UF IFAS UNIVERSITY of FLORIDA

Florida LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 71 (2015)

Happy 30th Birthday LAKEWATCH!

By Mark Hoyer, LAKEWATCH Director

CITIZEN SCIENCE SINCE 1986

The Florida Legislature officially established Florida LAKEWATCH in 1991 (Chapter 91-69; s. 240.5329, F.S.; now F.S. 1004.49) as Florida's volunteer water quality monitoring program. However, the first LAKEWATCH samples were taken on Lake Santa Fe August 16, 1986 and the program was born. Since that humble start, LAKEWATCH has analyzed samples from 1,903 lakes, 394 rivers stations, 368 coastal sites, 16 springs, and

In this issue:

A shoreline photo of Lake Santa Fe in Alachua County. The first LAKEWATCH samples were taken on Lake Santa Fe on August 16, 1986. Photo Credit: Amy Richard.

213 special samples in aquatic systems located in or next to 64 Florida counties. There are over 125 lakes in the data base now that have over 20 years of monthly data, which makes the LAKEWATCH data base one of the most extensive available in the world. This data set could not have been accomplished without the tremendous number of dedicated volunteers across the state interested in being the best stewards of our aquatic systems possible. Hats off to the LAKEWATCH citizen scientist army!!!!

To celebrate the 30th Birthday LAKEWATCH will be kicking off a new web site, which should make tracking down our data and resources easier for everyone. LAKEWATCH is also developing new reports that you will receive at the regional meetings. These reports will show what nutrient zones the lake occurs in and how the lake compares to other lakes in the nutrient zones. Additionally, there will be a trend analysis on the lake to determine the probability of the lake increasing, decreasing or staying the same trophic status. The reports will take a while to understand but at each meeting LAKEWATCH staff will walk through the reports line by line so you can understand them and as always LAKEWATCH is only a phone call away.

LAKEWATCH has been blessed this year with an increase in state funding that stabilized the program and hopefully the decision makers will see the value of the data that the LAKEWATCH volunteers collect and make sure the program is funded properly and survives for another 30 years. The current and future data will be invaluable for detecting trends and helping manage Florida's valuable aquatic resources.

Dedicated LAKEWATCH volunteers like these in Lake County made it possible for the LAKEWATCH database to be one of the most extensive database in the world. Photo credit: Maryann Krisovitch.

UF/IFAS Creates a New Biological Station

By Dr. Mike Allen, Director of the Nature Coast Biological Station

The former Gulfside Motel in Cedar Key is now the location of the UF/IFAS Nature Coast Biological Station.

The Nature Coast spans the Big Bend of Florida on the Gulf of Mexico, ranging from Hernando to Wakulla County. The region contains one of North America's most pristine coastlines, with extensive seagrass meadows, valuable recreational and commercial fisheries, and healthy wildlife populations including marine mammals (manatee, dolphin), diverse waterbirds, and sea turtles. The region also supports productive shellfish fisheries (shrimp, oyster) and a vibrant hard clam aquaculture industry valued at $40 million annually.

Natural resources form a substantial portion of the economy in the region. About 13% of all jobs in the Nature Coast region are directly dependent on natural resources (farming, forestry, fishing), compared to only 1% of jobs in Florida overall (Southwick Associates 2015). Manufacturing jobs comprise 9% of total jobs in the region compared to 4% statewide, and these jobs are dominated by wood products which include pulp and paper industries, further indicating the importance of natural resources in the region.

Conservation and management of natural resources in the region is critical to continued growth. Recreational and commercial fisheries, aquaculture, and agriculture rely on adequate freshwater flows and clean water resources. Thus, the jobs in the region are uniquely dependent on high-quality natural resources and especially water resources.

UF/IFAS has a long history of research, teaching and extension programs in the Nature Coast region, along with an extensive track record of working with agency cooperators to improve the conserva-

tion and management of natural resources and communities in the region. Because of this strong foundation, UF/IFAS has created the Nature Coast Biological Station (NCBS) to further develop the UF/IFAS mission of research, teaching, and extension in the region.

In 2015 the UF provost, IFAS, and Santa Fe College purchased the Gulfside Motel in Cedar Key, which was intended to provide better access to Seahorse Key Marine Laboratory. IFAS is currently renovating the motel to accommodate the NCBS. The site was originally a boat yard and the primary building a boatway. Beginning in the 1950s, the facility saw a succession of owners each of whom added motel rooms and "improvements" to the property.

The renovated facility will fit into the historical character of Cedar Key and provide a research facility to support hard clam aquaculture, office space for the primary scientists of the station, and temporary office and accommodations for visiting scientists, graduate students and technicians.

The Nature Coast Biological Station's mission is to improve the conservation and management of natural resources in the region, through enhanced partnerships with state and federal agencies, improved public outreach and education, and enhanced teaching opportunities for students in the region.

Dr. Mike Allen, NCBS Director, with Dr. Jack Payne, UF/IFAS VP in Cedar Key.

While renovation is occurring on the NCBS facilities, NCBS staff will use space at the Florida Fish and Wildlife Conservation Commission's George Kirkpatrick Marine Laboratory.

The mission of the NCBS will be achieved using a multifaceted approach that will include:

- Increased collaboration among UF/IFAS, partner agencies and NGOs in the region.
- Development of research programs that address key uncertainties in natural resource management of freshwater, estuarine, and coastal terrestrial systems.
- Improved visibility of IFAS's natural resource programs via social media, web presence, and video.

- Enhanced graduate and undergraduate opportunities in the region including research, field courses, and extension activities.
- Strengthened relationships among communities of the region with UF/IFAS, including local and county governments, economic development organizations, and industries (e.g., shellfish culture, commercial and recreational fisheries, ecotourism).
- Conduct focused research and outreach workshops that address resource issues of regional and national prominence and communicate these findings to the public through outreach events, social media, and coordination with IFAS Extension and Florida Sea Grant.

Our goals over the first five years are to:

- Develop research projects in the region involving agency cooperators and UF/IFAS that address wildlife conservation, fisheries, aquaculture, and sustainable human use of natural resources.
- Prioritize coastal management issues and work with stakeholders and cooperators to select a signature area to focus research and extension engagement.
- Form an Advisory Board for the NCBS that includes faculty, agency partners and members of the public.
- Demonstrate public involvement with extension activities, and capture the capabilities of UF/IFAS to address economic and education needs of the region.
- Construct a hatchery facility for shellfish research.
- Partner with cooperators to secure a boat dock at the new site for overnight mooring of vessels.
- Begin renovation /construction of facility for laboratory space and dorm rooms for students, visiting faculty, and staff.

This will result in the NCBS communicating science to the public that can improve local communities and enhance the quality and economic value of these critical resources.

The University of Florida/IFAS Nature Coast Biological Station in Cedar Key Florida.

NCBS Mission Statement: The mission of the Nature Coast Biological Station (NCBS) is to enhance the conservation and sustainability of natural resources throughout the Nature Coast through collaborative research, enhanced public engagement, field-based courses, and hands-on training workshops.

A Day In The Life Of A Water Sample

Sample bottles ready for total phosphorus and total nitrogen analysis.

You've finished collecting water samples on your lake for another month. Your boat is secure at the dock. Labels have been carefully filled out on the sample bottles; the water's been filtered, data sheets completed, and samples delivered to the collection center. Now it's time to relax and enjoy another peaceful evening on your lake. And you should. You deserve it. While you're relaxing and enjoying that beautiful sunset, did you ever wonder what happens to those precious samples after you've done your part? Read on to discover a day in the life of a LAKEWATCH water sample...

Pick-ups

You've probably guessed the next step in the life of your water sample; after being delivered to the nearest collection center, one of 63 throughout the state, your sample is stored in the freezer until one of the LAKEWATCH staff arrives to collect them. Data sheets are removed from the sample bags at this time and great care is taken to keep the samples frozen during transport, to maintain the integrity of the water.

Storage

After transport, your samples are then placed in a large walk-in freezer at UF's Program in Fisheries and Aquatic Sciences in the School of Forest Resources and Conservation, where they will remain, along with hundreds of other samples, until it's their turn to be analyzed.

Algae samples that you've stored in the larger plastic bottles with desiccant (drying agent) are placed into a separate freezer.

The data sheets are delivered to the laboratory, so that Secchi disk readings and other pertinent information can be logged into the computer.

Once defrosted, a portion (50 ml) of your lake water is "poured out" of the bottles into large test tubes.

Sample Preparation

When it's time for your samples to be analyzed, they are defrosted overnight, along with about 130 to 150 other sample bottles.

Once defrosted, a portion (50 ml) of your lake water is "poured out" of the bottles into large test tubes. The bottles are then stored in a cooler, until both phosphorus and nitrogen analyses are complete, just in case any of the samples produce unusual results and need to be redone. After the chemist is satisfied with the results, the remaining water is discarded.

Digestion

We're all familiar with the term "digestion" when it comes to food, but did you ever hear about water being digested?

When it comes to analyzing lake water, digestion is one way to "free up" the phosphorus and nitrogen so that it can be measured similar to the way in which stomach acids help to digest foods to "free up" nutrients for our bodies.

To digest the water samples, a solution of potassium persulfate is added to each prepared test tube. After the potassium persulfate has been added, the samples are heated in an autoclave (a glorified pressure cooker) under a pressure of 15 psi (pounds per square inch) for 30 minutes. Now the samples are ready for analysis.

Are we done yet?

Phosphorus Analysis- Samples being analyzed for phosphorus receive a color reagent, a mix of chemicals that will react with phosphorus in the water and turn blue.

Samples containing small amounts of phosphorus develop very little color, while samples containing large amounts may turn very blue indeed. The color is allowed to develop for 15 minutes and the samples are spun in a centrifuge, a device that spins the tubes at high speed, forcing

Robert Gallagher analyses samples for total phosphorus concentration.

particles to the bottom.

Then the amount of "blue" in each sample is measured on a spectrophotometer, an instrument that measures the absorbance of light at different wavelengths. The values are then calculated by comparing them to standards solutions containing known amounts of phosphorus.

Play it again, Sam

Nitrogen Analysis- Samples being analyzed for nitrogen are done separately and handled a bit differently. Instead of receiving color reagent, they are made acidic by the addition of a small amount of concentrated sulfuric acid. The sample is then scanned over a range of ultraviolet wavelengths, and a peak, similar to absorbance, is identified. The amount of nitrogen in the samples is, like phosphorus, calculated by comparing the samples to nitrogen standards.

Chlorophyll Analysis- Chlorophyll samples are analyzed somewhat differently, and independently, of the water samples. When the algae samples arrive at the lab, they are taken out of their bottles and sorted.

The replicate samples for each lake are paper-clipped together and put into desiccant-filled bags that are labeled by county. These are kept frozen until their scheduled analysis date.

When it's time to analyze chlorophyll, samples are removed from bags, and the small glass fiber filters containing the algae are rolled up and inserted into small plastic test tubes. (The volume of water sampled is then recorded from the labeled wrappers and used to prepare a working sample analysis list). Eight milliliters (ml) of 90% ethanol is added to each tube and the tubes are capped and heated in a water bath for five minutes at 172 ° F, the boiling point for ethanol. The rack of tubes is then wrapped tightly in a black plastic bag to protect the samples from light and is allowed to stand for 24 hours. During this time, the chlorophyll pigments are extracted from the algae, and into the ethanol.

The next day, the chlorophyll tubes are centrifuged and the ethanol extract is read on the spectrophotometer. Similar to the phosphorus "readings," samples containing more chlorophyll are more intensely green.

The chlorophyll concentrations are then calculated using a formula that includes the absorbances given by the spectrophotometer, the volume of ethanol used, and the volume of water you filtered for the sample. This calculation is for total chlorophyll which is reported to our volunteers. In addition we go

Steve Banes analyses samples for chlorophyll concentration.

through an extra step to produce a "corrected" concentration which is required for the Florida Department of Environmental Protection.

Once all four parameters (nitrogen, phosphorus, chlorophyll and Secchi depth) have been measured and documented it's time to do it all over again.

This process must be completed within five months of the day that you collect your sample or the data will get a "qualifier." Essentially what this means is that the data may be considered unusable for regulatory purposes. So, it is very important that you deliver your samples to the collection center as soon as you can so that we can have them all finished by the five-month deadline.

Did the BP Deepwater Horizon Oil Spill Change the Growth Rate of Spotted Seatrout?

By Debra Murie, Daryl Parkyn and Rob Ahrens, Fisheries & Aquatic Sciences, School of Forest Resources and Conservation, UF

Photo credit: Diane Rome Peebles

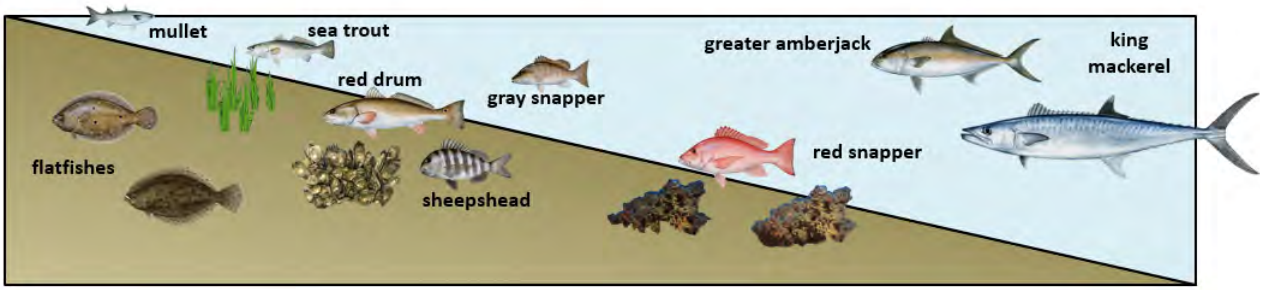
Next to issues of food and human safety, one of the most immediate questions following the Deepwater Horizon (DWH) oil spill of 2010 was to ask to what extent the spill, and associated events (e.g., dispersants), impacted the growth and productivity of important recreational and commercial fisheries in the Gulf of Mexico. In the Fall of 2012, we received $1.36 million in competitive grant funding from the Consortium of Ocean Leadership through the Gulf of Mexico Research Initiative to pursue this question.

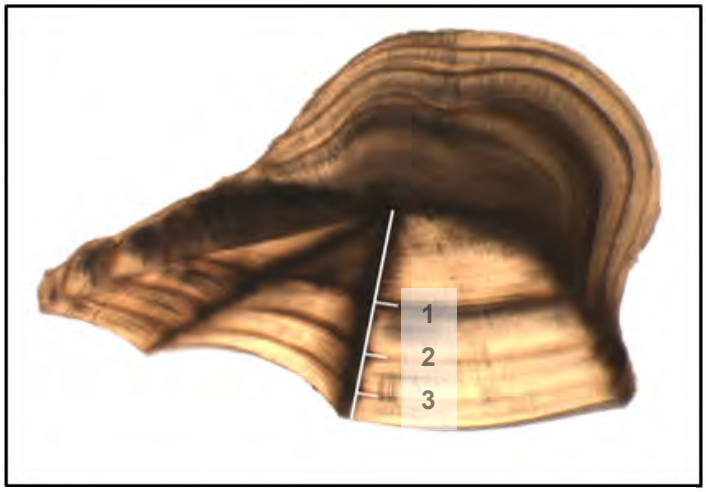
Our overall goal has been to model the potential spatial and temporal effects of the DWH oil spill on the growth and productivity of representative fish species associated with different habitats, including estuarine (spotted seatrout, red drum, mullet, sheepshead), reef (red snapper), sand/mud (flounder), and pelagic habitats (king mackerel, greater amberjack).

Changes in growth of these fishes is being estimated by measuring the annual growth patterns captured in their ear stones (otoliths), which work as natural chronometers just like tree rings. Growth rates of these fishes are being measured for fish collected within the area directly impacted by the DWH oil spill (Louisiana) and from outside of the potential impact area (west coast of Florida) for a time series prior to the start of the spill (2005-April 2010) and after the spill (late 2010-2015).

The potential impact of the DWH oil spill at a fisheries level is being modeled using stock assessments that take into account the potential changes in the growth of these fishes at specific ages. At an ecosystem level, we are using a time-series analysis of the annual growth increments from older red drum and red snapper (e.g., 15-35 years old), a process known as sclerochronology, to detect the impact of major environmental perturbations and natural cycles, including hurricanes and the oil spill.

We are currently completing the measuring of otoliths for most of the target species, which depends on a complete time series ranging from 2005 to 2015 for the growth analy-





Cross-section of an otolith from a 3-year old spotted seatrout showing the measurement axis. Photo: D. Murie

sis. We have initially focused on seatrout because it uses estuaries throughout its life and is a relatively short-lived species (most seatrout in Louisiana are less than 5 years old), and it was therefore predicted that seatrout would suffer reduced growth because the coastal areas of Louisiana were physically covered by the oil slick.

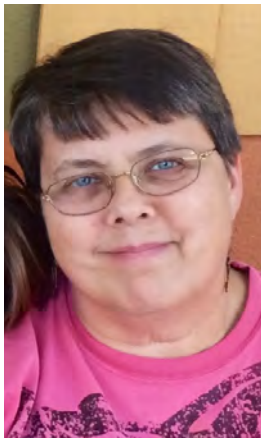
To date, we have measured otoliths and aged over 20,000 spotted seatrout from Louisiana. Surprisingly, we have not observed any decrease in the growth of 1 to 4 year old female or male seatrout from Louisiana before and after the oil spill. In fact, there appears to have been a marginal increase in the growth rate of spotted seatrout, although we still need to add the 2015 growth data to our analysis. Since spotted seatrout stay close to their "home" estuary, we also analyzed their growth based on specific major estuaries. Growth was also consistently greater post- versus pre-spill in female spotted seatrout collected from the major estuaries of Terrebonne, Barataria and Lake Pontchartrain in Louisiana.

Any increase in growth may be due to the release of seatrout from density-dependent growth that could have occurred due to the massive mortality of various fishes observed immediately following the oil spill (i.e., reduced density of fish, so more food available to the surviving seatrout).

As a sub-lethal effect, growth is only one component of the life history traits of fish that can be affected by environmental conditions. Reproduction is also important to estimating productivity in fisheries but could not be addressed in spotted seatrout because of a lack of sufficient data available prior to the oil spill.

This leads us to a big shout out to the Louisiana Department of Wildlife and Fisheries and the Florida Fish and Wildlife Commission's Fisheries and Wildlife Research Institute! These agencies have long-term, ongoing monitoring programs for the species that we are studying and our project could not have been done without them providing us with a time series of fish otoliths and data for each species.

The greatest deficit in understanding the effects of the Deepwater Horizon oil spill, or any other potential disaster, rests with having data prior to the event for comparison to data collected after the event. Based on our experience, it is critical to continue these ongoing monitoring programs in the state and federal agencies in order to assess the potential impacts of future natural and man-made disasters in the Gulf of Mexico.



Debra Murie is an Associate Professor in the Program of Fisheries & Aquatic Sciences, School of Forest Resources and Conservation, at the University of Florida. Photo credit: D. Parkyn

Fishing For Success is seventeen and still counting…

By Charles E. Cichra, Professor / Fisheries Specialist and Sharon Fitz-Coy, Senior Biologist, University of Florida, School of Forest Resources and Conservation

A visiting school group with their teachers, participating in tours, demonstrations, and hands-on environmental learning activities at the Fisheries facility in Gainesville. Photo credit: Sharon Fitz-Coy.

Fishing For Success (FFS) turned seventeen in 2015 and is still going strong!

Fishing for Success is part of the UF/IFAS Fisheries and Aquatic Sciences (FAS) program in the School of Forest Resources and Conservation and receives help from Florida LAKEWATCH, UF/IFAS Center for Aquatic and Invasive Plants, and the Florida Fish and Wildlife Conservation Commission (FWCC).

This multifaceted program, which uses fishing and other related activities as the "hook" to introduce children of all ages to various aspects of fisheries and aquatic environmental sciences, has weathered and survived budget cuts, constraints, and numerous changes in personnel. The program began in 1998, as the brain child of Dr. Daniel Canfield, Jr., with the initial focus of providing mentoring and career counseling to a small group of underprivileged youth, but evolved to meet the needs of students and their teachers, 4-H extension faculty, youth group leaders, and the community at large. Dr. Canfield served as its Co-director until he stepped down in 2013, when Co-director Dr. Chuck Cichra took over at the helm.

Today, through a combination of on-site and off-site programs, demonstrations, hands-on activities, and community fishing events, the program provides education, recreation, and rehabilitation therapy to a broad demographic slice of Florida's population.

For many schools in Alachua County and from surrounding areas, a field trip to Fishing For Success has become an annual, much anticipated and favorite event. More than 150,000 children have been involved in this hand-on program since it began, with 2007 being the peak year with over 17,000 participants. FAS graduate students have been paramount in stepping in and volunteering to help with the instruction of our school children on their visits, and thus facilitate our ability to keep going and to reach such large numbers of youth.

On-Site Programs

Visiting school groups with their teachers, homeschoolers, youth clubs and camps, participate in tours, demonstrations, and hands-on environmental learning activities which are specifically tailored to the age and interests of each group. They learn about freshwater aquatic invertebrates and plants that they collect from small ponds using dip nets, and freshwater fish, including their life history, biology, anatomy, and reproduction.

Finally, after eating their lunch and relaxing, the groups are given the opportunity to fish ponds that have been stocked with channel catfish, bluegill, and largemouth bass. The program provides a memorable experience, and for many, their first chance to participate in the rewarding sport of fishing.

FFS also provides valuable physical and behavioral rehabilitation for many organizations such as Harbor Chase Assisted Living Facility, Meridian Behavioral Center, the VA Hospital, Gainesville Rehabilitation Center, and Shands Rehab Hospitals.

Off-Site Programs

If you can't come to us, we can often come to you. FFS personnel visit schools, on a limited basis, to give educational presentations on the biology and ecology of aquatic invertebrates and fish found in Florida lakes and ponds, or to help environmental educators with the presentation of other aquatic topics. FFS conducts hands-on environmental education and ecology day presentations around the state in conjunction with UF/IFAS county agricultural, natural resource and 4-H extension staff, working directly with youth at these events. FFS also sets up interactive exhibits at youth fairs, festivals and museums, which allow FFS to interact with large numbers of children and their parents.

Family Fishing Days

FFS hosts "Family Fishing Days" on one Saturday each month (March through November). These provide families with the opportunity to fish together in a safe and fun setting at seven heavily-stocked "catching ponds" located at FAS' facility in northwest Gainesville. Anglers catch bluegill, largemouth bass, channel catfish, redear sunfish, and warmouth. Family Fishing Days are free, open to the public, and catch-and-release. Fishing starts at 8 a.m. and ends at 12 noon. Participants expect us to be open and able to attend, no matter what the weather brings (heat, rain, freezing temperatures, and even approaching hurricanes). We have free loaner poles and bait (cut-up hotdogs and liver) available, but people are welcome to bring their own fishing equipment and bait.

Our volunteers are the heart and soul of our Family Fishing Days. Volunteers also provide our guests with help baiting hooks, casting, untangling lines, repairing fishing gear, releasing fish, or just offering a little advice to novice anglers.

There is a railed fishing deck, with two handicapped accessible ramps available, so those with disabilities can also enjoy the thrill of freshwater fishing!

***For more information or to schedule a program**, contact Sharon Fitz-Coy, FFS Education Coordinator (sharfc@ufl.edu or 352/273-3622) or Dr. Chuck Cichra, FFS Director (cecichra@ufl.edu or 352/273-3621). The current FFS website resides at:*

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

This website will be updated and moved by 1 Jan 2016, with a redirect to the new web address.

You can make a tax-deductible contribution to Fishing for Success by:

Writing a check made out to: UF Foundation Inc. - SHARE (indicate on the bottom of the check that the donation is for "Fishing For Success". Send the check to Dr. Chuck Cichra, Fisheries and Aquatic Sciences, 7922 NW 71st Street, Gainesville, FL 32653.

You can also donate by credit card, CLICK HERE to go to and fill out the donation form. Leave the "appeal code" blank and be sure to state that your donation is for "Cichra - Fishing for Success" in the "comment box" at the bottom of the page.

Sharon Fitz-Coy, FFS Education Coordinator and Dr. Chuck Cichra, FFS Director

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