TEXAS SEA GRANT

2019 ANNUAL REPORT

Letter from the Director

Pamela T. Plotkin, Ph.D.
Director, Texas Sea Grant College Program

TEXAS SEA GRANT has been turning challenges into opportunities since Texas A&M University was named one of the first Sea Grant institutions 50 years ago. At a time when we all feel challenged to adapt to new and emerging issues of concern to Texas and our nation, Texas Sea Grant continues to serve Texans by bridging the gap between knowledge and action to address societal problems.

The unique partnership between the federal government (NOAA), the State of Texas, and universities across Texas fuels Texas Sea Grant's greater purpose to create knowledge, tools, products, and services that help the coastal communities, marine industries, and the people of Texas.

Throughout our history, faculty at Texas' universities have been funded by Texas Sea Grant to study numerous issues significant to the Texas coast and its people. These topics include droughts, floods, fish kills, shrimp diseases, marine debris, oil spills, oyster reef collapse, sea turtle deaths, hurricanes, ocean acidification, and many other emerging issues of concern to Texas coastal communities and economies.

The research Texas Sea Grant supports is relevant to the public, and our outreach, education, and engagement programs translate and communicate the results of this research to coastal communities and is responsive to the needs of Texas. Ultimately the research Texas Sea Grant funds produces necessary information to create tangible solutions, which we actively help Texans implement through our outreach and education programs.

As we look forward to the next 50 years, Texas' needs will continue to evolve and so will our adaptation strategies, but our purpose will remain the same. Texas Sea Grant will still look to challenges with optimism and create opportunities that better the lives of Texans.

Warm regards,

Pamela Plotkin

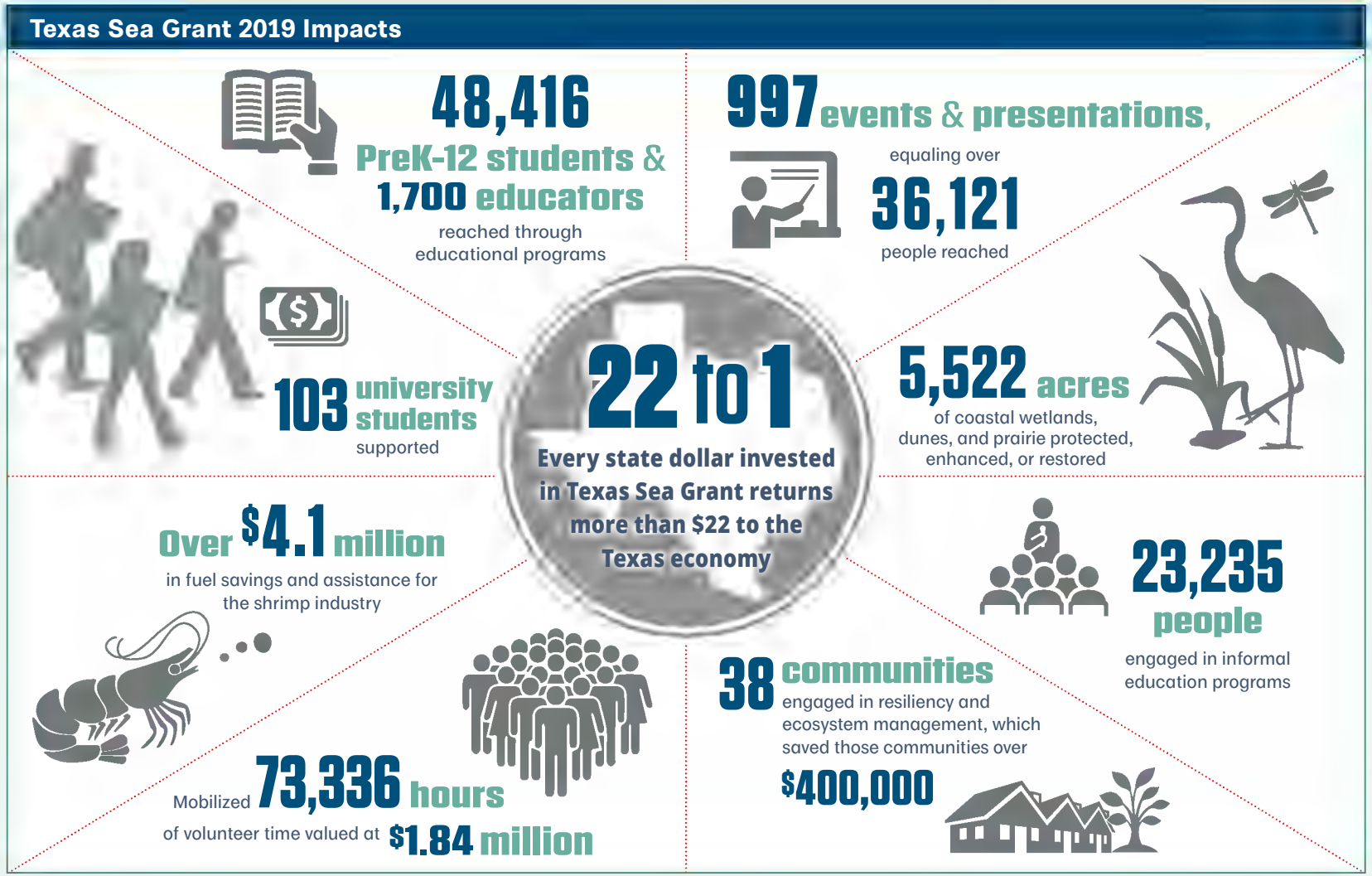
Sea Grant Texas
AT TEXAS A&M UNIVERSITY


Sea Grant
Texas
50
YEARS
Science at Work for Texans
An Exhibit Celebrating Texas Sea Grant
February 2021 - January 2022
George H.W. Bush Presidential Library and Museum
50 Years of Serving the Texas Coast

Making Science Work for Texans

TEXAS SEA GRANT is a unique partnership that unites the resources of the federal government, the State of Texas, and universities across the state to create knowledge, tools, products, and services that help coastal communities, marine industries, and the people of Texas.

We support practical research that provides solutions to real-world problems, and our extension team works directly with coastal stakeholders and residents to help them adopt the resulting tools and techniques to benefit themselves and their communities.



Supporting Resilience, Helping Communities

The Community Resilience Collaborative

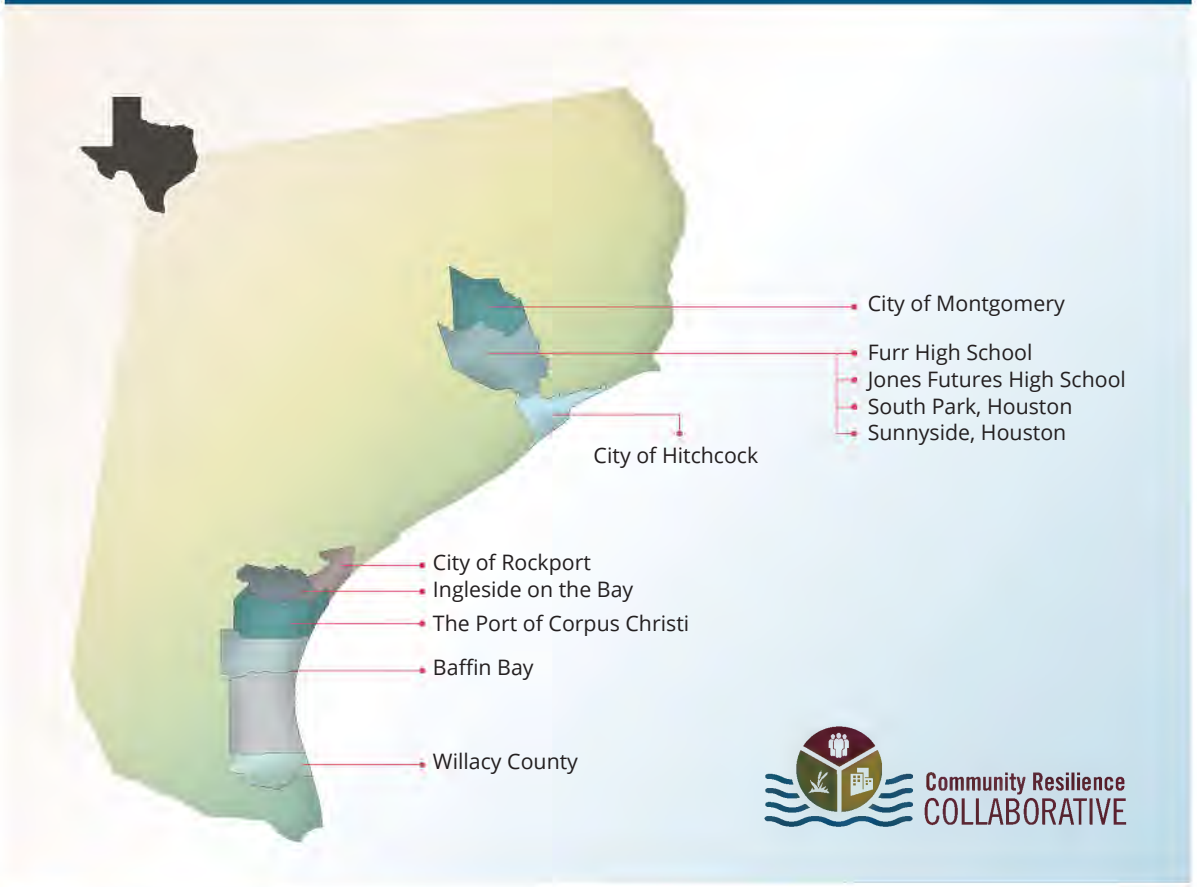
Founded in 2017 following the devastation of Hurricane Harvey, the Community Resilience Collaborative (CRC) is a research- and extension-based coastal planning program that combines the reach and resources of two Texas A&M University programs: the Texas Sea Grant College Program and Texas Target Communities.

The CRC provides technical assistance for planning, outreach, and education aimed at coastal communities, particularly resource managers, land-use planners, and emergency managers who deal with hazard mitigation. Planning is emphasized to address critical land-use, environmental, hazard mitigation, and disaster recovery issues through coastal planning. Priority is placed on providing planning assistance to low-capacity, low-resource, and/or underrepresented communities.

The CRC community resilience research and facilitates service-learning opportunities at Texas A&M University for faculty and students in the:

- College of Architecture
- College of Geosciences
- School of Public Health
- College of Agriculture and Life Sciences
- College of Engineering
- Bush School of Government and Public Service
- School of Law
- College of Liberal Arts
- Texas A&M University at Galveston

Communities Impacted by the CRC



CRC Success Stories

HITCHCOCK

The City of Hitchcock in Galveston County, Texas was among the communities devastated by Hurricane Harvey. This small city of 7,000 residents struggled to restore normality after Hurricane Harvey devastated 70 percent of the homes. Harvey brought city-wide damage that also affected City Hall and its operations. Hitchcock was chosen by the Texas Target Communities Program, in collaboration with Texas Sea Grant, to develop the city's first Comprehensive Plan and community development efforts through community participation.

The CRC enhanced community-wide discussion about planning initiatives and set a community vision and goals for future development. The CRC facilitated public meetings, community tours, and leadership training, which promoted a holistic planning effort. Community members were active throughout the process, with 250 citizens attending meetings.

"Number one, the plan provided hope of a better tomorrow," said Sam Collins III, a citizen from Hitchcock who participated in all stages of the comprehensive planning process. "The plan is a guide to a better future for the community of Hitchcock. I would recommend anyone considering working with [the CRC] not to delay your decision to move forward. The only way you could make a better decision is if you were able to re-run to yesterday and start a day earlier."

With the aid of the CRC, a task force was created to guide the planning process and engage local stakeholders, residents, and organizations. Final comments from stakeholders were incorporated into the Comprehensive Plan over summer 2019, and the plan was formally adopted by the City of Hitchcock in February 2019.

> This small city of 7,000 residents struggled to restore normality after Hurricane Harvey devastated 70 percent of the homes.

ROCKPORT

On August 25, 2017, residents of Rockport held their breath as Hurricane Harvey breached the coast, and its eye passed directly over their homes. Wind speeds upwards of 130 mph tore through the town for 12 hours straight. The resulting damages are estimated to be around $812 million for residents and $134 million for businesses. When Harvey hit Rockport, many residents had been coasting on their past luck. The last major storm to impact Rockport was Celia in 1970, leaving many residents confident that they would be spared this time.

In winter 2017, Aransas County (which includes Rockport, Fulton, and parts of Aransas Pass) began to collaborate with planning specialists from Texas Sea Grant on a Long-Term Recovery Plan. To support the planning process, Texas Sea Grant researched pre-Harvey conditions to help with decision-making during the planning process. Additionally, Texas Sea Grant helped keep up with all the progress being made by many different groups by compiling and summarizing all ongoing efforts into a single document. The planners worked concurrently with Aransas County officials while parts of the plan were being implemented.

To ensure that the community's voice was kept central in generating the plan a task force was developed. The goal was not only to get input from community leaders, but to hear from those traditionally not part of the planning process. Through public outreach, city officials and planning specialists requested that members of the public serve on the task force.

For City of Rockport Community Planner Amanda Torres, the plan brings hope even beyond Rockport. The process has the potential to be used as a blueprint for other communities. "The exciting part to me is that this could be a model for other communities on the Texas coast," she said. "I'm excited to see how we can impact other communities and encourage them to become resilient too."

> "The exciting part to me is that this could be a model for other communities on the Texas coast," said Amanda Torres.

Community members of Rockport and Hitchcock taking an active role in planning for their cities and working with the Community Resilience Collaborative.

Research in Action

Applying Cutting-Edge Research To Promote Resilience in Rockport

The planning process in Rockport was followed by an additional layer of evaluation to ensure the Comprehensive Plan was complementary to existing plans, and that all plans promote resilience in an integrated way. Dr. Matt Malecha, Texas Sea Grant research associate, worked with city staff to apply the Plan Integration for Resilience Scorecard (PIRS), an analytical method designed to reduce a community's vulnerability to hazards by cross-referencing various planning documents.

The process generates recommendations for the community to consider. According to Malecha, the PIRS process "can enhance community resilience by helping align planning efforts and integrating hazard mitigation throughout a community's 'network of plans' — the collection of documents that guide its development and management."

Subsequently, the City of Rockport received the American Planning Association Texas Chapter's 2019 Resilience Planning Achievement Award – Silver for its exceptional planning work, a much-appreciated confirmation of the community's hard work.

Partner Highlight

Texas Master Naturalists: An Impactful Partnership

The Texas Master Naturalists Program is made up of a cadre of volunteers, well-informed, trained, and prepared with a wealth of knowledge about Texas wildlife and nature. The group includes numerous chapters throughout the state of Texas and has been a long-standing partner of Texas Sea Grant on an array of efforts around the coast. Here are just a few accomplishments from this partnership in 2019:

KEY ACCOMPLISHMENTS

- **15 educators** *attended the 2019 mini-Master Naturalist class, an 18-hour continuing education course, which included field trips to Armand Bayou Nature Center and Galveston Island State Park.*
- **200 2nd and 3rd grade students** *at Morgan Elementary in Galveston learned about oyster reef restoration and actively participated by writing positive messages on oyster shells used to grow these reefs.*
- *Over* **400 lbs** *of monofilament fishing line was collected and recycled.*
- **50.2 acres** *of wetland and prairie habitat in Galveston Bay were restored through* **6,770 hours** *of volunteer service valued at* **$172,432.**
- *Over* **52 downed pelicans** *were saved.*
- *Sea turtle nests were monitored on South Padre Island during the nesting season, helping efforts to increase the population of endangered sea turtles, and* **25 cold stunned sea turtles** *were recovered.*


MORGEN AYERS

From the Masters to the Students

Texas Sea Grant and Texas A&M – Corpus Christi students worked with Texas Master Naturalists and county government to remove invasive plants from Rockport habitats

Under the guidance of Texas Sea Grant, Texas Master Naturalists, and Aransas County, three students participated in a habitat restoration and enhancement project in the summer of 2019. The team helped remove invasive species from hurricane-damaged properties in Rockport, planted pollinator habitats for local birds and butterflies, and learned techniques for assessing the health of coastal habitats.

These efforts built on the county's existing project, Aransas Pathways, which is designed to attract birdwatchers, hikers, kayakers, and others interested in the outdoors. The project unites 18 birding sites in and around Rockport, including several natural areas that are important habitat for migrating birds. The list of Pathways sites includes the Linda S. Castro Nature Sanctuary, a four-acre plot near the county airport, and Ivy Lane, a 28-acre site on Rockport's northeastern flank.

Before Harvey, both sites were having problems with invasive grass species, especially Guinea grass and St. Augustine. "Guinea grass was already in the area and getting worse every year," Texas Master Naturalist Kris Kirkwood said. "It's growing in everybody's pastures, and it's not being fought. When those seed heads work loose, they roll along like tumbleweeds in the wind."

With a reduced tax base, though, Aransas County had no money to spend to combat the invasive species. "After the hurricane, most of our volunteers were gone," said John Strothman, leader of Aransas Pathways. "We were thinking of ways to bring our sites back, get them cleaned up, and get our native plant program back on track.

From June through August 2019, the students and Master Naturalists spent about 16 hours per week working at the two sites. They worked four mornings per week, stopping around noon to avoid the draining afternoon heat. The students were guided by Kirkwood and her husband, Ray, who helped the students identify different species of plants and learn how to conduct a site survey and record their findings, with assistance from Texas Sea Grant. "Learning to identify all of these different plants was pretty awesome," said Liliana Cantu, a Texas A&M University - Corpus Christi student.

The students' main job, though, was to remove the invasive grasses, which they hauled off by the truckload. The invading grasses grow in big clumps or in long runners, so it takes time and effort to pull them out.

The project continued through the fall, with Sheasby and Johnston hired on as Texas Sea Grant interns. They visited the Aransas County sites every other week to monitor their status and, when needed, pulled more invasive grass. The team also planted native species in areas where dense populations of invasive grasses were cleared.

"I felt we were doing some good just by teaching them. They were really interested, and they did great work. I'd do it again in a heartbeat," Kirkwood said.

Above: Student volunteer Carinne Johnston holding up invasive grass removed from Linda S. Castro Nature Sanctuary

Responding and Adapting to COVID-19

Is The Coast Clear?

Texas Sea Grant provides a rapid response grant to examine water quality during the COVID-19 quarantine

At the peak of quarantine during the COVID-19 pandemic, an image went viral on social media of the canals in Venice. As people stayed home, without the usual bustling human traffic of tourists, the city's waters were left clear and shimmering, the bottom clearly visible – a picture that left many people around the world wondering if nature was doing better without us.

Dr. Michael Wetz, chair for Coastal Ecosystem Processes at the Harte Research Institute for Gulf of Mexico Studies at Texas A&M University - Corpus Christi, and Dr. Jeff Turner, Texas A&M - Corpus Christi associate professor of marine biology, want to find out what happened to Texas's coastal waters while we were inside.

The duo received a rapid response grant from Texas Sea Grant that will allow them to examine water quality data collected during the quarantine to try to determine whether our waters changed or even improved while most people stayed home from the beach to wait out the pandemic.

The researchers will take water quality data collected on the Texas coast during the period of Texas Gov. Greg Abbott's emergency stay-at-home order, which was issued March 31, 2020 and lasted through the month of April. They plan to compare data from that period to the same time in years past to determine how a lack of human activity might have impacted water quality.

> ***"The quarantine period, and a reduction in things like beachgoers during Spring Break, gives us a rare opportunity to directly examine how humans affect coastal water quality," Dr. Mike Wetz said.***

"The quarantine period, and a reduction in things like beachgoers during Spring Break, gives us a rare opportunity to directly examine how humans affect coastal water quality," Wetz said. "Beyond just the gee-whiz factor [like seeing clear canals in Venice], it can help us to identify areas on the coast where the human impact is most pronounced."

HARTE RESEARCH INSTITUTE

Dr. Mike Wetz examining water quality

That can help scientists to prioritize projects like living shorelines, oyster reef restoration, and infrastructure improvements that could improve water quality for the benefit of our coastal habitats and our human economies, which in the beachfront communities that dot the Gulf of Mexico often depend on the health of the coast.

Article originally by Nikki Buskey at the Harte Research Institute, reprinted with permission

Texas Sea Grant Planning Specialist Walter Peacock produced a video discussing how the U.S. Small Business Administration's COVID-19 Paycheck Protection Program can help small businesses. Texas Sea Grant also collaborated with the National Sea Grant Law Center to produce informational factsheets on the Paycheck Protection Program, which were translated into Spanish and Vietnamese.

IDA RIVERA

Although COVID-19 presented a challenge, Texas Sea Grant staff continued to serve the Texas coast while taking necessary precautions. This includes continuing to perform the annual courtesy Turtle Excluder Device checks, in which expert staff assist shrimp fishermen with ensuring their nets meet regulations.

Texas Sea Grant Compiles List of Texas Seafood Retailers Delivering During COVID-19.

Typically, spring is a high-demand season for commercial fisheries, and many in the industry rely on these peak months to carry their income throughout the year. But, the widespread disruption from COVID-19 caused seafood demand to come to a screeching halt. To support Texas fisheries and keep local seafood coming to consumers, Texas Sea Grant has compiled and kept an up-to-date list of seafood retailers that remained open with details on services provided, including curbside service and delivery options. The list is available at **tx.ag/OpenTXSeafood**

Sustainable Seafood

Growing Oysters, Growing an Industry

Texas Sea Grant Aids Texas Oyster Mariculture

Texas Sea Grant is supporting the newly emerging oyster mariculture industry on every front. From new staff to support the budding industry, to an innovative website informing potential oyster farmers, to cutting-edge oyster research, Texas Sea Grant is showing Texans that the coast is their oyster!

Annually, the oyster fishery is worth about $20 million in Texas alone and about $236 million nationwide. Oyster reefs are great habitats for fish, which not only means a healthier ecosystem, but also great fishing spots for recreational fishers. Other benefits of oysters and oyster reefs include shoreline protection and water filtration.

Since 2010, Texas oyster landings have declined by 40 percent. Although natural Texas oyster reefs have degraded, the demand for oysters in Texas remains high. The time has come for Texans to grow their own oysters and usher in a new mariculture industry. On May 27, 2019, Governor Greg Abbot signed House Bill 1300 and Senate Bill 682 legalizing oyster mariculture in Texas.

Mariculture doesn't compete with wild-caught oyster fisheries because these oysters are typically sold on the half shell, whereas wild fisheries generally produce shucked oysters without the shell. "It is a win-win situation for everybody. Oysters are a no-brainer in terms of ecosystem services and a benefit to the retail sector," said Dr. Joe Fox, chair of Marine Resource Development at the Harte Research Institute and Texas Sea Grant-funded researcher.

> ***"It is a win-win situation for everybody. Oysters are a no-brainer in terms of ecosystem services and a benefit to the retail sector," said Dr. Joe Fox***

Being a new industry comes with new challenges, but the timing has been particularly challenging for this industry, and the COVID-19 pandemic further complicates this industry's start. These added challenges are why Texas Sea Grant is providing critical support to the oyster industry on several fronts.

RESEARCH GIVES OYSTERS A "JUMP START"

To start growing oysters, farmers need seed — or oyster larvae. The problem is there are no oyster hatcheries in Texas, so there is currently no seed to start an oyster farm. Texas Sea Grant-funded Researcher Dr. John Scarpa is working on establishing best practices for seeding oyster stocks. This would essentially "jump start" oyster reefs.

When oysters are growing, oyster seed must attach to a surface to fully develop. Scarpa's research compares surfaces to identify which are best for successful oyster settlement and survival. This information will be used for cost analysis and developing best practices for growing oysters. Additionally, his research asks if there is a seasonal effect on successful settlement and survival on these surfaces.

The research is relevant to both wild and farmed oysters. Wild oyster populations along the Gulf of Mexico have been affected by extreme weather events, such as hurricanes and flooding, and human-induced stresses, such as oil spills, which have dramatically reduced oyster landings. These stresses on the oyster populations are a prime example of the need to develop direct restoration methods, which would be especially helpful when oyster larval supply is limited or to help start up a reef or farm in Texas.

KARA THOMPSON

Oyster mariculture cages


KARA THOMPSON

TEXAS SEA GRANT SEEDS TEXAS OYSTER RESOURCE AND RECOVERY CENTER

Bill Balboa, a retired Texas Sea Grant extension agent and now executive director of the Matagorda Bay Foundation, was among the first to seriously consider the possibility of bringing oyster mariculture to Texas, and he found the perfect place for it. An abandoned research lab in Palacios, which served as an aquaculture learning facility for Texas State Technical College in a previous life, was a prime candidate. The facility was complete with classrooms, offices, and lab space.

"I thought someone should try to buy the facility because it would be the most awesome coastal facility ever. There's no coastal research facilities on the Central Texas Coast, so this would be perfect," Balboa said.

After being given a tour of the facility by Balboa, Dr. Joe Fox applied for a RESTORE grant from the National Oceanic and Atmospheric Administration to get the facility up and running. The grant was awarded to him, enabling the creation of the Texas Oyster Resource and Recovery Center, in partnership with Texas A&M AgriLife Research. The center will be primarily responsible for workforce development, while also providing oyster larvae to farms, partnering in research, working with industry, ensuring coastal conservation, and boosting environmental and economic resilience.

MORE HANDS ON DECK

A key player in developing and fostering the growing industry will be the newest addition to the Texas Sea Grant team: Mario Marquez, an aquaculture specialist.

> ***"I'm so excited to help in developing this new oyster aquaculture industry along the Texas coast and growing some of the best oysters any Texan would be proud of," Marquez said.***

Marquez will be based at the Texas Oyster Resource and Recovery Center in Palacios, TX, and he will aid the expansion and development of the oyster aquaculture industry.

In partnership with the Harte Research Institute at Texas A&M – Corpus Christi, Marquez will coordinate with public and private stakeholders to facilitate economical and sustainable oyster aquaculture. This assistance to the oyster aquaculture industry will include planning and program evaluation; assisting the integration of oyster hatcheries, seed production and oyster farm operations; and educating and guiding stakeholders.

"I'm so excited to help in developing this new oyster aquaculture industry along the Texas coast and growing some of the best oysters any Texan would be proud of," Marquez said.

ON THE HORIZON: WEBSITE WILL HELP ASPIRING OYSTER FARMERS

Aspiring oyster farmers may know their oysters, but learning the logistics of how to start up a farm can be daunting. Regulations and procedures are new and need to be made clear to those ready to set up their farm.

To make things easier, Texas Sea Grant is partnering with the Harte Research Institute, through funding from the National Sea Grant Office related to COVID-19, to develop a website that with walk oyster farmers through the process. Not only will this website give detailed and up-to-date information on best practices, it will also provide a step-by-step guide on how to navigate the permitting process.


Mario Marquez at an oyster farm

MARIO MARQUEZ


MARIO MARQUEZ

Texas Sea Grant's efforts in oyster mariculture mirror a nationwide effort to increase support for mariculture. In Sept. 2019, the National Sea Grant Office pledged $16 million in funding for aquaculture/mariculture. Across the United States, the Sea Grant network employed or partially funded 111 professionals working on aquaculture.

Sustainable Seafood

Oyster Fishery First to Receive Sustainability Certification with Texas Sea Grant Support

As sustainability of fisheries becomes more pressing, a milestone has been achieved for Gulf of Mexico oysters. With help from Texas Sea Grant, Prestige Oyster's Inc., a Houston-based international oyster company, has become the first private oyster fishery in the Americas to receive the Marine Stewardship Council's (MSC) certification.

TEXAS SEA GRANT'S ASSISTANCE REDUCED ADDITIONAL CONSULTATION COSTS AND SUPPORTED JOBS BY MAINTAINING PREMIUM MARKET ACCESS, LEADING TO A $699,320 ECONOMIC IMPACT.

The label is one of the most well-recognized certifications designating a sustainable seafood product. Those with the certification can use the esteemed blue label to indicate that they have met the expert-developed rigorous standards for MSC certification. Each MSC certification is valid for five years, with annual audits, and its standards assess sustainability of the fishery, environmental impact, and effective fisheries practices.

The 10-month certification process is complex and often requires a consultant with expertise in certification standards, costing upwards of $20,000 in fees in addition to the certification costs. Texas Sea Grant Fisheries Specialist Laura Picariello served as a consultant, guiding Prestige Oyster's Inc. through the rigorous assessment process, providing technical support and gathering the necessary data to determine whether they met the MSC's standards.

"With her knowledge and expertise in fisheries, she was able to ask the right questions," said Raz Halili, vice president of Prestige Oyster's Inc. "It made everything much more efficient and helped get us where we needed to be."

With this certification, Prestige Oyster's was able to maintain access to premium markets, which support 20 fishermen in Texas and Louisiana. Texas Sea Grant's assistance reduced additional consultation costs and supported jobs by maintaining premium market access, leading to a $699,320 economic impact.

Workers at Prestige Oyster's Inc. with a fresh catch.

One of the oyster boats with Prestige Oyster's Inc.

Raz Halili (left) and Laura Picariello (right) at the public announcement for Prestige Oyster's Inc.

Texas Chapter of the G.U.L.F. Restaurant Partnership Program

Texas State Aquarium and Texas Sea Grant have partnered with Audubon Nature Institute to develop a Texas Chapter of the G.U.L.F. Restaurant Partnership Program. This partnership is dedicated to promoting local, sustainable seafood harvested from U.S. fisheries of the Gulf of Mexico.

"Since 2014, G.U.L.F. has worked with chefs and restaurants in Louisiana to enhance the profile of sustainable Gulf seafood," said John Fallon, director of sustainability and coastal conservation at Audubon Aquarium. "We're thrilled to partner with Texas State Aquarium and Sea Grant to bring this important effort to Texas."

"The Restaurant Partnership Program provides education and training to restaurants committed to serving local and sustainable seafood," said Laura Picariello, Texas Sea Grant fisheries specialist. "This partnership also supports the coastal economy while enabling chefs to create delicious meals that consumers can feel good about eating."

The partnership staff is a team of experts in the field of fisheries, with experience in both the science and business aspects of seafood sustainability. They offer a variety of support methods to restaurant, whether answering questions to assist you in sustainable purchasing decisions, or in-depth menu reviews.

RESTAURANTS ACCOUNT FOR 70 PERCENT OF THE SEAFOOD CONSUMED IN THE UNITED STATES AND CHEFS AND RESTAURATEURS ARE ON THE FRONT LINE OF SEAFOOD EDUCATION.

Restaurants account for 70 percent of the seafood consumed in the United States, and chefs and restaurateurs are on the front line of seafood education. The partnership's goal is to promote the sustainability of Gulf of Mexico and domestic seafood.

To provide accurate recommendations to our partners, Texas Sea Grant uses the latest data available from state and federal management agencies, universities, scientific journals, and peer-reviewed research to keep our information regarding fisheries up to date and grounded in rigorous science.

Texas Sea Grant also provides an in-house training to partner restaurants' staff. After the initial training, staff may attend one of the biannual workshops. Additional in-house trainings can be provided on request. Marketing support is also provided to partner restaurants.

Dish from Corpus Christi Yacht Club

TEXAS SEA GRANT

Current Restaurant Partners:

- Corpus Christi Yacht Club, Corpus Christi
- Glow, Rockport
- Groomer's Seafood, San Antonio
- Katie's Seafood, Galveston
- Palmer's Restaurant, Bar, and Courtyard, San Marcos
- Pier 6, San Leon
- Texas State Aquarium-Pepsi Shoreline Grill, Corpus Christi

Sea Grant Texas AT TEXAS A&M UNIVERSITY

Audubon Nature Institute G.U.L.F. Gulf United for Lasting Fisheries

TEXAS STATE AQUARIUM

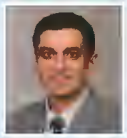
PARTNER RESTAURANT IN SUPPORTING SUSTAINABLE SEAFOOD

Research Funding to Support the Texas Coast

THROUGH PARTNERSHIPS with the State of Texas and the National Oceanic and Atmospheric Administration, Texas Sea Grant conducts a competitive research grant program every two years that draws on the expertise of the state's top scientists. Funded projects are selected using a competitive and rigorous peer-review process that considers the project's potential to produce substantial and beneficial impacts to society and its ability to integrate research and extension efforts.

Texas Sea Grant has awarded five new research grants totaling $1.4 million for the 2020-2022 cycle. The grants will fund researchers at universities around the state to support coastal and marine ecosystems, communities, and economies.

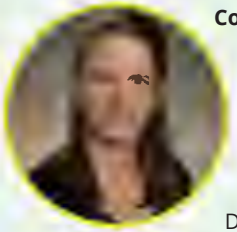
AWARDS FOR THE 2020–2022 CYCLE

Researcher and Affiliation	Project Title	Amount Awarded
 **Dr. Amir Behzadan,** Department of Construction Science **Texas A&M University and Texas A&M Engineering Experiment Station**	A hybrid decision support system for driving resiliency in Texas coastal communities	$299,995.00
 **Dr. Jens Figlus** Department of Ocean Engineering **Texas A&M University**	Guaranteeing coastal wetland survival under sea level rise through nature-based beneficial-use dredged sediment placement: A Galveston Bay living laboratory	$297,737.00
 **Dr. Joe Fox** Harte Research Institute **Texas A&M University – Corpus Christi**	Oyster aquaculture suitability index and production potential model for the eastern oyster *(Crassostrea virginica)* in Copano Bay, TX, USA	$297,255.00
 **Dr. Nur Yazdani** Department of Civil Engineering **University of Texas at Arlington**	Safety of slab home elevations in Harvey-affected communities: Research, extension, training and outreach	$299,372.00
 **Dr. Paul Montagna** Harte Research Institute **Texas A&M University – Corpus Christi**	Long-term benthic data Informs adaptive management of freshwater inflow to the Texas Coastal Bend	$287,473.00

Texas Sea Grant Funded Research Spotlights

The effects of shifting coastal wetland plant communities on the food webs that support coastal living resources

Funded Researcher: Dr. Anna Armitage, Texas A&M University - Galveston



Coastal wetlands support iconic wildlife and fisheries, many of which use estuaries as spawning grounds or nursery habitat. A mosaic of habitat types, such as salt marshes and mangroves, make up the wetlands along the Gulf of Mexico. Due mainly to warming temperatures, mangroves are becoming more common throughout the region and are overtaking marshes.

Dr. Anna Armitage is investigating how this change will affect many of the benefits that the coastal wetlands provide. Specifically, she is measuring how the shift from marsh to mangrove habitat along the Texas coast will affect marine wildlife. This knowledge would fill in information gaps on ecosystem effects of this shift and better guide future restoration and management decisions in coastal wetlands.

Novel method for detecting contaminants in sea turtle blood.

Funded Researcher: Dr. Yina Liu, Texas A&M University

Contaminants known as per- and polyfluoroalkyl substances (PFAS) have made headlines recently for being found throughout surface waters, such as lakes and rivers, and in drinking water. PFAS are used in numerous consumer products, including firefighting foams, non-stick cookware, water-repellent fabrics, and fast food packaging. They do not easily degrade in the environment or the body. Preliminary research even indicates that some PFAS compounds can be found in the Gulf of Mexico. The question is, how do PFAS impact endangered wildlife, such as sea turtles?

To better understand the effect of PFAS on sea turtles Dr. Yina Liu developed a method for extracting and isolating PFAS from sea turtle blood samples and used this method to detect the presence of PFAS in sea turtles. This tool could be used in future PFAS assessments in other wildlife to aid future wildlife protection policies. The project also aims to improve public awareness of PFAS compounds.

The South Texas Banks ecosystem: Oceanography, biodiversity and genetics

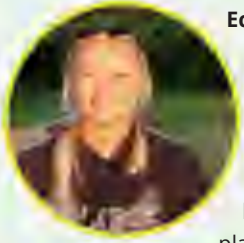
Researcher: Dr. Diego Figueroa, University of Texas Rio Grande Valley

The South Texas Banks ecosystem is a rare feature on the vast mud seafloor of the Gulf of Mexico. These banks are home to a community of deep-water sea whips, sea fans, and black corals that provide structurally complex habitat and significant ecosystem services. Yet, there is still much to learn about the diversity of life in this region.

Dr. Diego Figueroa uses remotely operated vehicles to perform video surveys of fish and corals in the South Texas Banks. He also collects coral specimens for genetic research in which they will use advanced molecular methods to examine geographic patterns of genetic connectivity. Preliminary results show the community of fish and corals are structured based on depth, terrain patterns, and latitude. This research fills in critical gaps in the understanding of these important habitats; this will help define a long-term sampling strategy to monitor the reefs and better evaluate changes over time.

Sand dune restoration: Do plant diversity and soil microbial amendments enhance ecosystem services?

Researcher: Dr. Kerri Crawford, University of Houston



Ecologists are just beginning to recognize the importance of soil microbes to plant communities. However, soil microbes are not always considered during dune restorations. Adding a dash of cultured soil may help create healthy dunes, similar to how probiotics can help human health. Dr. Kerri Crawford's research tests whether dune restoration outcomes can be improved by adding native soil communities or increasing the diversity of planted grasses.

Crawford's lab created mini restorations by filling 100-gallon pots with sand and testing how adding native soil microbial communities influence plant performance and soil stability. Her team found that including a tiny amount of soil from existing sand dunes increased plant diversity and helped stabilize sand. This research also resulted in a website, dunescience.com, which displays the research results, a guide to local plants, and restoration recommendations.

Texas Sea Grant Research Spotlights

A Mobile App for Mobile Turtles

The iSeaTurtle App Contributes to the Assessment of Matagorda Bay

As part of a $2.7 million initiative to assess the health of Matagorda Bay, Dr. Pamela Plotkin, Texas Sea Grant director, is assessing the status of sea turtles in the bay. The project is part of a partnership with the Texas Comptroller of Public Accounts' Natural Resources Program and the Harte Research Institute and will provide critical information for protecting the endangered species of Matagorda Bay.

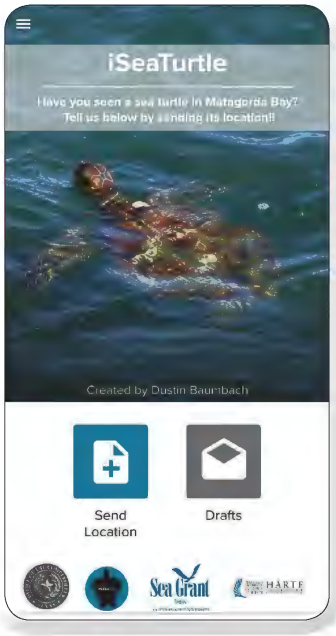
The Plotkin Lab is tracking sea turtles in Matagorda Bay to better understand where they travel and how they move. But Plotkin is not alone in this effort, she is employing the help of citizen scientists to collect important data.

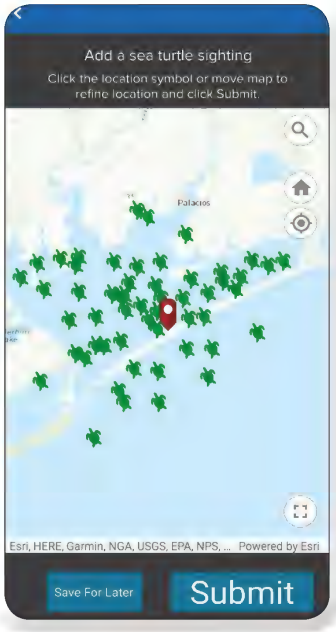
Through the iSeaTurtle app, available for iPhone and Android, visitors to the bay can easily let Plotkin know that they have spotted a turtle. All they have to do is open the app and click "Send Location," and the app automatically logs the location, which can be refined if needed. In cases of low signal, users can choose "Save For Later."

The app is already a hit among users and is being frequented by many charter captains in the area. An up-to-date view of the data is available at **tx.ag/iseaturtle.**

Left: Captain Kirk Barringer of Barringer's Guide Service. Middle: Captain Jeff Larson. Right: Captain "Wild Bill" Caldwell, the first citizen scientist to use iSeaTurtle.

Capt. Kenneth Gregory, with Kenneth Gregory Guide Service and Mowdy Boats of Texas, is one several fishing guides who have repeatedly submitted data to iSeaTurtle. His goal is to log 100 turtle sightings.





Texas Sea Grant produced and distributed this educational poster about sea turtles in Texas. Request copies by emailing sgpublications@seagrant.tamu.edu

Texas Sea Grant Supports Students

Grants-in-Aid of Graduate Research Program

Texas Sea Grant's Grants-In-Aid of Graduate Research Program provides small two-year grant's to students enrolled at Texas A&M University, Texas A&M University at Galveston, or Texas A&M University - Corpus Christi. Funded projects must be marine- or coastal-related research and relevant to Texas, though not necessarily based in Texas.

The grants are awarded after a competitive proposal review process and are designed to promote scientific excellence and achievement. Grants range from $500 to $2,500, and may be used for expenses directly related to the student's project, such as fieldwork, laboratory analysis, and testing materials.

The Texas Sea Grant College Program at Texas A&M University awarded $48,810 in research grants to 19 graduate students at three Texas A&M University System institutions.

GRANTS-IN-AID OF GRADUATE RESEARCH PROGRAM FY2020–22 RECIPIENTS

Student	Project Title
Paxton Bachand Pursuing a doctorate in Marine Biology Texas A&M University - Corpus Christi	Stable isotope analysis of natural nutrient sources contributing to a reoccurring *Aureoumbra lagunensis* bloom in Baffin Bay, Texas
Fernando Calderon Gutierrez Pursuing a doctorate in Marine Biology Texas A&M University at Galveston	Characterizing the microbial community on the subterranean estuary of the Yucatan Peninsula, Mexico through Next-Generation sequencing
Jessie Castanier Pursuing a Master's in Fisheries and Mariculture Texas A&M University - Corpus Christi	Public aquariums as a potential source of marine fish for exhibits and conservation
Michael Curtis Pursuing a Master's in Fisheries and Mariculture Texas A&M University - Corpus Christi	Variation in habitat use and trophic dynamics of catadromous fish (*Anguilla rostrata*) in sub-tropical Texas
Bimal Gyawali Pursuing a doctorate in Coastal and Marine System Science Texas A&M University - Corpus Christi	Estimation of groundwater discharge variability to the Gulf of Mexico using GRACE satellite and field observations
Maureen Hayden Pursuing a doctorate in Marine Biology Texas A&M University	Quantitative analysis of microplastics on beaches and effects of microplastic ingestion on amphipod populations in Texas
Christena Hoelscher Pursuing a doctorate in Oceanography Texas A&M University	Episodic sediment dispersal on three different depositional environments
Robert Iles Pursuing a doctorate in Oceanography Texas A&M University	Refining Submersible autonomous glider observations with coincident in-situ sampling
Bumsoo Kim Pursuing a doctorate in Oceanography Texas A&M University	Rethinking the role of methane during the Paleocene – Eocene Thermal Maximum

Student	Project Title
Ashley McDonald, Pursuing a doctorate in Coastal Ecology Texas A&M University at Galveston	Impacts of a large-scale hydrological alteration on coastal wetlands
Emily Meese Pursuing a doctorate in Marine Biology Texas A&M University at Galveston	Movement patterns of a coastal predator in a subtropical estuary
Alexis Neffinger Pursuing master's in Coastal and Marine System Science Texas A&M University - Corpus Christi	Assessing biotic integrity for tidal streams along the South Texas Coast
Dominic Swift Pursuing a doctorate in Marine Biology Texas A&M University - Corpus Christi	Assessing MHC-dependent mate choice in the dusky smoothhound (*Mustelus canis*) and blacktip shark (*Carcharhinus limbatus*)
Altaf Taqi Pursuing a doctorate in Ocean Engineering Texas A&M University	A two-dimensional experimental investigation on mixed sediment dune evolution under storm surge and wave impact.
Jamie Thompson Pursuing a doctorate in Marine Biology Texas A&M University at Galveston	Patterns of insect herbivory on black mangroves (*Avicennia germinans*) along the Texas Coast
Yu Umeki Pursuing a doctorate in Marine Biology Texas A&M University at Galveston	The use of a juvenile American alligator (*Alligator mississippiensis*) liver enzyme assay to study the metabolism and detoxification of man-made pollutants
Christopher Vickers Pursuing master's in Coastal and Marine System Science Texas A&M University - Corpus Christi	Groundwater contribution of elevated nutrients to Laguna Salada, Baffin Bay
David Weber Pursuing a doctorate in Marine Biology Texas A&M University - Corpus Christi	Epigenetic biomarkers center: A novel, non-lethal approach to aging exploited fish species
William Wolfe Pursuing a master's in Coastal and Marine System Science Texas A&M University - Corpus Christi	Quantifying submarine groundwater discharge through continuous, long-term measurements of radon in a semi-arid estuary

$48,810 IN RESEARCH GRANTS TO **19** GRADUATE STUDENTS

Texas Sea Grant Supports Students

Graduate Student Spotlights

Mary "MC" Hannon
PhD student
Texas A&M University at Galveston

Would you believe that the metamorphosis of a worm could serve as "bioinspiration" for the medical field? MC Hannon is researching worms along the Galveston coast and bay that swarm in the summer months around the full moon as part of their reproductive strategies.

Specifically, she is looking at how the common clam worm undergoes a metamorphosis in which it grows large paddles (to aid in swimming) and big eyes (likely to track the lunar cycle and to locate other worms) during these reproductive swarms. Broader implications from understanding the genetics that control the worm's eye enlargement could aid in understanding the genetic causes of vision loss in humans.

"Bioinspiration is an emerging field where design is inspired by the biological world around us. I hope to contribute to this field by better understanding how these worms achieve such an interesting phenomenon," said Hannon.

Hannon credits Texas Sea Grant for providing the needed confidence boost to take control of her own research path. The funding from Texas Sea Grant has allowed her to choose the best experimental methods available for her research.

James Fiorendino
PhD student
Texas A&M University

Certain species of phytoplankton (the plant-like microbes that live in the ocean) can produce toxins that manifest in shellfish. Humans then consume these shellfish, putting them at risk of developing diarrhetic shellfish poisoning.

Through his Texas Sea Grant-funded research, James Fiorendino works in Port Aransas and Surfside Beach, analyzing how and when populations of phytoplankton are blooming along the Texas coast. He is particularly interested in one particular type of phytoplankton: *Dinophysis ovum*.

"My research is important because it seeks to expand our understanding of phytoplankton community dynamics, which are an important part of marine food webs and many other marine processes," said Fiorendino. "It is important for Texas because harmful species of phytoplankton can threaten coastal economies and human health."

Fiorendino hopes to develop a way to predict when these toxic blooms would likely occur in the future. He is culturing the bacteria in the laboratory and capturing images of the phytoplankton community hourly, which can be used to build a model. "Through experiments and research, I try to answer questions regarding how and why these harmful species bloom, when they do and whether blooms can be predicted," he said.

Wing Man Lee
PhD student
Texas A&M University - Corpus Christi

Harmful algal blooms (HABs) have plagued Baffin Bay, an important recreational fishing and tourism region, but Wing Man Lee aims to characterize a key piece to the HAB puzzle: nitrogen.

HABs occur when there is an abundance of toxic algae in the water. Excess nitrogen in the water can be a contributing factor to these blooms.

Lee's research aims to characterize sources of nitrogen that support HABs in the Texas' Baffin Bay and San Antonio Bay. She also investigates the various freshwater inflows (such as streams) as nitrogen sources that bring in different nitrogen signatures. She will compare these unique chemical signatures, using a new method developed by the lab of her advisor, Dr. Lin Zhang.

Characterizing nitrogen sources in Baffin Bay will provide policymakers and resource managers with science-based information to design ways to combat HABs, to maintain natural flows, and protect the ecosystem services that the bays provide to Texas.

With help from Texas Sea Grant, Lee is able to fund the lab supplies and chemicals, which are essential to sample analysis. Lee says this grant has helped expand her research and tackle local environmental issues in Texas.

Elizabeth DiBona
Masters student
Texas A&M University - Corpus Christi

Elizabeth DiBona examines how microplastic fibers, or tiny fiber-shaped plastic pieces, can harm a fish's development, nutrient uptake, gut microbiome, and reproduction success. These fibers break off from larger materials, particularly synthetic fabrics such as polyester or nylon, and end up in waterways that empty into the ocean.

Once in the ocean, animals can mistake these, often brightly colored, fibers as food and ingest them. This is a major concern for the health of animals as microplastics can 1.) block the gut, leading to starvation, 2.) tear the gut, leading to septic shock, and 3.) carry dangerous pollutants that leach into the gut. This microplastic pollution may even affect the seafood we eat.

To determine the impacts of microplastic fiber ingestion, DiBona studies juvenile fish raised in Dr. Frauke Seemann's lab. She analyzes the gene expression of digestion enzymes in these fish to determine how microplastic ingestion affects digestion and nutrient uptake. She examines gut integrity and composition of gut bacteria to assess health and analyzes reproductive success.

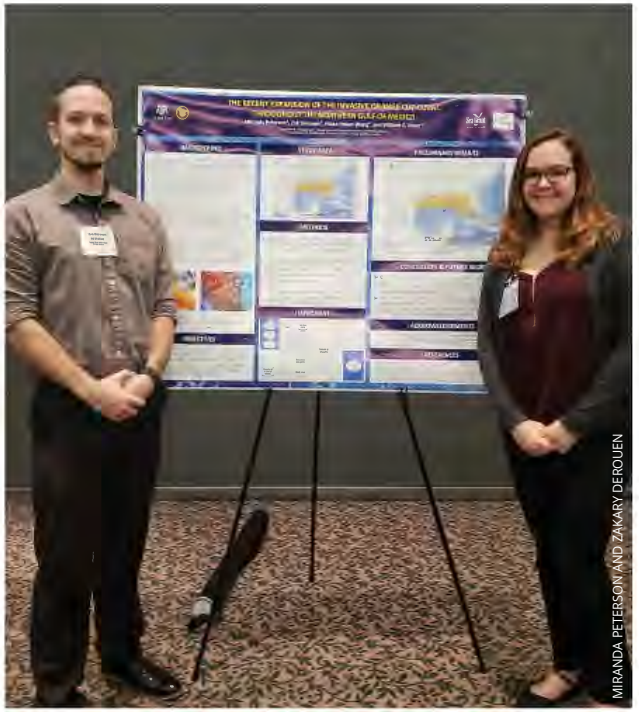
DiBona stated, "Texas Sea Grant has provided help in funding my research as well as providing networking and collaboration amongst scientists performing similar research."

Texas Sea Grant Supports Students

TEXAS SEA GRANT SCHOLARS 2019 RECIPIENTS

Student	Project Title
Mikeelee Brink Marine Biology major Texas A&M University at Galveston	The role of zebrafish (*Danio rerio*) metabolism in influencing physiological fitness under metabolic stress
Kelci Chambers Marine Biology major Texas A&M University at Galveston	Antibiotic resistant gene analysis post Hurricane Harvey
Madlyn Crist Marine Biology major Texas A&M University at Galveston	Synthesizing metallic complexes as catalysts for hydrogen evolution reactions
Margaret Guy Wildlife and Fisheries Sciences major Texas A&M University	Implications of tourists with handheld lights on sea turtles
Kristina Simons Marine Biology major Texas A&M University at Galveston	The effects of oxybenzone on the metabolic physiology of zebrafish
Marcus Wharton Marine Biology major Texas A&M University at Galveston	Chemical characteristics of sargassum


NICOLE GUENTZEL


MIRANDA PETERSON AND ZAKARY DEROUEN

$5,200 IN RESEARCH GRANTS TO 6 UNDERGRADUATE STUDENTS

Texas Sea Grant Scholars Program

Texas Sea Grant Scholars are designated from among those selected for the LAUNCH: Undergraduate Research Scholars Program. Students' proposal topic may be from any discipline but must be related to the marine environment. Recipients receive up to an additional $1,000 from the Texas Sea Grant Scholars Program to supplement their research budgets.

The goal of the program is to encourage motivated undergraduate students to participate in research and to give them the opportunity to communicate their findings as principal authors to the university's scholarly community. In 2019, Texas Sea Grant awarded $5,200 in research grants to six undergraduate students.

OIL SPILL OUTREACH TEAM

UNIVERSITY OF TEXAS

Top: The oil spill science outreach team (Left to right) Steve Sempier, Missy Partyka, Emily Maung-Douglass, Monica Wilson, Dani Bailey, and Tara Skelton Bottom: An oil spill science workshop at the Mission-Aransas National Estuarine Research Reserve in Port Aransas, TX.

The Oil Spill Science Team Celebrates 10 years

Located about 50 miles offshore of Louisiana, the Deepwater Horizon oil spill was one of the worst environmental disasters in United States history. Nearly 172 million gallons of oil spilled into the Gulf of Mexico from late April through July 15, 2010, causing economic strain and irreversible damage to wildlife and the environment. The effects of the oil spill are still evident today in the Gulf of Mexico and along the coastlines of Texas, Louisiana, Alabama, Mississippi, and Florida. Questions such as, "Is Gulf seafood safe to eat?" and "Is it safe to swim in Gulf water?" still linger in the minds of both coastal locals and visitors.

To help answer these and similar questions, BP donated $500 million to the federal government following the oil spill. These funds were used to form the Gulf of Mexico Research Initiative (GoMRI), a 10-year research program aimed at better understanding, responding to, and mitigating the impacts of oil spills and their effect on marine and coastal ecosystems. Thanks to GoMRI, research on the impacts of oil spills have drastically grown in the last 10 years.

In 2014, the directors of the Texas, Louisiana, Mississippi-Alabama, and Florida Sea Grant programs proposed the formation of a team of scientists who could focus on addressing the public's need for information about the consequences of the Deepwater Horizon oil spill. A few months later, the oil spill science team — a regional Sea Grant collaboration between the five states affected by the oil spill in the Gulf of Mexico — was born.

The publications produced by the team primarily serve the Gulf Coast, benefitting commercial fishermen, natural resource managers, the tourism industry, public health officials, the oil industry, and even emergency responders, including the Coast Guard. The team also hosts seminars that bring the public face-to-face with scientists who can answer oil spill questions. Over the last few years, the seminars have grown in popularity and have expanded to serve locations beyond the Gulf Coast, including Alaska, California, the Great Lakes, Puerto Rico, and Saint Croix in the U.S. Virgin Islands. In fact, the oil spill science team has done such a fantastic job of educating and communicating with various publics that they were awarded the 2017-2018 Sea Grant Superior Outreach Programming Award.

> The oil spill science team has done such a fantastic job of educating and communicating with various publics that they were awarded the 2017-2018 Sea Grant Superior Outreach Programming Award.

"We get emails all the time from people both involved with the team and from the communities we serve saying, 'thank you, this is great,'" said Dani Bailey, the team's current extension specialist for Texas Sea Grant. "In fact, someone from the Coast Guard recently reached out saying he was going to use our materials to educate the rest of his crew."

A Decision-support Tool for the Gulf Red Snapper Fishery

The highly sought red snapper is a treasure to recreational anglers, commercial fishermen, and seafood lovers throughout the Gulf of Mexico. However, this fishery is complicated. Unique life history characteristics of red snapper, combined with competing interests, and various regulations, make it difficult to know what the best management decisions are.

In collaboration with scientists from Florida International University and NOAA Southeast Fisheries Center, Texas Sea Grant is working on developing a decision-support tool that will help fishermen, scientists, and resource managers make these critical, yet difficult decisions. The tool is based on a cutting-edge modelling tool known as Management Strategy Evaluation. This model runs a simulation that allows stakeholders to compare the risks and outcomes associated with their choices and make the best decision based on that information.

"The goal of this tool is to take everything that we already know in the science and the management of this fishery to create a virtual world and give users the ability to go in and test out some of these different harvest strategy options to see how each change might impact the fishery or other users before it is implemented in the real world," said Laura Picariello, Texas Sea Grant fisheries specialist.

A unique feature of the tool is that it is designed for both scientists and the public. For example, fishermen can investigate the effects of changing the season or bag limits. Meanwhile, scientists and resource managers can investigate more detailed and complex fisheries data.

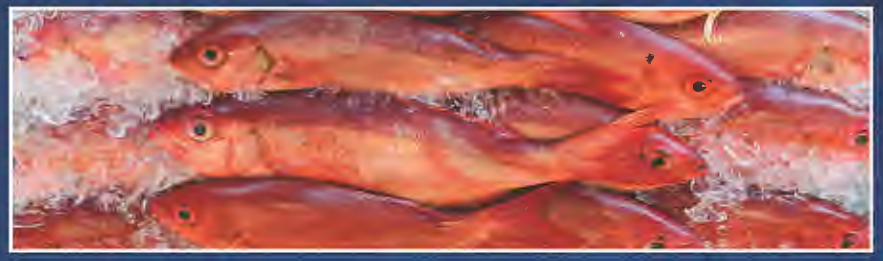
An important feature of this project is the integration of stakeholder feedback. Workshops facilitated by Texas Sea Grant and partners engage stakeholders from commercial and recreational fisheries as well as environmental non-profits and resource managers. This ensures that the tool adequately meets the needs of its users, which is necessary to the success of the tool. "We wanted an opportunity to get feedback from everyone who has a stake on this fishery in what kinds of questions they wanted to see answered with the tool," said Picariello.

A unique feature of the tool is that it is designed for both scientists and the public.

SETH PATTERSON

MATT STREICH

SCOTT HICKMAN

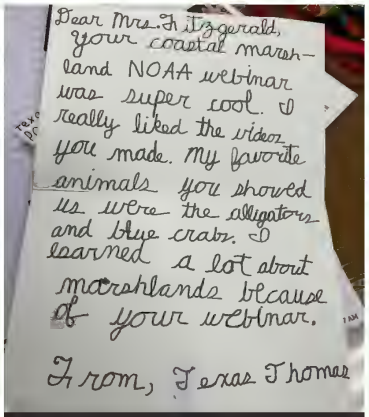


New Extension Agents, New Projects

Nikki Fitzgerald

Chambers and Jefferson Counties
Project: Highlight NOAA Webinar "My Backyard Marsh"

Live from Anahuac, Texas, the "Alligator Capital of Texas," Fitzgerald introduced children around the country to the marsh habitat in her backyard through a NOAA webinar series. Although many children were staying at home in May 2020, this webinar allowed them to explore the marshland and many of its inhabitants. This webinar showcased numerous engaging marsh topics, including catching blue crab, riding a marsh buggie, kayaking on the marsh, and — of course — alligators. Webinar attendees also participated in a Q&A session to get answers to all their burning marsh questions.



NIKKI FITZGERALD

A note of appreciation sent to Fitzgerald from a webinar attendee.

Nicole Pilson

Matagorda County
Project Highlight: Black Gill in Shrimp


THUY VU, CAPTAIN TOM'S

Shrimp infected with Black gill

The parasite known as black gill attacks shrimp gill tissue, inhibiting the shrimps' ability to breathe and making them slow and more easily consumed by predators. Although not harmful to humans, consumers often find the appearance off-putting. In 2019, Texas Parks and Wildlife Department (TPWD) sampled Texas coastal bays from Sabine Lake to the Laguna Madre and found that 65 percent of 1,600 samples collected were positive. However, the prevalence of this disease in the federal waters of the Gulf of Mexico is currently unknown. In partnership with researchers at TPWD, Nicole Pilson is collaborating with Texas shrimpers to sample shrimp to better understand where the disease can be found along the Texas coast.

R.J. Shelly

Calhoun County
Project Highlight: Crab Trap Clean-up

For the San Antonio Bay and surrounding areas, removing abandoned crab traps is a priority because they can cause damage to boats and trap wildlife. With the help of many partner organizations, R.J. Shelly helped coordinate a February 2020 clean-up and removed a record 1,632 abandoned crab traps. There was a record for volunteer turn out: 68 donated boats and 164 volunteers. Using an app, volunteers in spotter planes marked on a virtual map the location of the crab trap, and then the traps were removed.

Partners: San Antonio Bay Partnership, Guadalupe-Blanco River Authority, Guadalupe-Blanco River Trust, Lavaca Bay Foundation, Lavaca-Navidad River Authority, Matagorda Bay Foundation, Bay Flats Lodge, Dallas Zoo, International Crane Foundation, Precision Flying Services, Texas Parks and Wildlife, U.S. Fish & Wildlife Service.


BRIGID BERGER


LAVACA BAY FOUNDATION

Above: Shelly with Dallas Zoo volunteers, who helped with collect crab traps. Right: Volunteers loading crab traps into a boat

Staff map

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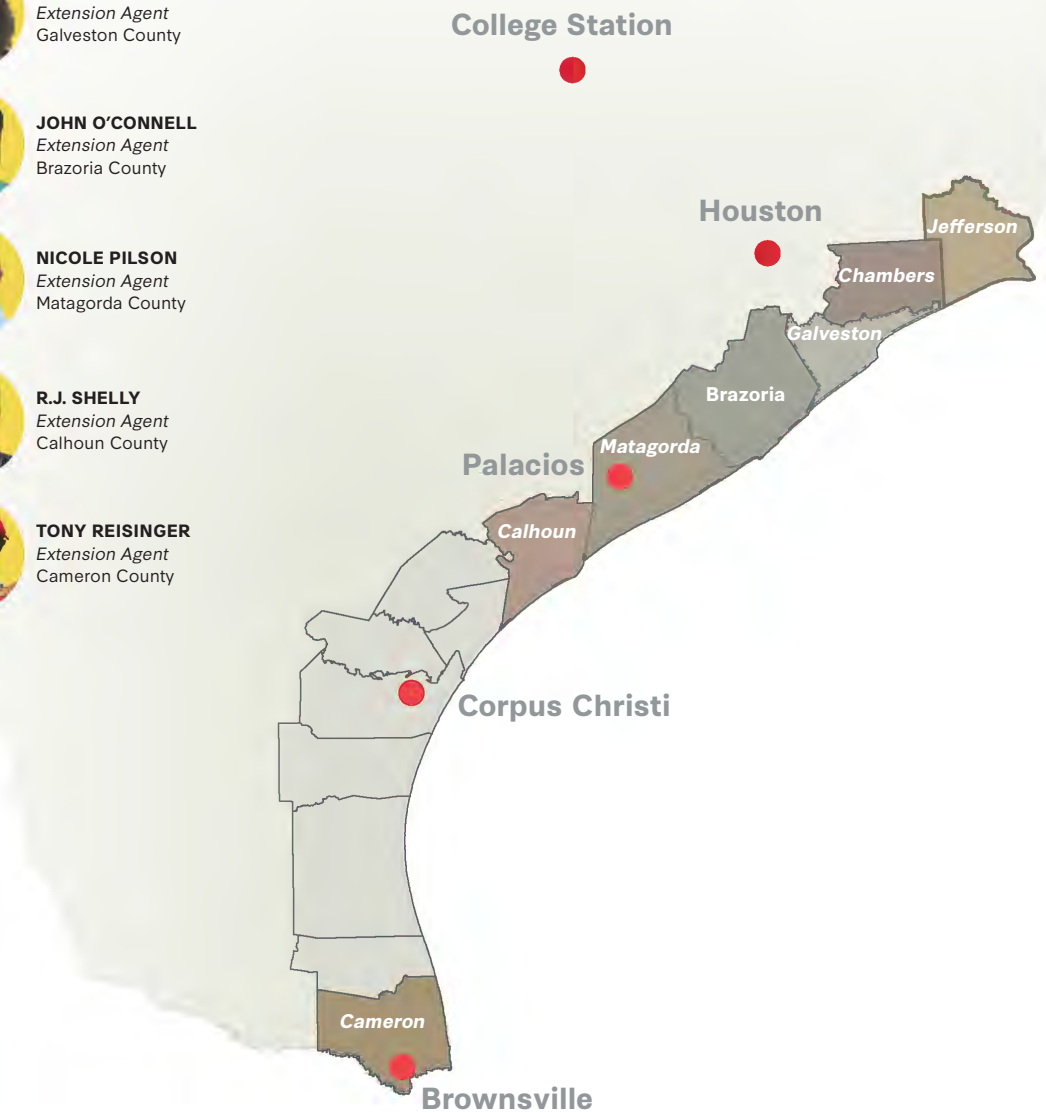

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