

LSU AgCenter and Alligator Industry Align for Reptile Research

Alligator is showing up on more and more restaurant menus, but the biggest profit realized from these reptiles comes from the hides, which are used in high-end consumer goods such as purses, belts, watch bands and even a \$400 pair of flip-flop shoes currently on the market. Gator hunting has been popularized by reality television programs like the History Channel's "Swamp People," but most of the highest quality leather comes from smaller animals raised in captivity. In Louisiana, alligator farmers bring in nearly \$47.5 million annually, with roughly \$43.4 million of the value coming from trade in skins.

Finding the most efficient means of raising these prehistoric beasts is the goal of the new Alligator Research Facility (ARF) located at the LSU AgCenter's Aquaculture Research Station in Baton Rouge. Construction on the \$150,000, approximately 3,600 square-foot, insulated metal building began earlier in 2012. The final stages of installing and testing equipment and plumbing systems were underway in November. The ARF was paid for by the Louisiana alligator industry, which includes farmers, feed mills and tanneries. Some equipment, supplies and research are supported by the AgCenter.

Since alligators are strictly carnivores, a farmer's biggest expense is feed, according to Mark Shirley, a Marine Extension agent with Louisiana Sea Grant (LSG) and the LSU AgCenter. Shirley said the high-protein, animal-based commercial pellets cost more than \$1,000 per ton – far more than any other livestock feed. Other major expenses include labor and the energy needed to keep the indoor farms warm during winter months. Since captive breeding is not feasible, farmers must also pay fees to landowners every year for each wild alligator egg collected from nests on their property.

"The industry needs some practical questions answered," said Greg Lutz, a professor and specialist with Louisiana Sea Grant and the LSU AgCenter at the Aquaculture Research Station. Lutz said that aside from questions about nutrition, the ARF will be used to study growth rate, skin quality and survival of farmed alligators. "No one has ever built a facility like this before," Lutz said. "We are moving cautiously at every step to make sure it works and that it is a realistic environment, like what you would find at a farm. This is the only one in the world for the study of the American alligator."

Twelve to 30 gators will be kept in each of 24 4x8-foot tanks filled from a warm-water well on the property. Lutz said the quality of alligator skins is directly related to water quality, so the water will be changed every other day. He also said it's important to keep the reptiles calm and well-fed to prevent them from injuring or killing each other. The ARF includes a state-of-the-art automation system and 24-hour monitoring of each tank that records important data, such as temperature, which influences growth. There are also four "infirmary tanks" where sick or injured animals can be isolated.

While the immediate intent is to improve the economic viability of Louisiana alligator operations, Lutz said the potential exists to benefit the numerous threatened or endangered crocodylian species worldwide. Though the population of Louisiana alligators is sustainably managed, participants in the state industry face tough international regulations when exporting their products due to laws designed to protect other species. Research to increase the populations of threatened and endangered reptiles could ultimately benefit people dealing in the American alligator.

Shirley said alligator farming is worthy of support and is important to the state, not only for the economic benefits derived from the industry itself. "Some large landowners are making more than a million dollars on alligator eggs. It gives coastal landowners a monetary incentive to take care of the wetlands. It's a pretty significant value that encourages land owners to maintain the quality of that habitat and to keep it as healthy and productive as possible.

"The societal benefits are all the other wildlife that comes out of that land, plus storm protection and aesthetics. The landowner



Greg Lutz, a professor and specialist at the LSU Aquaculture Research Station, shows one of the tanks that will be used to raise and study alligators at the AgCenter's new Alligator Research Facility in Baton Rouge.

doesn't get an annual payment because his land provides storm surge protection. He doesn't get paid for butterflies or mosquito fish. All these benefits are not contributing to the sustainable management and conservation of this habitat, but alligators are. Because we have a valuable resource out there, it's worth the investment and time and effort to take care of the wetlands."

On the Web:

Aquaculture Research Station
http://www.lsuagcenter.com/en/our_offices/research_stations/aquaculture/

Swamp People
<http://www.history.com/shows/swamp-people>

Volunteers Needed to Remove Derelict Crab Traps

Louisiana's near-shore waters face a ghostly problem.

Crab traps are lost to storms, accidental catch in other gear, vandalism and when ropes connecting floats to the mesh pots are severed by the propellers of passing boats. These traps often continue to capture marine animals like blue crabs and other species in a process called ghost fishing. They also pose a navigation hazard and can damage fishing nets.

To gain a better understanding of the problem and to reduce impacts to the environment, Louisiana Sea Grant (LSG) and the LSU AgCenter are collecting information on lost pots as part of the Derelict Crab Trap Removal Program with the Louisiana Department of Wildlife and Fisheries (LDWF). Commercial and recreational crabbers are asked to report lost gear either online at www.surveymonkey.com/s/LMHYN7P, or by leaving a telephone message at (225) 578-6352. This information will only be used for data collection purposes and will not be used by enforcement officials.

"It's difficult to collect accurate statistics on the number of traps lost each year," said Julie Anderson, assistant professor and fisheries specialist with LSG and the LSU AgCenter. "If recreational and commercial crabbers report their gear losses, this data will help guide future clean ups and will benefit the scientific community and crab management as well."

Anderson said more than 1,400 traps lost in Hurricane Isaac have already been reported to the database.

In 2004, LDWF began the Derelict Crab Trap Removal Program with the help of volunteers and a host of other agencies and non-profit groups. Louisiana Sea Grant and the LSU AgCenter rejoined the effort last year with a grant from the National Fish and Wildlife

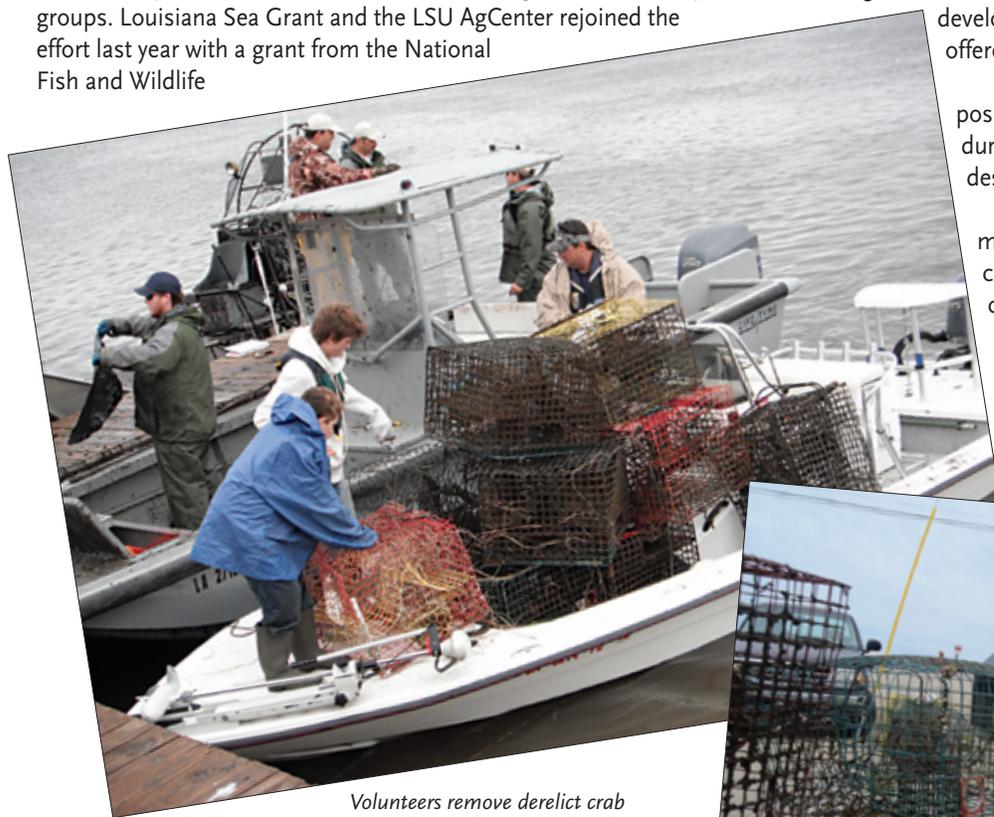
Foundation and expanded the cleanup with a festive rodeo event. In 2012, nearly 2,800 traps were removed from the waters of St. Bernard and Terrebonne parishes. Martin Bourgeois, a LDWF Office of Fisheries biologist, said LDWF staff and community volunteers have cleared a total of 22,200 derelict traps from coastal Louisiana since the program's inception.

Volunteers, particularly those with boats, are needed for 2013. The closures and cleanups will be in Plaquemines Parish from 6 a.m. Feb. 16 through 6 a.m. Feb. 25 and in St. Bernard Parish from 6 a.m. March 9 through 6 a.m. March 18. Designated areas will be closed to all crabbing for 10 days, and any traps – whether serviceable or not – found within the closure areas will be considered abandoned and subject to removal. Traps may be removed by anyone, but only between one-half hour before sunrise to one-half hour after sunset. All traps must be brought to LDWF-designated disposal sites and may not be taken from the closed areas. Volunteer rodeo days are Saturdays, Feb. 16 and 23, in Plaquemines Parish, and March 9 in St. Bernard and will feature free food, T-shirts and door prizes for participants.

"LDWF is pleased to be partnering, once again, with Louisiana Sea Grant in coordinating and conducting the derelict crab trap removal program. Removing these derelict traps is a dirty job, perhaps just as dirty as anything Mike Rowe with "Dirty Jobs" has featured. It's obvious from the successes achieved last year, particularly in terms of volunteer participation and the number of traps removed, that LDWF, Louisiana Sea Grant, along with industry and local volunteers have been instrumental in calling attention to the problems associated with derelict traps and developing renewed efforts in recruiting volunteers," offered Bourgeois.

Anderson stressed that it is illegal to remove or possess crab traps belonging to someone else, except during these special closure dates and within the designated locations.

Links to volunteer sign-up, the lost trap database, maps of the closure areas, disposal sites and more can be found at www.laseagrant.org/crabtraps or by contacting Anderson at JAnderson@agcenter.lsu.edu or (225) 578-0771.



Volunteers remove derelict crab traps during the 2012 rodeo days in Terrebonne and St. Bernard Parishes.



Letter from the Director

Just as the tides have a cycle, so does Sea Grant.

Every few years, programs evaluate their recent past and adjust their course. This is one of those times for Louisiana Sea Grant. After many months of public input and internal review, we are launching a new strategic plan with a retooling of our four focus areas.

We're not jettisoning any part of our mission. But, rather, we're consolidating some "like" efforts and taking aim at some areas that require more attention since our last strategic plan was adopted. We will still be addressing the need for healthy coastal ecosystems and habitats. Sustainable fisheries remain a priority, as well as the need for resilient coastal communities and economies. And we will continue our emphasis in outreach (education, communication and extension) along with a legal program that is instrumental in developing policy for coastal conservation, restoration and protection.

What is new, in one sense, is an environmental education and workforce development focus area. Environmental literacy and workforce development have always been part of the Sea Grant lexicon. We work with teachers year-in and year-out and expose thousands of students to the concepts of coastal stewardship. Louisiana Sea Grant also provides training to our seafood industry and supports undergraduate and graduate students studying our coast and waters. The coastal challenges facing Louisiana, also seen recently in the northeast and other regions of our nation, place increased emphasis in developing an environmentally literate population. In addition, we need to place more emphasis on synthesis of information that can be digested by the science community and our outreach program to solve problems facing coastal communities.

Launching alongside Louisiana Sea Grant's new strategic plan is our biennial research proposal competition. Researchers from any state or private university or institution are encouraged to submit funding proposals for applied research that dovetails into our strategic objectives. Our unique structure at Sea Grant is that of a university-based organization that can support and communicate research to provide guidance to our coastal communities. By partnering with innovative researchers from across the state, we move a step closer to solving many important coastal issues.

For those interested, our new strategic plan and information on the funding competition can be found at LSG's website – www.laseagrant.org.

And ... finally ... Happy Holidays from everyone at Louisiana Sea Grant to all our constituents and stakeholders.



Robert Twilley, Ph.D.

*Executive Director
Louisiana Sea Grant College Program*



Ocean Commotion Marks Crystal Anniversary and Honors Returning Exhibitors

Ocean Commotion celebrated its 15th anniversary on Oct. 30, with several exhibitors marking 10 or more years' participation at the Louisiana Sea Grant-sponsored coastal stewardship fair. Recognized for their milestones were:

- Pam Blanchard, former Louisiana Sea Grant education coordinator and an Ocean Commotion founder, 15 years. Blanchard is now an associate professor at the School of Education where she prepares future science teachers.
- Louisiana Department of Environmental Quality, 15 years, taught students where drinking water comes from.
- The Louisiana Department of Natural Resources, 15 years, showed how coastal wetlands can protect homes from hurricanes.
- Louisiana Department of Wildlife and Fisheries, 15 years, talked to students about fish age and growth, invasive species and how fish are tagged for research purposes.
- The Safari Club International, 15 years, brought preserved skins, skulls, tusks and other examples of fish and wildlife from the world's oceans and estuaries.
- The U.S. Coast Guard, 15 years, explained its rescue procedures.
- National Resources Conservation Service, 15 years, explained how coastal plants can restore wetlands and improve water quality.
- The LSU Department of Oceanography and Coastal Sciences, 15 years, was involved in four exhibits, including one that demonstrated the importance of plankton.
- The LSU Department of Agriculture and Forestry, 15 years, titled its exhibit "Tree'rific Trees and Louisiana Leaves."
- Louisiana State Parks, 15 years, taught how to make baskets out of pine needles.
- LSU Ag Center, 15 years, and its Youth Wetlands Program displayed artifacts of native animals including an alligator, a snapping turtle and furs.
- LSU Biological Sciences, 15 years, brought a variety of marine organisms, living and fossilized, which could be viewed using their Scope-on-a-Rope microscopes.
- Ed Bush, associate professor at the LSU AgCenter's School of Plant, Environmental and Soil Sciences, marked 10 years. Bush teamed up with Blanchard to present Coastal Roots, where students plant their own native plants that can be used to restore the state's coast.
- The Barataria-Terrebonne National Estuary Program, 10 years, exhibit taught students about marsh mud.
- LSU's School of Renewable Natural Resources, 10 years, gave students a chance to learn about ongoing efforts to round up derelict crab traps in Louisiana's waterways.
- The National Oceanographic and Atmospheric Administration, 10 years, exhibit "Be a Turtle, Do the Hurdle," showed students how a turtle excluder device can help protect turtles from being trapped in shrimp trawls.
- The LSU Coast and Environment Graduate Organization, 10 years, booth offered graduate students a chance to share their work in seafood and coastal conservation.

More than 2,500 kindergarten through eighth grade students from public and private schools, home schoolers, teachers and chaperones attended Ocean Commotion 2012 in the Pete Maravich Assembly Center on LSU's Baton Rouge campus. More than 60 exhibitors, including LSU researchers and students, private organizations and peer teaching groups from at least three area schools, had displays.

Ocean Commotion is a lively, hands-on learning experience. Topics extend beyond ocean-exclusive themes to subjects like coastal marshes and wetlands, invasive species, local ecosystems, boating safety and Louisiana geology and wildlife. Exhibitors come from area businesses and universities as well as government, public, private, non-profit and educational organizations.

Improving Storm Surge Forecasts to Protect Lives and Property



Members of the CERA team (from left) Robert Twilley, Hartmut Kaiser, Carola Kaiser and Q. Jim Chen. The CERA website runs in the background.

Hurricane storm surge erodes beaches and dunes, washes away roads and bridges, damages buildings and threatens the lives of those who don't evacuate when a tropical cyclone nears. Knowing in advance the intensity of a surge of water in coastal areas is critical for emergency planners and officials responding to the danger.

Tools for predicting storm surge have improved dramatically over recent decades, and potentially more precise tools are being developed. Since Hurricane Katrina in 2005, researchers have used advancements in hurricane forecasts and computer models that predict storm surge to develop an experimental system that shows promise in more accurately predicting storm surge – as evidenced during this summer's Hurricane Isaac.

During this August 2012 storm, the Advanced Circulation (ADCIRC) Surge Guidance System (ASGS), a multi-state coastal modeling research and development effort, gave emergency responders across the Northern Gulf of Mexico unofficial guidance on which roads were likely to flood and what neighborhoods might be inundated by water.

Through the project's Coastal Emergency Risks Assessment (CERA) interactive website (<http://nc-cera.renci.org/cgi-cera-nc/cera-nc.cgi>) at LSU, storm surge forecast maps were posted online for emergency management officials to view. If further research bears out their effectiveness, such surge maps could

be incorporated into National Oceanic and Atmospheric Administration's official tropical storm forecasts.

"This data can save lives," noted Robert Twilley, Louisiana Sea Grant executive director and one of the project's principal investigators. "It provides emergency responders with information on potential hot spots of coastal inundation and suggests where they may need to conduct search and rescue missions. Planners can look at it to determine where they need to stage relief operations. It also can be used in damage assessments."

What makes ASGS and CERA impressive are speed and detail. When Hurricane Katrina made landfall seven years ago, computer models used about 300,000 nodes and took four hours to run a storm surge simulation. During Hurricane Isaac, 1.1 million nodes were used on three different storm tracks, and the simulations were completed in one hour using a suite of high performance computers.

A node is a unique location on the map where the computer makes physics calculations to determine how water levels will change during a storm. The more nodes used means more detail in forecasting water levels across the state's complex coast. Louisiana's deltaic coast includes an extensive levee system, navigation canals, ridges and highways and natural landscapes of wetlands and barrier islands. Thus, it is important to utilize the greatest possible number of nodes to capture the intricate nature of how people live in this setting.

The storm surge simulations were run on Louisiana State University's Center for

Computation and Technology computers, as well as computers at the U.S. Army Corps of Engineers Engineering Research Development Center and the Renaissance Computing Institute at the University of North Carolina (UNC) at Chapel Hill. During Katrina, computer simulations had a resolution of about 100 to 200 meters across the bayous and coastal communities. For Isaac, the models were precise to as little as 10 meters across for some inland areas.

"When officials make a decision to respond to the threat of flooding during a hurricane, having detailed storm surge simulations quickly is vital," said Rick Luettich, director of the Institute of Marine Science at UNC, also a principal investigator on the ASGS. "What CERA provided for Isaac was remarkable."

ASGS and CERA are a partnership among Louisiana State University, the UNC Institute of Marine Sciences, the UNC Renaissance Computing Institute, Seahorse Coastal Consulting, the US Department of Homeland Security Coastal Hazards Center of Excellence and the ADCIRC Coastal Circulation and Storm Surge Model Group. Additionally, significant funding for the project came from NOAA's Integrated Ocean Observing System (IOOS) program.

Louisiana Sea Grant Research Update

LSG Law and Policy Continues to Assist Communities as They Adapt to Climate Change

On the heels of a successful program in Mandeville in St. Tammany Parish, the Louisiana Sea Grant (LSG) Law and Policy Program has expanded its outreach to help officials in Lafourche Parish better understand vulnerability to storm hazards in their area and ways to mitigate future damage. LSG is working with the LA 1 Coalition, a cooperative effort of government and businesses dedicated to completely elevating the parish's main highway to the coast.

The LSG project, titled "Adapting to Climate Change through the Integration of Land Use Planning and Hazard Mitigation in Coastal Communities," focuses on strengthening parish and local leadership through technical assistance, information and guidance, all with an eye to the ways climate change and sea level rise are expected to worsen the problems coastal communities face.

Lafourche Parish in south central Louisiana is the home of Port Fourchon, which supports 90 percent of the Gulf of Mexico's deepwater petroleum production and up to 18 percent of America's total energy supply. The parish is subject to an alarming amount of coastal erosion that threatens La. Hwy. 1 – the only roadway in and out of Port Fourchon. The southern stretch of the two-lane highway has been elevated, but the northern portion continues to deteriorate and flood, causing concerns for residents and the energy sector, alike. Hurricane Isaac, which came ashore as a Category 1 storm,

covered the road with three feet of water and kept it closed for three days, according to the LA 1 Coalition. Plans for Phase 2 of the elevation have stalled for lack of funding.

The LSG climate change project began with the completion of a Coastal Resilience Index for Lafourche, which assessed six different categories of facilities and services to gauge the parish's vulnerability and response capabilities. Maurice Wolcott, LSG and LSU AgCenter instructor and Extension specialist in GIS support, collected elevation data and information on the parish's levees. In a workshop to be held in January 2013, the program will discuss two different storm scenarios and how the community would react – a storm of record and a storm that would be worse than the storm of record.

"When we talk about this future storm of record, we always talk about climate change and sea level rise," explained Melissa Trosclair Daigle, LSG research associate and resiliency specialist. "That's kind of where we open the discussion."

A similar program is in the works for Abbeville for 2013.

On the Web:

Louisiana Sea Grant Law and Policy Program

<http://www.lsu.edu/slegal>

LA 1 Coalition

<http://www.la1coalition.org>



Hurricane Isaac flooded and eroded parts of La. Hwy. 1 in Lafourche Parish. Photo courtesy Greater Lafourche Port Commission.

Louisiana Sea Grant Research Update

Louisiana Not Ready Yet for Commercial Oyster Hatchery

In some parts of the United States, it's commonplace for oysters to be grown from hatchery-raised seed. But is there enough demand in Louisiana for these juvenile bivalves to warrant building a commercial oyster hatchery here? With support from Louisiana Sea Grant, Charlie D'Agostino and Jason Boudreaux, both with the Louisiana Business & Technology Center (LBTC), set out to answer that question.

"The Eastern Seaboard has experienced decades of declining naturally occurring seed, necessitating the use of hatchery seed to produce a fraction of the oyster landings experienced in Louisiana," said D'Agostino, LBTC executive director. "Between 1998 and 2008, Louisiana was responsible for 34 percent of all U.S. oyster landings – but our landings were made without any significant use of hatchery seed."

That fact makes Louisiana – specifically Terrebonne Parish, the study area – not a good location for a commercial oyster hatchery at this time, according to the pair's findings. "As long as there's an abundance of free natural seed, there's no incentive for our oyster industry to purchase hatchery-produced seed," said Boudreaux, lead counselor at LBTC.

Two scenarios could change that, though. One would be a crash in natural seed production. The second would be a superior oyster – such as a triploid oyster being researched by Louisiana Sea Grant – that cannot be spawned efficiently in the wild.



Oyster seed raised at LSG's hatchery.

Triploid oysters have three sets of chromosomes, unlike normal (diploid) oysters that have two, and are sexually sterile. From June through November when diploid oysters are expending energy to spawn and shedding fat stores, triploid oysters remain meaty – creating a possible summer crop for Louisiana oyster growers.

Triploids can be created artificially in the lab by manipulating oyster chromosomes, but that process is not 100 percent. However, chromosome manipulation can also be used to create tetraploid oysters, which have four sets of chromosomes and can sexually reproduce. When bred with diploid oysters, tetraploid oysters produce 100 percent triploid offspring. So a Louisiana oyster hatchery could serve as a tetraploid/diploid breeding ground, one day.

D'Agostino and Boudreaux developed cost estimates for establishing a commercial hatchery. The estimates are based on LSG's research oyster hatchery at its operation on Grand Isle.

Not including land and buildings, equipment start-up costs for a hatchery that could produce up to one billion larvae annually is \$116,885. Labor costs – with a minimum of three employees – is estimated at \$122,000 annually. So a year-one cash outlay would be \$239,000. Maximum annual revenue from such an operation would be \$210,000, based on East Coast seed prices.

Aerial Seeding of Cordgrass Refined

Time is of the essence when it comes to restoring Louisiana's coastal marshes. During the 20th century, more than 1,800 square miles of coastal Louisiana were lost to erosion and subsidence. Another 500 square miles are expected to be lost by 2050.

Vegetation is critical to keeping the state's wetlands from washing away. Plants fortify the soil against wind, rain, tides and tropical storms. Replanting marshes experiencing dieback, as well as planting new wetlands created by dredging and other means, has been proven to be an effective restoration tool. But hand-planting just one acre of marsh with juvenile plants is labor-intensive and expensive – not to mention the difficulty in reaching many of the locations.

Aerial seeding of one acre of wetland takes less than eight seconds, and the cost is a fraction of hand planting. But there are issues. Herry Utomo, a professor with the LSU AgCenter, hopes to overcome some of the challenges through his Louisiana Sea Grant-funded research project – "Enhancing Seed Versatility and Protection against Biological and Coastal Environmental Variables to Improve Success Rates of Smooth Cordgrass (*Spartina alterniflora*) Aerial Seeding."

The same winds and tides that batter coastal marshes can push cordgrass seed out to sea before it can germinate. Seed spread on

marshes weakened by drought may not get the moisture it needs quickly enough to sprout. And the fresh, raw seed is an enticing meal for many birds.

"One objective of the project is to powder-coat the smooth cordgrass seed to improve its survival, stand establishment, planting precision and the overall success rate of aerial seeding," said Utomo.



Herry Utomo watches an aerial seeding run. Photo by Bruce Schultz, LSU AgCenter Communications.

Essentially, the powder-coating process creates seed pellets that include compounds to attract moisture, fertilizers to improve germination synchronization and seedling vigor, and compounds to make the seeds non-digestible and less palatable without harming birds. The pellets also have more weight to them, so they're less likely to be moved about by wind and tides. And, even if they are, the coating helps the seeds survive longer should they be submerged for extended periods.

With the commercialization of a high-yield seed-producing smooth cordgrass that Utomo helped develop, combined with the aerial seeding, the state could see a greater return on investment from coastal restoration dollars.

"Large-scale restoration efforts could be conducted quickly and less expensively with this process," said Utomo. "It's the threshold of something truly exciting."



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Three Added to LSG Rolls

Louisiana Sea Grant expanded its ranks recently with several new hires. Drew Walker is the newest member of the communications staff. Previously, Walker worked for the Louisiana State University campus newspaper, the *Daily Reveille*, and interned at WRKF radio in Baton Rouge. He graduated from LSU in 2010 with degrees in philosophy and political science.

Megan Gima has joined the program's oyster hatchery operation in Grand Isle, where she will be heading up the breeding program. Gima earned her Bachelor of Science degree in fisheries and aquatic sciences from Purdue University in 2006. In 2008, she received her Master of Science in fisheries genetics at Auburn University. She previously worked with salmonid species as the hatchery manager at the University of Washington.

The oyster hatchery has another new face. Lisa Bourassa is the phycologist, responsible for the production of four different types of algae. Bourassa graduated from Roger Williams University in 2010 with a Bachelor of Arts in marine biology and French language. While at Roger Williams, she worked in the marine ornamental aquaculture lab where she cultured various types of plankton necessary for fish growth.



Drew Walker



Lisa Bourassa

*Happy
Holidays
and a
Joyous
New
Year
from
Louisiana
Sea
Grant*