

Oyster Hatchery Marks 30 Years

The Grand Isle Oyster Hatchery is celebrating its Pearl Anniversary – 30 years – in 2023.

Originally started as a commercial hatchery by Gulf Shellfish Farms (GSF) in 1990 when natural oyster seed production was down, Louisiana Sea Grant bivalve specialist John Supan was loaned to GSF to manage the operation and train oystermen in remote setting techniques. In 1993, when the commercial venture ended because natural seed rebounded, Louisiana Sea Grant acquired it and turned it into a research facility with Supan leading the effort.

Twelve years later, Hurricane Katrina devastated the hatchery with tens of millions of oyster larvae lost. It took two years for hatchery operations to resume before it was destroyed again by Hurricane Gustav in 2008. By 2009, operations moved across Grand Isle and restarted at the Louisiana Department of Wildlife and Fisheries (LDWF) lab. A new hatchery building was funded in 2013 with money from a Natural Resource Damage Assessment (NRDA) grant following the 2010 BP Oil Spill. In August of 2015, the new facility was designated the Michael C. Voisin Oyster Hatchery after Voisin, a leader and advocate for the oyster industry who passed away in 2013. While the main hatchery building was spared by Hurricane Ida in 2021, the storm destroyed the attached camp that housed Sea Grant personnel who operate the facility.

Natural disasters haven't stopped hatchery operations though. Interim director and operations manager Elizabeth Robinson and her team have taken the initiative to keep production on task. The hatchery has added new equipment to their flow-through system, including a bubble bead filter and a protein skimmer, to assist in the removal of suspended sediments and organic materials. In conjunction with a tangential flow filter (TFF), bay water is filtered down to 0.1 microns, providing extremely clean water to raise algae (which the bivalves eat) and oysters. At peak operations, the hatchery cycles through four to eight thousand gallons of bay water a day. When the Mid-Barataria freshwater diversion becomes operational, the hatchery will have to switch to a recirculating system – a process that is more expensive.

Currently, the hatchery supplies LDWF with pediveliger larvae – “eyed” larvae with a foot. Pediveliger larvae use their foot to search for a suitable substrate to settle on, such as existing or recycled oyster shell (spat on shell). LDWF sets larvae on oyster shell and then deploys the spat on shell to restore public seed grounds for the oyster industry. The hatchery also produces larvae and seed for scientific research and the Alternative Oyster Culture (AOC or off-bottom oyster aquaculture) industry.

While the hatchery's production technology is at industry standards, Robinson would like to create a water quality monitoring station at the facility's broodstock farm and acquire a fluorometer for the larval production room. The fluorometer would allow hatchery researchers to monitor how the oysters are feeding on live algae.

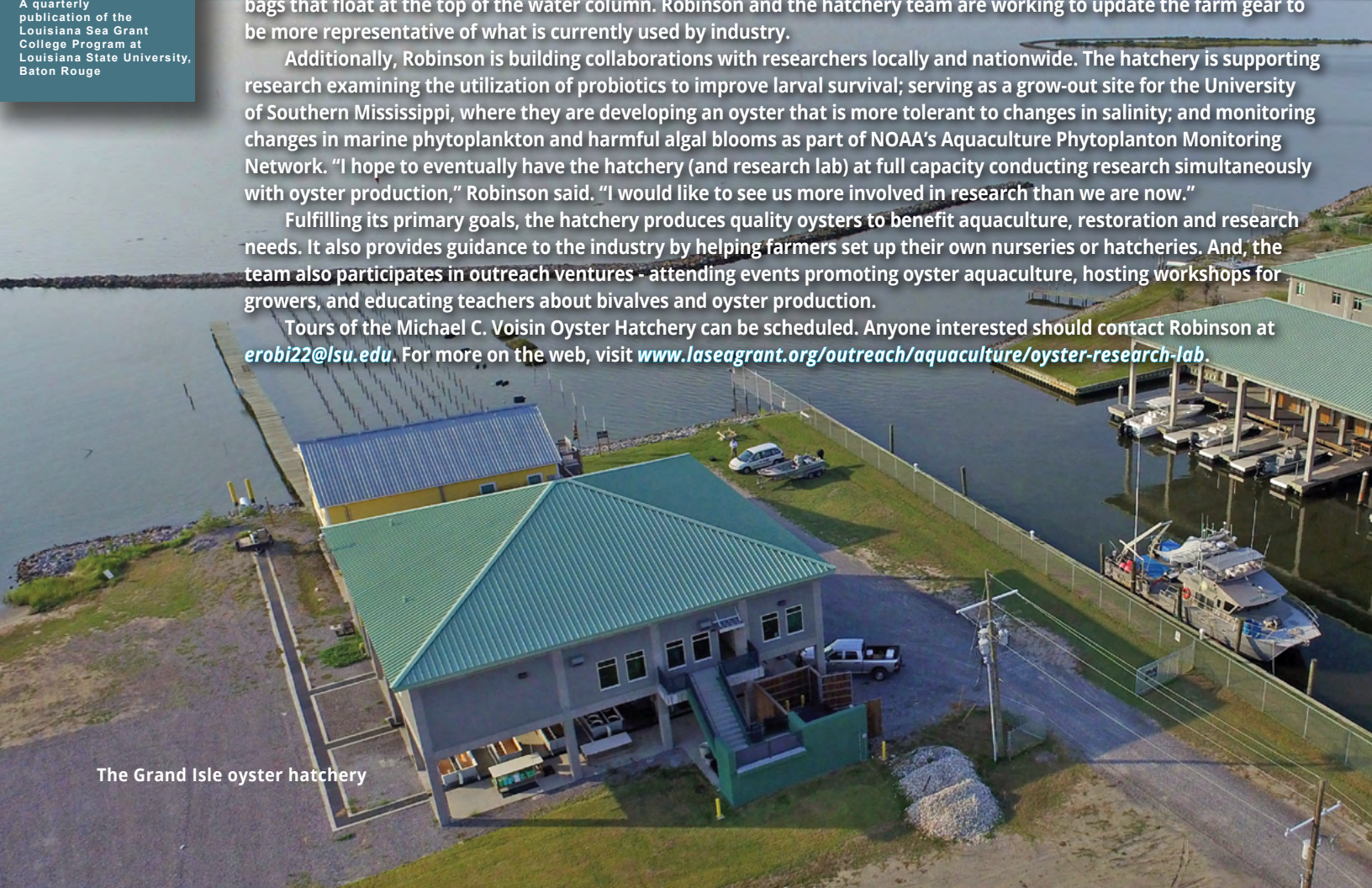
The hatchery site also includes an AOC demonstration farm that houses broodstock from different bays across the state - Calcasieu, Sister Lake, Vermillion and Hackberry. The broodstock are contained in cages on longlines and also in bags that float at the top of the water column. Robinson and the hatchery team are working to update the farm gear to be more representative of what is currently used by industry.

Additionally, Robinson is building collaborations with researchers locally and nationwide. The hatchery is supporting research examining the utilization of probiotics to improve larval survival; serving as a grow-out site for the University of Southern Mississippi, where they are developing an oyster that is more tolerant to changes in salinity; and monitoring changes in marine phytoplankton and harmful algal blooms as part of NOAA's Aquaculture Phytoplankton Monitoring Network. “I hope to eventually have the hatchery (and research lab) at full capacity conducting research simultaneously with oyster production,” Robinson said. “I would like to see us more involved in research than we are now.”

Fulfilling its primary goals, the hatchery produces quality oysters to benefit aquaculture, restoration and research needs. It also provides guidance to the industry by helping farmers set up their own nurseries or hatcheries. And, the team also participates in outreach ventures - attending events promoting oyster aquaculture, hosting workshops for growers, and educating teachers about bivalves and oyster production.

Tours of the Michael C. Voisin Oyster Hatchery can be scheduled. Anyone interested should contact Robinson at erobi22@lsu.edu. For more on the web, visit www.laseagrant.org/outreach/aquaculture/oyster-research-lab.

The Grand Isle oyster hatchery



Liffmann Returns to Louisiana Sea Grant

Michael Liffmann has returned to Louisiana Sea Grant (LSG) as a Sea Grant Scholar.

Liffmann began his LSU career in 1984 as the first assistant director of the Ports and Waterways Institute. He then joined Louisiana Sea Grant (LSG) as assistant director in 1986. He worked in that position until 1995 when he was promoted to associate director and was made responsible for coordinating LSG's extension and outreach (Extension, Communications and Education) projects.

In 2007, Liffmann moved to the National Sea Grant Office in Silver Spring, Maryland, where he was National Extension lead and a program officer. After retiring from the federal government in December 2015, he returned to Louisiana, and although he retired, Liffmann remained involved in coastal issues by being a member of LSG's Advisory Board, helping review



proposals, selecting award winners and serving on ad hoc committees.

Looking forward to returning to LSG, he said, "My first task should be challenging and interesting. Louisiana's Office of Community Development (OCD) has asked Sea Grant to conduct a study to determine whether the commercial and recreational fisheries infrastructure and economic development investments made following hurricanes Katrina and Rita (2005) and Gustav and Ike (2008) had the intended outcomes. The four storms caused more than \$800 million of fisheries-related economic losses in 2005 and 2008."

To help with the industry's post-storm recovery process, OCD invested approximately \$60 million in nearly 50 projects throughout coastal Louisiana.

Louisiana Sea Grant Recipient of Marine Debris Grants

Louisiana Sea Grant (LSG) is the recipient of \$595,000 in grants from the National Oceanic and Atmospheric Administration (NOAA) Sea Grant office to address the prevention and removal of marine debris. The two projects are:

Consider Litter: Data-Driven, Community-Centered Marine Debris Prevention and Mitigation

Federal funding from the Bipartisan Infrastructure Law (BIL) totals \$295,748.

Summary: The project is designed to empower community members (students, teachers, businesses and local leaders) in dialogue and stewardship on the removal and prevention of marine debris from Louisiana's Barataria, Pontchartrain and Terrebonne basins – communities disproportionately impacted by pollution and historically marginalized. By focusing on Title I schools, *Consider Litter* will build a network of visible and diverse community stewards who can monitor litter in their communities and compile data that can help inform resulting prevention/mitigation projects. The principal investigator is Dani DiIullo, LSG education and engagement director, and the project is being coordinated in partnership with the Pontchartrain Conservancy.

Fostering Community Partnership and Understanding Financial Vulnerabilities to Reduce Marine Debris and Enhance Louisiana's Resilience to Disaster

Federal funding from the Inflation Reduction Act (IRA) totals \$299,638.

Summary: The project is designed to improve awareness of the issues surrounding storm-transported litter in Louisiana. Trainings with the Financial Debris Management Simulation tool will help municipalities with underrepresented populations understand their financial vulnerability to storm events in terms of clean-up costs. Additionally, youth and community outreach will educate on the consequences of litter/marine debris and promote environmental stewardship through clean-up activities. Project lead is Julie Lively, LSG executive director.

This work is a component of nearly \$3 billion in targeted investments for NOAA in the areas of habitat restoration, coastal resilience and weather forecasting infrastructure.

"Litter is such a pervasive problem across Louisiana, and is very easy to become marine debris, especially after all the tropical storms and heavy rain events we see," said Lively. "This is a great opportunity to combine research, education and extension with communities to improve the situation."

NOAA Sea Grant awarded a total of \$27 million in marine debris

projects throughout the United States. Projects were competitively selected through the Bipartisan Infrastructure Law and leveraging funds from the Inflation Reduction Act: The Marine Debris Challenge Competition and The Marine Debris Community Action Coalitions.

"The work supported by these projects presents exciting opportunities to tackle a wide range of debris issues, such as microplastics, single-use food packaging and derelict fishing gear, using an assortment of innovative approaches informed by and implemented with communities" said Jonathan Pennock, director of NOAA's National Sea Grant College Program.

The full list of Marine Debris Challenge (BIL) projects and descriptions is available at <https://seagrants.noaa.gov/Portals/0/Documents/Funding/Sea%20Grant%20Marine%20Debris%20Challenge%20Competition%20Projects.pdf>. And the full list of Marine Debris Community Action Coalitions (IRA) projects and descriptions is available at <https://seagrants.noaa.gov/Portals/0/Documents/Funding/Sea%20Grant%20Marine%20Debris%20Community%20Action%20Coalition%20Projects.pdf>.

This work is a component of nearly \$3 billion in targeted investments for NOAA in the areas of habitat restoration, coastal resilience and weather forecasting infrastructure through the Bipartisan Infrastructure Law to help America build resilience to climate change. The Bipartisan Infrastructure Law is a federal government-wide investment that furthers NOAA's efforts to build a Climate-Ready Nation. The law's investment in NOAA – with funding leveraged from the Inflation Reduction Act – will help to meet the needs of a nation that is ready for and resilient to climate change. The projects announced represent Sea Grant's starting efforts to support marine debris prevention and removal over the next five years through this legislation.

2023 UROP Projects Announced

This year the Louisiana Sea Grant College Program (LSG) is funding seven Undergraduate Research Opportunities Program (UROP) projects. Established in 1992 to provide talented undergraduate students with hands-on research experience, LSG has funded more than 200 UROP projects.

Each UROP student will gain first-hand knowledge regarding the whole research process from design, implementation, analysis to conclusion. The hope is for students to present at relevant conferences and publish in peer-reviewed scientific journals.

Projects receive funding up to \$3,000. UROP applications are accepted each fall for projects starting the following March. Full-time undergraduate students at all Louisiana colleges and universities are eligible.

Miranda Buckheit, Loyola University

Advisor: Frank Jordan

Continued Assessment of Early Invasion Dynamics of Asian Swamp Eel in Lake Pontchartrain Estuary

Cuchia, an invasive Asian swamp eel, was discovered recently in Bayou St. John. They are opportune predators that can breathe air, crawl from waterbody to waterbody, burrow, inhabit dense vegetation, tolerate fresh and brackish water, all while feeding on shrimp, crabs, insect and small fishes. The primary objective of this project is to quantify the distribution and abundance of Cuchia within Bayou St. John and nearby locations in Lake Pontchartrain. The research team hopes their work will provide insight toward aggressive management of this species.

Rayna Carner and Kayla Willis, Tulane University



Rayna Carner



Kayla Willis

Advisor: Torbjorn Tornqvist
Carbon Accumulation in the Lafourche Delta Lobe: Towards Understanding the Potential of Sediment Diversions as Carbon Sinks

Coastal environments sequester organic carbon at high rates, with organic carbon burial rates being well-constrained for wetlands but less so for deltaic deposits like those formed from sediment diversions, such as the Mid-Barataria Diversion Project. This project will help determine the potential of the Mid-Barataria Diversion as a carbon sink by analyzing sediment cores taken near the diversion site.

Marissa Catalanotto and Kevin Quinet, LSU



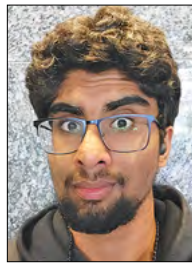
Marissa Catalanotto



Kevin Quinet

Advisor: Theresa Davenport
Isolating the Structural Preferences of Blue Crabs to Advance Habitat Restoration and Conservation under Changing Environmental Conditions

As a multimillion-dollar industry, blue crabs are a significant contributor to Louisiana's economy. Blue crabs rely on a variety of habitats to thrive and reproduce. This project seeks to determine blue crab habitat preference – oyster shell reef vs. submerged aquatic vegetation – at various salinities to help fill a data gap that can help inform restoration to support the fishery under changing environmental conditions. Additionally, the project will help determine if habitat preferences are likely to change under different salinity regimes, such as those caused by freshwater diversions.



Rohan Durgum



Jamar Whitfield

Rohan Durgum and Jamar Whitfield, LSU

Advisor: Romain Lavaud

Developing an Open-hardware Oyster Behavior Monitoring System

Traditional on-bottom oyster production yields high numbers of product, but output can be highly cyclical and subject to predation, salinity changes or poor reproduction. Alternative oyster culture can help mitigate the variables of one-bottom culture, but the use of floating cages and longline bags to grow the bivalve is underutilized. Oyster farmers currently lack a convenient, inexpensive tool to determine how oysters are performing during grow-out. The goal of this research is to design, test and eventually produce a low-cost, open-source valve opening behavior data collection system that monitors oysters during their development in both on-bottom and alternative culture techniques to improve the productivity of oyster aquaculture.

Daniel Harris, LSU

Advisor: Jerrod Penn

Understanding the Effects of Tactile Marketing on Preferences for Alligator Hide

The last several years has seen a shift in the price of American alligator hides, with wild-caught hide demand and pricing dropping and farm-raised hides being favored. Consequently, lower prices for wild-caught hides reduce incentives for hunters to harvest wild alligators, resulting in changes to the state's ecosystem. This project's objective is to determine if an in-person, tactile experience with a wild-caught alligator hide increases a crafts market consumer's desire to purchase the hide versus an online experience. The research team believes a better understanding of the true value of wild-caught alligator hides will bolster the wild-caught hide market while helping with the state's wild alligator management program.



Ethan Horn, University of Louisiana at Lafayette

Advisor: Kelly Robinson

Testing the Effectiveness of Invasive Asian Carp as Crawfish Bait Relative to Natural and Artificial Baits at Winter Water Temperatures

Louisiana crawfish are fished using baited traps. Fishermen have the option to use natural fish bait, such as menhaden or shad, or artificial pellet bait. However, both baits can vary in availability and price by season. This project will look at whether raw invasive Asian carp pieces are an effective crawfish bait during winter when natural fish bait is less abundant and compare Asian carp bait efficacy compared to established natural and artificial baits.



Emalee Swisshelm, University of New Orleans

Advisor: T. Erin Cox

Trace Element Pollutants in Tissues of Fishes at Artificial Reefs in the Northern Gulf of Mexico: Are Recreational Anglers at risk from Seafood Consumption?

Many fish species rely on artificial reefs for refuge and foraging. These species, popular commercially and recreationally, may be exposed to trace element pollutants (TEPs) that can accumulate in their tissue and then be transferred to humans when eaten. Additionally, ecosystem around these artificial reefs in the Northern Gulf of Mexico may be exposed to TEPs from a variety of waste producers, transported by the Mississippi River and other tributaries. This project will focus on the amount of TEP concentrations in the tissues of 14 common fish species around artificial reefs. This project hopes to provide an analysis of the risk anglers face from harmful TEPs when consuming their catch.

State of the Coast



Louisiana Sea Grant (LSG) was one of four partners hosting the 2023 State of the Coast Conference in New Orleans. Other host partners were the Coalition to Restore Coastal Louisiana, the Water Institute and the Coastal Protection and Restoration Authority. The conference drew more than 1,200 attendees for three days of presentations by leading experts on the dynamic conditions of Louisiana's coastal communities, environment and economy. Additional information about the event can be found at www.stateofthecoast.org. Pictured, from left, are: Merritt McCall Walker, LSG research associate; Jessica Young, LSG assistant to the executive director; LSG communications coordinator Hannah Bellone; LSG executive director Julie Lively; Melissa Trosclair Daigle, LSG research attorney; Jackson de Gruy, LSG legal intern; and LSG and LSU AgCenter marine extension agent Rusty Gaudé.

Commercial Clam Project Recommended for Funding

The National Marine Fisheries Service, an office within the National Oceanic and Atmospheric Administration (NOAA), has recommended the Louisiana Sea Grant Program (LSG) receive a \$296,000 grant to help develop a market for *Rangia cuneata* (Gulf wedge clam). The project is one of 40 nationwide recommended under the Saltonstall-Kennedy Competitive Grants Program.

Principal investigator on the two-year project – titled *Louisiana Clams: Foundation of Novel Culinary Bivalves in Commerce* – is Rusty Gaudé, marine extension agent for LSG and the LSU AgCenter in Jefferson, Orleans, St. Charles and St. John parishes. “Rooted deep in Louisiana’s pre-history is the wide-spread human consumption of clams which served as the dietary foundation of the Paleo-Indians along the Gulf Coast,” said Gaudé. “Consumption of this clam was premised on the ease of harvest and the high nutritional value of the clam meat.”

Clams are still popular with many Americans – particularly wild East Coast species – in today’s seafood markets, with clam harvests by tonnage being twice that of oysters. However, in Louisiana, clams are essentially an overlooked culinary item.

In 2015, state regulations to allow for the legal commercial harvest of *Rangia* were amended, opening a path for retail sales. This project will introduce Louisiana clams into seafood markets, initially as a supplemental product through the state’s Alternative Oyster Culture program, by identifying suitable wild populations for harvest, demonstrating harvesting methods to oyster fishers and showing clams’ potential role in Louisiana wholesale and retail culinary circuits.

Gaudé can be reached at AGaude@agcenter.lsu.edu.

Third Round Alternative Oyster Culture Grant Recipients Announced

The third round of Alternative Oyster Culture (AOC) grants, totaling \$470,000, have been announced.

Six grow-out farm grants were awarded to:

- | | |
|------------------------|-------------------|
| • Kirk Daigle | • Anthony Theriot |
| • Hubert Ray Doxey, Jr | • Blake Theriot |
| • Ryan Mallory | • David Sorrells |

Two additional AOC parks also received funding:

- Southern Belle AOC Park, located south of LA-1 between Port Fourchon and Grand Isle.
- Bahía De Los Sueños AOC Park, located in the Biloxi Marsh of St. Bernard Parish.

Funding for the grant program, which is administered by Louisiana Sea Grant and awarded by the Iberia Development Foundation (IDF), comes from the Louisiana Department of Wildlife and Fisheries (LDWF) and the Coastal Protection and Restoration Authority (CPRA).

This third round of competitive funding was open to all Louisiana licensed oyster fishers. Award amounts were \$45,000 per grow-out farm and \$100,000 per park. The grow-out farm funding was for farms within the newly established Cameron Aquaculture Park located in the southern part of Lake Calcasieu in Cameron Parish and administered by the Cameron Port, Harbor and Terminal Authority. Solicitation for the park grants was announced in the prior second round of funding and selected at that time, but finalization of their contracts did not occur until now. The Southern Belle Park will be administered by Grand Isle Sea Farms, a private company. The Bahía De Los Sueños Park (which translates to Bay of Dreams in Spanish) will be administered by Two C’s Enterprises Inc., a private company using water bottoms owned by the Meraux Foundation of St. Bernard Parish.

“It is exciting to see our local oystermen having the opportunity to participate in the AOC Program here in Cameron,” said Kim Montie, executive director of Cameron Parish Port, Harbor and Terminal District.

“This gives them an opportunity to supplement their traditional oystering income. The grant will provide these fishermen a ‘hand up’ in getting started in the alternative oyster culture business. I am eager to watch this endeavor grow with each of their successes.”

Grant recipients were chosen by an independent selection committee made up of impartial industry experts, who evaluated each on a competitive scale based on five key elements and their interview. The committee reviewed the applicants’ personal qualifications and experience, the AOC site location as it influences the biological and physiological needs of the oyster and the ability to work and harvest without influences of public health concerns. Additionally, the committee was able to evaluate an applicant’s personal thoughts on what AOC means to them and how prepared they are to start a business, and any outside financial efforts they may be pursuing to bolster their business through grants.

Over a three-year period, from 2020 to 2023, \$1.8 million in grants were available to AOC operators to acquire equipment and supplies to enhance existing businesses or establish new AOC businesses. That includes AOC seed nurseries and grow-out facilities, hatcheries and areas legally designated as AOC Management Units (parks) that contain multiple farms in one location. Grant recipients are reimbursed for their purchases, up to the total amount of his or her grant.

AOC is when oysters are grown in floating cages or in bottom-placed cages attached to pylons. This method allows the cages to be raised and lowered to protect oysters from predators, fouling and the burial effects of disasters like hurricanes.

“This is a great opportunity for local fishermen to expand their seafood production to include cage culture-grown oysters,” said Kevin Savoie, marine extension agent with Louisiana Sea Grant and the LSU AgCenter. “The alternative oyster culture produces a much cleaner, uniform sized oyster which fits into the half-shell market, making it a specialty product.”

CSAP Projects for 2023 Announced

The Louisiana Coastal Protection and Restoration Authority (CPRA) continues its commitment to the Coastal Science Assistantship Program (CSAP). This program supports Master of Science students in science or engineering research relevant to Louisiana coastal protection efforts. This collaboration offers the dual benefit of engaging students in CPRA activities while potentially recruiting qualified personnel for the agency.

The Louisiana Sea Grant College Program (LSG) administers these assistantships available to all Louisiana university faculty to recruit outstanding students to coastal restoration-related research. Annually, up to four new students are chosen, based on the review of proposals, and awarded \$25,000 each for up to three years. The latest students and projects are:



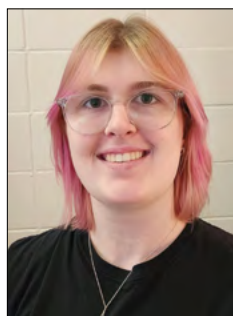
Emmanuel Adeniyi, Louisiana State University (LSU)
Major professor: Lei Wang
Title: *Cloud-based Implementation and Dissemination Tool for Long-term River Diversion and Land Restoration Assessment near the Mid-Barataria Basin in South Louisiana*

River sediment diversions have been used for wetland restoration. Long-term assessment of restoration projects can help in determining diversion efficacy. However, traditional, large geographic, long-term assessment can be costly, subjective and tedious. Existing and planned land monitoring satellites can detect vegetation abundance and suspended sediment concentration in water, while Unmanned Aircraft Systems (UAS) can be used to calibrate that data, at significantly lower cost. Using information collected by these instruments, the research team plans to develop a cloud-based tool to assess the magnitude of land restoration near the Mid-Barataria River Diversion. The research team is hopeful this tool can be used for other wetland-river diversion projects, as well.



Anissa J. Hyde, LSU
Major professor: Thomas Douthat
Title: *Flooding, Migration and the Coastal Master Plan: Linking Small Areas and Regional Dynamics to Big Events, Long-term Stressors and Planning Processes*

Large-scale disasters such as hurricanes, as well as sea level rise and coastal land loss, result in long-term stressors on coastal communities. This project aims to predict how disaster events cause human population migration – into, out of, and within the state – independent of normal migration patterns, as well as how the sensitivities to event-based migration may vary. Hyde will study how communities' sociodemographic and economic statuses could reveal information not previously considered during community planning. The research team hopes the resulting project model could be utilized by CPRA within the Coastal Master Plan, and to inform future population modeling predictions.



Elizabeth Granier, Nicholls State University
Major professor: Jonathan M. Willis
Title: *Elucidating the Successional Trajectories of Louisiana Barrier Island Vegetation Communities through Data Mining*

Barrier islands – which are vulnerable to hurricanes and tropical storms – play an integral role in mitigating coastal land loss. The state has made considerable investment in barrier island restoration, which includes vegetation plantings to armor islands against storms. Currently, data gaps exist regarding vegetation propagation and community composition through time on restored barrier islands. This project plans to fill in those data gaps by utilizing existing monitoring data from restoration projects, as well as geospatial data – such as LIDAR and satellite imagery – to determine land stability for various vegetation habitat types. By filling in the gaps, this research's results could aid coastal restoration planners in determining where and when follow-up plantings are needed to enhance barrier island stability after hurricanes and high-energy storms.

NOAA Science Report Features LSG

Louisiana Sea Grant's work with the Pointe-au-Chien Indian Tribe is featured in the National Oceanic and Atmospheric Administration's (NOAA) 2022 Science Report. The newly released report includes more than 60 stories about NOAA's 2022 research and development accomplishments across NOAA's mission. To read the report, visit: <https://sciencecouncil.noaa.gov/Council-Products/NOAA-Science-Report>. To fulfill its mission of science, service and stewardship, NOAA's science activities are driven by guiding principles and shaped through the development of strategic priorities. Resources supporting R&D enable NOAA to carry out its objective of transitioning research into operations, applications, commercialization and other uses.





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Coastal Connections at Nicholls



Winners of the Coastal Connections Infographic Challenge at Nicholls State University were Claire Boudreaux, Shasta Kamara and Elizabeth Myers. The event, hosted by Louisiana Sea Grant, was held this spring in the Bollinger Memorial Student Union. The competition was open to all undergraduate and graduate students at Nicholls conducting coastal research. Students used a mixture of visual imagery and text to communicate their research findings. The winners each received a \$500 travel award to attend conferences and professional meetings to share their research.