

TEXAS SEA GRANT 2020/2021 ANNUAL REPORT



Letter from the Director



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

AS TEXAS SEA GRANT enters its 51st year of science and stewardship of Texas' coastal and marine resources, I hope you will join us in celebrating **YOU** – our partners and stakeholders who have guided our work to bridge the gap between knowledge and action to address societal problems. Our success is dependent on your knowledge, your thoughts, your interests, your needs, your visions, and your dreams for resilient Texas communities and economies.

We have so many people and organizations to thank and acknowledge, and it is my sincere hope that when you visit Texas Sea Grant's year-long exhibit in the George H. W. Bush Presidential Library and Museum in College Station, TX, you will see first-hand how your engagement with our team influenced Texas Sea Grant-supported science, technology, education, outreach, and Texas' coastal and marine resources.

Thank you for your support of and trust in Texas Sea Grant. We hope you will join us for the next 50 years as we continue to adapt and evolve to meet the needs of Texas and Texans.

Warm regards,

A handwritten signature in cursive script that reads "Pamela Plotkin".

A **66**e
can do
so little;
together
we can do
so much.

HELEN KELLER

Bush Library Update

Texas Sea Grant Exhibit Featured at the George H.W. Bush Presidential Library and Museum



Texas Sea Grant College Program is celebrating 50 Years of Science

and Stewardship with an exhibit at the Bush Library and Museum in the Ansary Gallery of American History.

As one of the first sea grant programs, Texas Sea Grant has a rich history of supporting the Texas coast and its people through cutting-edge research and innovative outreach and educational programs. From maintaining healthy coastal ecosystems to aiding sustainable fisheries to promoting resilient communities, Texas Sea Grant has helped Texans protect and enhance the unique, culturally significant, and economically important resources of Texas' coastal and marine environments.

At this exhibit, visitors can discover the wonders of the Texas coast, learn how sea turtles are saved by turtle excluder devices (by walking through a shrimper's net), find out how experts build communities for the changing Texas coast, see how Texas Sea Grant has helped these efforts, and more.

Visitors can learn about historic and current Texas Sea Grant programs and successes, and they will realize their own impact as stewards of the Texas coast.

Despite challenges due to closures of the museum related to COVID-19, visitors were able to visit the exhibit briefly during the month of July 2021. With the exhibit open at limited capacity, 6,335 visitors viewed the exhibit. In Oct. 2021, the museum re-opened once again.

Notably, visitors offered their own pledges to help the Texas coast as part of the "Change I Will Make" board. Among the many promises made, visitors wrote:

"I will properly dispose of my fishing line."

"I will take action by recycling the proper items, throwing away garbage rather than polluting the environment and encouraging others to do the same."

"I promise to utilize less plastic and be responsible about seafood purchasing!"

OUR VISION

The 50 Years of Science and Stewardship Exhibit in the George H.W. Bush Presidential Library will educate new audiences about Texas Sea Grant's mission and history, the resources of the Texas coastal and marine environments, and the actions they can take to be stewards of these resources.

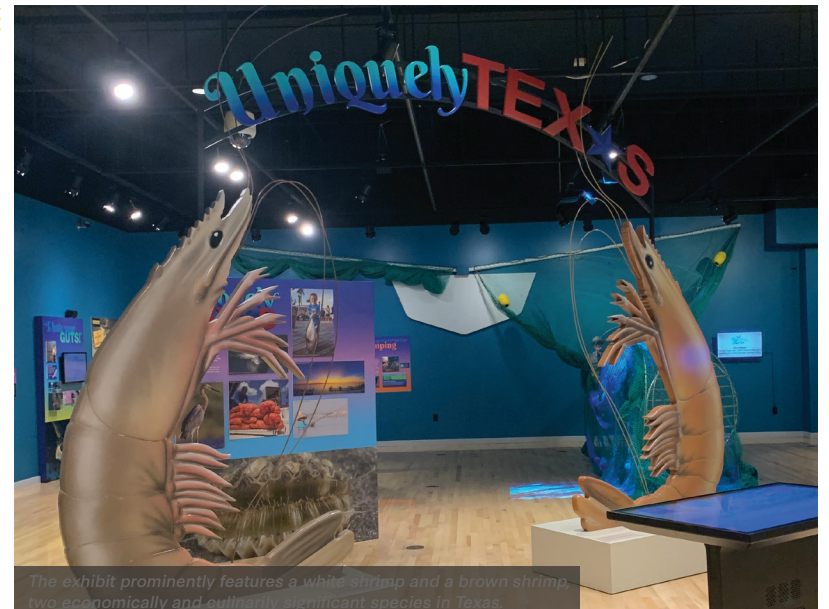
SELECTED OUTCOMES SUPPORTED

"Informal education opportunities increase the public's knowledge of coastal and ocean resource issues."
(Source: Texas Sea Grant 2018-2023 Strategic Plan)

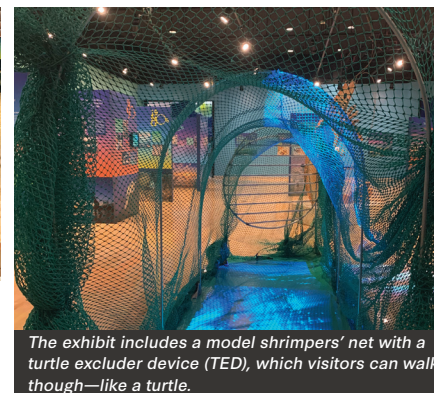


Museum designers Mary Anna Murphy (left, seated) and Beth Remsburg (left, standing) with Texas Sea Grant Director Dr. Pamela Plotkin (right, seated), and Communications Manager Sara Carney (right, standing) following installation of the exhibit.

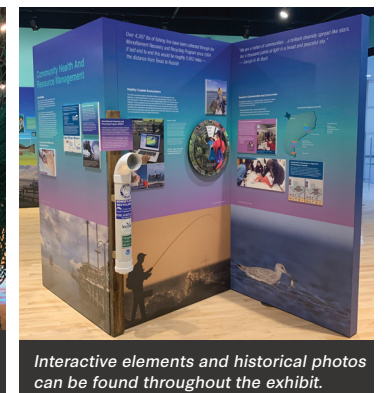
This exhibit was made possible through the hard work and support of Beth Remsburg (Brands That Leap), Mary Anna Murphy (MAM Exhibit Design), Dr. Wendy Gordon, NOAA, the National Sea Grant College Program, and Harte Research Institute.



The exhibit prominently features a white shrimp and a brown shrimp, two economically and culinarily significant species in Texas.



The exhibit includes a model shrimpers' net with a turtle excluder device (TED), which visitors can walk through—like a turtle.



Interactive elements and historical photos can be found throughout the exhibit.



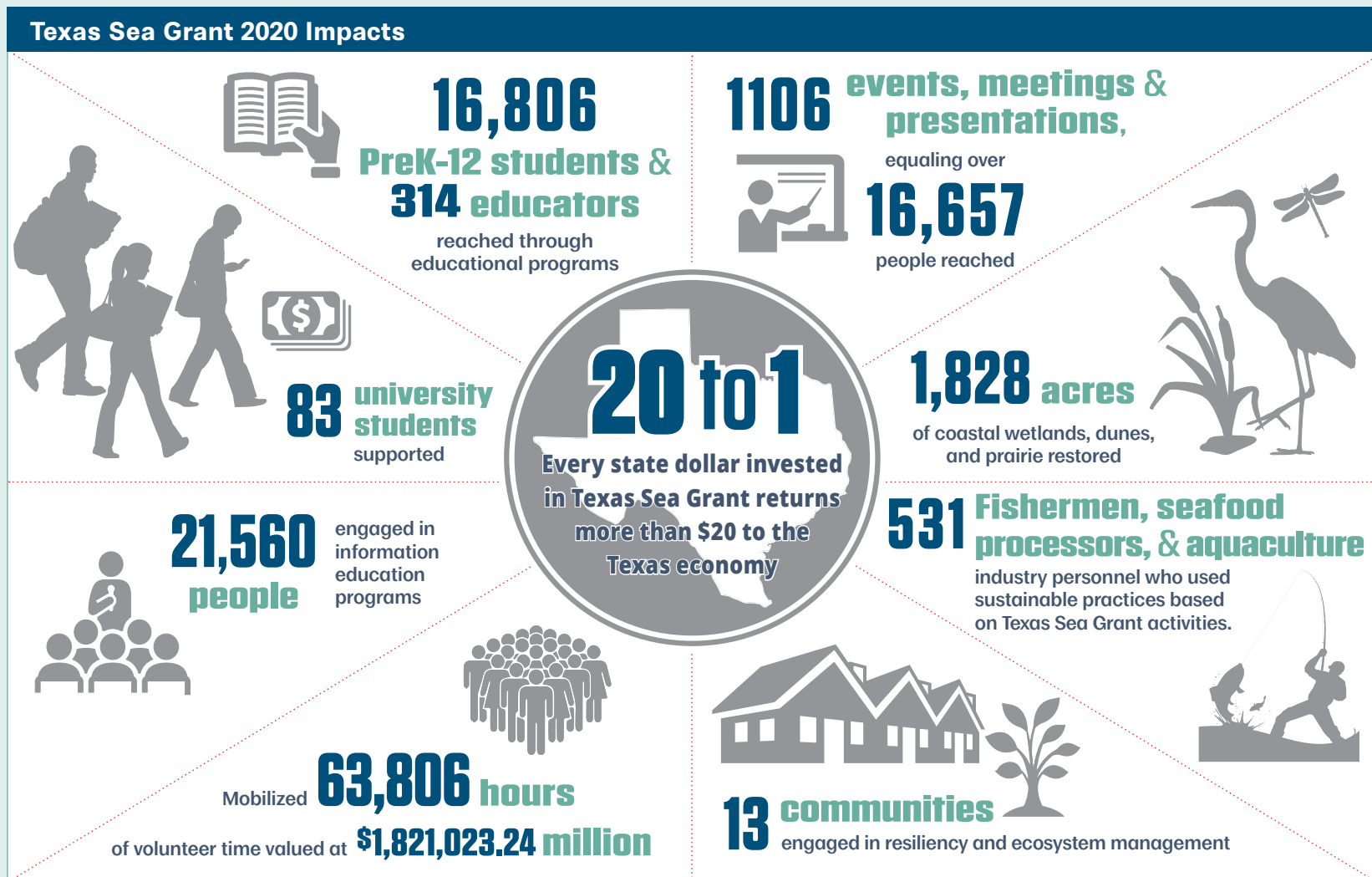
A timeline of Texas Sea Grant milestones at the exhibit.

PHOTOS BY TEXAS SEA GRANT

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.



Sustainable Seafood

Ensuring Safety at Sea

- **48 FISHERMEN AND PORT ARTHUR WORKERS RECEIVED CPR AND MAN OVERBOARD TRAINING**
- **VESSELS RECEIVED A LIFE-SAVING SLING WORTH \$450 EACH**
- **TRAININGS PROVIDED AN ECONOMIC IMPACT OF \$21,600**

Safety is a paramount concern to commercial fishermen. When out at sea, it may take hours for the Coast Guard to reach the crew in distress. That's why fishermen must be well versed in safety basics. Training in first aid and CPR is not only life saving, it is a requirement for fishermen to stay in business.

To address this need, Texas Sea Grant provided man overboard and CPR training to fishermen in Port Arthur. The trainings were supported by a Vietnamese translator to ensure that local fishermen who speak Vietnamese could participate.

In addition to learning first-aid skills, including dressing wounds, CPR, and how to use a defibrillator, the 48 fishermen who participated learned what to do in the event that a crew member is overboard. Each vessel received a man overboard sling, which can save an overboard crew member. This equipment is valued at \$450 each. The training provided an overall economic impact of \$21,600.

These trainings were made possible through partnerships with:

- Southeast Texas Regional Training Center
- American Heart Association
- Port Arthur International Seafarer Center
- Southwest Ag Center
- University of Texas at Tyler

OUR VISION

Fishermen have the tools and knowledge to stay safe and address crew in distress at sea.

SELECTED OUTCOMES SUPPORTED

"Texas shrimp fishermen are in compliance with state and federal regulations."

(Source: Texas Sea Grant 2018-2023 Strategic Plan)



A workshop participant practicing using the man overboard sling.

NIKKI FITZGERALD

Workshops Guide New Oyster Farmers

- **OVER 70 NEW OYSTER FARMERS TRAINED AT WORKSHOPS IN PALACIOS, PORT ARANSAS, PORT ISABEL, AND GALVESTON**
- **NEW WEB RESOURCE [OYSTER.TEXASSEAGRANT.ORG](https://oyster.texasseagrants.org) HOUSES INFORMATION ON FARMING OYSTERS IN TEXAS**

The emerging oyster mariculture industry in Texas provides new and exciting economic and culinary opportunities. However, the logistics of entering this new industry, including site selection, the permitting process, and various gear options, can be daunting for new farmers.

Texas Sea Grant created a series of four workshops across the Texas coast (Galveston, Palacios, Port Aransas, and Port Isabel) designed to provide a comprehensive overview of oyster farming.

These trainings, which lasted a day and a half, gathered experts including seasoned oyster farmers and officials from the Texas Parks and Wildlife Department and the Texas General Land Office. Participants also received hands-on training with the equipment. Topics covered included:

- The permitting process
- Site selection
- Seed selection and hatchery broodstock
- Gear types
- Farm management
- Hurricane Preparedness

The content of these workshops are now available to all Texans interested in oyster farming through a newly developed website: oyster.texasseagrants.org.



TEXAS SEA GRANT



TEXAS SEA GRANT

Participants of the oyster workshop receiving hands-on training from experts.

OUR VISION

Potential oyster farmers who have attended these workshops will use the knowledge they gained to create successful oyster farming operations.

SELECTED OUTCOMES SUPPORTED

"Commercial fishermen are trained on and knowledgeable about sustainable and economically viable practices."

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

"Increased understanding and technological solutions aid aquaculture management and production."

(Source: National Texas Sea Grant 2018-2023 Strategic Plan)

Sustainable Seafood

Texas and Louisiana Sea Grants Work Together to Develop Better BRDs

- **THIS THREE-YEAR, \$2.48 MILLION GRANT SUPPORTS THE DEVELOPMENT OF BETTER BYCATCH REDUCTION DEVICES (BRDs).**
- **NEW STAFF WERE HIRED TO ASSIST BRD DEVELOPMENT AND DISSEMINATE INFORMATION.**
- **THE PROJECT IS A COLLABORATIVE EFFORT BETWEEN TEXAS AND LOUISIANA SEA GRANTS, WORKING CLOSELY WITH NOAA, TO SUPPORT THE COMMERCIAL SHRIMP INDUSTRY ON THE GULF OF MEXICO.**

As part of a larger National Oceanic and Atmospheric Administration (NOAA) restoration project, Texas Sea Grant and Louisiana Sea Grant are collaborating on a three-year, \$2.48 million project to find and develop better bycatch reduction devices (BRDs) for the commercial shrimp industry in the Gulf of Mexico.

The NOAA Better Bycatch Reduction Devices for the Gulf of Mexico Shrimp Trawl Fishery Project is supported by the Deepwater Horizon Open Ocean Trustee Implementation Group.

The project will engage members of the shrimp industry through a stakeholder working group, and shrimpers will be surveyed about current BRD usage, ideas, and willingness to use new equipment. Additionally, NOAA will test new BRDs, and then work with Gulf shrimpers to test and improve the devices.

The goal of the project is to create a new Gulf-wide plan for the improved BRDs, with an incentives strategy and monitoring the progress associated with adopting the new device. As part of this project, shrimpers

will receive BRD training and educational materials in English, Spanish, and Vietnamese.

To support this project, Texas Sea Grant has hired Matthew Kammann as a project manager and Corley-Ann Parker as a communications specialist.

"I am very excited to be working with Sea Grant," said Kammann. "I love working in the community, I love helping people and the environment, and it's great to lend my help and expertise to this project."



Texas Sea Grant provides courtesy turtle excluder device (TED) bycatch reduction device (BRD) checks for commercial shrimp fishermen. This allows fishermen to ensure that their gear is compliant with federal regulations without receiving a fine.

In 2020 alone, Texas Sea Grant provided on-site inspection and training aboard **42** vessels, training **95** shrimp fishermen and ensuring **148** TEDs and **132** BRDs were correctly installed and used. This saved fishermen **\$413,500** in penalties.



Back Row, Left to Right: Tony Reisinger (TXSG), Julie Lively (LASG), Laura Picariello (TXSG), Matt Kammann (TXSG). Front Row, Left to Right: Tiffany Pasco (LASG), Nikki Fitzgerald (TXSG), Corley-Ann Parker (TXSG), Mark Shirley (LASG).

Recreational Fisheries

Fishing Guide Survey will Inform Support for Recreational Fisheries

Texas Sea Grant developed and shared a survey for recreational fishing guides to better understand the programming needs of their industry and how Texas Sea Grant could address these needs.

This comprehensive survey collected information on Texas fishing guides' business operations, disaster preparedness, environmental stewardship, and understanding of fisheries management, as well as demographic information. Texas Sea Grant used postcards to encourage participation, mailing them to 1,400 registered fishing guides.

The information gathered from the survey will help develop Texas Sea Grant staff better understand the industry and develop training workshops on topics, such as disaster preparedness and safety, that directly address the needs of the members of this industry.

OUR VISION

Using the information gathered from a recreational fishing guide survey, Texas Sea Grant will create trainings and resources that directly address the educational needs of recreational fishermen, ultimately contributing to greater knowledge and stewardship among anglers.

SELECTED OUTCOMES SUPPORTED

"Commercial and recreational fishermen and aquaculturists are knowledgeable about efficient, sustainable, and responsible tools, techniques and uses of coastal and freshwater resources."

(Source: National Sea Grant 2018-2023 Strategic Plan)

"Greater awareness and understanding of ecosystem functions and services they provide improved stewardship efforts."

(Source: National Sea Grant 2018-2023 Strategic Plan)



SETH PATTERSON



SETH PATTERSON



Results



Fishing guides who took the survey indicated interest in learning about Fisheries Science/Ecology, Fisheries Management, and Environmental Stewardship. Some suggested providing information on boating and angling etiquette.

As a direct result of feedback given in the survey, Alexis Sabine developed an Ethical Angler brochure and a Sustainable Fishing and Environmental Stewardship checklist. As part of Texas Sea Grant's Seaside Chats series, Sabine hosted an ethical angling webinar in partnership with Flatsworthy, a Texas nonprofit dedicated to ethical angling.

Recreational Fisheries

New Fisheries Specialist Joins Texas Sea Grant

Alexis Sabine has joined Texas Sea Grant as the program's new fisheries specialist. She will contribute to a variety of local and Gulf-wide fisheries programs, with a particular focus on the Texas recreational fishing industry.

In this role, Sabine will facilitate knowledge and technology transfer to fishing guides, private anglers, fishing tournaments, and other related industry participants. She is also supporting research efforts on locally important species and fishing practices. This includes research on greater amberjack and on bycatch reduction techniques around the Gulf of Mexico.

"I am so excited to join the Sustainable Fisheries and Aquaculture team and to help advance Texas Sea Grant's important extension work by serving as a link between researchers, local stakeholders and fishing communities," Sabine said. "My goals and interests include building and maintaining connections with the recreational fishing industry, promoting sustainable fishing practices and conducting fisheries research in collaboration with fishermen."



Alexis Sabine weighs a red drum entered in the 2021 Texas International Fishing Tournament.

Revitalizing the Weighmaster Program

Fishing tournaments are enjoyed by anglers of all ages, and recreational fisheries contribute to the Texas economy. For tournaments to run smoothly, judges, known as weighmasters, must effectively and fairly weigh and measure the fish caught. To carry out their duties, weighmasters must have knowledge of a variety of fish species, fishing regulations, and tournament rules.

At the request of coastal residents, Texas Sea Grant is revitalizing and modernizing its weighmaster training program to help saltwater fishing tournaments run

smoothly, ethically, and successfully. Topics that will be included in the curriculum include topics: fish identification, fish condition and freshness, equipment, and the weigh-in process.

Texas Sea Grant staff have been meeting with stakeholders to plan a new curriculum and training program. These meetings will inform a curriculum that will be available in print and video form. Texas Sea Grant is working with current weighmasters to create a video series outlining how to serve as a weighmaster at a fishing tournament.



Veteran weighmaster Kevin Burns serving as weighmaster at the 2021 BACH Fishing Tournament in Surfside, Texas.

OUR VISION

The revitalization of the weighmaster program will train new weighmasters to support the integrity and efficacy of fishing tournaments, effectively positively contributing to an economically and culturally significant Texas industry.

SELECTED OUTCOMES SUPPORTED

"Commercial and recreational fishermen and aquaculturists are knowledgeable about efficient, sustainable, and responsible tools, techniques and uses of coastal and freshwater resources."

(Source: National Sea Grant 2018-2023 Strategic Plan)

"Greater awareness and understanding of ecosystem functions and services they provide improved stewardship efforts."

(Source: National Sea Grant 2018-2023 Strategic Plan)



Healthy Reef and Wetlands

The Addition of Over 50,000 Healthy Cultured Oysters Restore Local Reefs

Oysters provide essential ecosystem services. A single oyster can filter up to 50 gallons of water a day—the amount of water used in a 10-minute shower. However, natural oyster reefs in Texas are at the lowest historic level, and conservation practices are essential to restoring natural reefs.

Through partnerships with Harte Research Institute at Texas A&M–Corpus Christi, Matagorda Bay Foundation, and Copano Bay Foundation, Texas Sea Grant deployed over 50,000 cultured oysters back into the Matagorda and Copano Bay ecosystems to reinforce existing reefs.

“The importance of adding these oysters back into the environment cannot be understated. Oysters are critically important to our ecosystems, and getting more oysters in our ecosystems helps keep our waters healthy,” said Mario Marquez, aquaculture specialist.



OUR VISION

The deployment of 50,000 cultured oysters will help restore and conserve natural oyster reefs, preserving their vital ecosystem services.

SELECTED OUTCOMES SUPPORTED

“Coastal habitats and ecosystems are restored and/or enhanced.”
(Source: Texas Sea Grant 2018-2023 Strategic Plan)

“Biodiversity, habitats and ecosystem functions and services are restored and sustained.”
(Source: Texas Sea Grant 2018-2023 Strategic Plan)



Successful Wetland Strategies

- MANGROVES ARE INCREASINGLY ENCROACHING ON SALT MARSHES.
- TEXAS SEA GRANT-SUPPORTED RESEARCH REVEALS THAT MANGROVES DO NOT PROVIDE AN INTERCHANGEABLE FOOD SOURCE TO EXISTING WILDLIFE IN THESE AREAS.
- THESE FINDINGS PROVIDE CRITICAL DATA FOR RESTORATION PRACTICES.

Restored coastal wetlands provide many important functions, including vital food web support for iconic wildlife and for fishery species that use estuaries as spawning grounds or nursery habitat. Mangroves are becoming more common across the Texas Gulf Coast, largely due to warming winter temperatures. Texas Sea Grant-supported researcher Dr. Anna Armitage studies how these mangroves alter food webs in Texas coastal wetlands.

Armitage’s research found that organisms at the bottom of the food web, such as snails and fiddler crabs, had lower fitness on



diets of mangrove leaves. Predators, such as blue crabs, foraged less effectively among mangroves.

These results reveal that mangrove trees encroaching into Gulf Coast salt marshes are not an interchangeable food source with the marsh plants they are replacing. Furthermore, mangroves are likely to disrupt commercially and recreationally important food webs, and they should not be integrated into restoration projects outside of their naturally occurring range.

The findings were disseminated to restoration practitioners such as the Galveston Bay Foundation and management agencies like the Texas Parks and Wildlife Department. Effective and adaptive restoration strategies could integrate mangroves into restoration projects, where they are likely to have the largest direct benefit to living marine resources, such as fishery species and iconic wildlife, and the food webs that support them.

Partner Spotlights

Over 900 Crab Traps Removed from the Environment

- **944 CRAB TRAPS REMOVED FROM SAN ANTONIO BAY, ESPIRITU BAY, MESQUITE BAY, AND CARLOS BAY.**
- **COLLECTED CRAB TRAPS CONTAINED 567 BLUE CRABS, 707 STONE CRABS, AND 328 FISH.**
- **148 VOLUNTEERS HELPED REMOVE TRAPS.**

Crab season closes annually for a week in February so that derelict crab traps can be removed and discarded through a state-wide program.

For the San Antonio Bay and surrounding areas, removing abandoned crab traps is a priority because they can cause damage to boats and potentially disrupt the ecosystem by trapping wildlife. This process, known as “ghost fishing,” also costs fisheries approximately \$170 thousand annually, reducing landings by 27 percent.

That’s why Texas Sea Grant, particularly Extension Agent R.J. Shelly, works closely with the San Antonio Bay Partnership to promote the cleanup of abandoned crab traps through the Removing Abandoned Traps program. This program focuses on ridding San Antonio, Aransas, Lavaca, and Matagorda Bays of abandoned crab traps.

The 2021 crab trap clean up proved more difficult than most years due to the Texas freeze and associated power outages. Yet, Texas Sea Grant staff coordinated various organizations, and a total of 148 volunteers to clean up crab traps from San Antonio Bay, Espiritu Bay, Mesquite Bay, and Carlos Bay during the 2021 season closure. Collected traps were found containing 567 blue crabs, 707 stone crabs, and 328 fish.

OUR VISION

Texas Sea Grant will work with partners and volunteers to remove abandon crab traps to reduce ecological and economic damage.

SELECTED OUTCOMES SUPPORTED

“Coastal habitats and ecosystems are restored and/or enhanced.”
(Source: Texas Sea Grant 2018-2023 Strategic Plan)

This effort was possible through the partnership of: NOAA, Texas A&M-Corpus Christi Harte Research Institute, the San Antonio Bay Partnership, the Coastal Bend Bays and Estuary Program, the Lavaca Bay Foundation, the Matagorda Bay Foundation, the Mission Aransas National Estuarine Research Reserve, and Texas Sea Grant.



Volunteers at the crab trap clean up with the collected derelict traps.

Serving the Coast with Texas Master Naturalist Volunteers

Since 1997, the Texas Master Naturalist (TMN) program has sought to “develop a corps of well-informed volunteers to provide education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities for the State of Texas.”

There are currently 48 local chapters in 213 counties with over 12,000 certified volunteers. They have garnered many partnerships throughout almost 21 years of service and, with the help of Texas Sea Grant extension agents, TMN has developed multiple education and volunteer efforts that help serve communities along the Texas coast.

In 2020, Master Naturalist Chapters led by Texas Sea Grant agents totaled 61,302 volunteer hours, an over \$1.6 million economic value to coastal communities. In 2020, contributions from this volunteer service include:

- TMN Rio Grande Valley volunteers participated in restoration projects that impacted 120 acres in the Laguna Madre ecosystem.
- TMNs drew awareness to brown pelican mortalities at a highway crossing along the Bahia Grande. As a result, the Texas Department of Transportation replaced barriers along the highway, saving an estimated 200 brown pelicans.
- The Galveston Bay Area TMNs partnered with the Gulf Center for Sea Turtle Research to address the data gaps and research needs for sea turtle conservation in the Gulf of Mexico. TMNs contributed over 1,500 hours of volunteer service, with

an economic impact of \$40,800.

- TMN in Brazoria County organized beach clean-ups to document and remove debris. Over a dozen volunteers collected 147 pounds of marine debris.

TMN support a number of Texas Sea Grant programs, including the National Ocean Sciences Bowl Dolphin Challenge, Red Tide Rangers, and the Monofilament Recovery and Recycling Program.



Texas Master Naturalist Maureen Wilde teaching students at the National Ocean Sciences Bowl Dolphin Challenge quiz bowl.

OUR VISION

Through advising and assistance of Texas Sea Grant staff, Texas Master Naturalists volunteer efforts positively impact the Texas coastal environment and provide educational opportunities.

SELECTED OUTCOMES SUPPORTED

“Coastal habitats and ecosystems are restored and/or enhanced.”
(Source: Texas Sea Grant 2018-2023 Strategic Plan)

“PK-12 students increase their knowledge in coastal and ocean resource issues.”
(Source: Texas Sea Grant 2018-2023 Strategic Plan)

Responding and Adapting

Feed the Fleet Event Gives Back to Fishermen

• **\$5,000 AND 3,330 GALLONS OF DIESEL WERE DONATED TO FISHERMEN AFTER HURRICANE LAURA, WITH THE HELP OF TEXAS SEA GRANT STAFF.**

In the aftermath of Hurricane Laura, Texas Sea Grant joined other Texas and Louisiana groups to provide supplies and food to fishermen of Cameron Parish in Louisiana at the Oct. 5, 2020 Feed the Fleet event.

Cameron Parish, near the Texas border, is where many fishermen call home and make a living. When Hurricane Laura hit on Aug. 27, 2020 the fishermen lost supplies, vessels, and income. Some fishermen even lost their homes

Texas Sea Grant staff worked with local businesses and leaders to get necessary supplies, including water, gasoline, and a meal, to those who needed them.

Over \$5,000 in donations from various individuals and organizations was raised. As a result, meals for over 150 people were provided along with 3,300 gallons of diesel. Canned water was also provided courtesy of Giglio Distributing Company.

This event was possible thanks to the donations and volunteer efforts of the following organizations and individuals: Preston and Andrea Hance (Texas Shrimp Association), Mari Galvan, David Cordy, Zimco Marine, Gerald Pockrus, Bobby Parish, Gary Graham, Triton, Port Arthur Shrimpers Association, Dave Wildin, Stuart Salter, Carlton Reyes, Thuy Vu (Captain Tom's), Ashford Rosenberg of the Gulf of Mexico Reef Fish Shareholders Alliance, Theodore Teske, Erin Hall, Rhonda Cummings, Wesley Moore, James

(Left to right) Laura Picariello, Doreen Badeaux, and Father Sinclair Oubre at the Feed the Fleet event.



OUR VISION

The help provided to those affected by Hurricane Laura, will help fishermen return to work.

SELECTED OUTCOMES SUPPORTED

"Communities employ adaptive management strategies and apply tools to engage diverse members of the community to improve resilience and community sustainability."

(Source: National Sea Grant 2018-2023 Strategic Plan)

Robertson, Giglio Distribution Co., Megan Carter, David Oates, Kevin Savoie and Julie Falgout (Louisiana Sea Grant), Nikki Fitzgerald and Laura Picariello (Texas Sea Grant), Doreen Badeaux, Father Sinclair Oubre (The Apostleship of the Sea), and The Port Arthur Seafarer Center.

Fighting the Freeze

• **TEXAS SEA GRANT STAFF PROVIDED WATER TEMPERATURE DATA TO NOAA THAT HELPED RELEASE COLD-STUNNED TURTLES.**

In February 2021 Texans faced a historic freeze that left many without power and water. The impacts of the freeze were wide-reaching and even experienced by marine life, particularly sea turtles. Nearly 5,000 sea turtles were rescued during the freeze thanks to the efforts of many organizations and volunteers.

These turtle champions included Texas Sea Grant Extension Agent Tony Reisinger and Planning Specialist Kate de Gennaro, who helped stranded turtles and checked water temperatures regularly, trekking knee deep into freezing waters and reporting the findings to NOAA to help determine when to release the turtles back into the water.

According to the National Park Service Division of Sea Turtle Science and Recovery, cold stunning occurs when water temperatures drop below approximately 50°F. Reisinger and de Gennaro measured water temperatures around 44°F at this time.

"We were on Boca Chica Beach near the mouth of the Rio Grande to look for evidence of a fish kill from the cold snap and measure surf temperature when we encountered this cold stunned small green sea turtle, and Kate rescued it," said Reisinger. "We transferred the turtle to volunteers who had rescued around 20 cold stunned greens there. They were taking them to the South Padre Island Convention Center for recovery."

OUR VISION

The help provided to fishermen affected by Hurricane Laura will help them recover the disaster.

SELECTED OUTCOMES SUPPORTED

"NOAA and volunteers received accurate and timely information to successful release cold-stunned sea turtles."

(Source: National Sea Grant 2018-2023 Strategic Plan)



Left: Award to Texas Sea Grant from NOAA for work with cold-stunned turtles.

Above: Texas Sea Grant Planning Specialist Kate de Gennaro assisting a cold-stunned turtle.

Education Spotlight

Promoting Boater and Water Safety

In 2019, 184 boating accidents were reported in Texas, according to the U.S. Coast Guard (USCG). These accidents resulted in 43 fatalities, 122 injuries, and over \$2 million lost.

The Calhoun County Boater Education Program, led by Texas Sea Grant Extension Agent R.J. Shelly, was developed in 2020 to provide hands-on education to prevent boating and water-related accidents. The program allows participants to obtain the Texas Parks and Wildlife Department (TPWD) Boater Education Certification.

This training gave the participants an opportunity to learn about boating safety from a USCG licensed Captain, a TPWD Game Warden, personnel from USCG Station Port O'Connor and the Port of Victoria, Port Lavaca Fire Department, and the USCG Auxiliary.

At this training 53 participants received TPWD Boater Education Certification. One individual who participated in the program later received a USCG Captain's license and is currently employed in a marine industry in Calhoun County.

Additionally, 77 participants between the ages of 6-14 participated in the Basic Water Safety Course. These courses were designed to educate younger children that would be participating in activities on or around water.

OUR VISION

Participants of the Boater Education Program and the Water Safety Course will have better knowledge and skills to safely participate in marine and coastal activities.

SELECTED OUTCOMES SUPPORTED

"Informal education opportunities increase the public's knowledge of coastal and ocean resource issues."

(Source: Texas Sea Grant 2018-2023 Strategic Plan)



Participants get comfortable with floatation devices.



Participants at the Basic Water Safety Course.



Attendees of the Boater Education Program.



Extension Agent R.J. Shelly assisting Boater Education Program attendees with how to properly select and wear a life jacket.

Education Spotlight

YMCA Camp Educates Youth on Marine Issues

The lack of safe youth activities was identified as an issue in Calhoun County, Texas. To address this concern, the Calhoun County YMCA Environmental Summer Camp Program was developed in 2020 to provide a safe, enjoyable hands-on environmental education for Calhoun County youth.

Texas Sea Grant partnered with the local YMCA to implement Camp AWALA (Air, Water, Land), a YMCA youth environmental summer camp, which supported 102 local youth, ages 3-12, from diverse populations.

The camp included saltwater and freshwater ecology activities, fishing, crabbing, kayaking tours, as well as educational sessions on the water cycle, erosion, and delta formation. There were also beach and dune ecology tours, educational kayak tours of marsh ecosystems and hands-on reptile and horticultural activities.



Extension Agent Nicole Pilson teaching campers about marine life.

OUR VISION

Youth in Calhoun County, Texas will gain a greater understanding of Texas coastal and marine resources through the Calhoun County YMCA Environmental Summer Camp Program.

SELECTED OUTCOMES SUPPORTED

“PK-12 students increase their knowledge in coastal and ocean resource issues.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)



Campers enjoying various activities and learning about the coastal and marine environment.

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 (<i>Crassostrea virginica</i>) 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



Research Spotlights

Safety of Slab Home Elevations

**Funded Researcher: Dr. Nur Yazdani,
The University of Texas – Arlington**



Severe flooding has caused

extensive economic losses in coastal communities affected by Hurricane Harvey and necessitated effective flood mitigation, such as elevating residential homes. Dr. Nur Yazdani, in partnership with Texas A&M and the

University of Texas – Arlington, has worked

with local governments, engineers, and contractors to develop a web-based decision tool for home elevations and train stakeholders on the structural safety and benefits of elevated slab homes.

This research aids in understanding stakeholder biases towards home elevation selection, and the tools created from this project will allow access to detailed information about safe home elevation parameters. Homeowners could use the tool to compare retrofit options and community officials can use the information gathered to develop targeted elevation campaigns.

▶ OUR VISION

Homeowners and community leaders will be able use this information to make science-based decisions on home elevation as protection from flooding.

▶ SELECTED OUTCOMES SUPPORTED

“Coastal community residents and leaders and coastal industry decision makers are able to use data and tools for informed decision-making.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

“Coastal decision makers have access to data and information based on sound science that can be implemented in planning processes.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

Comparing Natural and Artificial Oyster Reefs

**Funded Researcher: Dr. Jennifer Pollack,
Texas A&M University – Corpus Christi, Harte
Research Institute**



In Texas, oyster reef restoration

activities have traditionally occurred in subtidal areas to improve effects from commercial oyster harvesting. However, less is known about the ecological role of the intertidal oyster reefs and the potential need for targeted restoration and conservation efforts.

Dr. Jennifer Pollack’s research compares ecological performance of natural and restored oyster reefs in subtidal and intertidal areas and assesses differences in oyster populations and faunal communities.

This research showed that oyster density was similar between restored and natural habitats, and subtidal reefs had lower oyster densities than intertidal reefs. Multiple factors influenced oyster recruitment and growth. This information can provide much needed insight to guide future oyster reef restoration focused on maximizing ecosystem benefits.

▶ OUR VISION

Oyster reef restoration is guided by up-to-date science, enabling successful and ecologically beneficial restoration efforts.

▶ SELECTED OUTCOMES SUPPORTED

“Coastal habitats and ecosystems are restored and/or enhanced.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

“Biodiversity, habitats and ecosystem functions and services are restored and sustained.”

(Source: National Sea Grant 2018-2023 Strategic Plan)

Assessing prawns (*Palaemon spp.*) on the Texas coast

**Funded Researcher: Dr. Mary Wicksten,
Texas A&M University**



Grass shrimp (*Palaemon spp.*) are a

major food source for wading birds and coastal fishes, and they are useful indicators of pollutants, bacterial infections, and salinity. Yet, there is much to learn about these species.

Existing literature is outdated, with the last major survey happening in the 1950s.

This is in part because features used for identification are imprecise, hard to see, or based on deceased specimens.

Dr. Mary Wicksten collected new grass shrimp samples for future research, comparing samples to existing specimens. She and her team obtained and analyzed specimens from Florida to South Padre Island, Texas, including inland waterways. They determined that the freshwater species *P. texanus*, once only characterized based on deceased specimens, is a valid species. Additional genetic comparisons of the species caught will help define the geographic differences in populations.

▶ OUR VISION

Better defining and identifying previously understudied species, such as the grass shrimp, will help scientists and resource managers better understand and, ultimately, manage coastal ecosystems.

▶ SELECTED OUTCOMES SUPPORTED

“Research and extension activities reveal new information to better guide management decisions regarding habitat, ecosystems, and the services they provide.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

Research Spotlights

Particulate Organic Matter in a Texas Subtropical Estuary

Funded Researcher: Dr. Amber Hardison, The University of Texas Marine Science Institute



The Mission-Aransas Estuary (MAE) receives freshwater in sporadic rainfall events interspersed with periods of prolonged drought and low river inflow, a dynamic variation that drives continuous change in MAE ecology. Since 2010, the MAE has experienced an extreme drought and historic flooding, providing a unique research opportunity. To understand the environmental impacts of these changes, Dr. Amber Hardison characterized particulate organic matter, which includes nutrient-rich materials and plankton, in the MAE.

This research showed that phytoplankton increased following storms, suggesting increased estuarine productivity. The research also uncovered a trend of increasing particulate organic matter and chlorophyll concentrations following the flood that ended the 2010-2015 drought, indicating an increase in productivity in the wet period. This drought-to-wet transition period also showed a dramatic response of phytoplankton in certain sites in Copano Bay. Characterizing the dynamics of particulate organic matter is important in understanding how estuarine food webs and fisheries respond to droughts and floods.

OUR VISION

Understanding the effects of extreme weather, such as floods and droughts, on economically and ecologically significant areas will allow resource managers to better predict, prepare for, and mitigate impacts to ecosystems and fisheries.

SELECTED OUTCOMES SUPPORTED

“Research and extension activities reveal new information to better guide management decisions regarding habitat, ecosystems, and the services they provide. (Source: Texas Sea Grant 2018-2023 Strategic Plan)

Improving Flood Prediction

- A TEXAS SEA GRANT-FUNDED RESEARCHER DEVELOPED A NOVEL FLOOD PREDICTION TOOL, SHOWING WHERE FLOOD WATERS MIGHT FLOW.
- THE NEW TOOL INTEGRATES INFORMATION FROM SOCIAL MEDIA TO PREDICT FLOODS.

Funded by Texas Sea Grant, Dr. Ali Mostafavi, assistant professor in the Zachry Department of Civil and Environmental Engineering at Texas A&M University, and his team at the Urban Resilience Artificial Intelligence Lab developed a data-driven flood-prediction algorithm to complement the current hydraulic and hydrologic physics-based flood models. These models look at the physical features of an area, how those features could affect the usual flow of water, and where water might collect and cause potential flooding.

The new tool can accurately predict the flow of floodwater utilizing data from past Harris County flooding events, such as Hurricane Harvey in 2017 and Houston’s Memorial Day flood in 2015. Flood prediction is a critical resource for emergency responders as they plan evacuations and later, rescues.

In addition to utilizing data from water-level reading on flood gauges, the algorithm is also being trained to extract reliable information from social media. “We had 21 million tweets from Harris County alone in 30 days of Harvey” Mostafavi said. Our algorithms are trained to search the data and narrow down to credible sources that provide a



The goal is to make the model open source for other states and disaster response teams to be able to train the model on their own data and then make predictions for their regions.

OUR VISION

The development of a data-driven flood prediction tool will allow community leaders in Harris County to understand how floodwater flows and make planning decisions accordingly.

SELECTED OUTCOMES SUPPORTED

“Coastal community residents and leaders and coastal industry decision makers are able to use data and tools for informed decision-making.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

“Coastal decision makers have access to data and information based on sound science that can be implemented in planning processes.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

specific location, through either text or pictures, and then we can integrate this data into our flood prediction model.”

The goal is to make the model open source for other states and disaster response teams to be able to train the model on their own data and then make predictions for their regions. With the accuracy of the results produced by the flood-prediction tool, Mostafavi and his team of researchers have received funding for additional artificial intelligence and data science-based projects focused on improving the resilience of cities to disasters.



DR. ALI MOSTAFAVI

iSeaTurtle Update

iSeaTurtle App Expands to Track Turtles Over the Entire Texas Coast

Sea turtle lovers and citizen scientists along the Texas coast have an opportunity to provide scientists at Texas A&M University with critical data to understand the distribution of sea turtles in Texas. The iSeaTurtle app allows anyone with a smartphone to alert scientists when they see a sea turtle in Texas waters.

The iSeaTurtle app was originally created by the lab of Dr. Pamela Plotkin, professor and Texas Sea Grant director, to assist with an ecosystem assessment of Matagorda bay, sponsored by the Texas Office of the Comptroller, which would aid the development of science-based solutions to benefit the economy and environment, including sea turtles. Though partnership with Turtle Island Restoration Network (TIRN), the app has expanded its coverage to track turtle sightings over all of Texas' coast.

Following its launch in 2020, the app received numerous logs of sea turtle sightings from fishermen and citizen scientists alike, prompting the desire to grow the app to gather data from the entire Texas coast.

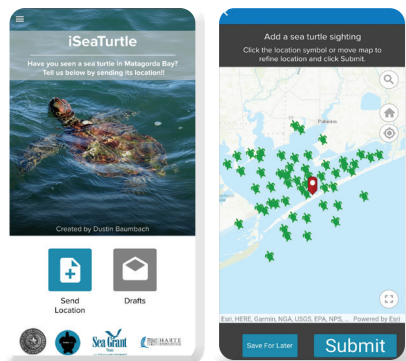
"Turtle Island Restoration Network is thrilled to be part of the iSeaTurtle app to gather critical data on sea turtles in Gulf waters," stated Joanie Steinhaus, gulf program director of TIRN. "Knowing the locations of sea turtles will help scientists save turtles from going extinct, and we hope every Texan will support these paramount efforts."



KIMBER DE SALVO ANDERSON

Instructions on how to download and use the app and an up-to-date map of sea turtle sightings is available at tx.ag/iSeaTurtle.

Screenshots of the iSeaTurtle app.



OUR VISION

The expansion of the iSeaTurtle app creates a greater opportunity for citizen scientists to collect data on turtle observations, providing critical information on turtle habitat that will ultimately help conserve them.

SELECTED OUTCOMES SUPPORTED

"Citizen science efforts provide current data about coastal ecosystems to resource managers and coastal decision makers."

(Source: Texas Sea Grant 2018-2023 Strategic Plan)



Chloe Dannenfels (left) and Dr. Natalie Wildermann (right) with a sea turtle captured in Matagorda Bay.

KIMBER DE SALVO ANDERSON

Research to Action

Protecting Baffin Bay, Working with Locals

Baffin Bay, located about 50 miles south of Corpus Christi, is home to trophy redfish and black drum and critical habitat for migratory birds and other wildlife. However, visitors and residents of the area began to raise concerns over water quality in 2012 because the fish they caught were showing signs of “jelly flesh,” a condition where the muscle tissue appears gelatinous.

This fueled scientific studies to determine the root cause of these water quality issues. Notably, Texas Sea Grant-funded researcher and Chair for Coastal Ecosystem Processes at the Harte Research Institute Dr. Michael Wetz assembled a team of citizen scientists to gather data. Their findings suggested that high salinity paired with bacterial overgrowth and low oxygen resulted in these degraded conditions.

Now, scientists hypothesize that a combination of regional drought, nutrient sources (such as wastewater and septic systems), and nonpoint runoff are contributions to these water quality issues. As scientists began to better understand the root of the problem, it became clear that a Watershed Protection Plan (WPP) was needed to help save the bay. These locally driven plans guide a community’s voluntary efforts to protect and restore impaired bodies of water.

A WPP for Petronila and San Fernando creeks, two of Baffin Bay’s tributaries, was initiated by Texas Water Resources Institute (TWRI), and Texas Sea Grant staff, including Planning Specialist Ashley Bennis, stepped in to engage with locals to develop a WPP.

In 2019, Texas Sea Grant received a grant from the Coastal Bend Bays & Estuaries Program to develop the locally driven “Early Phase Watershed Planning for Baffin Bay.” This led to a series of meetings and conversations that helped identify which best management practices should be included in the plan.

“I have watched the degradation of the Baffin Bay water particularly over the last 40 years. But, in the meetings that [Texas Sea Grant] set up with stakeholders and other people, I actually saw some hope of people being willing to implement some of the things that can be done to improve the water quality that goes into the bay, and I was seeing some movement and interest in people understanding the problem,” said Orville Ballard, long-time Baffin Bay area resident.

OUR VISION

Working closely with Baffin Bay residents on a watershed protection plan ensures that locals have access to science-based information and can take an active role in the planning process, producing an effective plan that protects the Baffin Bay environment.

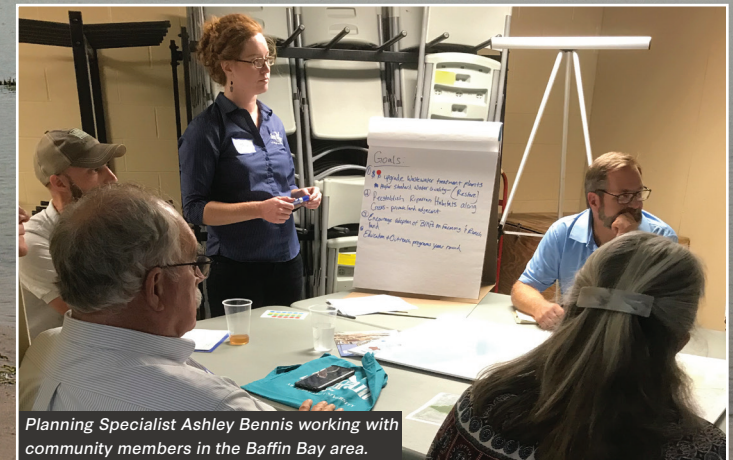
SELECTED OUTCOMES SUPPORTED

“Participants in restoration activities are more knowledgeable about restoration techniques and the value of services provided by healthy ecosystems.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)

“Community residents and decision makers adopt best management practices for water resource management.”

(Source: Texas Sea Grant 2018-2023 Strategic Plan)



Planning Specialist Ashley Bennis working with community members in the Baffin Bay area.

Texas Sea Grant Supports Students

Grants-in-Aid of Graduate Research Program

The 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 **\$49,335** in research grants to **20** graduate students at three Texas A&M University System institutions.

GRANTS-IN-AID OF GRADUATE RESEARCH PROGRAM FY2021-2023

Student	Project Title
Molly Brzezinski Pursuing a doctorate in marine biology Texas A&M University - Corpus Christi	Dermal Toxicity of Photodegraded Polycyclic Aromatic Hydrocarbons
Dillon Campbell Pursuing a doctorate in marine and coastal management and science Texas A&M University at Galveston	The Socioeconomic Implications of Marine Debris in Galveston Bay: Unraveling the Management Strategies and Increasing Public Awareness
Katheryn Campbell Pursuing a doctorate in marine biology Texas A&M University at Galveston	Mineralogical Influence on Microbial Community Composition and Function in Lakes Along the East-West Precipitation Gradient of Texas
Sarah Davis Pursuing a doctorate in marine biology Texas A&M University at Galveston	A Toxic Fate? The Impact of Perfluorooctanesulfonic Acid on the Toxin Production of <i>Karenia brevis</i> and <i>Dinophysis ovum</i>
Elena Duran Pursuing a doctorate in ecology and evolutionary biology Texas A&M University	Avian Sentinels: An Evaluation of Black Skimmer Health in a Persistently Contaminated Region
Ashleigh Epps Pursuing a masters in marine biology Texas A&M University - Corpus Christi	Corals Thriving in Dynamic Environments May Hold Key Insights into Future Coral Reefs
Allyson Girard Pursuing a masters in chemistry Texas A&M University - Corpus Christi	Assessing the Influence of Genotypic Diversity on Sulfur Dynamics in the Seagrass <i>Halodule wrightii</i> Using Stable Isotope Analysis
Alexandra Good Pursuing a doctorate in marine biology Texas A&M University - Corpus Christi	A Risk and Resilience Assessment of Coastal Bend Oyster Reefs from Two Sub-Species of the Eastern Oyster, <i>Crassostrea virginica</i>
Binglin Guo Pursuing a doctorate in environmental engineering Texas A&M University	Characterization of Microplastics/ Nanoplastics in Photochemical Interactions with Natural Organic Matters in the Marine Environment
Tacey Hicks Pursuing a doctorate in oceanography Texas A&M University	Understanding the Chemical Environment of Deep Sea Coral Reefs

Student	Project Title
Asim Bashir Khajwal Pursuing a doctorate in civil engineering Texas A&M University	Trustworthy Crowdsourcing for Rapid Disaster Damage Assessment: Addressing Uncertainty and Enhancing Reliability
Chengxue Li Pursuing a doctorate in marine biology Texas A&M University	Impacts of Hurricane Harvey on Recruitment Dynamics of Eastern Oysters (<i>Crassostrea virginica</i>) in Galveston Bay
Kaden Muffett Pursuing a doctorate in marine biology Texas A&M University Galveston	Impact of a Jellyfish on Gulf Microbial Sediments
Rayna Nolen Pursuing a doctorate in marine biology Texas A&M University Galveston	The Fate and Physiological Effects of Emerging PFAS Pollutants in Coastal and Offshore Pelagic Fish and Marine Mammal Species
Colin O'Donnell Pursuing a masters in marine biology Texas A&M University - Corpus Christi	Genomic Analysis of Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) on Nurdles in Beach Sediment Along Galveston Bay
Sangeetha Puthigai Pursuing a masters in oceanography Texas A&M University	Per and Poly Fluoroalkyl substances in Sea Turtles and Ocean. A One Health Approach
Allison Savoie Pursuing a doctorate in oceanography Texas A&M University	Investigating Changes in Carbonate Chemistry at the Flower Garden Banks National Marine Sanctuary across Five Years
Dominic Swift Pursuing a doctorate in marine biology Texas A&M University - Corpus Christi	Assessing MHC-Associated Mate Choice in the Dusky Smoothhound (<i>Mustelus canis</i>) and Blacktip Shark (<i>Carcharhinus limbatus</i>)
Olivia Thibault Pursuing a doctorate in marine biology Texas A&M University Galveston	Comparison of Invasive and Noninvasive Steroid Hormone Sampling Techniques in Adult Southern Flounder (<i>Paralichthys lethostigma</i>)
David Weber Pursuing a doctorate in marine biology Texas A&M University - Corpus Christi	Epigenetic Biomarkers: A Novel, Non-Lethal Approach to Aging Exploited Fish Species

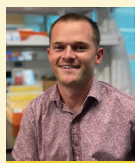
Texas Sea Grant Supports Students

Graduate Student Spotlights

David Weber

PhD student

Texas A&M University - Corpus Christi



Age data are fundamental

to determining life history parameters of fish populations and are critical for fisheries assessment and management.

Despite the importance of accurate age estimates, traditional aging techniques, which typically involve counting growth zones in hard structures, such as otoliths (ear bones), vertebrae, and scales, can be costly, time intensive, and are lethal in the case of collecting otoliths and vertebrae. To better age fish, David Weber is working on developing accurate epigenetic clocks for both red grouper and red snapper in the Gulf of Mexico.

The term “epigenetics” refers to molecular-level mechanisms that affect gene expression without altering the DNA sequence. The number of epigenetic changes to the DNA can indicate age and is known as an “epigenetic clock.” While epigenetic clocks have been developed for two fish species reared in a laboratory (European sea bass and zebrafish), the applicability of epigenetic clocks to wild-caught fishes of management concern remains unknown.

Weber’s research is on the development of an epigenetic aging technique. This would allow for the collection and incorporation of age-specific biological data into stock assessments without the need for lethal sampling. In addition, the use of epigenetic clocks could enable accurate, rapid, and cost-effective age estimation in thousands of individuals.

Maureen Hayden

PhD student

Texas A&M University



Marine debris and

microplastics have now been found in marine environments ranging from the open ocean, pelagic waters, and beach sediments. The prevalence of

microplastics in the marine environment has raised concern about how they interact with marine life, with one of the most pressing concerns being how likely marine life are likely to ingest them.

There have been few studies of the effects of microplastics on invertebrates along the Texas coast. Such invertebrates include amphipods, shrimp-like crustaceans that occur in enormous numbers and play a crucial role in beach communities as decomposers among debris and dead plant material cast ashore.

Maureen Hayden studies the effects of microplastic pollution on amphipod populations on Texas beaches. These amphipod populations can serve as indicators of plastic pollution, and ingestion of microplastics in their natural environment may be affecting their physiology.



Sangeetha Puthagai

Masters student

Texas A&M University



Per- and polyfluoroalkyl

substances (PFAS) are chemicals that are resistant to water, oil, and heat, and have non-stick properties. These characteristics make PFAS

useful chemicals in a wide range of products—from food wrappers and cooking pans to waterproof clothing and fire-fighting foams. The carbon-fluorine bond that constitutes the chemical backbone of PFAS molecules is one of the strongest bonds in nature. Therefore they are virtually impossible to break down, earning them the nickname “forever chemicals.”

Through consumption and disposal of products containing PFAS, these forever chemicals find their way into our bodies and the environment, including the oceans. PFAS have been linked to several health concerns in humans including possible increased risk of kidney disease and reproductive system disorders, and they are starting to be found in marine animals such as sea turtles and certain seabirds.

Sangeetha Puthigai is analyzing levels of PFAS in sea turtles on the Texas coast. Recently, Puthigai and other researchers analyzed tissue samples from sea turtles that had succumbed to the 2021 Texas winter freeze. She is also working on developing a means of detecting PFAS from skin samples instead of blood samples, which is typically done.

Texas Sea Grant Supports 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 2020, Texas Sea Grant awarded \$7,000 in research grants to seven undergraduate students.

In 2020, Texas Sea Grant awarded \$7,000 in research grants to 7 undergraduate students.

TEXAS SEA GRANT SCHOLARS 2020 RECIPIENTS	
Student	Project Title
Leah Bogan Marine Biology Texas A&M University at Galveston	Comparative Analysis of Fin Whale Tag Data through Machine-Based Learning
Santiago Canel Soria Environmental Geoscience Texas A&M University	Screening for Per- and Polyfluoroalkyl Substances (PFAS) in Sea Turtles Blood and Tissue Samples
Timothy Chomiak Marine Sciences Texas A&M University at Galveston	Cavity Ring-Down Spectroscopy as a Method for Studying Dissolved Inorganic Carbon (DIC) Cycling in Aquatic Systems
Edsel Santoni Delgado Marine Biology Texas A&M University at Galveston	Melanophore Response and Behavior of the Marine Isopod <i>Sphaeroma quadridentatum</i> in the Presence of a Common Estuarine Predator Species
James Scolley Marine Biology Texas A&M University at Galveston	Zooxanthellae Counts in Bleached Coral
Madeleine Thompson Marine Biology Texas A&M University at Galveston	Viral Activity and Its Role on Prokaryotic Communities within Anoxic Ecosystems
Brianne Wharton University Studies (Oceans and One Health Concentration) Texas A&M University at Galveston	Constraining Dissolved Organic Matter Fluxes from the Houston/Galveston Watershed to the Gulf of Mexico

Community Engaged Internship Program

Two undergraduate students, Alexis Guidroz and Shadrach Villafranca, completed summer internships through the new Texas Sea Grant Community Engaged Internship Program (TXSG-CEI).

The TXSG-CEI is an opportunity for undergraduate students from underserved and/or underrepresented or indigenous communities, to gain experience and mentorship in an area of interest specific to each student. This internship is part of a national Sea Grant-wide effort to broaden participation in marine and coastal professions to the next generation of scientists and decision-makers.

Guidroz, an undergraduate student studying environmental biology at the University of Houston-Clear Lake, worked in Galveston under the mentorship of Texas Sea Grant's Distinguished Extension Agent Julie Massey to learn more about environmental research.

Villafranca, an undergraduate student majoring in marine biology at the University of Texas Rio Grande Valley (UTRGV), worked with Texas Sea Grant Extension Agent Tony Reisinger and Planning Specialist Kate de Gennaro to gain valuable field experience in restoration and conservation efforts throughout the Rio Grande Valley, especially with fisheries and aquaculture.

Both Guidroz and Villafranca completed a professional development series, focusing on networking and building relationships with local community members. The interns also completed a project to extend the knowledge of community stakeholders to address coastal issues of environmental, economic, and social importance.

OUR VISION

Students from underrepresented communities, who complete the Community Engaged Internship will receive valuable mentorship and training that will help them advance their careers related to coastal and ocean science.

SELECTED OUTCOMES SUPPORTED

"Students complete their studies and find employment in STEM fields."


(Source: Texas Sea Grant 2018-2023 Strategic Plan)



Top: Alexis Guidroz with her mentor, Extension Agent Julie Massey.
Bottom: Shadrach Villafranca (left) attending an oyster farming workshop.

Resilient Communities and Economies

Texas Sea Grant Staff Assist Coastal Businesses with CARES Act Loan Applications

 COVID-19 had significant negative impacts on the economy, particularly to local and small businesses.

Programs such as the Paycheck Protection Program (PPP) and U.S. Small Business Administration (SBA) loan programs offered businesses economic relief during these times. Yet, the process to apply for these loans was not well understood by many local businesses along the coast, and many businesses tried and failed to receive PPP loans.

In collaboration with the National Sea Grant Law Center, Texas Sea Grant distributed CARES Act information to Texas fisheries and businesses and assisted business owners in applying for PPP loans.

Texas Sea Grant translated information about PPP and SBA applications into Spanish and Vietnamese for local commercial fishermen. Additionally, extension agents served as liaisons for the CARES Act loans and grants programs.

In Calhoun County, Texas Sea Grant assisted six fishing guides in understanding the National Sea Grant Law Center PPP Tip Sheet for Texas Fishing Guides. Direct engagement in Calhoun County resulted in six guides successfully obtaining a PPP loan at approximately \$10,000 per loan. The total impact for Calhoun County alone was \$60,000.00.

In the Port Arthur area, two businesses received \$22,000 in PPP loans resulting in grants that enabled them to retain 14 employees and hire one new employee.



*As a result of Texas Sea Grant's efforts, Texas coastal businesses received approximately **\$4,582,000 in PPP loans**, retaining approximately **390 jobs** and **25 businesses**.*

OUR VISION

After receiving assistance from COVID-19 relief programs, Texas coastal businesses will adapt economically and continue to operate profitably despite challenges associated with COVID-19.

SELECTED OUTCOMES SUPPORTED

"Communities have access to tools, services and technologies to adapt and grow resilient economies."

(Source: National Sea Grant 2018-2023 Strategic Plan)

"Coastal decision makers and individuals make use of programs and best practices to decrease vulnerability to hazards."

(Texas Sea Grant Strategic Plan 2018-2023)



PHOTOS BY SETH PATTERSON



Texas Sea Grant Planning Specialists have provided their expertise to many communities to promote resilience. In 2019 and 2020 these efforts saved community partners over \$400,000. One such effort includes the City of Hitchcock's plan, which received the 2020 Comprehensive Plan: Rural Planning Following Hurricane Harvey from the American Planning Association (Texas Chapter).



Staff map

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Director



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MIA ZWOLINSKI
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MARIO MARQUEZ
*Aquaculture Specialist
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JULIE MASSEY
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JOHN O'CONNELL
*Extension Agent
Brazoria County*



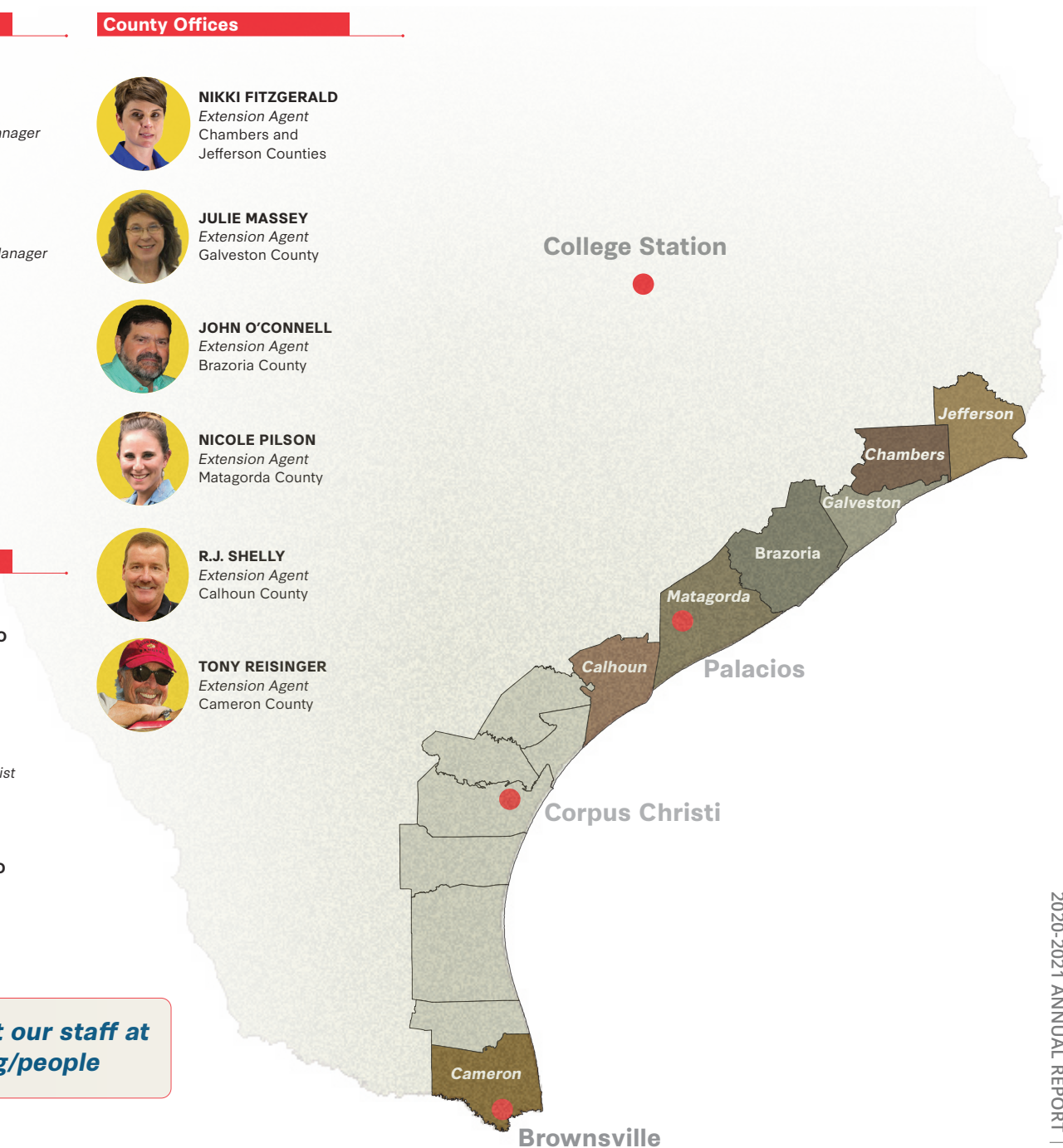
NICOLE PILSON
*Extension Agent
Matagorda County*



R.J. SHELLY
*Extension Agent
Calhoun County*



TONY REISINGER
*Extension Agent
Cameron County*



Learn more about our staff at
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