UF|IFAS UNIVERSITY of FLORIDA

Florida LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 78 (2017)

Gainesville or Rainsville?

By Mark Hoyer, LAKEWATCH Director

Gary Johns

Lake Mize in March, 2017 looking at the guage.

In this issue:

In the last LAKEWATCH newsletter I shared a picture of Lake Mize located on University of Florida's Austin Cary Forest as an example of one major impact that many people have seen during extreme drought situations, lakes can disappear. "No Water, No Lake". At the end of the article I mentioned that "Florida's drought is having major impacts on Florida's lakes but that the wet season is almost upon us so pray for rain." You can stop praying for rain now.

Meteorologist Jeff Huffman from the University of Florida's WUFT states that "Rainesville will never be the same after 2017. Three major rainfall records have been broken at the Gainesville Regional Airport this summer, following the driest start to a year on record.

- Rainiest June on record (16.86 in)
- Rainiest July on record (16.70 in)
- Rainiest summer on record (Jun-Aug)

The most incredible number is 33.56". That's how much rain has fallen since June 1st, which is now more than any amount ever recorded in the three-month period from June 1 to August 31. We're not sure what's more amazing: the fact that there are 33 more days to add to this record or that it occurred without the help of a tropical storm or hurricane."

As you can imagine, just as the drought was impacting Florida lakes the rain can also impact Florida Lakes. The following are pictures of Lake Mize taken in March 2017 and late July 2017. It is a pleasure seeing Lake Mize full again and I hope your lake is doing as well too.

Gavy Johns

Lake Mize on July 2017 looking at the guage.

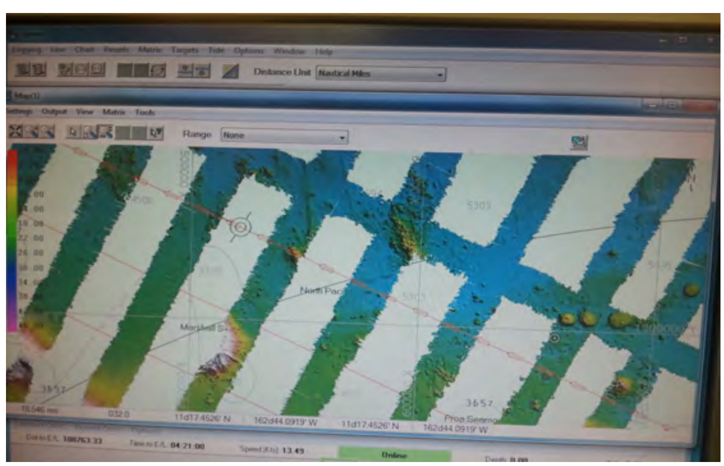
Exploring (part of) the Hydrosphere, from Above and Below

By Vincent Lecours, Assistant Professor, Fisheries and Aquatic Sciences, School of Forest Resources & Conservation, University/IFAS, 7922 NW 71st St., Gainesville, FL 32653

Do you ever wish that you could take a stroll along the bottom of the sea, and directly observe this hidden, inaccessible world, like Jules Verne's Captain Nemo did? While we cannot yet replicate the Captain's experience, the last 25 years have seen the development of technologies that enable us to collect data that give us a better view of marine environments and, ultimately, a better understanding of their intricate physical and ecological patterns and processes.

Some of these technological developments are in the field of remote sensing and give us a perspective from above. By definition, remote sensing is the acquisition of information about a target from a distance, i.e. without making any direct contact with the target. You may never have realized, but you do remote sensing every time you take a photograph: light is emitted by a source (the sun, a street light or the flash of your camera), and interacts with the subject of your photograph. A portion of this light will bounce off your subject and come back, at the speed of light of course, towards your camera: this is what your camera captures and there is your photograph! The sensors onboard satellites work exactly the same way: they capture the light that comes back to them, whether that light is naturally emitted from the sun or artificially emitted by those sensors. These sensors have the ability to see the world like our eyes do, but can also detect types of light that are invisible to the naked eye. For instance, we can collect information from different parts of the electromagnetic spectrum, which includes visible light, infrared light, ultraviolet light, x-rays, gamma rays, and even radio waves. Since each of these types of light interacts differently with the Earth's surface, we can collect a wide range of information about the Earth and what lays on it.

While satellite remote sensing was traditionally used for land use and land cover mapping, more and more applications look at the hydrosphere. Some satellites are now dedicated to the study of the water content in the atmosphere, to soil moisture content, or to the study of the oceans. The information collected by satellites can help monitor shorelines changes, water levels, ocean circulation and current systems, measure ocean temperature and salinity, track hurricanes and floods, and map wetlands and wildlife habitats. The problem with most satellite-based data is that they only give a relatively broad picture of patterns and processes. This means they are not always adequate for purposes like management planning, and are not very effective at studying phenomena related to narrower and smaller water bodies like lakes and rivers. However, scientists have recently begun building sensors that work the same way as those aboard satellites, but that are much smaller. These smaller sensors can be mounted on small aircrafts and unmanned aerial vehicles, often called drones. By flying lower and closer to the target, we are able to collect more detailed observations that are generally more useful for regional monitoring and management. The last decade has seen an increase in scientific research based on drones, especially in agriculture and forestry. Coastal applications are just beginning to gain traction; very little work has

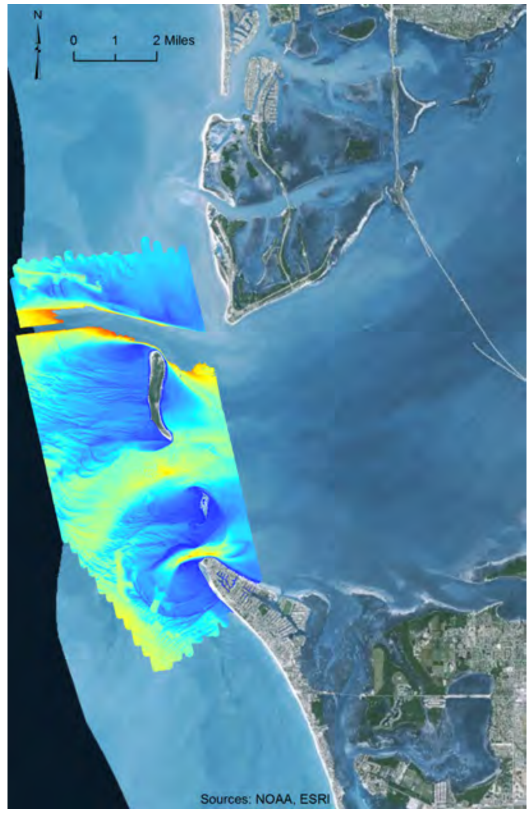


Example of multibeam bathymetric (depth)data as they are collected. Multiple swaths are represented here.

Vince Lecours.

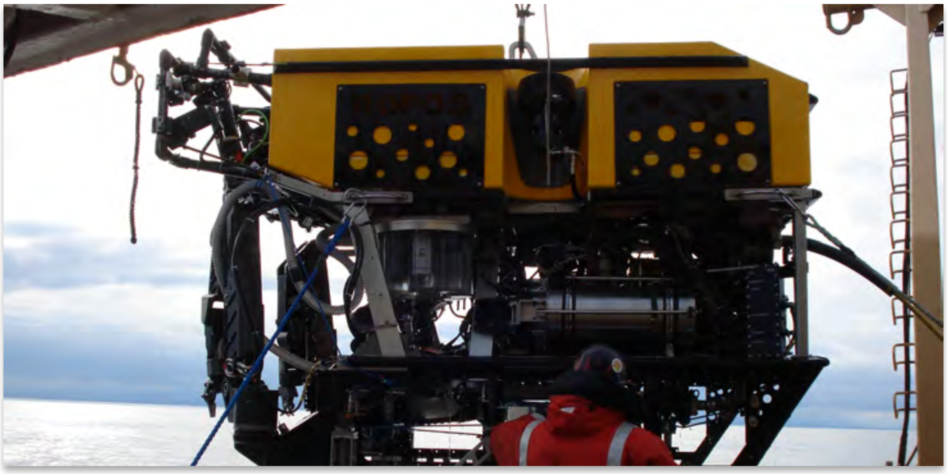
been done using drones for water quality monitoring in lakes and rivers, despite a huge potential for quick, efficient and repeatable data collection.

One of the biggest limitation of aerial technologies that use electromagnetic radiation (i.e. light) is that they can only capture information at the surface of water bodies because light can only penetrate the first few feet of water. This limits our ability to study and understand most of our lakes, rivers, and oceans. Fortunately, there is another type of remote sensing, though far less developed, that can help fill that gap in information. Acoustic remote sensing uses sound waves instead of electromagnetic waves. Many boaters are using acoustic remote sensing every time that they get on the water. Indeed, sonars and fish finders function based on the principles of acoustic remote sensing: a sound, first emitted by the sonar, propagates through the water column until it interacts with a target. A portion of the sound is reflected, or bounces off the target and the sonar captures the information that comes back to it. Depending on the frequency of the sound used, the target can be anything underneath the platform, from plankton and fishes in the water column to the sediments beneath the seafloor or the seafloor itself. By analyzing the characteristics of the sound returned, we can deduce the depth of the target and some of its properties, for instance, whether it is soft/hard and flat/rough, which is important information to better understand sediment patterns and seafloor morphology.



Combination of different types of remotely sensed data for the entrance of Tampa Bay. Bathymetric data range from sea level (blue) to about 50 feet deep (red).

Multibeam echosounders, one of the most common research tools used in the marine environment, are like hundreds of regular sonars put together at different angles. This enables the collection of a wide swath of data underneath the platform. Multibeam echosounders are most often used to create 3D representation of the seafloor by collecting and mapping information about the type of sediments and geomorphological features that occur on it. While the platform supporting this type of instrument is most often a large vessel, researchers from all around the world are now commonly using remotely operated vehicles or autonomous underwater vehicles (underwater drones!), sometimes as big as an SUV, to sample the oceans. These robots can be equipped with a multitude of different sensors to get an idea of what the environment looks like in the surveyed areas. These robots are almost always equipped with high-resolution cameras, that, in addition to ensuring safe navigation, enable the quantification of various elements of biodiversity (e.g. abundance, density, size) and of the types of substrate found on the seafloor. These robots are also often equipped with sensors to measure water clarity, quality, temperature, salinity, oxygen concentration, phosphate concentration, and many more parameters. The combination of these data in a geospatial con-



Example of remotely operated vehicle used for scientific research. This is the Canadian ROPOS (Remotely Operated Platform for Ocean Science) before it is dropped into the water.

text enables a well-needed quantification of physical and ecological patterns and processes that improve our understanding of these complex environments. From this quantification, we can create 3D habitat maps or maps based on the physical and geomorphological characteristics of an area, which can then be used to inform decision-making in conservation, management planning and monitoring. While many of these technologies have been developed in and for the marine environment, they can be adapted to the study of smaller and shallower water bodies like lakes, rivers, and estuaries.

My personal research at UF looks at methods for underwater environmental characterization. I work with many different groups around the globe to try to understand how we can make the best use of all the information that we collect, both from above and below the water line. I look at the information content of such data: do they give an accurate representation of what is really happening in the environment? I also look at how we can combine different types of spatial environmental data to maximize their potential and ensure that we get a comprehensive image of the complex marine and aquatic environments. In the next few years, I hope to be able to equip a small unmanned boat with some of the technologies described here and to use it to get an accurate 3D characterization of some of Florida's lakes. This would allow us to be like Captain Nemo – at least virtually – and to walk the bottom of our lakes, to identify potential habitats for some of our species, and to monitor the quality and content of our waters. But rest assured: despite all the past and future technological developments, nothing will ever replace the quality and accuracy of *in situ* data. Those data are crucial to validate remotely sensed data, meaning that there will always be a need for field-based data collection. So keep up the good work, LakeWatchers, you will always be needed!

Vince Lecours on the lake.

Living in a Spineless World: Jellyfish Life

By Jessica R. Frost, PhD, University of Florida, School of Forest Resources and Conservation, Program of Fisheries and Aquatic Sciences, 7922 NW 71st Street, Gainesville, FL 32653, Email:frost.jessica.r@gmail.com

Most public reactions to jellyfish are "Ow! and Eww!" but my hope is to change that response to "Wow! and Who knew?!" through education of some general but important things to know.

What are Jellyfish?

Jellyfish have been around for as long as 700 million years and belong to a much larger group of animals called **Gelatinous Zooplankton**. The word **zooplankton** is derived from Greek words meaning "animal" and "drifters," and these animals spend all or part of their life drifting in the water column of fresh or marine waters. Drifting serves an important function because it conserves energy. Just as the name gelatinous zooplankton implies, one characteristic feature of this group is their gelatin-like consistency; often appearing clear in color, transparent to light, and having the feel of your kid's favorite snack…JELLO! In addition to jellyfish, there are thousands of members from other groups that make up gelatinous zooplankton, so it is important to remember that all jellyfish are gelatinous zooplankton but not all gelatinous zooplankton are jellyfish.

Jellyfish Pros (+)

Jellyfish have simple body plans, with no bones, heart, brain, liver, or lungs. They can survive across a wide range of oxygen levels, salinities and temperatures. Jellyfish contain a type of tissue called **mesoglea**, which is acellular, contains muscle bundles and nerve fibers, functions as a hydro-static skeleton and is approximately 96% water. The remaining 4% contains approximately 72% protein, 22% lipid and 7% carbohydrate (Lucas 2009), making jellyfish not very nutritious resulting in predators. Due to such a high water content, jellyfish are fragile and require the support of their surrounding aqueous environment to retain their shape. Taking a jellyfish out of water often results in a collapse to an unidentifiable blob. Thus, investigating these organisms for research purposes requires special or modified sampling methods and equipment when compared to typical fishing gear. However, there is an advantage to lacking a bony skeleton, jellyfish grow faster than those organisms that rely on the construction of complex skeletal structures to increase size. Here, we can inject the age-old adage of "Does size matter?". As a matter of fact, Acuña *et al.* (2011) showed that despite a jellyfish's inability to actively track prey by sight, they encounter a greater number of prey by becoming larger in size. So yes, "size matters."

Fun fact, jellyfish were the earliest animals to evolve muscle-powered swimming in the seas. Their buoyancy is maintained by controlling the accumulation and exclusion of ions, namely ammonium and sulfate, respectively. Swimming (a.k.a. **cruising**) is one type of feeding strategy employed by jellyfish, while the other strategy is to sit-and-wait (a.k.a. **ambush**). As cruising predators, jellyfish use muscle bundles in the mesoglea to contract and propel forward through the water column with the mouth open, engulfing everything in its path. As ambush predators, jellyfish lie in wait, relying on chance encounters with prey as they encounter the jellyfish's tentacles, after which the tentacle brings the captured prey to the mouth of the jellyfish to ingest (Frost *et al.* 2010).

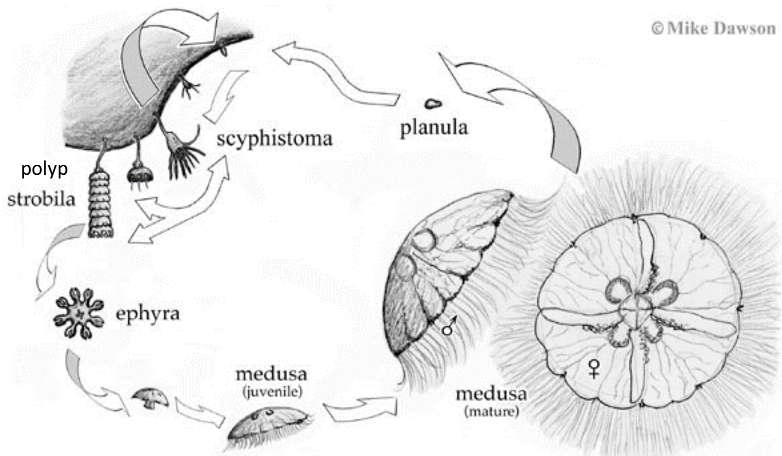
Obviously, most people associate tentacles of jellyfish with stinging and pain, but their primary function serves to capture and immobilize prey or protect against potential predators. Using **nematocysts** as stinging structures makes jellyfish effective predators in spite of not having jaws and teeth. On the other hand, nematocyst-laden tentacles and the bell of a jellyfish, shaped much like an umbrella, also provide important **ecosystem services** (e.g., feeding, protection and locomotion) for juvenile fish in a symbiotic relationship. Beyond having unique stinging organelles, jellyfish also have a complex life cycle in which they reproduce both sexually and asexually during their lifetime (Figure 1), taking on both pelagic (**medusa**) and benthic body forms (**polyp**). An adult jellyfish is called a medusa and it reproduces sexually by spawning (mass release of eggs and sperm in the water). The resulting larva (a.k.a. **planula**) eventually settles onto any firm substrate and develops a polyp, which resembles a flowering stalk. During development under favorable environmental conditions, a single polyp can generate numerous genetically identical clones of juvenile jellyfish (a.k.a. **ephyrae**). Depending on the species, jellyfish have short lifespans from a few months to a couple years. Polyps, however, can go dormant and live to reproduce for decades. The take home message for why it is good to be a jellyfish: survives a wide range of environmental conditions, grows fast, unpalatable as a prey, efficient predator, habitat for juvenile fish, possesses enthusiastic fecundity, and can have the ability to defy death.

Jellyfish Cons (-)

A number of negative socioeconomic impacts have been associated with jellyfish, especially when they form **aggregations** or **blooms** at your favorite coastline. Aggregations are formed by physical forcing of winds and currents that push these weak swimmers into a centralized location. Blooms are formed by sudden and massive reproduction of the population. By either formation, increased abundances of jellyfish comes at a cost to the economy and environment:

Economic costs include: (1) decrease in the tourism industry of coastal cities because stings pose public health concerns and swimming with jellyfish is not aesthetically appealing, (2) increased cost from shutting down desalination, natural gas and power plants that depend on the sea for cooling water because jellyfish clog their intake valves, (3) impacts to commercial fishing industries because jellyfish bycatch clog and break nets, and (4) impacts to the aquaculture industry because jellyfish get entangled with cages containing farmed species like salmon and inadvertently kill the stock via contact with their nematocysts.

Environmental impacts include: (1) competition for the same food source as fish, namely hard-bodied zooplankton like copepods, coupled with an insatiable appetite (Frost *et al.* 2010), (2) consumption of fish eggs and larvae, which affects recruitment and future populations, (3) establishment of exotic species via translocation of ballast waters from shipping transport, and (4) shifting trophic systems from fish-dominated to jellyfish-dominated.



Reproduction Cycle. Image courtesy of Dr. Mike Dawson.

The take home message here is: jellyfish can accumulate in large numbers possibly creating socioeconomic and environmental havoc, even to the extent of replacing fish atop of the food chain.

Inciting a Future with More Jellyfish?

Factors like **eutrophication**, **overfishing**, **habitat modification**, and **climate change** can be vectors leading to population increases of jellyfish. Eutrophication (additions of excessive nutrients) can cause blooms of harmful toxic algae and other species of phytoplankton that can cause localized oxygen deficiencies (a.k.a. **hypoxia**). Massive fish kills resulting from decreased oxygen or very low oxygen create advantageous conditions for jellyfish due to their tolerance, decreased competitors for prey and increased feeding success. Additionally, humans love to eat fish. In 2010, approximately 110 million tons of fish were officially reported removed from the world's oceans as compared to 30 million tons reported back in 1950 (www.pewtrusts.org). Overfishing creates an ecological niche for jellyfish. Removing fish allows for more prey and less predation pressure on jellyfish. Furthermore, trawling of the seafloor typically takes place over soft-bottom not over rocky outcrops where polyps settle during asexual reproduction. Habitat modifications like "**ocean sprawl**," in which coastal (waterfront housing, docks, canals, marinas, bridges) and offshore (oil and gas platforms, wind farms) developments use artificially engineered structures, also provide ample and ideal habitats for polyps and increasing jellyfish production.

The reproduction of jellyfish also can be affected by climate change and warming of the seas. Warmer water accelerates growth of adult jellyfish and production of ephyrae. Over the last 50 years, more jellyfish have been recorded in the warmer years than compared to colder years (Richardson *et al.* 2009). Warmer water temperatures also allow jellyfish to expand their geographical distributions, with the potential for the more venomous and lethal tropical species (*Chironex* box jelly) making their way towards subtropical and temperate latitudes. In closing, there is still a great deal to learn about the future of our marine ecosystems. Research continues to better understand if the future is bleak for fish and bright for jellyfish.

If this sparked an interest into learning more, feel free to contact me or check out the following links and articles provided below.

Gelatinous Zooplankton Diversity. Image courtesy of Dr. Cornelia Jaspers, DTU Aqua.

http://ocean.si.edu/jellyfish-and-comb-jellies

http://fox.rwu.edu/jellies/index.html

http://www.pewtrusts.org/en/research-and-analysis/analysis/2016/01/19/scientists-find-that-30-percent-of-global-fish-catch-is-unreported

Acuña J.L., López-Urrutia A., Colin S. (2011) Faking Giants: The Evolution of High Prey Clearance Rates in Jellyfishes. Science vol. 333 (6049), 1627–1629.

Frost J.R., Jacoby C.A., Youngbluth M.J. (2010) Behavior of *Nemopsis bachei* L. Agassiz, 1849 medusae in the presence of physical gradients and biological thin layers. In: Purcell J.E., Angel D.L. (eds) Jellyfish Blooms: New Problems and Solutions. Hydrobiologia 645: 97–111.

Lucas, C.H. (2009) Biochemical composition of the mesopelagic coronate jellyfish *Periphylla periphylla* from the Gulf of Mexico. Journal of the Marine Biological Association of the United Kingdom 89: 77–81.

Richardson A.J., Bakun A., Hays G.C., Gibbons M.J. (2009) The jellyfish joyride: causes, consequences and management responses to a more gelatinous future. Trends in Ecology and Evolution vol. 24, no. 6: 312–322.

Jessica R. Frost, PhD

Florida Lake Managment Society (FLMS) 2017 Awards of Excellence

The Marjorie Carr Award - is the Society's highest award and is given for life time work on behalf of Florida's aquatic resources. This award is named in honor of Marjorie Carr who, among other things, organized citizens and brought to an end the proposed Cross Florida Barge Canal.

Dr. JIM GRIFFIN is the 2017 recipient, Environmental Scientist, Principal Investigator for Water Atlas Informatics projects and the Hillsborough County Lake Assessment Project, is a Research Associate at the Florida Center for Community Design and Research and Adjunct Professor in Geography, teaching introductory and advanced courses in spatial analysis and spatial database development. The Water Atlas is a unique resource that serves eleven counties with detailed water information.

Dr. Griffin manages the collection of morphologic, biological and water chemistry data on Florida Lakes and employs these data to develop detailed lake assessment reports which are published on the Water Atlas. He also is involved in projects that help to better understand surface water pollution and the development of spatial models that allow the visualization of surface and groundwater pollution through the use of the Water Atlas.

Dr. Griffin, a retired Naval Officer and Flight Officer, served as Senior Environmental Scientist with the Southwest Florida Water Management District and Hillsborough County. He has been actively involved in the management of Florida Lakes and is past president of the Florida Lake Management Society and currently serves as a Director of the Society.

Dr. Griffin earned his Bachelor of Arts in Chemistry at the University of South Florida, his Master of Science in Electronic Systems Technology at Naval Postgraduate School in California, and his PhD in Environmental Science and Chemistry at the Florida Institute of Technology. Specializations: Environmental Chemistry (Ph.D.), Limnology, GIS Technology, Electronic Systems Technology (Chemical Instrumentation) (MS), Graduate and Undergraduate Education, Adult Environmental Education.

Dr. Jim Griffin and his wife Nella

The Edward Deevey, Jr. Award - is given to an individual for contributing to our scientific understanding of Florida's water bodies. Edward Deevey was an internationally recognized limnologist and affiliated with the State Museum of Florida at the time of his death.

Judy Ott is the award winner and has been a scientist practically since the day she was born, studying biology at Central Michigan University and later getting a masters degree at University of Wisconsin Madison and aquatic biology and water resource management.

She worked at the Department of Environmental Protection office in Wisconsin in the 1970s conducting shipboard collection and laboratory analysis of water quality samples from Lake Huron. She also worked for eight years at the Wisconsin Department of Natural Resources identifying and correcting non-point source water pollution in critical Wisconsin watersheds. She wrote three watershed management plans and managed six priority watersheds. She received the Exceptional Performance Award from the Wisconsin Department of Natural Resources.

Judy taught seventh, eighth and ninth grade life, earth and physical science at the US accredited bilingual school Colegio Lincoln in Costa Rica.

From 1990 to 2009, she worked at the Florida Department of Environmental Protection conducting estuary resource management activities, protecting state designated aquatic preserve estuaries in the Charlotte Harbor region of Southwest Florida. In 1999 she formed the Charlotte Harbor volunteer water quality monitoring network with 100 volunteer citizen scientists monitoring the water quality conditions throughout six local aquatic preserves of more than 200,000 acres of coastal waters critical to Charlotte Harbor.

She received two exceptional performance awards, the Gulf of Mexico Gulf Guardian Partnership Award and the Audubon Society for Southwest Florida Conservationist of the Year Award.

Judy work as an adjunct professor at Edison State College teaching oceanography and interdisciplinary science for 14 years from 1994 to 2008.

In 2008 she became the program scientist of the Charlotte Harbor National Estuary Program where she assisted with the development of work plans, workshops, summits and scien-

Judy Ott

tific publications to exchange technical information between scientists, agencies and public officials.

She retired this year but continues participating in volunteer citizen scientist programs for the wellness of the environment.

The Marjory Stoneman Douglas Award - is given to individuals in the media who report on aquatic resource issues. This award is named in honor of Marjory Stoneman Douglas who authored the book "Everglades: River of Grass", founded the Friends of the Everglades and who was environmentally active in south Florida.

The Water Atlas Program was designed to help meet the needs of local governments by providing the means through technology to connect multiple stakeholders in water resource management. The Atlas serves as a one-stop data warehouse, which provides unprecedented access to a wealth of water resource information. This information is presented in a variety of ways, including interactive graphs, tables, maps and graphics, so as to be understandable to both water research professionals and those people simply interested in learning more about the water resources within their area.

The Seminole Education, Restoration, and Volunteer (SERV) Program is **The Dr. Daniel E. Canfield Volunteerism Award** recipient this year. This award is given to a volunteer organization for significant contributions to the research, restoration and/or preservation of our water resources. The award is named after Dr. Daniel Canfield, founder of Florida LAKEWATCH, the pioneering citizen-volunteer water quality monitoring program involving over 1,200 lakes statewide, and now being emulated across the United States.

The SERV Program was established in 2010 and works to protect local waterways and natural areas through volunteer restoration projects and education. The program has documented over 10,400 volunteers and 37,300 hours of service.

Dr. Elizabeth Stephens is the SERV coordinator for Seminole County Public Works, Watershed Management Division, which involves leading volunteer-based environmental restoration events along with teaching about water quality and watershed awareness in classrooms and the community.

Dr. Beth , as she is affectionately called by staff and volunteers, is a biologist who earned her Master of Science in Horticulture at Purdue University and her doctorate in Conservation Biology from the University of Central Florida (UCF). She has taught and led UCF laboratory classes for Biology and Ecology.

The SERV Program works to actively protect and restore the waterways and natural areas of Seminole County. SERV volunteer events are great for one-day service projects or long term opportunities, including;

- lake restoration events which typically involve planting native vegetation,
- invasive removal events,
- waterway clean-up events,
- stormdrain marking,
- Adopt-A-Road and
- Adopt-A-River

These opportunities are a great way for the public to experience local ecosystems first-hand, and to make a difference in the community. Public education and outreach activities play a vital role in protecting and maintaining our water resources, and therefore, the quality of life we have. SERV presentations include topics such as:

- Watershed Awareness,
- Benthic Macroinvertebrates,
- Invasive Species, Biodiversity,
- the Enviroscape (stormwater model),
- Biological Restoration,
- Careers in Aquatic Biology, and
- the Water Cycle.

SERV volunteers help in providing vital information about water quality, and assist in the education of our children and residents. Volunteers, in most instances, act as an extension of County staff, helping to achieve much more than staff could do alone. SERV also helps to connect students with staff shadowing opportunities, as well as internships, when available, through the Seminole County Watershed Management Division and Natural Lands Program.

Seminole County SERV Program

Dr. Beth has grown the SERV program into a robust and diverse volunteer organization for Seminole County!

The Young Professional Award is presented to a young lake management professional who exhibits exemplary professional accomplishments and a commitment to water resource protection and management of our lakes and watersheds.

Nia Wellendorf is an exemplary example of what it means to be committed to water resource protection and management of our lakes and watersheds.

Nia has always followed her passion to make a difference for the environment. After completion of a B.S. degree in Natural Resources from Cornell University, Nia worked as a researcher at Cornell Biological Field Station, Marine Biological Laboratory in North Slope Alaska, and Notre Dame University. Her love of learning about the environment is limitless and she continued her studies at the University of Alabama receiving a M.S. in aquatic ecology.

Nia devotes endless effort as an advocate of the environment, especially in the State of Florida. Nia began a career with the Florida Department of Environmental Protection (FDEP) in 2002 developing an alternative classification system for Florida's surface waters, including aquatic life use and water body types. Since then, she has not only been promoted within FDEP, but tackled numerous challenges to enhance protection of Florida's water bodies. For example, she managed ground and surface water quality monitoring networks and led evaluation of sampling programs targeting revision of Florida's dissolved oxygen and nutrient standards. Working on biological assessment methods, she directed the biological quality assurance program for FDEP, which included training, auditing, and tracking of FDEP and non-FDEP staff statewide. She participated in development of numeric nutrient criteria for Florida estuaries, performing a multitude of duties: biological quality assurance, data usability assessment, QA rule development, field sampling training, and report writing.

If you know Nia, you know her passion for the aquatic environment is contagious. Nia enthusiastically contributes to entities working to manage healthy ecosystems. She donates hours of her time volunteering to promote environmental protection and education. For example, here is a little secret…if you are ever on the FLMS board of directors and leading the workshop efforts…Nia will be your first call. She has, countless years, enthusiastically led amazing workshops (e.g., LVI training and numeric nutrient criteria workshops) at the Florida Lake Management Society Symposiums. If you have taken one of these workshops you have experienced Nia's enthusiasm. It is difficult to recall any other individual who gets more excited when talking about *Panicum repens* or various *Utricularia sp.*

There is great challenge in beginning to summarize all the facets of Nia's contributions. But, such challenge speaks to Nia's involvement and dedication to helping develop tangible solutions to address water resource protection and management of Florida's aquatic ecosystems. To summarize why Nia is deserving of the Young Professional Award—

Nia actively and measurably makes a difference for our aquatic environment.

Thank you Nia for your devotion and continued contributions!

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CITIZEN SCIENCE SINCE 1986

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All unsolicited articles, photographs, artwork or other written material must include contributor's name, address and phone number. Opinions expressed are solely those of the individual contributor and do not necessarily reflect the opinion or policy of the Florida LAKEWATCH program.

Nia Wellendorf.

Regional Meetings 2017

Alachua, Hamilton, Bradford and Columbia- 9/14/17

Putnam, Clay, Duval and St. John's- 10/5/17

Hillsborough and Pasco- 10/12/17

Highlands- 11/5/17

Miami-Dade, Broward and Palm Beach- 12/9/17

Notice to all Florida

LAKEWATCH active samplers

Keep those samples flowing!
Please be sure to deliver all frozen water and chlorophyll samples to your collection center as soon as possible. This will allow us to collect and process them in a timely manner.

Thanks for you help!