





LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 84 (2019)

Aquatic Plant Management in Florida

Most of you know that Florida LAKEWATCH staff keeps track of all the questions that volunteers ask allowing LAKEWATCH to direct research and extension activities. Throughout the years aquatic plant management and ecology continues to be a major area of interest. Recently, voices from many additional lake users around Florida showed concerns about the current state of aquatic plant management activities directed by Florida Fish and Wildlife Conservation Commission (FWC). Based on these concerns, beginning January 28th FWC paused all aquatic plant herbicide treatment while they held public meetings and collected comments on the plant management program.

To date, meetings were held at the following times and locations:

- February 6 Kissimmee: County Commission Chambers, fourth-floor Osceola County Administration Building, 1 Courthouse Square, Kissimmee, FL
- February 7 Okeechobee: Okeechobee County Civic Center, 1750 U.S. Highway 98 N. Okeechobee, FL
- February 13 Sebring: Bert J. Harris, Jr. Agriculture-Civic Center, 4509 George Blvd, Sebring, FL.
- February 19 at the Alachua County Library Headquarters, 401 E. University Ave., Gainesville, FL.
- Feb. 26 Eustis: Eustis Community Center, 601 Northshore Dr., Eustis, FL.

These meetings provided the public with an opportunity to voice concerns about plant management activities on Florida water bodies



Orange Lake August 5, 2015 by Mark Hoyer

during the past 12 months. The following is an early summary of the concerns voiced at the public meetings and presented to FWC Commissioners at their annual Commissioners meeting:

- Dissatisfaction with the condition of lakes:
 - Poor water quality
 - Unhappy with plant management
 - Declining fishing, hunting, and bird watching
- Contractor oversite, accountability, management
- Preference for mechanical harvesting versus chemical control
- Human and ecological safety of herbicides
- Coordination lacking with other agencies.

Based on these preliminary public inputs, FWC Commissioners directed staff to move forward with some of the following changes to the Aquatic Plant Management Program:

- Expanding the creation of habitat management plans for individual lakes.
- Forming a Technical Assistance Group consisting of staff, partners and stakeholders.
- Improving timing of herbicide-based invasive aquatic plant removal treatments.
- increasing coordination with manual invasive aquatic plant harvesting companies.
- Exploring new methods and technologies to oversee invasive plant herbicide application contractors.

Developing pilot projects to explore better integrated plant management tools.

"Invasive plants are a serious threat to Florida's waterbodies, and we know from history that they can cause considerable harm in a short amount of time. We are resuming our management program with a commitment to these enhancements," said FWC Executive Director Eric Sutton, "and will solicit alternative methods, working with research partners and others - especially in south and south central Florida."

"I applaud staff for hitting pause, and I know that impacted a lot of people. But sometimes in order to raise awareness and create dialogue you have to do that," said Commission Vice Chair Mike "The feedback we received from Sole.

FWC for decades and understands that FWC's aquatic plant management program is sound and based on the best available science, much of which has been conducted by University of Florida. However, the difficulty comes with the diversity of stakeholders utilizing individual lake systems and that there is no one size fits all lakes management plans. For example, Harris Chain of Lakes Restoration Council and local stake holders are communicating with the State Legislature and County Government to acquire more funding for herbicides to control the hydrilla in the Harris Chain of Lakes. At the same time stakeholders from Lake Istokpoga are screaming to University of Florida staff who are currently developing a habitat management plan for the lake to stop all herbicide work on the lake.

Complicating things, these two stake holder viewpoints are also a moving targets depending



FWC Commissioner's Meeting in 2019 by Mark Hoyer. stakeholders has been tremendous and will help us improve this necessary program."

Aquatic plant management has been, is and will continue to be a major issue in Florida. LAKEWATCH has worked and collaborated with

of vegetation (15 - 30% concentrate) seems a solid approach.

Mark Hover

Director of Florida LAKEWATCH

each system have to "say". At one time there was little or no submersed aquatic vegetation in the Harris Chain of lakes and the stakeholders/anglers were screaming to get some for fish habitat. In 1996, Lake Istokpoga was covered with over 25,000 acres of hydrilla and at that time the stakeholders were screaming to spray the hydrilla. Thus, heading in the direction of individual lake management plans that can be adjusted as plants come and go in a system with a goal of maintaining a moderate level

E. coli in our lakes: What does it really mean?

This information originally appeared on the personal blog of University of Minnesota associate professor of biosciences Dr. Timothy Johnson. Dr. Johnson's research at the U of M College of Veterinary Medicine includes investigations into antibiotic resistance in bacterial pathogens, microbial communities in the animal gastrointestinal tract, and multidrug resistance of E. coli and Salmonella in both humans and animals.

What is E. coli? E. coli stands for Escherichia coli. This is the formal for name а of species bacteria in honor of the German-Austrian physician Theodor Escherich, who identified first the bacteria associated with digestion in infants. Here are the important take-home



coli. And, there are many different "flavors" of E. coli. Some can colonize birds, some can colonize humans, some can colonize pigs, some can colonize cattle, and some can colonize all of these animals. So, Ε. one coli certainly does not equal all.

3. Fecal coliform and E. coli counts do not necessarily mean that

messages about E. coli:

1. We all carry about 1,000,000 E. coli cells per gram of feces in our guts. That's right, over 1 million E. coli per gram of poop! If you are healthy, none of these E. coli are capable of causing gastrointestinal illness. In fact, gastrointestinal disease (i.e., diarrhea) due to E. coli is extremely rare in the U.S. and other industrialized countries. We tend to think of E. coli as bad because of the popular press, but in actuality these are important pathogens capable of causing disease are in the water. It is very important to understand what "high E. coli levels" means when they are found in lakes. E. coli levels are established, according to the Minnesota Department of Health, through testing of water samples from Minnesota beaches. They take these samples and perform culturing of the samples to determine how many E. coli are present in 100 mL of water (100 mL is slightly more than 3 ounces of water). Over a 30-day period, the number of E. coli cells should not exceed 200 per 100 mL of water, on average. Also, no single sample should ever exceed 1,000 E. coli cells per 100 mL of water. If these criteria are exceeded, then closure of a beach is recommended until the numbers of E. coli go down. Remember, these are generic counts of E. coli cells in the water. The actual source of these E. coli are unknown. In fact, they likely originate from a multitude of possible sources, including human waste, bird droppings, agricultural run-off, or even naturally occurring E. coli present in the soil. In short, an E. coli count of 1,000 cells per 100 mL does not means that there are 1,000 E. coli cells that can make you sick per 100 mL of water. It is actually quite likely that none of these E. coli will make you sick. The reason that the department of health uses these criteria is based on the likelihood of pathogens (not just E. coli, but other pathogens as well) being present in the water based on the counts of E. coli as an "indicator organism." This is a very conservative approach to estimate the possibility that pathogens are in the lake water.

4. What about the E. coli that can cause disease? So let's assume that the lake we are going to swim at does harbor some pathogenic E. coli or other pathogen. We have to consider something called "infectious dose," or how many cells of the pathogen it actually takes to make you ill. Remember, I said before that at best, a small fraction of the E. coli present in lake water will actually be capable of causing disease in humans. The only way it can make you sick is through oral ingestion (the infamous fecaloral route). And, for healthy humans, the infectious dose of E. coli (only the ones able to cause disease) needs to be in the range of 100-10,000 cells. And, you can ingest these bacteria even if you don't drink the lake water. However, typically in order to acquire enough of the pathogenic bacteria you would have to swallow water, in my opinion. If you have young kids, you know all about swallowing water. Yes, it happens.

So why should I be worried? There really shouldn't be any cause for major alarm when these alerts go out. The department of health is looking out for your best interests, with good reason, to prevent the occurrence of disease acquired through swimming. I am not recommending that you do not heed These warnings their warnings! are established, like I said, through a conservative approach to ensure that you don't get sick when you swim. In my opinion, most of these alerts are likely benign, and only a small percentage of "high E. coli level" lakes actually contain pathogens capable of causing human disease. However, I am not willing to play the pathogen lottery with my kids or my family, and I wouldn't recommend that anyone do that. Until we have better and cheaper ways to measure pathogens in lake water, this is the best we have and it is in place for a reason. But there is no reason to panic. Like I said before, these E. coli can arise for a lot of different reasons, they don't always correlate with microbes that can make you sick, and they will go down over time. So, my advice? Pick a different lake this week, and don't hesitate to return to your favorite lake when the alert subsides! Oh, and don't blame the E. coli.

Dr. James Leary of the University of Florida/IFAS Center for Aquatic and Invasive Plants

The University of Florida/IFAS Center for Aquatic and Invasive Plants would like to introduce our newest Assistant Professor, Dr. James Leary. His appointment is Research and Extension Specialist in Aquatic Plant Management. His duty is to conduct applied research developing practical solutions for you to better manage invasive of Hawaii, where he has accrued over 20 years of tropical weed science experience in managed and natural area landscapes. His current claim to infamy, is the development of Herbicide Ballistic Technology (HBT) for surgically eliminating invasive species targets from helicopter platforms. In 2010, he saw his first miconia plant (*Miconia*)



Dr. James Leary

plant problems in aquatic habitats. His approach will be to participate in conducting site visits, assessing your problems, using the Center's resources to test and validate new recommendations and improve techniques that can be readily adopted into your management programs. He will seek to develop productive relationships with all local, state and federal programs responsible for protecting Florida's precious water resources.

Originally born and raised in Michigan, Dr. Leary comes to us by way of the University calvescens); known as the worst weed invader in Hawaii. Not coincidentally he also experienced his first helicopter ride into the back country of the East Maui Watershed, where miconia was invading. Since that first encounter, he has changed the game in miconia management in Hawaii, working directly with his management partners conducting over 150 heliops with the HBT platform eliminating over 25,000 high-value miconia targets, resulting in the protection of over 50,000 acres of forested watershed across the state. He didn't start out being an expert on the issue, but he dedicated himself



to working closely with those who were and learning everything he could about the problem, leading to this invention developed in Hawaii...for Hawaii.

Dr. Leary exhibits a strong passion for protecting ecosystems against invasive species and an aptitude for creativity in solving problems. With his program modestly succeeding in Hawaii, Dr. Leary was seeking new opportunities with greater challenges. He accepted this new challenge as APM Specialist motivated by:

- The UF/IFAS commitment to the land grant mission placing a premium on public service and building stakeholder relationships.
- The opportunity to become a better weed scientist through collaborations with eleven other weed scientists and many other scientific disciplines, relevant to APM, at UF/IFAS.
- The rich history of science and management in Florida APM promoting a culture of professionalism and comradery.

Dr. Leary sees many rewards ahead working with his new colleagues and partners carrying on the great traditions in ecosystem aquatic stewardship, by continuing to build our resources with new knowledge and state of the art technologies. Не acknowledges having much to learn, but he accepts the challenge

with confidence knowing it starts with building strong relationships with experts and peers in Florida APM. He enjoys meeting as many people as he can. Please give him a call or send him an email at 808-352-8774 (Hawaii number for now) and learyj@ufl.edu.



Dr. James Leary

Florida LAKEWATCH supports the North American Lake Management Society (NALMS)

Much of Florida LAKEWATCH's success comes from information staff have received by participating in NALMS. Many volunteer monitoring program coordinators from around the country participate in the annual NALMS conference and share success and failure stories, which helps to strengthen all of the programs. Below is an opportunity for you to thank and help NALMS for providing a forum that supports volunteer monitoring programs.

Mark Hoyer

Florida LAKEWATCH Director



You shop. Amazon gives...to NALMS

You shop on Amazon right? Well now you can help NALMS at the same time with AmazonSmile. When you shop at smile.amazon.com you still get all the same low prices and wide selection you've come to expect from Amazon. Only now 0.5% of your purchase price can go to NALMS. The average online order these days hovers around \$70. So on average about 35¢ per order could come to NALMS to enhance our programs and further our mission. That may not sound like much but every penny can make a difference. And when you add those pennies up, say, over 1,000 NALMS supporters making two purchases a year, the total comes to \$700. Not too shabby. Now imagine those 1,000 supporters got a couple of friends to join in as well. Now we're rolling at \$2,100. You can help us get going by getting set-up today – here's how:

1.Go to smile.amazon.com.

2.Log into your account or create a new one.

3.Look up and select "North American Lake Management Society" when prompted.

4.Shop until you drop.

5.And don't forget to tell your friends and family!

MUCK!

Introducing a new information circular entitled: "A Beginner's Guide to Water Management—Muck: Causes and Corrective Actions"

Muck is both the popular and the scientific term for the material found on the bottom of many depressions that have held water rotten egg odor. Adding to the list of problems, larvae of occasionally problematic insects such as mayflies and blind midges live

for any length of time. It is of great importance to many recreational lake users because its presence can ruin their enjoyment of the water body. Its dark color and "oozy" feel lead many people to believe muck could be an indicator of a polluted system.

Another cause for people's distaste for muck is the stink. Bacterial decomposition of the organic matter in muck can release gases such as methane and hydrogen sulfide (often called marsh gas or sewer gas), the latter possessing characteristic а



in muck and often emerge as adults in swarms prior to mating. These swarms can create nuisances by coating lights, equipment, homes, roads, and bridges. The insects, especially blind midges, also swarm around people and are often confused with mosquitoes. The midge adults (flies), however, do not bite, suck blood, or carry diseases like true mosquitoes do, so they are simply a nuisance, rather than a health hazard.

It may seem simple: get rid of the muck; get rid of the problems. However, there is more to this muck-raking story. Excessive amounts numerous other aquatic organisms called macroinvertebrates (e.g., other insect larvae, leeches, worms, snails, mussels). These organisms provide food for a variety of fish, insects, amphibians, and water birds. In Florida, aquatic insects and other invertebrates are extremely important food sources for the recreational bream (i.e., bluegills, redear sunfish) and speckled perch (black crappie) fisheries in lakes. Thus, the goal for resource managers is not to eliminate muck entirely, but to keep the right amount of muck in the lake for proper ecosystem function and human uses of the water body.



of muck in the wrong places certainly can cause problems, but just enough muck in the right places is essential for a healthy lake that supports diverse wildlife and fishing. That's because, in addition to midge and mayfly larvae, muck provides habitat for Striking the proper balance for each lake can be problematic because each system is distinct, with different ecological characteristics and designated human uses. Some waters naturally have little accumulated muck, whereas others have a lot. Some have muck only in deep-water areas, but display sandy beaches and muckfree shallow zones. How old the basin is, i.e., how long it has continuously held water, and whether it has input streams or rivers, influences the quantity of bottom muck. In fact, many factors conspire to determine the amount of muck on a lake bottom, but for many lakeside dwellers and lake users, the only question about a lake with substantial muck accumulation is: "How do I get rid of the stuff?"

Considering the complexities that face Florida communities and individuals tackling muck issues, this publication explains what muck is and what determines its distribution, provides an understanding of the origins of muck in aquatic systems and the ontogeny (individual development) aquatic systems, and lists possible corrective actions, including approaches for muck removal. So if you say "ew," "ick," or "yuck" when your toes encounter muck, this publication will help you learn more and perhaps make partial peace with this richly complicated, if sometimes off-putting, natural material. Before you begin, however, we encourage you to peruse the following LAKEWATCH circulars to obtain a more comprehensive understanding of how aquatic systems function:

Circular 101: A Beginner's Guide to Water Management, The ABCs

Circular 102: A Beginner's Guide to Water Management – Nutrients Circular 103: A Beginner's Guide to Water Management - Water Clarity

Circular 104: A Beginner's Guide to Water Management - Lake Morphometry

Circular 109: A Beginner's Guide to Water Management - Oxygen and Temperature

Circular 110: A Beginner's Guide to Water Management - Fish Communities and Trophic State in Florida Lakes

Circular 111: A Beginner's Guide to Water Management - Aquatic Plants in Florida Lakes

Circular 112: A Beginner's Guide to Water Management - Muck: Causes and Corrective Actions

These publications can be downloaded free from the Florida LAKEWATCH web site:

http://lakewatch.ifas.ufl.edu/LWcirc.html.



Mark Hoyer, Director of LAKEWATCH

Dear Florida LAKEWATCH Citizens Scientists

I am writing to thank you for taking the time to complete the online survey we emailed to you. As of now, we have 171 volunteers who have worked on the survey, which is wonderful! We will be sending one more reminder with the link for anyone else who has not yet taken the survey, but would like to complete it before the end of March. Your insights are invaluable for helping us better understand citizen science programs. We greatly appreciate it. As an



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> Florida LAKEWATCH Fisheries and Aquatic Sciences

School of Forest Resources and Conservation

PO Box 110600

Gainesville FL 32611-0600 or call 1-800-LAKEWATCH (800-525-3928), (352) 392-4817, E-mail: <u>fl-akewatch@ufl.edu</u>,

Website: http://lakewatch.ifas.ufl.edu/

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update, we hope to have the data analyzed by the end of May 2019. From there, we would like to share the findings with you all, program managers, and citizen scientists across the country through a conference presentation and peer-reviewed manuscript by the end of 2019. Again, thanks so much for your time. We will stay in touch.



Contact Information

- Name: Rachel Damiani
- Email address: <u>rdamiani@ufl.edu</u>
- Phone number: 904-687-5237