapidly and re-accumulation occurs every time aquatic sprays are reapplied or when turf is fertilized and irrigated. The growth of aquatic weeds and algae is primarily caused by the runoff of lawn fertilizers.



**Figure 1: Runoff from turf applications on waterways used for irrigation.**



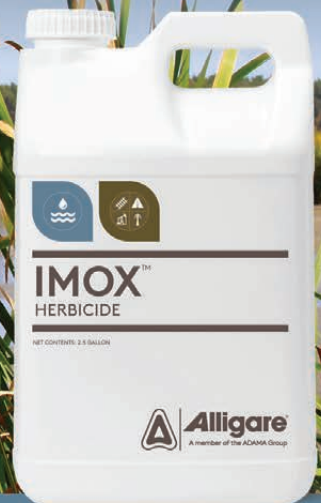
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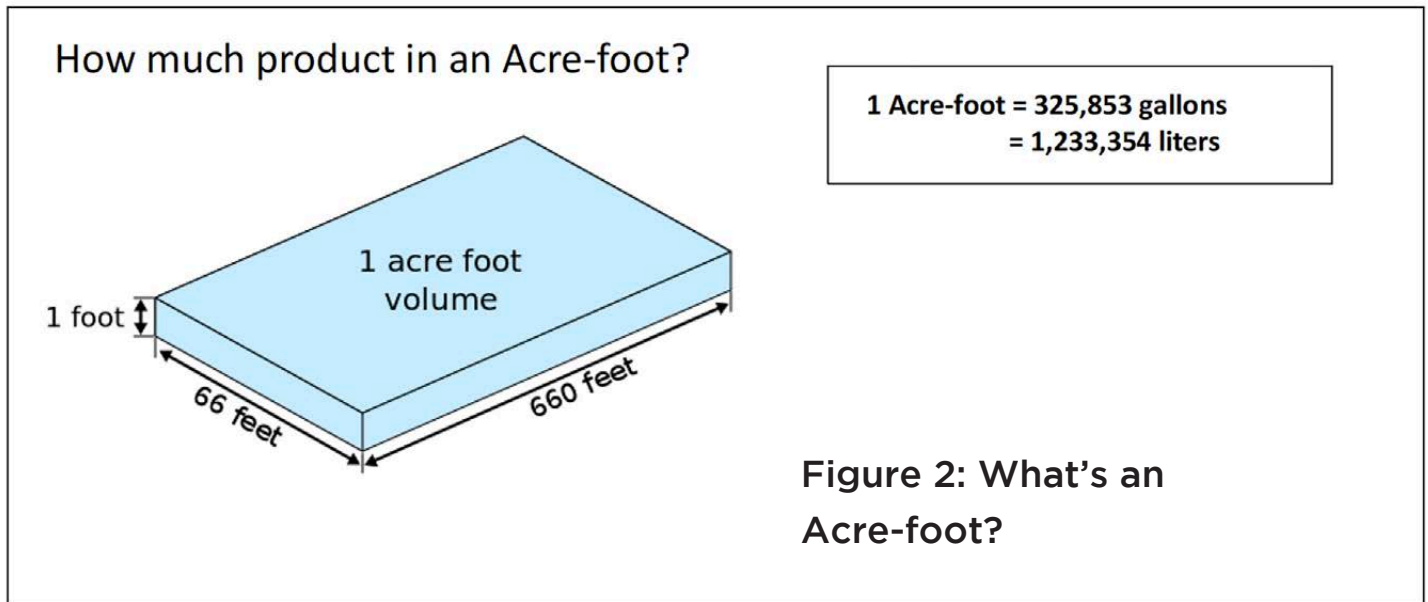


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# Understanding Environmental Chemical Load:



Environmental chemical load refers to the cumulative presence and impact of chemicals in the environment resulting from agricultural, horticultural, lawn & garden, golf course, and aquatic weed/algae control activities. Adjuvants are substances added to pesticide tank mixes to enhance their effectiveness.

However, some adjuvants may contain ingredients that contribute to the overall chemical load in the environment, are not readily biodegradable, and may have a negative impact on non-target organisms such as fish, amphibians, and other beneficial species.

Let's assume that we add to our spray tank:

- Herbicide.....1.0 gallon per Acre-foot
- Surfactant/penetrant...0.5 gallon per Acre-foot
- Sticker .....0.5 gallon per Acre-foot
- Drift agent .....2.0 gallon per Acre-foot

In total, we are adding 4.0 gallons of materials to an acre pond, of which 3.0 gallons are adjuvants. Will non-target species, like fish, tolerate this level of loading? In worst case, you can observe fish kills due to surfactants interfering with their fish gills causing hypoxia.

Dr. Bill Haller's group wrote an article explaining the LC50 of some of these adjuvants. LC50 is the lethal concentration of a substance to kill 50% of the population.

After years of continuous re-spraying, the pond may slowly become saturated with ecologically adverse pollutants. In combination with additional run-off from fertilizers and nearby crop inputs, lakes, such as Lake Okeechobee, can begin to show toxic effects on non-target species.

The result of years of residual accumulation of materials, that cannot biodegrade easily, leads to pollution and oxygen depletion in our waterways implying following.

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## **Implications of Environmental Chemical Load:**

### **1. Impact on Non-Target Organisms:**

Adjuvants, when released into the environment, can affect non-target organisms such as beneficial insects, birds, and aquatic life.

These substances may have unintended toxic effects on non-target species, disrupting ecosystems and biodiversity.

### **2. Water Contamination:**

Runoff from spray applications can carry adjuvants and other agrochemicals into nearby water bodies, leading to water contamination. This contamination can harm aquatic organisms, disrupt ecosystems, and compromise water quality for human consumption and recreational purposes.

### **3. Persistence and Bioaccumulation:**

Some adjuvants and their breakdown products can persist in the environment for extended periods. These substances may accumulate in soil, sediments, and living organisms, resulting in bioaccumulation and potential adverse effects on the food chain and human health.

### **4. Soil Health and Microbial Balance:**

Excessive use of adjuvants can disrupt the natural balance of soil microorganisms and beneficial insects. This can affect soil health, nutrient cycling, and overall ecosystem resilience, compromising long-term agricultural sustainability.



## Florida Watermelon Gimlet

Recipe from Fresh From Florida  
Florida Department of Agriculture and Consumer Services

### Ingredients

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2 ounces Florida gin

(such as Old St. Pete Sunset Gin)

1/2 cup fresh Florida watermelon, cubed

1 lime, juiced

3/4 ounce simple syrup

Watermelon, sliced thin and  
fresh mint for garnish

### Preparation

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Chill a coupe glass by filling with ice and water. In a cocktail shaker, add fresh watermelon, lime juice and simple syrup. Using a muddling stick, mash watermelon to release all the juices. Add gin and fill shaker halfway with ice. Place top on shaker and vigorously shake for at least 30 seconds. Discard ice and water out of coupe glass. Use an ice strainer to pour the watermelon gimlet mixture evenly into the chilled coupe glass. Garnish with a thin slice of Florida watermelon. Drink responsibly.

# Promoting Responsible and Sustainable Aquatic Practices:

## 1. Integrated Pest Management (IPM):

Implementing IPM strategies that focus on minimizing chemical inputs, optimizing timing and dosage, and incorporating alternative pest management methods can help reduce the overall chemical load on the environment. Using plant-based organic adjuvants can reduce the input of synthetic polymers such as latex (polyacrylate), ethoxylated compounds, and other non-biological substances that can introduce potential ecological effects.

## 2. Proper Product Selection:

Choose adjuvants that are specifically formulated for reduced environmental impact, such as those labeled as biodegradable, environmentally friendly, or certified for organic agriculture. Ensure compliance with relevant regulatory standards and certifications.

## 3. Appropriate Application Techniques:

Follow recommended application guidelines for adjuvants, including proper timing, dosage, and application methods. Avoid overuse or misuse of adjuvants, as this can lead to unnecessary environmental chemical load.

## 4. Precision Agriculture:

Utilize precision agriculture technologies to optimize the use of agrochemicals, including adjuvants. Site-specific application based on real-time data can minimize chemical usage, reduce environmental impacts, and improve resource efficiency.

Aerial spray drone applications on target species, instead of the entire waterbody, can also help reduce contamination to non-target species.

## 5. Education and Training:

Provide education and training to aquatic applicators and professionals regarding the responsible use of adjuvants, emphasizing the importance of environmental stewardship and sustainable practices. Encourage knowledge sharing and awareness of emerging best practices.

## 6. Regulatory Measures:

Support and comply with regulations and policies that aim to minimize the environmental impact of agricultural adjuvants. Advocate for stringent assessment and monitoring of adjuvant formulations to ensure their safety for the environment and human health.

## Conclusion:

Spray adjuvants can enhance the effectiveness of agrochemicals and contribute to improved aquatic weed and algae control. However, it is essential to balance their benefits with the potential environmental chemical load they may introduce. By adopting responsible and sustainable agricultural practices, utilizing precision technologies, and promoting awareness, we can mitigate the environmental impact of adjuvants, protect ecosystems, and work towards a more sustainable future.

Using a biodegradable natural-based adjuvant that does not accumulate in waterways, such as the cereal derived Microsponge™ system in TopFilm™, is one of the best alternatives to reduce the chemical load in our ponds, canals, and lakes. A new product called FertiGlu™, implying “fertilizer glue,” which contains the same Biocar® Microsponge™ technology will help reduce fertilizer run-off into waterways.

Biological substances that chelate and absorb chemicals in waterways, not only make treatments stick due to natural carbohydrate, but are easily metabolized by bacteria, microorganisms and species that can digest grain derived materials.

Remember, achieving clear lakes and waterbodies must go hand in hand with environmental stewardship to ensure the long-term health and resilience of our planet.

**References:**

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- 14th edition of the Compendium of Herbicide Adjuvants by Purdue University (2023) [www.herbicideadjuvants.com](http://www.herbicideadjuvants.com)

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# SFAPMS Seminar June 29, 2023

By: Patricia Fleming

The seminar was an education program which gave CEU (Continuing Education Unit) credits to those attending. There were more than 100 attendees who work in the field of controlling aquatic weeds. The following is a short summary of the presentation.

## **Saltwater Impacts of Hurricane Ian in Storm Water Ponds**

*Dr. Ernesto Lasso de la Vega, Lee County Hyacinth Control District*

- Ernesto spoke about stratification in the ponds with low temperatures at the bottom and higher temperatures at the top; however, the main reason for stratification in this case was salinity since salt water is heavier than freshwater. Aerators will help in mixing the waters.
- Aquatic plants that will survive in salty waters: swamp lily (*Crinum americanum*), spider lily (*Hymenocallis latifolia*), ruppia (*Ruppia maritima*).
- New organisms are now in the ponds because of hurricane Ian. When ponds have high salinity, low oxygen and high ammonia, there will be algae blooms.
- Mussels filter the water.
- Rain will help get rid of the salinity. Don't irrigate if salinity is high (1.2 ppt). Calcium sulfate can be put on golf courses irrigation water to alleviate the damage of salt water on the grass.

## **Broad Spectrum Approach to Public Outreach at Lee County Mosquito Control District**

*Eric Jackson*

- "Fight the Bite" is a slogan used by mosquito control districts and agencies throughout the country. Lee County Mosquito Control District uses it on billboards, informational materials, and advertisements.
- The District also devotes a great deal of time to public outreach at community events (Skeeter Eaters mobile exhibit, outreach tables, speaking engagements).
- The public can request service as well as access information on where treatments are occurring throughout Lee County at <http://LCMCD.org>.
- Helicopters and Unmanned Aircraft Systems (UAS) are used in areas where ground vehicles cannot access.
- IMAG History and Science Center Museum in Fort Myers has a permanent Lee County Mosquito Control District display featuring information on mosquito-borne disease, life-cycle, common predators of mosquitoes, and District documentary.
- There are also District tours, media interviews, and education programs delivered to schools throughout Lee County.
- The District uses a variety of materials to control mosquitoes including chemicals, naturally occurring bacteria, larvae-eating fish, and Sterile Insect Technique.

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## Why Aquatic Plants Are Essential for a Healthy Pond

*Mike Sweeny*

- Littoral Zones are crucial for storm water ponds.
- The purpose of storm water ponds is flood control and removal of pollutants.
- Wildlife hangs out in littoral plants. Littorals act as a buffer.
- Spike rush rids the pond of unwanted nutrients. Periphyton contains good algae. Periphyton is an entire community of organisms, including blue-green algae, fungi, microbes, bacteria, plant detritus, and animals that together compose the foundation of an entire ecosystem.
- Littoral zones support birdlife, provide cover, food and protection for young fish and animals.
- Fish are very important to ponds because they eat mosquitoes and midges. It is important to stock the ponds with fish.
- Littorals stabilize the shoreline by protecting the banks from wave action which erodes the banks.
- A drop-off of over 9 inches is dangerous and is out of compliance with the state and county.
- Bacopa is a good ground cover plant.
- Swamp lily is salt tolerant.
- Yellow Cana consumes large amounts of phosphates in the sediments.
- Arrow arum is carp resistant.
- Pickerel weed and spike rush buffers wave action.
- Pickerel weed can get mites which will turn the leaves brown.
- Muscovy ducks do damage to a pond with their large waster as well as eating the roots of littorals.
- Littorals can be damaged by weed wackers and herbicides.
- Littorals must be maintained by getting rid of weeds.
- When planting aquatic plants, such as blue flag iris, swamp lily, canna, arrow arum, and arrowhead, they tend to do much better when they are planted in tight clumps.

## Red Tide/Blue Green Algae - What Are They and How Do They Impact Florida Waterways

*Miranda Barrington*

- Cyanobacteria algae have a detrimental effect on health. This type of algae known as Blue-Green Algae occurs in freshwater.
- Microcystis aeruginosa causes kidney and liver damage. It smells like sewage. It might cause Parkinson's disease. It kills fish.
- Red tide is *Karenia brevis*, a single cell algae which has been around since the 1500s. It kills fish, affects health, produces a respiratory irritant, disrupts the coastal economy, and animals can absorb the toxin in their meat. The blooms of Red Tide begin in October and end in February. FGCU is studying the long term health impacts.

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### CALENDAR OF EVENTS

**September 28, 2023**  
General Meeting (Location: TBD)

**November 16, 2023**  
Zoom Presentation TBD



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Full Page Ad in Hydrophyte <small>(4 issues)</small>	—	—	—	—	✓

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Business Card Ad (4 Issues)	\$125

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