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Coastal Clips

A quarterly publication of the Louisiana Sea Grant College Program at Louisiana State University, Baton Rouge

WAVE Smartphone Application Brings Variety of Information to Fishermen

A new, free smartphone application is now available to improve emergency preparedness for those who navigate Louisiana waters. Waterway Information for Vessels, known as "WAVE," went online in November. It is unique because it brings a host of useful data from numerous sources into a single mobile platform.

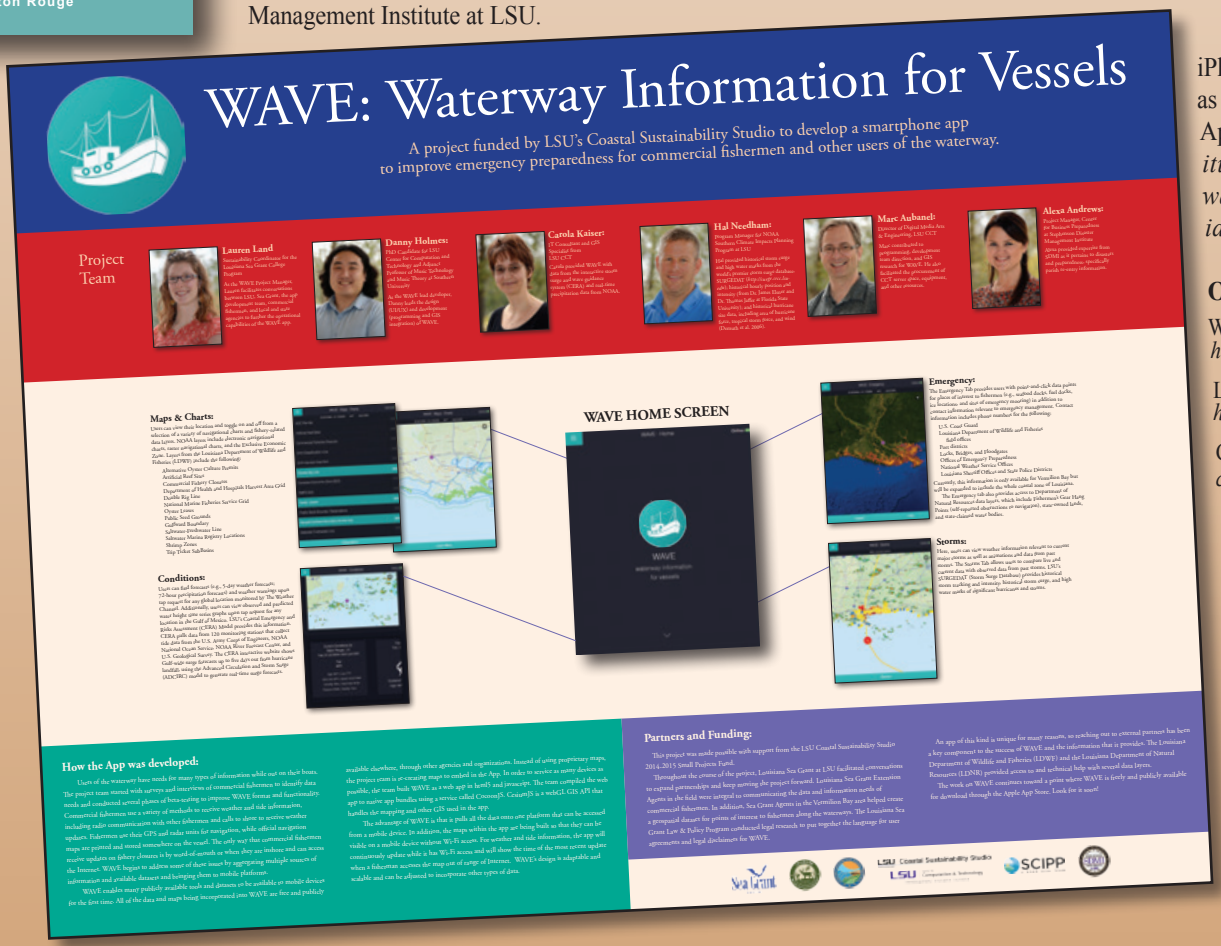
Lauren Land, Louisiana Sea Grant's (LSG) sustainability coordinator, served as project manager for the multi-disciplinary team from four different entities at Louisiana State University that created the app. The idea grew from Sea Grant's work on harbors of refuge, with the initial goal of helping commercial fishermen locate safe mooring for their vessels in the event of a major storm.

"If fishermen are away from their home port, they don't necessarily know where to go when a hurricane approaches," she explained. "However, we learned that if a captain is not in the habit of opening an application, then it will not be used in an emergency. We started talking with fishermen and interviewing them to learn what information they would want year round. We decided to integrate a variety of helpful data that boaters can use every day."

Land facilitated conversations among the project team, commercial fishermen, LSG Marine Extension agents, and local and state agencies to further the app's operational capabilities. As a result, WAVE users can toggle on and off the layers of information they want to view, including maps; charts; weather conditions, warnings and forecasts; fisheries data; and historic storm information. The application also shows publicly owned waterfront areas, and an emergency preparedness section is provided for Vermilion Parish.

Fisheries content is drawn from the Louisiana Department of Wildlife and Fisheries and includes public seed grounds, private oyster leases, boundaries for fresh- and saltwater shrimp zones, and Louisiana Department of Health and Hospitals harvesting areas and how they are classified. National Oceanic and Atmospheric Administration content includes electronic navigation charts and raster navigational charts, the latter of which is similar to what a captain might print and store on the boat. The charts are built into the application and can be accessed in the absence of an Internet connection, which can be a limiting factor when boats travel offshore. The application also incorporates data compiled from the Coastal Emergency Risks Assessment (CERA) model. For example, uses can select a monitoring station and see one line for observed storm surge and another for predicted storm surge in a particular area. For comparison's sake in a storm situation, boaters can also access databases of prior hurricanes to view historical high water marks, storm surge, hourly position and intensity. For weather and tide information, the app will continuously update while it has online access and will show the time of the most recent update when the smartphone does not have an active Internet connection. The design is adaptable and scalable and can be adjusted to incorporate other types of data.

WAVE was made possible with funding from the LSU Coastal Sustainability Studio's 2014-2015 Small Projects Fund. Other WAVE team members include lead application developer Danny Holmes, a Ph.D. candidate at LSU's School of Music and an employee at LSU's Center for Computation and Technology; Carola Kaiser, an information technology consultant and GIS specialist with LSU's Coastal Sustainability Studio; Hal Needham, program manager for NOAA's Southern Climate Impacts Planning Program at LSU; Marc Aubanel, director of Digital Media Arts and Engineering at LSU's Center for Computation and Technology; and Alexa Andrews, project manager with the Center for Business Preparedness at the Stephenson Disaster Management Institute at LSU.



WAVE was designed for iPhone and iPad and is available as a free download through the Apple App Store at *https://itunes.apple.com/us/app/wave-waterway-information/id1056713560?mt=8.*

On the Web:

WAVE, *http://wave.laseagrant.org*

LSU Coastal Sustainability Studio, *http://css.lsu.edu/*

CERA, *http://nc-cera.renci.org/cgi-cera/cera-nc.cgi*

Seafood Quality Training Lab Hits the Streets

Joining the ranks of Charles Kuralt, Bob Hope and Bing Crosby, Louisiana Sea Grant and LSU AgCenter Marine Extension agent Thomas Hymel is spending his days "on the road" with the Seafood Quality Training Lab. The mobile training lab, which is part of the Louisiana Fisheries Forward program, is designed to educate commercial fishermen on the latest in onboard seafood refrigeration and cold chain management.

The lab is equipped with a pre-chiller for brine or plate freezing, which drops seafood temperatures to below 32 degrees in a flash; a shrimp splitter and deveiner; as well as a vacuum packing machine.

"This trailer has everything on it to teach commercial fishermen and those in the seafood industry how to properly use this type of equipment and produce a quality frozen seafood product," said Hymel. "The objective of the lab, as well as the entire LFF program, is to provide fishermen with the knowledge they need in order to produce the highest quality seafood product so they can capture the highest price possible."

Commercial fishermen and others interested in a visit from the mobile lab can contact Hymel at *thymel@agctr.lsu.edu*. Those interested in the Louisiana Fisheries Forward program – a partnership between Louisiana Sea Grant, the LSU AgCenter and the Louisiana Department of Wildlife and Fisheries – can visit *http://lafisheriesforward.org*.

The mobile lab was engineered and built by LeBlanc & Associates, a specialty marine refrigeration company.

Cameron Fisheries Project Nears Completion

The Cameron Fisheries Waterfront Development Project facility is near completion. The $4.7 million building is a public-private joint venture involving local land owners, Cameron Fisheries Inc., the West Cameron Port Commission and the Cameron Parish Police Jury. Cameron Fisheries Inc. – a privately owned company – will lease the building that includes a new dock, processing facility and ice house. The project is part of an effort to rebuild critical commercial fisheries infrastructure initially damaged by Hurricane Rita in 2005, and to improve seafood quality and pricing.

First Four Videos for Seafood Industry Debut

Phase One of the Louisiana Fisheries Forward (LFF) initiative is complete. The initial components include a website (*LaFisheriesForward.org*), eight fact sheets and four videos approximately 35 minutes in length:

- Best Practices for Commercial Fishermen
- Best Practices for Seafood Dealers and Processors
- Best Practices for Commercial Crab Fishermen
- Best Business Practices for the Seafood Industry

The videos provide an overview of best practice methods, with a focus on quality, safety and industry regulations. They can be accessed from the LFF website.

"The world of seafood is rapidly evolving, and it can be overwhelming to stay up to date with changes while you're trying to run a business," said Thomas Hymel, LFF program director and Marine Extension agent with Louisiana Sea Grant and the LSU AgCenter. "Our online materials make it easy for fishermen, dealers and processors to access relevant information on their own timeline."

A collaboration of the Louisiana Department of Wildlife and Fisheries and the Louisiana Sea Grant College Program, LFF was established with the goal of improving the economic success and environmental sustainability of Louisiana's commercial fishing industry.

Another four videos are planned in the next year, in addition to eight more fact sheets, workshops along the coast and the annual LFF Summit to be held Tuesday, March 1, 2016, in New Orleans.

LOUISIANA FISHERIES FORWARD
Advancing Our Seafood Industry

Research Projects for 2016 Omnibus Announced

The Louisiana Sea Grant College Program (LSG) intends to support eight research projects for the funding period beginning Feb. 1, 2016. Below is a synopsis of the projects, along with a list of the principal investigators and their affiliations.

Impacts of Ocean Acidification on Natural Phytoplankton Communities, Oyster Development and Trophic Interactions

Principal Investigator: Sibel Bargu (LSU)
Associate Investigators: Reagan Errera (LSU) and Achim Hermann (LSU)
Collaborator: John Supan (LSU AgCenter and Louisiana Sea Grant)

Estuarine systems within Louisiana are critical for coastal ecosystem function. These waterbodies where a river meets the tide are essential habitats for freshwater and marine species of finfish and invertebrates, and they support a healthy regional economy. Although crucial to Louisiana, very little research has focused on the impact global climate change may have on coastal estuaries. The goal of this project is to better understand the impacts of multiple stressors associated with changing climate (sea surface warming, ocean acidification and nutrient enrichment) on coastal water quality and the health of the eastern oyster, which is an economically and ecologically important species along the Gulf coast. It will focus on the impact of ocean acidification on coastal water quality and the producer/consumer trophic link between phytoplankton and oysters. Research will concentrate on two locations – Barataria Bay, where poor water quality during high river discharge and runoff impacts the state's oyster hatchery programming, and Fourleague Bay, which receives three percent of the Atchafalaya River, causing an increase in freshwater input and declining salinities. Data generated from this project will be critical in evaluating potential vulnerability of the eastern oyster to ocean acidification and nutrient enhancement.

Migratory Movements and Fishing Mortality of the Louisiana Blue Crab Spawning Stock

Principal Investigator: M. Zachary Darnell (Nicholls State University)

The blue crab fishery in Louisiana is the third-largest fishery in the state, with a dockside value of roughly $51 million. Blue crabs have a migratory life cycle, inhabiting different estuarine and offshore habitats at different life stages. Female blue crabs mate in the lower-salinity waters of the upper-estuary and must migrate to the higher-salinity waters of the lower-estuary to spawn. Although the harvest of ovigerous (egg-bearing) females is prohibited in Louisiana, harvest of non-ovigerous mature females is permitted. Since blue crabs spawn multiple clutches of eggs, many of these females may be captured when they are between clutches, representing an under-recognized source of spawning stock mortality. An understanding of the spawning migration and the processes contributing to blue crab mortality during this critical period is necessary for accurate spawning stock assessment and management plans that ensure the sustainability of the fishery.

The researcher will examine the timing and route of crab migration using a mark-recapture study focusing on females that have recently molted to maturity. The crabs will be captured in collaboration with local commercial crabbers and marked with individually numbered tags. Tags will be printed with a unique ID number, contact information, a request for recapture data and an offer of small monetary reward.

This project has four objectives: 1. Determine the timing and route of migration of mature female blue crabs in the Pontchartrain and Terrebonne basins. 2. Quantify spatial and temporal variability in fishing mortality of female blue crabs in the Pontchartrain and Terrebonne basins. 3. Assess the potential for sperm limitation in the Louisiana blue crab spawning stock. 4. Quantify reproductive effort, output and future reproductive potential of crabs recaptured while ovigerous.

Impacts of Labor Policy Changes on Louisiana Seafood Processing and Production

Principal Investigators: Jeffrey Gillespie (LSU AgCenter) and Ashok Mishra (Arizona State University)

Louisiana seafood processors and producers indicate that the employment of foreign workers admitted to the United States for a limited time (called "nonimmigrant foreign workers") is essential to seafood production in the state. Nonimmigrant labor policy holds potentially serious consequences for the state's seafood industry and can affect its competitiveness in the global market. H-2A visas are issued for those engaged in agricultural work, which includes crawfish and alligator production. H-2B visas are issued to those engaged in non-agricultural work, which includes seafood processing like peeling crawfish and crabs. However, the federal government issues a limited number of visas each year. Not only has nonimmigrant labor been reportedly in short supply in recent years, but there has been pressure at the federal level to raise the required wage for nonimmigrant labor.

The objectives of this study are to determine: 1. The extent of uses of H-2A and H-2B labor in crawfish and alligator production and in seafood processing in Louisiana, 2. The consequences incurred by Louisiana crawfish and alligator production firms and seafood processing firms under various scenarios of labor shortages and wage increases, 3. The reasons why producers and processors hire nonimmigrant labor, 4. The value of H-2A and H-2B labor to producers of crawfish and alligators and to seafood processors in Louisiana, 5. The full costs incurred by firms in using H-2A and H-2B labor in crawfish and alligator production and in seafood processing in Louisiana. Data will be collected via a mailed survey sent to all known Louisiana crawfish and alligator producers and seafood processors in the state.

Genomic Variation and Local Adaptation among Natural Stocks of Eastern Oysters (*Crassostrea virginica*) in Coastal Louisiana

Principal Investigators: Morgan Kelly (LSU) and Jerome LaPeyre (LSU AgCenter)

Louisiana's eastern oyster fishery is the nation's largest. Oysters in the Gulf of Mexico also provide critical ecosystem services – stabilizing shorelines, providing nursery and foraging habitat for other species and improving water quality. For any fishery, natural genetic variation among and within stocks is critically important, however, there are no comprehensive data on genetic variation among or within Louisiana oyster socks. This limits managers' ability to choose stock for successful aquaculture or to predict the ways that environmental change might differentially impact stocks with varying environmental histories. This study seeks to quantify genetic and phenotypic variation among and within stocks of Louisiana oysters, both at the genomic level and in key traits affecting their environmental distribution.

The research will address four questions: 1. How much genomic variation exists among oysters from geographically separated sites with differing environmental conditions? 2. Do genetic differences among sites translate into differences in growth and survival among stocks translocated among sites? 3. Does post-settlement selective mortality differ among sites? 4. Do the larvae of adults from different sites vary in their salinity tolerances?

Expansion of Black Mangroves on Trophic Dynamics in Coastal Louisiana: Implication of Climate Change and Coastal Restoration to Estuarine Fisheries

Principal Investigator: Michael Polito (LSU)
Associate Investigator: Melissa Baustian (The Water Institute of the Gulf)

Climate change, winter warming and drought conditions in coastal Louisiana are projected to increase the northward spread of tropical black

mangrove trees (*Avicennia germinas*) into salt marshes traditionally dominated by the grass *Spartina alterniflora*. In addition, recent coastal restoration efforts in Louisiana's marshes have promoted the use and planting of black mangroves as a method to reduce coastal erosion by trapping sediment in the trees' dense root structures. Once mangroves become well established in a salt marsh zone, they may potentially change the physical, biological, geological and chemical structure of the habitat.

This research will investigate how salt marsh-dependent commercially and recreationally valuable nekton species, such as crab and shrimp, may be affected by transitioning marsh habitats and shifts in basal carbon sources. Determining how climate-driven changes in the carbon sources influence trophic dynamics (the transfer of energy from one part of the ecosystem to another) in Louisiana's productive estuaries will fill an important gap in the current understanding of healthy coastal ecosystems and habitats, including the sustainability of fisheries. Estuarine-dependent fisheries in Louisiana support a multimillion-dollar industry, and the data collected in this research will help inform coastal restoration management and fisheries policy on the effects of mangrove expansion to the estuarine ecosystem, including food web dynamics.

Evaluation of Blue Carbon Accumulation Potential in Created Marshes of Louisiana

Principal Investigator: Tracy Quirk (LSU)
Associate Investigator: Ronald DeLaune (LSU)

Salt marshes are sinks for atmospheric carbon and play an important role in the global carbon cycle and offsetting carbon emissions. This high rate of carbon accumulation in saline marsh soils is associated with high primary production, anaerobic conditions and accretion in response to sea level rise. A growing stock of carbon in marsh soils increases the potential for long-term sequestration of "blue" carbon, which is the carbon captured by living coastal and marine organisms and stored in coastal ecosystems. However, wetland loss and degradation result in the export and remineralization of stored carbon pools, as well as the loss of capacity to function as blue carbon sinks.

This project seeks to inform the large data gap on the value of coastal marsh restoration to soil carbon development and long-term sequestration of blue carbon by testing the hypothesis that blue carbon stores increase with time in restoration sites, but vary spatially, depending on species composition, mineral sediment accumulation, elevation, hydrology, redox potential and soil texture. The two objectives are: 1. Investigate plant-soil interactions and soil organic carbon development in a chronosequence of created marshes and paired created and natural marshes across coastal Louisiana. 2. Develop empirical and spatial models of labile and refractory carbon development in restoration sites based on significant species-specific and environmental controls.

Towards Continuous Updates to Topography, Bathymetry and Surface Characteristics for Louisiana Surge Guidance and Related Coastal Studies

Principal Investigator: Scott Hagen (LSU)
Collaborators: Carola Kaiser (LSU) and
Maurice Wolcott (LSU AgCenter)

From running models in near real-time, to modeling impacts of proposed coastal protection and restoration projects, to conducting studies for the revision and improvement of flood insurance programs, the need for accurate computer modeling in coastal Louisiana is ever increasing. The ADvanced CIRCulation model (ADCIRC) is a system of computer programs that can be used to predict tide, wind-wave and hurricane storm surge. During a potential storm surge threat to the Louisiana coast, simulations are performed to estimate inundation with various forecasts of the hurricane wind and pressure fields. However, the Louisiana coast is constantly changing from both natural forces and from manmade alterations, like higher levees constructed in the wake of the 2010 hurricane season. In order to inform local governing agencies and institutions on accurate flooding scenarios, the storm surge model must include all relevant features. The interactive website CERA (Coastal Emergency Risk Assessment) is a tool for the presentation of ADCIRC model results.

This project will update an existing ADCIRC model mesh representation of topography (including levees and other flood control structures) and bathymetry by applying prior elevation data and data that is acquired as the project progresses. Researchers will also update representations of surface characteristics, including bottom friction and canopy and wind-reduction factors. They will use existing CERA technology to validate changes to the ADCIRC model; to ensure stable, reliable and accurate data outputs; and to communicate directly with their target audience. Three historical storms (Hurricanes Isaac, Rita and Katrina) will be used to test and validate any changes made to the ADCIRC model. Researchers will establish a framework for continuous model updates based on all available, high-quality levee and roadbed surveys and by working closely with local emergency managers and relevant decision makers through annual workshops. The over-arching goal is to develop a meshing framework so that continuous adjustments may be made to the ADCIRC model as coastal Louisiana evolves morphologically and ecologically and from engineered improvements.

From Physics to Oysters: An Integrated Modeling Study of the Potential Impacts of Future Large Sediment Diversions on Louisiana Eastern Oyster

Principal Investigator: Haosheng Huang (LSU)
Co-Principal Investigators: Dubravko Justic (LSU), Kehui Xu (LSU),
Megan LaPeyre (LSU) and Jerome LaPeyre (LSU AgCenter)

Coastal Louisiana has experienced massive wetland loss, and controlled river diversions that release pulses of sediment-laden fresh water into wetlands are increasingly used for coastal restoration. Louisiana's Comprehensive Master Plan for a Sustainable Coast proposes to use river diversions that would convey much more fresh water to the coastal wetlands than existing diversions. However, one of the controversies that arises with diversions is the displacement and salinity stress they may cause to commercially and recreationally important fish and shellfish, especially oysters. Mississippi River diversions have a potential to dramatically influence salinity gradients, as well as turbidity and water quality, in Louisiana estuaries. Diversions may increase nutrient inputs and thus alter the spatial and temporal dynamics of productivity within the system.

This project will provide a quantitative tool for assessing the effects of river diversions for coastal restoration. One of the final products will be a spatial distribution of coastal environments which is most favorable for the growth of oysters when large diversions are open. This information will help site selections of future oyster farms and aid economists in better estimating the costs and benefits of sediment diversions, including the corresponding increased fishery effort due to possible seaward shifts of oyster reefs.

Researchers will investigate the effect of ongoing small and future large freshwater and sediment diversions on the populations of eastern oyster in the Breton Sound estuary. Researchers will combine existing hydrodynamic, water quality, sediment transport and individual-based dynamic energy budget oyster models into a single integrated modeling system to study the impacts of various diversion scenarios on: 1. Salinity distribution and its seasonal and annual variations in the Breton Sound estuary and adjacent continental shelf; 2. Corresponding turbidity and water quality changes; 3. The effects of timing, extent and magnitude of habitat freshening and water quality variations on growth and mortality of the eastern oyster population.

2nd Annual Coastal Communications Clips at LSU

Louisiana Sea Grant (LSG) hosted the Second Annual Coastal Communications Clips at LSU in October. Sixteen graduate students each had three minutes or less – and no more than two PowerPoint sides – to present their research findings. The three winners of the competition – Ke Liu (front left), Tess Danielson and Valerie Feathers – each received $500 in travel funds from LSG to present their research at a professional conference sometime in the coming year. Also pictured are (from left) Julie Lively, Amy Clipp and Alison Satake, who served as judges, and Robert Twilley, LSG executive director. For more information on the competition, visit *www.laseagrant.org/outreach/ladia/coastal-communication-clips/*.

Ocean Commotion Marks 18th Year

Louisiana Sea Grant hosted the 18th annual Ocean Commotion on Oct. 27, at LSU's Pete Maravich Assembly Center (PMAC).

Ocean Commotion offers nearly 2,000 students annually an opportunity to learn about a host of issues that range far beyond ocean-exclusive themes in a lively, hands-on learning environment. Topics include coastal marshes and wetlands, invasive species, local ecosystems, boating safety and Louisiana geology and wildlife. More than 60 presenters from private business, universities around the state, government agencies, and public, non-profit, and private educational organizations participate as exhibitors.

"It's a great experience for the students," said Dianne Lindstedt, LSG's education coordinator. "They have the opportunity to learn from professionals, but from each other, too. This year we had several exhibits run by students in grades 5 through 12. It's a fantastic opportunity for those students to learn how important it is to communicate science and to embrace stewardship of our natural environment.

"Many of the students may have never been to the beach or even seen a swamp or marsh. This may be their first experience with seeing fish and other animals up close. It also benefits the presenters by highlighting how important it is to share their work with a variety of audiences."

Message from the Executive Director

"Sea Grant builds no great monuments or citadels. It has no bridges, dams, interstate highways or moon rockets. It is not that kind of program. It has numerous accomplishments, but none of their dimensions is either large or neatly discrete. Rather, Sea Grant is thousands of small actions – individuals responding to individuals, small groups interacting, problems identified and solved, information sought out and transferred, small solution-oriented research projects, subtle changes in educational processes, new perceptions of university roles and missions, and a better informed public."

from *The First Ten Years*,
National Sea Grant
College Program

It was the 1960s and America was excited about science and the possibilities it offered. A child of that time, Sea Grant will celebrate its 50th anniversary in 2016.

First envisioned by the oceanographer Athelstan Spilhaus, the notion of Sea Grant colleges went from concept in 1963 to execution in 1966 when Congress adopted the National Sea Grant College Act. Not long after, LSU tapped a former doctoral graduate – Jack Van Lopik – to establish Louisiana Sea Grant. Our program launched in 1968 as a "project" – the first rung on the ladder to being designated a Sea Grant College. And in 1978, LSU achieved the Sea Grant College status.

I can't express how excited I am about Sea Grant's golden anniversary and how we continue the mission that originated five decades ago. Granted, many of the issues have changed in 50 years, but the research we fund today is no less important. You can see that from the list of projects on the facing page that will launch in February.

To help us remain true to our charge, Louisiana Sea Grant will adopt a new strategic plan in 2016. That new plan – written with input from a myriad of stakeholders that range from commercial fishermen to policy makers – will guide us in addressing the needs of our coastal communities for the next four years and help us launch our second half-century of research, outreach and education.

Robert Twilley, Ph.D.
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