



PREPARING FOR **DISASTER**

As values of coastal property approach \$3 trillion, new projects will help communities increase storm resilience.

Photo courtesy Bill Frazzetto.

Damage from storms and flooding can be costly for both homeowners and the insurance industry in Florida, which has the highest percentage of coastal counties in the U.S. In 2004 and 2005, eight hurricanes slammed Florida, causing \$31.3 billion in insured losses. Now the state's insured value of coastal property is approaching \$3 trillion.

Florida Sea Grant is funding three novel research projects that focus on helping communities become more resilient to severe storms and hurricanes.

Ni-Bin Chang, professor and director of stormwater management at the University of Central Florida, is working with Pinellas County, a densely populated county already struggling with drainage problems during daily high tides, to create implementation plans for smart stormwater management grids. The new grids will be designed to incorporate the best-available science on sea-level rise and climate change.

“Access to a tool that can help us better understand how to plan for sea-level rise during infrastructure planning and management will be invaluable,” said Kelli Hammer Levy, manager of the county's natural resources section.

Storm surge caused by hurricanes is another area of concern in Florida. Peter Sheng, a civil and coastal engineering research professor at the University of Florida, is creating a rapid forecasting system for storm surge and coastal inundation. His new system will take into consideration the effects of sea-level rise and climate change, providing real-time information to city planners.

“We believe that this system will potentially add significant value to both our local and regional efforts to enhance our coastal resilience,” said Nichole Hefty, manager of the Office of Sustainability in Miami-Dade County.

City planners aren't the only ones responsible for preparing for natural

disasters. Homeowners can act too, but often do not. “We all know that hurricanes cause a lot of damage and we need to mitigate our homes. But we've learned that cost is a major barrier preventing homeowners from doing so,” says Sungmoon Jung, an associate engineering professor at Florida State University.

He and colleague Arda Vanli are working with insurance companies on improved hurricane risk models that would enable insurers to offer more aggressive premium reductions to homeowners who implement hurricane upgrades. Their approach would give homeowners better information to weigh the upfront cost of improvements against the future benefit.

“This approach would result in more accurate hurricane policy rates, more risk-informed decision-making and more accurate economic loss estimation,” Jung says.

FINDING THE SECRET TO STRONGER ROOFS

David Prevatt creates a new adhesive that protects roof shingles from strong winds.

Water damage caused by roof shingle failure accounts for over 50 percent of the billions of dollars in residential loss claims from hurricanes since 2004.

With \$180,000 from Florida Sea Grant, David Prevatt, assistant professor of civil and coastal engineering at the University of Florida, is developing a new adhesive to make roof shingles on older homes more durable and long-lasting.

Research shows that shingles become vulnerable to wind damage six years after installation due to loss of sealant

adhesion caused by natural aging. However, best practice guidelines recommend homeowners replace their roof shingles every 20 years.

“Failure of asphalt shingles is a gateway to costly interior damage, additional living expenses, business interruption, and delayed economic recovery,” Prevatt said.

By mitigating shingle failure in high winds, the new adhesive will decrease the economic damage to coastal communities.

“Addressing the unsealing phenomenon is perhaps the single most influential mitigation strategy with respect to loss reduction,” Prevatt said. “This is a very solvable problem whose solution will have a dramatic economic impact once implemented on a large scale.”



Photos courtesy University of Florida.



UF civil engineering professor David Prevatt (right) and graduate student David Roueche use their lab setting to test roofs for storm readiness.



Chuck Skoch
Scholar

Zachary Loeb
B.S., ENVIRONMENTAL
ENGINEERING, UF



**NOAA Coastal
Management Fellow**

Caitlin Pomerance
LEVIN COLLEGE OF LAW
UF



**Florida Coastal Office/
Florida Sea Grant Fellow**

Kayleigh Michaelides
M.S., MARINE AFFAIRS/POLICY
UM RSMAS



**NOAA Fisheries/Sea Grant
Graduate Fellow, Pop Dynamics**

Matthew Nuttall
PH.D., MARINE BIO/FISHERIES
UM RSMAS

Scholarship and Fellowship Recipients

\$353,249 in scholarships and fellowships awarded
and **95 students** supported through research grants

FOWA Outdoor Communicators



Chelsey Crandall
PH.D., FISHERIES
UF



David Shiffman
PH.D., ECO SCIENCE AND POLICY
UM

Florida Sea Grant Scholars



Abigail Clark
PH.D., FISHERIES &
AQUATIC SCIENCES
UF



Samantha Feingold
M.S., MARINE
AFFAIRS/POLICY
UM



Ryan Lind
M.A., MAR. AFFAIRS/
ECONOMICS
UM



Arvind Shantharam
PH.D.,
OCEANOGRAPHY
FSU



Danielle Puls
PH.D., INTERDIS.
ECOLOGY
UF



Richard Hodel
PH.D., BIOLOGY
UF

John A. Knauss Marine Policy Fellows



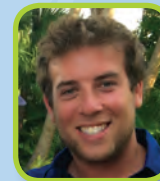
Robert Ellis
PH.D., BIOLOGY
FSU



Andrew Rubin
J.D., OCEAN POLICY AND LAW
UM SCHOOL OF LAW



Christy Foust
PH.D., ECOLOGY AND
EVOLUTION
USF



Matthew Gorstein
M.S., MAR. RESOURCE ASMT
UF



Stephanie Lawler
M.S., MARINE SCIENCE
USF

Aylesworth Foundation Scholars

Guy Harvey Scholars



Ed Camp
PH.D., FISHERIES &
AQUATIC SCIENCES
UF



Kristina Deak
M.S., MAR. RESOURCE
ASSESSMENT
USF



Bianca Prohaska
PH.D., ECOLOGY AND
EVOLUTION
FSU



Joseph Curtis
M.S., MARINE
ECOLOGY
USF



Geoff Smith
PH.D., FISHERIES &
AQUATIC SCIENCES
UF



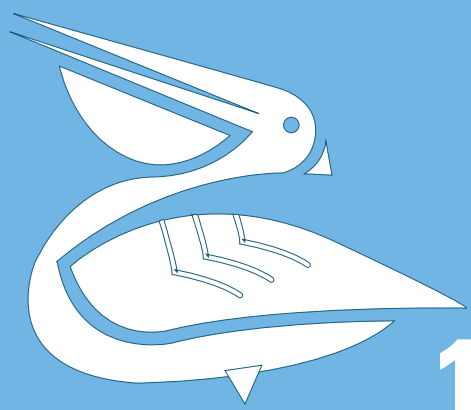
Diana Churchill
PH.D., TROPIC
ECOLOGY
FIU



Kristian Rogers
M.S., MARINE
ECOSYSTEM MGT
UM

274

coastal planners and lawyers trained about community resilience



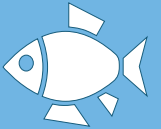
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new Clean Marinas established in Florida

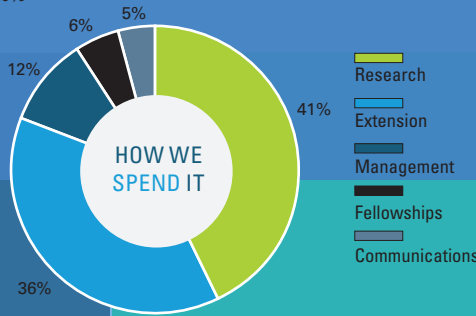
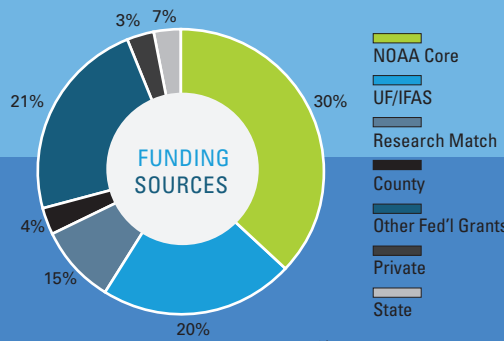
21

communities learn adaptation strategies for natural disasters

1,233



industry workers trained in safe seafood handling



2013-2014 EXPENDITURES	
FUNDING AREA	TOTAL
Research	\$ 2,627,527
Extension	\$ 2,292,666
Communications	\$ 347,218
Management	\$ 741,148
Fellowships	\$ 334,000
Total	\$ 6,342,559

2013-2014 FLORIDA SEA GRANT CUMULATIVE BUDGET

\$15,000,000

secured to sustain and help re-establish the Apalachicola Bay oyster fishery



\$9,500,000

generated by artificial reef deployment in Taylor Co.

\$353,249

awarded in scholarships and 95 students supported on research grants.

270



Volunteers reestablish degraded oyster habitat in the Indian River Lagoon, valued at \$20,000



Mahmood Shivji (right) and research assistants use satellite technology to track migration patterns of mako sharks. Photo courtesy Guy Harvey Research Institute.

PUBLIC and PRIVATE COLLABORATION

The Guy Harvey Ocean Foundation grows its partnership with Florida Sea Grant to solve coastal issues.

Florida Sea Grant and the Guy Harvey Ocean Foundation are expanding the scope of their partnership, by co-funding research and education to tackle ocean and coastal issues.

The Guy Harvey Ocean Foundation first joined Florida Sea Grant with the interest of supporting student scholars. Since the Guy Harvey Scholarship Award was established in 2009, \$114,000 has been given to 25 students at nine Florida universities.

In 2013-2014, Florida Sea Grant and the foundation strengthened their collaboration by cost-sharing research and outreach.

Mahmood Shivji, director of the Guy Harvey Research Institute Oceanographic Center, is using funds from the partnership to study the migration of mako sharks in the Atlantic Ocean, the Gulf of Mexico and the Caribbean using satellite

tagging technology. Knowing the movements of large apex predators, such as sharks, is a key element of understanding marine ecosystem dynamics.

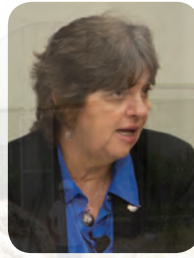
“We expect this information to make a valuable contribution to fishery management of this little understood and highly mobile exploited shark and provide data to inform fishery management,” Shivji said.



The partners are also working to expand citizen science efforts in the state by training interested citizens on how to restore and monitor sensitive habitats such as oyster reefs, seagrass beds, sand dunes and mangroves.

New courses are being designed following the existing Florida Master Naturalist curriculum with an emphasis in coastal restoration.

Upcoming collaborations include the co-funding of research that offers creative techniques to trap lionfish, an invasive species that is wreaking havoc in Florida waters.



At left, Mote Marine postdoc scientist Nicole Rhody transfers red drum into one of three fish tanks. (inset) Mote aquaculture director Kevan Main is testing new growout systems so local farmers can bring high-value fish and sea vegetables to market.

Photo courtesy Mote Marine Lab.

FARMING FOOD IN THE SEA

Experts in worldwide food production estimate that within 15 years, about 40 million more tons of seafood will be needed each year to meet current consumption rates.

To keep up, Florida Sea Grant researchers like Kevan Main, the director of aquaculture at Mote Marine Laboratory, are testing novel fish farming technologies that will help the aquaculture industry develop and expand with minimal impacts on land, water and existing fisheries.

Main and her team are experimenting with a marine version of an aquaponics system, which essentially marries conventional fish-growing tanks with hydroponics, the growing of plants in water. Her team is working out a system that community-based growers can use to raise both red drum and sea vegetables in Florida.

“Just by introducing the plants, you’re not only producing fish to go to market, you’re also producing plants to go to market,” Main said. “I’m able to use the nutrients from the feed to feed the fish, and then the nutrients that come from the fish tank system to feed the plants. You’ve produced two things for the price of one.”

To date, most aquaculture operations have been conducted near-shore or on land. But, there is also rising interest in the

possibilities of farming finfish in large pens that float in deeper, offshore waters.

Sea Grant researcher Daniel Benetti, director of aquaculture at the University of Miami, is looking at the environmental impacts of open-ocean aquaculture, which could be allowed in U.S. waters in the Gulf of Mexico in coming years.

Benetti and his team are collaborating with Open Blue Sea Farms, which commercially farms cobia, to quantify the environmental impacts of excess nutrient levels generated from the waste of a caged fish operation off the Atlantic coast of Panama. The waste concentrated in a relatively small area could cause dead zones, harmful algal blooms and fish kills. But Benetti said it is possible that in open-ocean aquaculture facilities, nutrients dilute enough to not have any detectable impact.

Data analysis is still ongoing, but after two years of study, the initial data readings indicate that farming operations are having little measurable impact on the surrounding environment.

“We’re really looking to find ways to work with the industry and improve the process so that we can realize the true potential for aquaculture and meet future demand,” said Ron Hoenig, fish hatchery manager at the University of Miami.

FLORIDA SEA GRANT NETWORK MEMBER INSTITUTIONS

University of Florida (Host) Gainesville, FL

Florida Atlantic University/
FAU at Harbor Branch Oceanographic
Boca Raton/Ft. Pierce, FL
Florida Gulf Coast University
Ft. Myers, FL
Florida A&M University
Tallahassee, FL
Florida Institute of Technology
Melbourne, FL

Florida International University
Miami, FL
Florida State University
Tallahassee, FL
Jacksonville University
Jacksonville, FL
Mote Marine Laboratory
Sarasota, FL
New College of Florida
Sarasota, FL

Nova Southeastern University
Dania Beach, FL
University of Central Florida
Orlando, FL
University of Miami
Miami, FL
University of North Florida
Jacksonville, FL
University of South Florida
St. Petersburg, FL
University of West Florida
Pensacola, FL



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