



2016-2017 FLORIDA SEA GRANT PROGRAM HIGHLIGHTS

SEA GRANT RESEARCHER GUIDES RESTORATION IN THE EVERGLADES

In the Florida Everglades, peat soils critical to maintaining wetland elevation are collapsing due to rising seas and saltwater intrusion.

Florida Sea Grant researcher Tiffany Troxler, in collaboration with the South Florida Water Management District and the Everglades Foundation, has been conducting experiments to help guide management decisions regarding the

Everglades and the peat soils that hold the famous wetlands together.

These peat soils are the fundamental building blocks of the Everglades, the single largest marsh system in the U.S. and home to many tropical foundational species. The vast wetland also protects humans from hurricane damages and generates millions of tourist dollars each year. Not to mention, the Everglades also helps filter water before

continued inside

Peat soils that form the foundation beneath the largest marsh system in the United States are being threatened by rising seas.

EVERGLADES RESTORATION *continued*

it reaches the Floridan aquifer that supplies drinking water to one out of three Floridians.

But peat soils are fragile – too little fresh water can dry them up, while too much salt water causes plants to die and peats to wash out, creating open-water slurry holes where the peat used to be. Sea-level rise is only expected to make the problem worse.

Troxler, through field and laboratory manipulations, is quantifying just how sea-level rise will impact peat soils in the not-so-distant future.

Her two-year study examined the physical, chemical and biological effects associated with exposing brackish and freshwater sawgrass peat communities to increased salinity, mimicking the anticipated consequences of sea-level rise.

"Peat soils provide the fabric that sustains large areas of the Everglades National Park. Increasing inputs of salt water into freshwater peat wetlands as a result of saltwater intrusion is resulting in higher salinities than we've ever observed in these types of wetlands," said Troxler, who serves as the director of the Sea Level Solutions Center at Florida International University.

"Given the low-lying land surface of the park, maintaining this fabric in terms of its elevation is critically important to preserving these wetlands."

Results of the project show that increased salinity in peat soils has resulted in loss of peat

structure and decline in the growth of plants that help form the peat.

Understanding these sea-level rise impacts has profound implications for future water management, policy development and restoration decisions in the Everglades, where more than \$20 billion of state and federal tax dollars will be spent to enhance freshwater flow for ecological restoration and human uses.

Troxler hopes her findings can help guide future management options to slow the rate of peat collapse and create options for adaptive management of sea-level rise in the Everglades.

"This is an example of critical Sea Grant research, especially if it can be broadened to provide sustainable, adaptive, predictive and economically important understanding of the drivers and processes that hold together the very fabric of the Everglades," Troxler said.

According to Fred Sklar, who heads up the Everglades section of the SFWMD, the local sponsor of the restoration project, "This science provides a better understanding of the hydrologic needs of Everglades peat, which in turn, helps us and the U.S. Army Corps of Engineers design sound Everglades restoration plans, and improved Everglades infrastructure."

Ultimately, the results from this research can be used by those agencies to optimize freshwater delivery projects planned in the southern Everglades.

The GrouperChek system features a portable touchscreen device that offers rapid, field-based testing.



FIGHTING SEAFOOD FRAUD

HANDHELD SENSOR TECHNOLOGY CHANGING HOW FAKE SEAFOOD IS DETECTED

Proper labeling of seafood is important throughout the supply chain to ensure buyers are getting what they expect.

Take grouper, one of Florida's most popular menu items. In recent years, news reports have surfaced of grouper being substituted with less desirable species, like tilapia.

Distinguishing between look-alike fillets makes it hard to enforce federal laws prohibiting the sale of mislabeled seafood. Although DNA-based testing is accurate, available methods tend to be time-consuming, costly and impractical for wholesalers or restaurateurs to conduct at the point of sale.

A Florida Sea Grant-funded researcher at the University of South Florida is changing that. John Paul is developing a suite of tools offering rapid, field-based testing that can differentiate grouper from other similar-looking fish in as little as an hour.

Paul and his former graduate student, Robert Ulrich, have patented the GrouperChek system, and are commercializing it through their start-up company, PureMolecular.

One of GrouperChek's core features is a portable touchscreen device that can screen suspect fillets without expensive lab analysis. Seafood inspectors can carry the device dockside or into the warehouse for prompt testing. Chefs can verify the fillets they purchased are grouper before serving them to customers.

"Simply knowing that this technology exists increases consumer confidence and frightens

unscrupulous industry members looking to defraud U.S. importers and wholesalers," Ulrich said.

In previously funded Sea Grant research, Paul's lab has successfully designed field-based DNA fingerprinting methods to quickly detect microorganisms in coastal waters. His refinements on that method now make it possible for volunteers to monitor and test coastal water quality with handheld remote sensors. GrouperChek relies on a similar approach to identify unique DNA markers in fish, specifically grouper.

PureMolecular also provides lab-based genetic identification services to test dozens of samples simultaneously. The company has added a prototype test that tells the difference between common species of farm-raised shrimp and wild-caught species.

"If consumer demand is strong enough, the technology could eventually be extended to tableside, letting restaurant customers equipped with the testing materials and a smartphone app conduct their own tests for authenticity," he added.

"We're at the forefront of the technology right now."



Robert Ulrich



Maia McGuire
(below) trains volunteers
around the state to
sample coastal waters for
microscopic bits of plastic.

SWIMMING IN PLASTIC

SEA GRANT AGENT LAUNCHES AWARENESS CAMPAIGN TO ENCOURAGE FLORIDIANS TO REDUCE PLASTIC FOOTPRINT

Less than 10 percent of plastic ever gets recycled and most ends up in landfills, as litter, or worse — broken down into even smaller and smaller fragments called microplastics. These particles drift, blow and otherwise disperse into bodies of water.

Some microplastics are deliberately manufactured in the form of tiny plastic beads that give scrub and gleam to some toothpastes, facial soaps, body washes, and other personal care products. There are even microplastic fibers in synthetic sportswear fabrics, and they shed from garments, especially in the wash.

Maia McGuire, a Florida Sea Grant agent with UF/IFAS Extension in Flagler and St. Johns counties, has launched a microplastics awareness program that recruits volunteers around the state to sample for microplastics in coastal waters. The data collected are entered into an online Google map that displays sampling results.

Thus far, more than 200 volunteers have collected and analyzed more than 1,000 water samples at 352 locations around the state. Nearly 90 percent of the samples contained at least one item identified as plastic, with microfibers being the most common type of plastic found.

All these microscopic bits make their way down sinks and around wastewater treatment plant filters, then are discharged into rivers, lakes and oceans along with the rest of the treated effluent. In turn, they are eaten by fish, birds, oysters, sea turtles and even tiny creatures low in the food chain, like plankton.



What's more, toxins that adhere to these bits of plastics get eaten, too.

"The goal of the analysis is not to quantify the total amount of microplastics in the water," McGuire said. "But to show people that microplastics are present in local waters, and that this is not just a problem in the 'Great Pacific Garbage Patch,' or in the Great Lakes, as people might think."

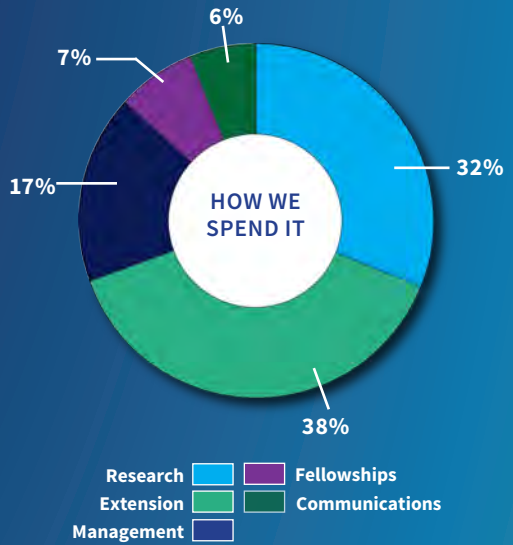
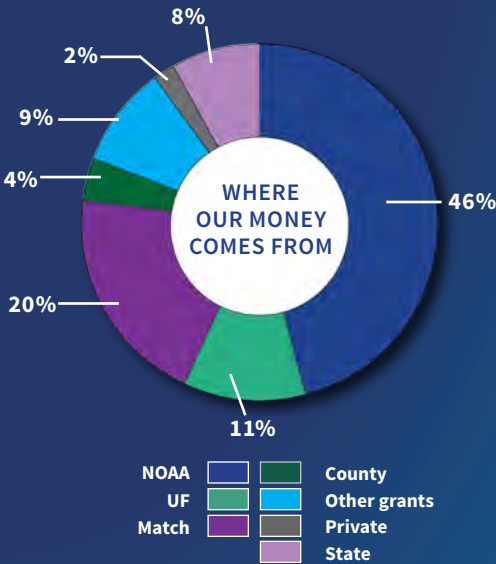
"I wanted to find a way to help people understand that there are things we can do as Floridians to help," McGuire said.

In addition to educating people about the prevalence of microplastics, McGuire also hopes to teach Floridians about their personal contribution to plastic pollution.

"No one is calling for the removal of plastic from our lives, but we are hoping people will think more carefully about how they use plastic, and how they can use less."

Want to become a volunteer? Visit www.plasticaware.org for more information.

FLORIDA SEA GRANT 2016-17 BUDGET \$6,711,778



84 students
supported on
research grants

\$294,333
awarded in scholarships

&

59 students
found jobs in their
field

765 anglers
trained
in sustainable
fishing techniques




12
new clean
marinas
established in
Florida

\$32.8 million
annual economic impact

&

395 water-
dependent
businesses sustained

7,677
residents participated
in environmental literacy and
workforce development programs

23 communities
adopted policies to
protect waterfront and
waterway access



DETECTING RED TIDE SEA GRANT RESEARCHER FINDS EFFICIENT METHOD TO DETECT TOXINS AND EVALUATE SHELLFISH CLOSURES MORE QUICKLY

Blooms of the toxic algae *Karenia brevis*, also known as Florida red tide, occur annually along Florida's southwest coast. The blooms can lead to significant economic losses because shellfish harvesting areas must be closed to prevent consumers from contracting neurotoxic shellfish poisoning, or NSP.

Savings could be made if regulators could use alternative and quicker NSP testing methods to replace the inefficient and antiquated mouse bioassay, which is presently the only federally approved detection method.

With Sea Grant funding, researchers at the Florida Fish and Wildlife Conservation Commission compared the accuracy, user-friendliness and costs of an alternative to the mouse bioassay test called ELISA, or enzyme-linked immunosorbent assay.

After comparing results of more than 500 samples tested by both methods, a proposal was submitted to the Interstate Shellfish Sanitation Conference, the state/federal cooperative that

establishes updated guidelines for sanitary control of the shellfish industry.

Researchers are proposing that ELISA be approved as a "Limited Use Method" appropriate at or below a safe minimum threshold.

If adopted, the new method will reduce the amount of time that shellfish farmers must stop harvesting their product and potentially provide a huge benefit to that business sector, while still ensuring that the seafood is safe.

"Using this method when we know toxin levels are relatively low will greatly increase the number of samples we're able to test in a week," said Leanne Flewelling, the project's principal investigator and researcher with FWC. "The availability of a more user-friendly alternative NSP testing method will also benefit those Gulf states that do not maintain the capability to conduct NSP mouse bioassays."

This project is a part of a larger collaborative effort with the U.S. Food and Drug Administration to put forth one or more alternative methods for reducing neurotoxic shellfish poisoning.



NAVIGATING OPEN WATERS

NEW BOATING LAW IN FLORIDA IS ANCHORED IN SEA GRANT'S LEGAL ANALYSIS

Legislation recently passed by Florida's lawmakers to resolve the patchwork of local and state laws regulating boating relies on Florida Sea Grant research dating back 10 years.

"Florida has been wrestling with the issue of vessels putting down anchor in state waters for as long as I have been with Florida Sea Grant," said legal specialist Tom Ankersen, a law professor at the University of Florida Levin College of Law.

Ankersen said local and state authority to regulate the anchoring and mooring of vessels is unclear, leading to long-standing conflicts.

The new law, which passed both the House and Senate unanimously, affirms the state's goal of promoting public access to public waters, but enacts measures that give local governments more ability to resolve issues with live-aboards, derelict boats, and vessels anchoring within their jurisdictions. The legislation also chips away at Florida's abandoned boat issues, strengthening language that will prevent "at risk" vessels from becoming derelict.

In the 2000s, as conflicts between waterfront homeowners and rights of anchored boaters

mounted, the state began a methodical public process to explore how much authority local governments could be given to write and enforce regulations.

In 2009, the state launched a pilot mooring project in five communities to test issues of unregulated anchoring, waterway management and local government authority.

But before anything could happen, the state needed to review its own statutory basis for vessel management. It was Ankersen's team of law students that provided the comprehensive analysis and policy recommendations.

"Our report eventually formed the basis of the legislation authorizing the pilot mooring program," Ankersen said.

Many of the changes made to the Florida boating law were based on recommendations resulting from the pilot program's final report, he said.

"I am pleased that our work was cited when the state made its final report about the program to the legislature last year," Ankersen said.

5,402 average daily views



through Florida Sea Grant social media channels

178 seafood industry workers



trained in safe seafood handling



Artificial reefs provide recreational diving and snorkeling opportunities for residents and visitors, boosting the state's economy.

SUNKEN TREASURE

LENDING EXPERTISE TO ARTIFICIAL REEF DEVELOPMENT, FLORIDA SEA GRANT BOOSTS THE ECONOMY AND ENVIRONMENT

For more than 30 years, Florida Sea Grant agents, scientists and volunteers have led the development of the state's artificial reefs. In the Florida Panhandle, novel snorkeling reef deployments are inspiring a new wave of tourism.

An hour west of Panama City, a concrete reef shaped like a sea turtle, aptly named Sea Turtle Reef, has given tourists and locals a new reason to visit a bluish-green stretch of beach.

This particular reef consists of 58 structures designed with concrete plates embedded within limestone. Each structure is held in place with fiberglass piling sunk deep in the sea floor.

"It's a very intensive process, but it has had a noticeable impact on tourist draw and local businesses," said Laura Tiu, Florida Sea Grant agent with UF/IFAS Extension in Okaloosa and Walton counties.

Early artificial reef projects mainly focused on improving fish populations, but artificial reefs today can improve aquatic habitats, mitigate damage to natural reefs, provide recreational opportunities for visitors and stimulate coastal businesses.

With its mostly sandy bottom, the Gulf of Mexico does not form natural reefs to the same degree as the Caribbean. For places along the Gulf Coast like Grayton Beach State Park in Walton County, artificial reefs provide an attraction for snorkelers and fishermen, Tiu said.

She and Scott Jackson, Florida Sea Grant agent with UF/IFAS Extension in Bay County, have been collaborating with artificial reef managers in the Florida Panhandle by providing them with the latest science and economic data, as well as educating the public about the new reefs.

They help coordinate regional artificial reef workshops around the state, and maintain the Florida Artificial Reefs Facebook page to keep the artificial reef community connected.

The funding for reef deployment comes from penalties assessed to BP as compensation for closures to recreational fishing and diving after the Deepwater Horizon oil spill.

Jackson assisted the county by synthesizing complex economic impact data related to artificial reefs to help write grant proposals. In total, the county received \$1 million to deploy new reefs that will attract residents and tourists alike.

212 citizen scientists
trained to monitor water quality in sensitive habitats around the state

8 communities
learned adaptation strategies for sea-level rise

26,220 acres of coastal
habitat enhanced

SCHOLARSHIP & FELLOWSHIP RECIPIENTS



Aylesworth Foundation



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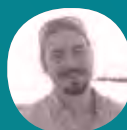


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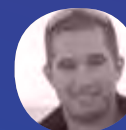


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