

Texas Shores

2025

Vol. 47

Generational Fishing Legacies and Changing Fisheries

A LIVELIHOOD AT STAKE

PG. 18



LETTER FROM THE DIRECTOR



Dear Friends,

It feels especially good to say this: Welcome back to Texas Shores.

It has been a few years since our last issue in 2021 and much has happened along the Texas coast and within Texas Sea Grant during that time. Like many of you, we have spent these years adapting, rebuilding, and finding new ways to support the communities we serve. While our work never slowed down, we have missed using these pages to share the stories of our progress with you.

This publication has always been about more than updates or research highlights. It's about the people behind the work—our coastal residents, fishermen, scientists, educators, and partners—whose dedication makes the Texas coast such a special place.

A New Chapter of Leadership

It is with deep humility and honor that I introduce myself as the Director of Texas Sea Grant, having officially stepped into this role on October 1, 2025. My journey here began in 2018. Over the years, serving as a Fisheries Specialist and later as the Director of Sustainable Fisheries and Aquaculture and Extension Leader, I have had the privilege of working directly with the people and ecosystems that make our coastline so unique. Most recently, serving as Interim Director for the past year has provided me with an even broader perspective on the vital work we do. Through these roles, I have developed a deep love for the Texas coast, but even more so, a profound admiration for our hard-working team. Their unwavering dedication to research, education, and extension is what allows us to strengthen Texas coastal communities and protect our precious marine environments.

As we've looked back on the past few years, we've been proud of the progress made across our four focus areas as you will read in the coming pages. Behind it all has been the same steady commitment: to serve Texas with science, partnership, and heart. Restarting this magazine feels like the right way to celebrate that work and to reconnect with you. I hope that this issue feels like catching up with an old friend: like watching the tide return to a familiar stretch of beach—steady, refreshing, and exactly where it belongs.

As we look to the future, our mission remains clear: to bridge the gap between complex coastal science and the everyday needs of Texans. We are committed to:

- **Empowering Communities:** Providing local leaders and residents with the tools they need to build resilience against a changing environment.
- **Advancing Science:** Funding innovative research that addresses the most pressing challenges facing our Gulf waters.
- **Supporting the Workforce:** Ensuring our coastal industries and economies remain sustainable and prosperous for generations to come.

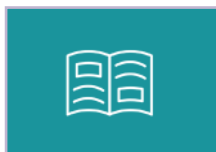
I am eager to lead this talented team into our next chapter. Whether you are a long-time reader of Texas Shores or discovering us for the first time, I thank you for your continued support of Texas Sea Grant. We're excited to share this next chapter with you and, together, we can ensure a vibrant and healthy Texas coast.

Warmly,



Laura Picariello

Director, Texas Sea Grant College Program



To View Past Issues, visit our Publications page on the Texas Sea Grant website at Texasseagrant.org/publications.

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Texas Sea Grant 2024 Impact At-A-Glance



Serving over 360 miles of coastline and over 7 million coastal residents

Who We Are

Texas Sea Grant delivers science-based solutions that help coastal communities, industries, and ecosystems thrive. Since 1970, we've connected the best available research with the people who depend on a healthy, productive Texas coast.



837

ACRES OF COASTAL HABITAT
RESTORED, ENHANCED OR
PROTECTED

407

RESOURCE MANAGERS USED
ECOSYSTEM-BASED
APPROACHES



233

COMMUNITY LEADERS ATTENDED A
RESILIENCE TRAINING OR
EDUCATIONAL EVENT

34

COMMUNITIES ADOPTED/
IMPLEMENTED SUSTAINABLE
ECONOMIC OR ENVIRONMENTAL
PRACTICES

**Total
Economic Benefit
\$125.1M**

*More than \$3.1 million
in federal research
funding dedicated to 6
research projects in
2024 - 2026*



1,377

FISHERMEN, SEAFOOD
INDUSTRY, OR AQUACULTURE
PERSONNEL MODIFIED THEIR
PRACTICES

\$5.2M

ECONOMIC BENEFIT FROM
SUPPORTING THE CREATION OF
6 MARICULTURE BUSINESSES



68K

ENGAGED IN TXSG-SUPPORTED INFORMAL
EDUCATIONAL PROGRAMS



450

TXSG-SPONSORED MEETINGS, WORKSHOPS,
EDUCATIONAL EVENTS



47K

K-12 STUDENTS REACHED



66K

VOLUNTEER HOURS CONTRIBUTED



\$2.2M

ECONOMIC IMPACT OF VOLUNTEER HOURS

THE WORK BEHIND THE WAVES

Texas Sea Grant's work supports Texas' natural resources, economy, and communities—from the coast to inland waterways. To reflect the breadth of our impact, our programs and partnerships are organized into four focus areas. Each icon represents a core pathway through which we serve Texans, connect science to solutions, and build a more resilient future.

These four icons will appear throughout this issue of Texas Shores and across our communications and educational materials. Each one represents the primary focus area of the work featured. However, Texas Sea Grant's projects often span multiple disciplines—so while one icon may take the lead, other focus areas may also apply.



Sustainable Fisheries and Aquaculture

Ensures thriving fisheries, responsible aquaculture and a safe and sustainable supply of seafood through research, innovation, and direct support for coastal producers and fishing communities.



Healthy Coastal Ecosystems

Supports science and community partnerships that protect, restore, and enhance the resilience of Texas' coastal habitats and wildlife.



Resilient Communities and Economies

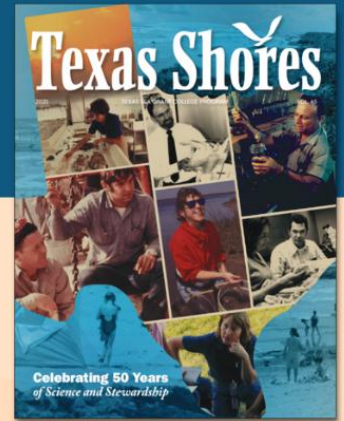
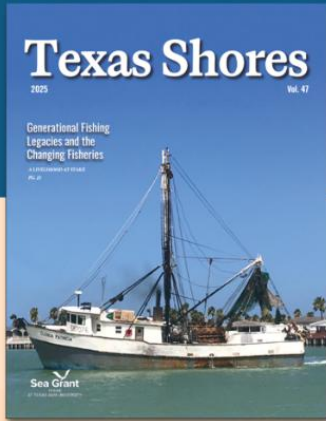
Supports the development of innovative policies, management strategies, and community-based solutions that strengthen resilience and increase preparedness in the face of coastal hazards.



Environmental Literacy and Workforce Development

Invests in education, training, and hands-on opportunities that empower Texans of all ages to become informed coastal stewards and future leaders.

Texas Shores



Don't Miss an Issue!

Over the years, subscriber addresses have changed, organizations have shifted, and many readers stopped receiving their magazine without realizing it. To better serve our engaged audience and ensure our content always reaches you, we're moving to a digital format unless you let us know you prefer print. If you already have filled out the post card sent to you in November, please disregard this notice, we have your preference submission.

If you'd like to continue receiving the print edition, please update your mailing address preferences by **May 1, 2026**.

Update Your
Subscriber
Preference Here





RESEARCH

Resilient Communities and Economies

WATER LEVEL SENSORS HELPING COMMUNITIES STAY AHEAD OF RISING WATERS

During Hurricane Beryl, the sensor provided unexpected insight. The hurricane was heading further north.

Beginning in June 2023 and continuing into 2025, a series of water level sensors were installed at five vulnerable coastal locations across Texas. These small devices have potentially life-saving impacts. The goal was simple: collect real-time data at the locations that flood most

often, and use that data to inform local decision makers as events take place and build predictive artificial intelligence (AI) models to help residents and first responders make better decisions. [Pictured: Coastal and Marine Agent R.J. Shelly and Dr. Phillipe Tissot.]



HOHONU, A HAWAII-BASED MANUFACTURER PROVIDES THE WATER LEVEL SENSORS



OTHER PARTNERS





Listening to the Community

This effort, led by Dr. Philippe Tissot at the Conrad Blucher Institute for Surveying and Science (CBI) at Texas A&M University-Corpus Christi, and supported by the National Science Foundation and Texas Sea Grant, has already provided critical insights and prompted further interest from local and state officials. From the beginning, the project was grounded in collaboration

with community members. Extension agents RJ Shelly, Amy Nowlin, and Pat Cruz worked with stakeholders such as emergency management personnel and local residents to identify high-risk locations. This grassroots input helped guide the installation of five sensors: four funded by Texas Sea Grant and one supported by the National Science Foundation AI Institute focused in part on coastal

oceanography, AI2ES.

The sensors were not randomly placed. Instead, they were positioned at known flood zones like Six Mile Park, Rockport's Little Bay, and Calhoun County's Ocean Drive near Magnolia Beach—areas where roads flood, vehicles are at risk, and emergency access can be cut off.

One of the most important sensor placements was in Calhoun County, near

Magnolia Beach, where Ocean Drive frequently floods during high tides. The road services around 120 residents who can become isolated during flood events, especially dangerous at night when emergency vehicles risk getting stuck or delayed.

“When we get high tides [on Ocean Drive] it becomes a huge public safety issue,” said Shelly. “Having a model like this here can prevent people from driving into a flooded roadway, or even help first responders get to a scene quicker if they know this particular road is going to be flooded and they need to plan a different route.”

The Magnolia Beach sensor employs engagement from the local community, especially the Magnolia Beach Volunteer Fire Department. Whenever water levels begin to rise near Ocean Drive, fire department volunteers send time- and date-stamped photographs to RJ Shelly. These images capture what the road conditions look

like in real-time as flooding begins to occur over the roadway. RJ then forwards the photos to Dr. Tissot and his research team at the CBI in Corpus Christi.

By matching the timestamps on the photographs with the exact water level readings from the nearby sensor, the researchers can pinpoint the “break point”, or the specific water level at which the road gets inundated by water and transitions from passable to flooded. This is critical information to provide warnings and for developing the AI model for Ocean Drive, as it helps define the threshold where flooding becomes a public safety hazard. This partnership has helped researchers gather not only raw data, but meaningful context about what flooding looks like on the ground and what other factors may drive this local flooding such as precipitation, high winds or nearby river flow.

Over time, as more flooding

Dr. Phillipe Tissot,
Texas A&M University - Corpus
Christi Conrad-Blucher Institute



“

“As coastal inundation becomes more frequent, what tools are helpful?”

Dr. Phillipe Tissot

events are documented with photo evidence and corresponding sensor data, the research team can refine the model to predict road flooding more accurately, even under routine high tide conditions. This level of detail allows for a highly localized prediction tool that can ultimately be shared with first responders and county officials to improve response times and avoid unnecessary risk.

This citizen-informed approach not only strengthens the science behind the project but also ensures the model is grounded in real-world experience. As Dr. Tissot's students continue working with this community-generated dataset, it's paving the way for a model that's technically robust and deeply practical. The opportunities for local emergency decisions are best taken when supported with reliable data and these installations are demonstrations in that direction.

An Unexpected Bonus: Real-Time Insight During a Storm

While the AI model is focused on non-storm scenarios, the system delivered an unexpected benefit during Hurricane Beryl. As the storm approached, the sensor at Six Mile Park recorded a rapid five-foot drop in water levels, indicating that water was being pulled away from the area and the worst of the storm was likely shifting north.

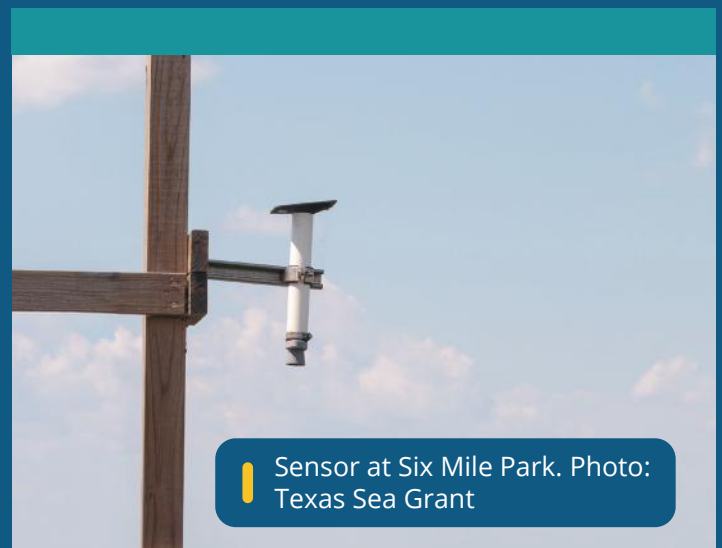
"It wasn't what the model was designed for, but the Six Mile Park sensor was priceless that night," said RJ Shelly. "You could tell the storm wasn't coming here and we had proof in real time."

Looking Ahead to Building a Smarter Coastal Future

Each sensor, leased for about \$3,000 per year from Hawaii-based company Hohonu, streams data directly to the cloud and updates every few minutes. Their affordability and accuracy have already drawn interest from agencies like Texas Department of Transportation (TXDOT) and the National Weather Service, which are exploring the sensors' potential for broader flood response planning.

This is just the beginning. As Dr. Tissot's team works with local officials, emergency responders, and volunteers like the Magnolia Beach Volunteer Fire Department, the project is creating a blueprint for future flood response, combining AI, local knowledge, and scalable technology.

"As coastal inundation becomes more frequent, what tools are helpful?" Dr. Tissot asks. This project is offering a clear answer: real-time data at the right place and the right time.





RESEARCH

Sustainable Fisheries and Aquaculture

MERCURY AND SELENIUM IN TEXAS SEAFOOD SHAPE THE SAFETY OF WHAT WE EAT

Tracking toxins and protectants in the fish Texans rely on

Mercury in fish
poses health
risks

Current
advisories
focus only on
mercury

Selenium may
offset mercury
risk in some
fish species

High mercury
levels found in
popular species

Research informs
public outreach
and policy

Key Takeaways

When Dr. Jessica Dutton, a marine ecotoxicologist, at Texas State University, steps onto a fishing pier or into a cleaning station along the Texas coast, she is not there for the catch of the day in the usual sense. Her prize is a sliver of fish muscle, a biological bookmark in the story of how two trace elements, mercury (Hg) and selenium (Se), interact in seafood that we consume.

When Dutton moved to Texas in 2015, she quickly noticed a gap in understanding. “At the time, there had only been a few studies investigating mercury concentrations in bay and offshore fishes, and no study had investigated selenium concentrations or calculated Se:Hg molar ratios and HBVSe values,” she said. “This was a knowledge gap that needed to be addressed.”

That realization set her on a course of research that began in 2016, when she started collecting samples and analyzing them for mercury. “Through the support of Texas Sea Grant,” she added, “I have been able to expand that research and include selenium as well.”

Mercury is a nonessential trace element that bioaccumulates in fish and shellfish and biomagnifies in estuarine and marine food webs. More than 80 percent of the Hg in fish muscle can be in the form of methylmercury (MeHg), a potent toxin that can affect the brain, cardiovascular system and developing fetuses. Humans are primarily exposed to Hg through the consumption of contaminated seafood.

State and federal agencies issue consumption advisories when Hg levels exceed established thresholds: 0.3 µg/g for the Environmental Protection Agency (EPA), 0.7 µg/g for the Texas Department of State Health Services (TDSHS), and 1.0 µg/g for the Food and Drug Administration (FDA).

Mercury advisories in the United States are issued based on Hg concentrations alone, but Se—an essential trace element—has an antagonistic relationship with Hg. Selenium can form a toxicologically inert Hg-Se complex. Scientists are investigating whether Se levels, expressed in Se:Hg molar ratios and Health Benefit Values (HBVSe), could be used as an additional seafood safety criterion. A Se:Hg molar ratio greater than 1:1 suggests that selenium may have a protective effect against mercury toxicity, whereas a ratio less than 1:1 indicates that selenium may not have a protective effect against mercury toxicity. A positive HBVSe suggests there may be health benefits from consuming that species, whereas a negative value indicates there may be health risks associated with its consumption.

Since 2016, Dr. Dutton and her team have collected muscle samples from 25 fish species such as greater amberjack, cobia and great barracuda at fishing tournaments and cleaning stations along the Texas coast. They recorded body length, calculated moisture content, measured mercury concentrations using a direct mercury analyzer and measured selenium concentrations using microwave acid digestion and ICP-MS analysis. The team then calculated Se:Hg molar ratios and HBVSe values to investigate



Why It Matters

“The goal of this project is to provide awareness, so people can make informed decisions about the type of seafood they consume.”

- Dr. Jessica Dutton

differences in the values within and among species.

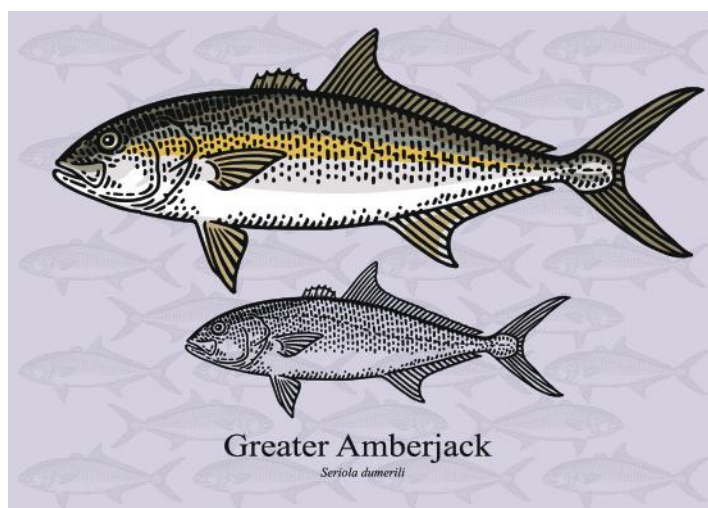
The result is what Dutton describes as “the largest dataset that I am aware of — over 4,000 samples — and all from one area, the Texas coast.” That scope is crucial for assessing seafood safety. “Before we can determine whether Se:Hg molar ratios and HBVSe values can be used in risk assessment, several large case studies are needed,” she explained. “For most species, there is large variability in the Se:Hg molar ratios and HBVSe values within and among body lengths, and therefore they may not yet be useful seafood safety criteria in risk assessment. Only future research will tell.”

The findings show that many popular offshore species have a high percentage of individuals exceeding federal and state mercury advisory levels. For example:

- ✓ Greater amberjack: mean Hg concentration 1.10 µg/g wet weight; 86.9% exceeded the TDSHS advisory level, 52.2% exceeded the FDA advisory level.
- ✓ Great barracuda: mean Hg concentration 0.89 µg/g wet weight; 65.2% exceeded the TDSHS advisory level, 31.8% exceeded the FDA advisory level.
- ✓ Cobia: mean Hg concentration 0.97 µg/g wet weight; 60.7% exceeded the TDSHS advisory level, 39.3% exceeded the FDA advisory level.

Although the mean Se:Hg molar ratio was greater than 1:1 in all three species, 2% of barracuda and 15.7% of cobia had a ratio less than 1:1, indicating that Se may not have a protective effect against Hg toxicity in all individuals within these species. Furthermore, 2% of great barracuda and 15.7% of cobia had a negative HBVSe, indicating there may be health risks associated with their consumption.

For Dutton, the importance of this research goes beyond data collection; it's about helping Texans make informed seafood choices. “We



are encouraged to consume fish because it's high in protein and omega-3 fatty acids and low in saturated fat,” she said. “However, depending on the species you eat, you may be exposed to high concentrations of mercury. The goal of this project is to provide awareness, so people can make informed decisions about the type of seafood they consume.”

Dutton's work extends beyond the lab to public outreach and education. Through the Texas Seafood Mercury Study, founded in 2022, she shares findings on Instagram (@hgtxseafood), a pocket-sized Hg in seafood consumption guide, and later this fall, through a multilingual website in English, Spanish and Vietnamese (www.texasseafoodmercurystudy.com).

The project has included collaborations with fishing tournaments, the Harte Research Institute, and Dartmouth College, involved seven graduate and four undergraduate students, and contributed to conference presentations, a thesis, and forthcoming publications. Dutton hopes that continued research and public engagement will lead to better-informed advisories and healthier choices for seafood consumers.

SERVING OUR COASTS

Texas Sea Grant supports marine- and coastal-related research, education, and outreach that promote sustainable use, conservation, and stewardship of Texas's coastal and ocean resources —offering service-oriented solutions grounded in sound science.

INTEGRATING RESEARCH AND EXTENSION

At Texas Sea Grant, *serving our coasts* means putting applied science into action to create practical solutions that support sustainability, resilience, and thriving coastal communities. We work hand-in-hand with scientists, local leaders, and residents to preserve the quality and abundance of our coastal and marine resources —balancing environmental stewardship with economic vitality.

From supporting the seafood industry and recreational fisheries to addressing critical issues like habitat loss, water quality, and climate resilience, our programs are rooted in service and grounded in community. Everything we do is about making science work where it matters most: in the hands of the people who live, work and rely on the Texas coast every day.

FIND YOUR
COUNTY'S AGENT
OR SPECIALIST AT
[HTTPS://TEXASSEAGRANT.ORG](https://TEXASSEAGRANT.ORG)



Marine & Coastal Agent, Pat Cruz, assisting attendees for a youth education event. Photo: Nic Perez, Texas Sea Grant



@TEXASSEAGRANT





FEATURED STORY

Sustainable Fisheries and Aquaculture

HOW TEXAS' GULF COAST FISHERIES ARE ADAPTING TO A SHIFTING INDUSTRY

Looking Through the Eyes of the People who Make the Industry

On the Gulf Coast of Texas, generations of families have gone out to sea before sunrise, hauling in shrimp that fed local communities and helped power the state's economy. Over the past century, the industry has been shaped and reshaped by regulations, environmental disasters, and international competition. Survival in this business demands creativity, resilience, and a willingness to adapt.

For many shrimping families, adaptation has meant responding to multiple pressures at once. "There is not 'just one problem' with the shrimping industry," wrote Tricia Kimball, whose husband, Kyle Kimball, and family has worked the Gulf for three generations. "There are a myriad of issues"—from market competition and regulation to rising costs and environmental change—"all stacking on top of each other."

Kimball explained how the effects ripple far beyond boat owners. "It is not just boat owners that lose out when boats are lost. The deckhands, fuel dock owners, netmakers, and businesses that sell boat electronics and boat supplies all lose income. Many businesses that rely on the shrimping industry have seen

declining revenues. The harsh economic climate in shrimping has had a negative effect on the coastal community. As boats are lost, those that worked them often move off in search of different and better opportunities."

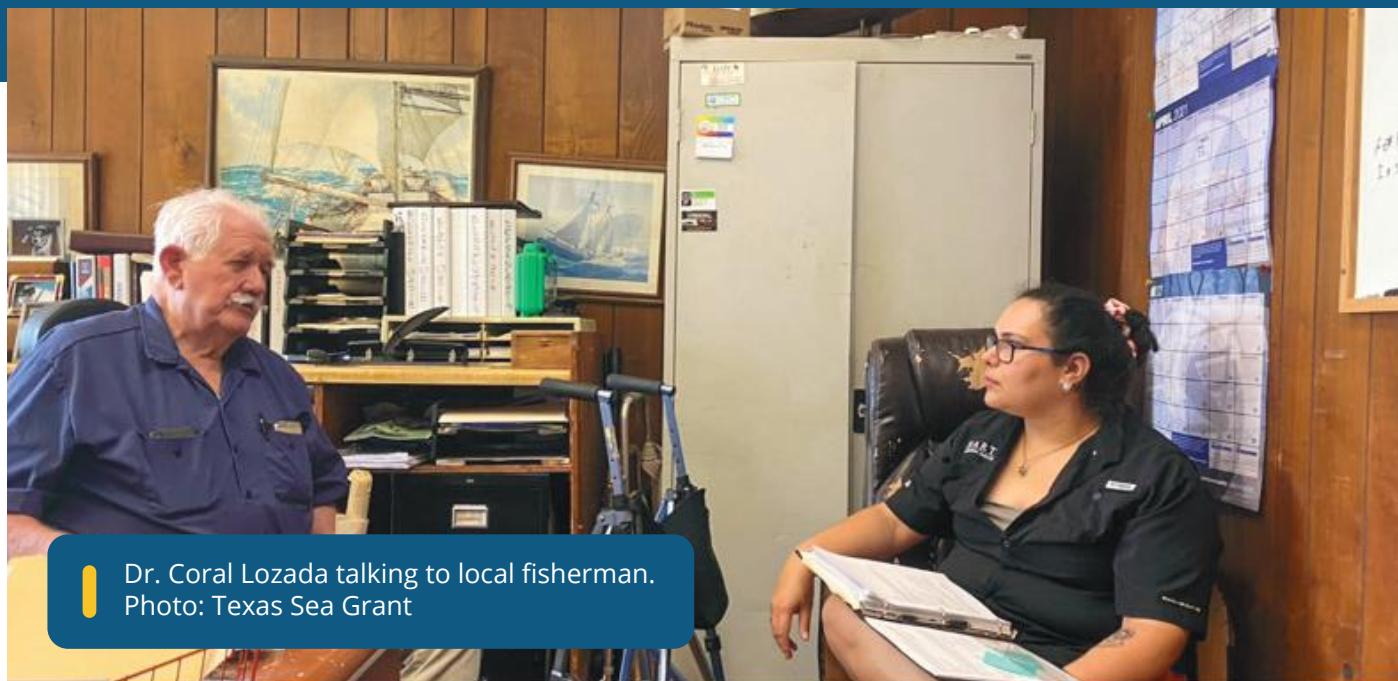
She added that the generational connection to shrimping is strong: "Those shrimpers that remain hold out hope that better days will come for the industry. For the older shrimpers, it is hard to leave a way of life that they love and in which they have invested their whole lives. The industry is now trying to engage younger fishermen back into shrimping. The Young Fisherman's Development Act is trying to give young people who are interested in seafood harvesting, like shrimping, the skills that they need to become fishermen and fisherwomen. Older fishermen are coming forward to mentor them and help them develop the skills they need to be successful. Recently, there have been two cohorts of future seafood harvesters, one out of Galveston, supported by Texas Sea Grant to encourage and support the next generation of commercial fishermen. Entry into the shrimping industry tends to be cost-



Why It Matters

“Being able to listen and see the policies that I had learned in my academic career, that were supposed to be a boon to the environment, from their lived experience really drove home the need to for an all-hands-on-deck approach to policy.”

- *Dr. Coral Lozada*



Dr. Coral Lozada talking to local fisherman.
Photo: Texas Sea Grant

prohibitive, and it is necessary to gain real-world skills as young shrimpers try to get into the fishery.”

The economic pressures are stark. “In 1990, U.S. shrimpers had a 50% market share in the U.S. Since then, it has dropped to only 4%, which means 96% of all shrimp sold in the U.S. are imports,” Kimball noted. “With plummeting prices for shrimp because of the aggressive dumping of imported shrimp onto our market, dock prices for shrimp in Southeast Texas have dropped precipitously, driving out long-time shrimpers from the industry.”

On top of market pressures, technology and infrastructure challenges persist. “Although our members are interested in trying new gear and state-of-the-art net materials, they often cannot afford to make these changes and have to continue to use outdated

equipment. Most of the vessels are also made in the 1990s or before due to newer Coast Guard requirements. Building a new vessel is now cost-prohibitive, and they just stick with their older vessels out of necessity. Although it is hard to teach an old dog new tricks, the shrimpers are interested in new fishing practices,” Kimball said.

Showing how the Texas shrimping tradition has faced constant pressure, a researcher from Texas Sea Grant, Dr. Coral Lozada, with support and guidance from Fisheries Specialist Laura Picariello, and Extension Agent Christine Hale, documented how shrimpers have weathered these changes. By mapping a historical timeline of policies and their impacts, they captured not just the rules and regulations, but also how those decisions affected the people who make their living on the water.

Dr. Coral Lozada Dives In

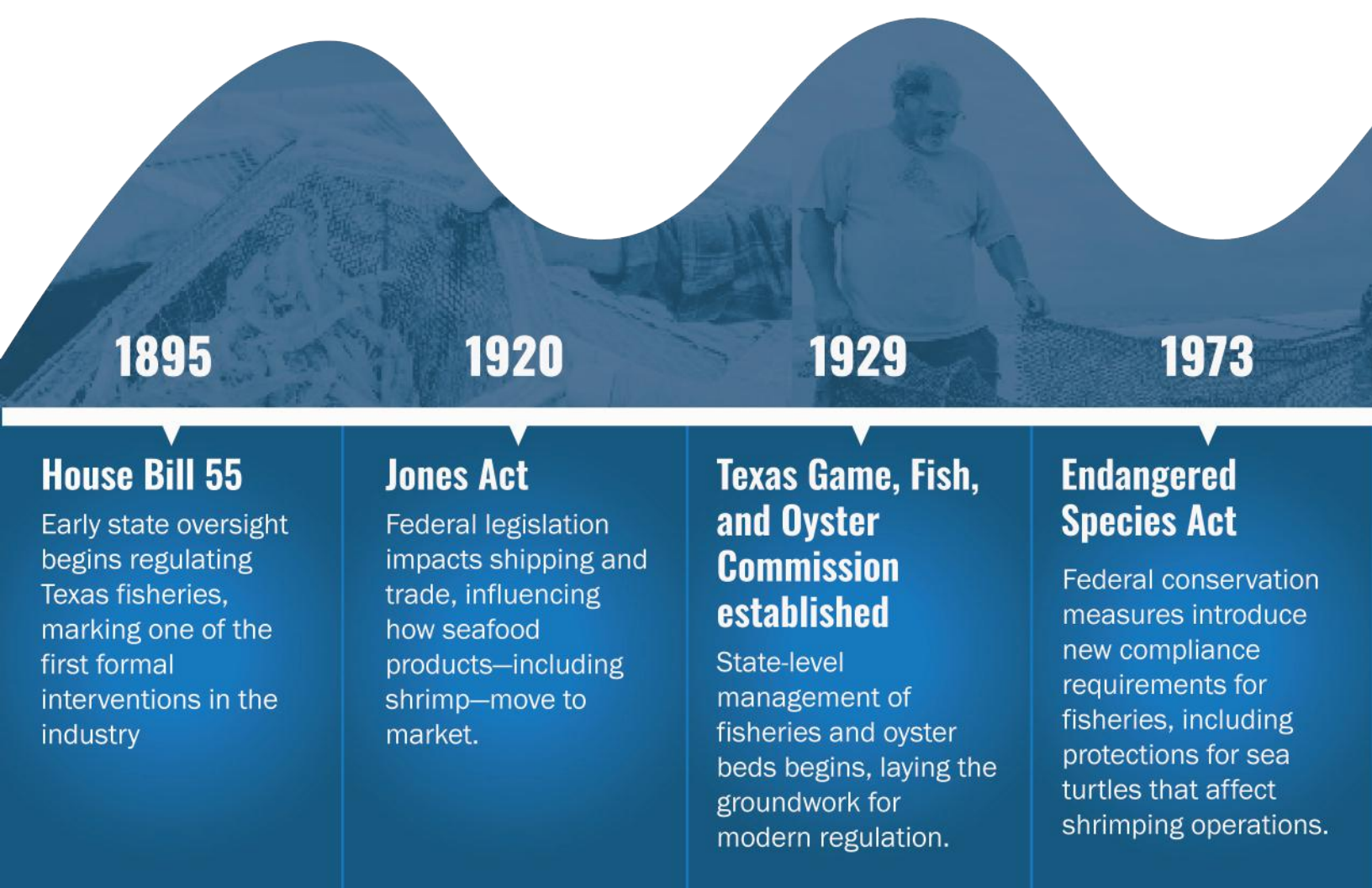
Lozada's path to studying the Texas shrimp industry was shaped by a lifelong commitment to bilingual education and community engagement. The daughter of an ESL teacher, she grew up fluent in Spanish, a skill that became vital during her early work with Texas Sea Grant, where she helped translate outreach materials for coastal communities. Her interest in bridging science and culture deepened during her service with the Peace Corps in Mexico, where she developed bilingual educational programs for coastal communities.

When Lozada began her PhD in Coastal and Marine System Science at Texas A&M University-Corpus Christi, she built on these experiences to investigate how shrimping communities in Palacios, Port Isabel, and Brownsville have weathered decades of regulatory change. Between 2020 and 2021, she conducted 60 bilingual interviews with shrimp boat owners, crew members, and

industry advocates. Working alongside Texas Sea Grant specialists Picariello and Hale and the National Sea Grant Law Center, she and her colleagues evaluated and documented regulatory changes in the shrimping industry.

Her research highlighted the complexity of these communities' relationships with regulation. Shrimpers expressed frustration with confusing policies, such as turtle excluder device mandates and state fishery closures, yet also emphasized the importance of partnerships with organizations like Texas Sea Grant, which helped them adapt gear designs and management strategies over time.

Lozada remarked, "Oftentimes in research we are not the experts but curious learners; the shrimpers wanted to teach and to talk about their trade, the life and work that they had honed for generations. Being able to listen and see the policies that I had learned in my academic career, that were supposed to be a boon to the environment, from their lived experience really drove home the need to for



1895

House Bill 55

Early state oversight begins regulating Texas fisheries, marking one of the first formal interventions in the industry

1920

Jones Act

Federal legislation impacts shipping and trade, influencing how seafood products—including shrimp—move to market.

1929

Texas Game, Fish, and Oyster Commission established

State-level management of fisheries and oyster beds begins, laying the groundwork for modern regulation.

1973

Endangered Species Act

Federal conservation measures introduce new compliance requirements for fisheries, including protections for sea turtles that affect shrimping operations.

an all-hands-on-deck approach to policy.”

By co-creating a narrative timeline with shrimpers’ own words, Lozada’s work validated local knowledge, built trust and demonstrated how participatory science and adaptive co-management, core elements of the Sea Grant extension model, can give resource users a stronger voice in shaping their livelihoods.

Laura Picariello, Texas Sea Grant’s now Director, but Fisheries Specialist at the time, remarked, “Working with Coral on this effort expanded my—and Texas Sea Grant’s—understanding of how new regulatory actions affect coastal communities. The success of environmental regulations depends on buy-in from the people who rely on these resources, and their input is essential to developing rules that protect our environment while supporting the coastal economies that feed our communities. Lozada’s work underscores the importance of a holistic

Dr. Coral Lozada talking with local fisherman. Photo: Texas Sea Grant



1976

1979

1980-2000

2022

Magnuson-Stevens Act

Federal law strengthens fisheries management, adding further regulatory oversight for commercial fishers in U.S. waters.

Ixtoc I Oil Spill

Environmental disaster disrupts marine ecosystems and impacts shrimping along the Gulf Coast.

Implementation of TEDs and BRDs

Shrimpers must adapt to new technology and compliance requirements, requiring investment and operational changes.

Launch of DJ's Oyster Company

The Aparicio brothers pivot from shrimping to oyster farming, becoming one of only three permitted oyster farms in Texas, supported by Texas Sea Grant and local research programs.

approach to fisheries management.”

Today, Coral Lozada continues her commitment to helping people, working in the Office of Sustainability for the Houston Methodist Hospital System. Below are the highlights from Lozada’s dissertation publication, “Bridging Texas Shrimpers and Texas Shrimping Policy”:

In 1895, the Texas legislature passed House Bill 55, the state’s first formal fisheries regulation. Later, in 1929, the Texas Game, Fish and Oyster Commission was established to conserve oyster beds and oversee fishing practices. The mid-20th century brought new federal oversight and environmental challenges. The Jones Act of 1920 restricted foreign vessels from U.S. waters, while the Endangered Species Act of 1973 introduced protections for sea turtles, forcing shrimpers to adapt their gear and practices. Then came the Magnuson-Stevens Act of 1976, which added federal quotas and regulatory oversight—“Texas shrimpers used to fish in Mexican waters and were then forced to come back and only fish United States (U.S.) waters, and foreign fleets were no longer allowed in U.S. waters—it was a huge disruption,” said Laura Picariello—fundamentally changing how the Gulf’s fisheries were managed.



| Shrimp boat on bay. Photo: Tiffany Pasco.

Environmental disasters also tested the industry. The Ixtoc I oil spill in 1979 released over 140 million gallons of oil into the Gulf, devastating shrimp populations. By the 1980s, shrimpers were required to adopt turtle excluder devices (TED) and bycatch reduction devices.

Texas Sea Grant provides research-based guidance and technical support for these tools, helping fishermen understand the new rules and implement them

properly. But still, while TEDs were designed to protect endangered species and reduce bycatch, shrimpers like Kimball say their economic impacts are often overlooked. These conservation gains for the Gulf ecosystem come with measurable catch losses that shrimpers must incorporate into already narrow operating margins.

Policy intent versus outcomes is a handoff that the industry faces every day.

These economic pressures have reshaped who remains in the fishery. Kimball described

A New Horizon in Fisheries

what many in the industry now call a “graying of the fleet,” as fewer young people enter shrimping and long-time fishermen struggle to keep boats fully crewed. Families that once worked together on the water now see younger generations pursuing other careers, as shrimp prices and operating costs make the future of shrimping increasingly uncertain. “What once provided a secure future for families has become very uncertain,” Kimball wrote, reflecting a generational shift that is changing the makeup of the Texas shrimping fleet.

This holds true for fishing families like the Aparicios on Matagorda Bay. According to their Oyster Bros. website, the family’s story began in 1978, when Homer Aparicio founded Anchor Seafood and launched a shrimping business that grew into a fleet of 10 vessels known as the “Rio fleet.” By 2020, rising fuel costs, imported competition and stricter regulations had made shrimping increasingly difficult. Homer’s grandson, David “D” Aparicio, recalls his father urging him to step back from shrimping. “Shrimping has been in our blood for three generations, but my dad didn’t want me fighting a losing battle,” Aparicio told NOAA Fisheries in 2023.

Fisherman discussing shrimp nets with team.
Photo: Tiffany Pasco.



With guidance from Texas Sea Grant and the Palacios Marine Agriculture Research program, David and his brother Jacob explored oyster aquaculture as a new path. According to their website, they launched DJ’s Oyster Company, only the third licensed oyster farm in Texas, in 2022. Sea Grant provided technical advice on sustainable practices, permitting and market development, helping the brothers establish a business model that honored their family’s fishing heritage while creating a viable future. Their signature oysters, branded “Matagorda Pearls,” have gained popularity among chefs across Texas and the Gulf Coast.

Jacob Aparicio said the family’s roots run deep in Texas fisheries. “Our grandfather started the shrimping company, then our dads took it over, and they’re still running it today,” he said. “We grew up on the docks and went out shrimping whenever we could. When oyster farming was finally legalized in Texas, we decided to try our luck in both.”

Where Seafood from the Gulf Stands Today

Behind these stories are market realities that continue to shape who can remain in the fishery today. Recent economic analyses highlight just how constrained the Gulf shrimp industry has become. Data presented to the Gulf of Mexico Fishery Management Council in 2025 show that domestic shrimp now account for only a small share of the U.S. shrimp market, with imports continuing to dominate both volume and price. Imported shrimp have consistently undercut Gulf shrimp prices, driving dockside values downward over time. In 2023, the average price paid across the total Gulf shrimp fishery fell to approximately \$1.91 per pound, while operating costs, particularly fuel, remained high, resulting in negative economic returns for shrimpers (the price reflects fishery-wide averages; Gulf Council economic analyses are based on survey responses rather than a census of all active vessels, which number in the 900s). These pressures are compounded by an aging infrastructure: the average federally permitted Gulf shrimp vessel was built around 1990, reflecting the

high cost and regulatory barriers associated with replacing or upgrading vessels. Together, these trends illustrate an industry facing structural economic challenges rather than short-term volatility.

The modern industry continues to evolve. In 2025, Texas enacted Senate Bill 823, requiring shrimp labeling to indicate whether products are imported. Despite this, the number of licensed Texas shrimpers has declined sharply over the past 25 years, with fewer than 1,000 active fishermen, according to TPWD license records. Texas Sea Grant continues to support these communities through outreach, workshops, and technical assistance, helping shrimpers navigate changing regulations and market pressures documented by NOAA and TPWD.

Shrimp remain the backbone of Texas commercial fisheries. As recent as 2022 NOAA and Texas Sea Grant–compiled data show Texas shrimp landings totaled 52,909,140 pounds with a dockside value of \$130,384,860. Dockside value is limited to the first point of sale from fisherman to dealer, and does not account for the additional economic benefits

Shrimp Percentage of Total Commercial Seafood Production in Texas in 2022

SHARE BY VOLUME

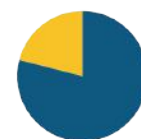
All Other Species
14%



Shrimp
86%

SHARE BY VALUE

All Other Species
21%



Shrimp
79%

throughout the supply chain including distributors/shipping, restaurant market value, and other economic inclusions surrounding the industry. When combined with all other wild-caught commercial species—61,484,609 pounds valued dockside \$165,449,892—shrimp represent a substantial majority of the state’s commercial harvest. By volume, shrimp account for 86% of all Texas commercial fisheries landings, and 79% of the total dockside value. Other commercially harvested species, including oysters, blue crab, and finfish such as flounder and black drum, make up the remaining share of landings and value, illustrating just how central shrimping remains to the Texas seafood economy.

Oyster aquaculture is also a growing sector in Texas, supported by new farms such as DJ’s Oyster Company, providing alternative economic opportunities for fishing families. The Texas oyster industry today relies on both wild harvest and farmed production. Wild oysters have faced environmental pressures and limited harvest areas, particularly in Galveston Bay, prompting the Texas Parks and Wildlife Department to intensify reef restoration efforts through oyster shell recycling. At the same time, oyster farms have expanded rapidly, with 11 permitted

farms producing roughly 1.4 million oysters in 2024, and the number of farms expected to double by 2026, according to Texas Sea Grant and NOAA Fisheries. While mariculture offers a controlled and sustainable approach to production, wild harvest remains critical for large-scale markets, demonstrating how both sectors complement each other.

The story of Texas’s seafood industry is one of adaptation, resilience, and reinvention. Gulf Coast fishermen have continually sought ways to maintain their livelihoods. Texas Sea Grant’s consistent involvement through research support, technical guidance, policy translation, and aquaculture training has been central to helping these communities adapt. The work of Lozada, Picariello, and Hale, the perspective of shrimpers, and the Aparicio family’s entrepreneurial pivot embody the Texas Sea Grant extension model, encouraging sustainability and guiding Gulf Coast communities through transitions in the fisheries industry.

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RESEARCH

Sustainable Fisheries and Aquaculture



HOW DNA RESEARCH IS GUIDING THE FUTURE OF TEXAS OYSTERS

Along the shallow bays of the Texas coast, oyster reefs rise quietly from the mud and shell, forming living structures that stabilize sediments, filter water, and provide habitat for fish, crabs, and other estuarine wildlife. These reefs face extreme environmental swings, including sharp changes in salinity and temperature, as well as storms that sweep across the coast.

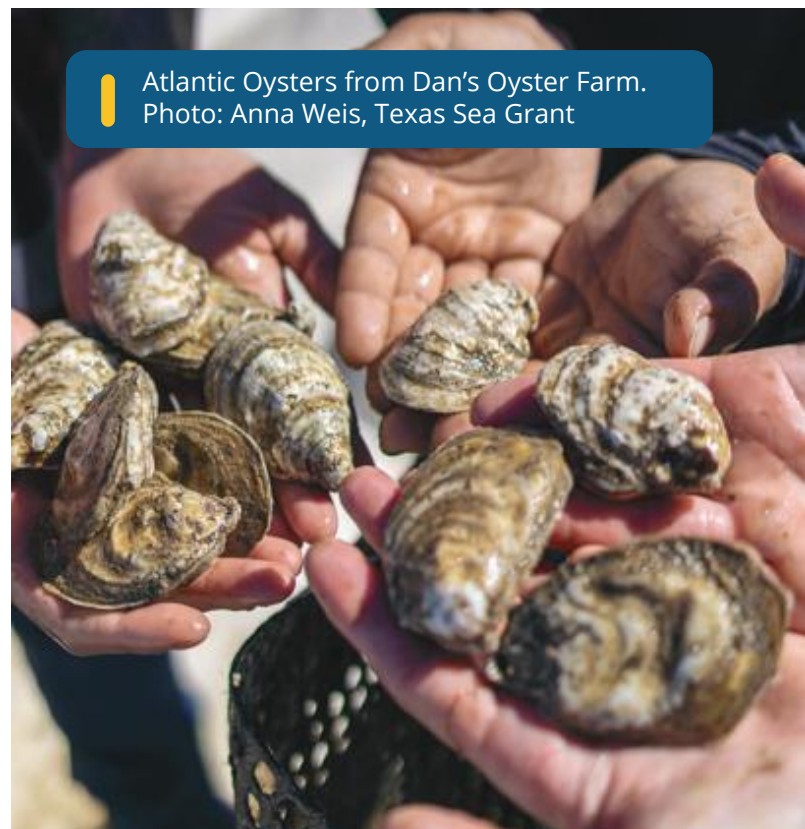
Understanding how oysters respond to these pressures is at the heart of a 2022 Texas Sea Grant-funded project led by geneticist Dr. Christopher Hollenbeck of Texas A&M University–Corpus Christi and Texas A&M AgriLife Research. His work is revealing how oyster genetics can guide restoration and support resilient coastal ecosystems.

The project focused on three objectives: developing cost-effective genetic tools, mapping the transition zone, and understanding physiological tolerances.

“Our research into population structure of oysters in Texas has built upon several studies that have indicated genetic differences in oysters along the coast (notably Anderson et al., 2014), specifically that there are two populations (in the north and south of the coast) that overlap to some extent in the Corpus Christi/ Aransas Bay systems,” Hollenbeck said.

“Recently, we’ve been able to add to this work, in collaboration with the Texas Parks and Wildlife Department (TPWD), by utilizing newer technology that allows us to observe differences at the genomic level. Not only does this provide higher resolution, but also gives us a way to understand how the genetic differences lead to differences in the physical characteristics of the populations.”

Hollenbeck’s research shows that the northern and southern oyster populations



Atlantic Oysters from Dan's Oyster Farm.
Photo: Anna Weis, Texas Sea Grant

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differ in environmental tolerances and spawning behavior. His lab's work has built on studies that have shown that the southern population, adapted to the warm and hypersaline conditions of the Laguna Madre, is more resilient to changes in salinity, temperature, and dissolved oxygen. Although *C. virginica* ranges from New England's Atlantic coast all the way down through the Gulf of America (formerly Gulf of Mexico), genetic analysis reveals a distinct, southern-Texas Gulf population in the western Gulf, highlighting how unusual this population break is within a broadly distributed species. Where they overlap near Corpus Christi, a dynamic transition zone is present that is important to consider for management and restoration decisions. Hollenbeck noted that the transition zone between the northern and southern populations appears to shift north or south over time, suggesting that population locations may change with cycles of environmental conditions, a factor important for management.

By tracking these shifts, scientists hope to anticipate how populations may respond to environmental changes and guide restoration and aquaculture strategies that maintain genetic diversity and resilience.



Why It Matters

"The more we learn about the genetic makeup of these oysters, the better we can protect their diversity, their resilience, and their role in keeping our coastal ecosystems healthy."

Dr. Christopher Hollenbeck

How Scientists Read Oyster DNA

Unlocking the genetic story of Texas oysters starts with a tiny tissue sample—often just a small piece of gill or mantle. From there, researchers extract DNA and use high-resolution genomic tools to scan thousands of markers across the oyster's genome.

These markers act like signposts, showing scientists where oysters come from, how populations differ, and which traits help them survive in Texas's highly variable bays. Newer sequencing technologies allow researchers to detect subtle genetic differences that older methods couldn't capture, giving them a clearer picture of how northern and southern populations adapt to their environments.

This genomic approach also helps managers and restoration teams match broodstock to specific reefs, monitor changes in wild populations, and track how oysters respond to environmental stress over time. By "reading" oyster DNA, scientists are building a foundation for smarter restoration, sustainable aquaculture, and long-term coastal resilience.

Hollenbeck's work also revealed important implications for oyster reproduction. His studies of wild and domesticated oysters indicate that strong natural barriers prevent the northern and southern populations from mixing freely, and hybrids tend to have limited reproductive success. He emphasized that the genomic tools his team has developed make it possible to quickly and inexpensively determine the genetic background of individual oysters, allowing researchers to regularly monitor wild populations for changes or impacts.

Sustainability and Resilience Considerations

These tools are already influencing reef restoration, aquaculture, and fisheries management. Fine-scale genetic mapping helps agencies like TPWD and partner groups set broodstock guidelines that maintain genetic diversity and local adaptation, preserving traits that improve survival and resilience. Hollenbeck said the project's findings are now being applied to match hatchery broodstock with the genetic background of wild locations for specific reef restoration projects in the transition zone.

For oyster aquaculture, studies of wild populations have been key to establishing sustainable breeding programs. The team has developed domesticated breeding lines sourced from both northern and southern populations, allowing farmers to grow seed that is locally adapted but also selectively bred for traits such as growth, shape, and

salinity tolerance. Over time, these efforts are expected to provide farmers with a variety of seed options, reducing the risk of losing crops to environmental stress or disease.

Dr. Hollenbeck will continue to expand his work as the first inaugural Director of a new Texas A&M Center for Marine Aquaculture in Corpus Christi. Recently approved by The Texas A&M University System Board of Regents, the new marine aquaculture center at Texas A&M–Corpus Christi will unite research, training, and industry expertise to advance sustainable aquaculture practices, support coastal conservation, and strengthen agriculture along the Texas coast.

For Hollenbeck, the promise of oyster genetics is about building a sustainable future. "The more we learn about the genetic makeup of these oysters," he said, "the better we can protect their diversity, their resilience, and their role in keeping our coastal ecosystems healthy."

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Oysters at Prestige Oyster, Inc. ready to be served from the shucking bar. Photo: Anna Weis, Texas Sea Grant

THE DRIFT

Catch up on the regional happenings at Texas Sea Grant.

Laura Picariello named Director, Texas Sea Grant College Program

We're pleased to share that as of October 1, 2025, Laura Picariello has been appointed director of Texas Sea Grant College Program at Texas A&M University. A member of Texas Sea Grant since 2018, Picariello has guided major efforts in coastal resilience, sustainable fisheries, aquaculture innovation, and community-driven science statewide.



Relaunching the Texas Seafood Trail

Texas Sea Grant's "Texas Seafood Trail" is a collaborative and statewide initiative designed to celebrate and promote the rich seafood heritage of the Texas Gulf Coast. This innovative project brings together a network of restaurants, seafood markets, fishers, processors, educators, and community partners who are committed to supporting and showcasing local Gulf seafood. The Trail not only encourages consumers to explore the culinary diversity of Texas's coastal communities but also helps raise awareness about the importance of sustainable fishing practices and responsible sourcing.

If your restaurant, farm, or market would like to participate, contact us at seagrant@tamu.edu or learn more at Tx.ag/texasseafoodtrail.

Upcoming Events and Conferences

The TXSG team will be at a variety of events and conferences in the spring! Come see us.

Houston Fishing Show

Feb. 18 - 22nd

*George R. Brown Convention Center
Exhibit Hall A, Houston, Texas*

State of the Bay Symposium

Feb. 24 - 25th

*Moody Gardens Hotel and Convention Center
Galveston, Texas*

8th Texas Plastic Pollution Symposium

Mar. 25

*Texas A&M University - Galveston Campus
Galveston, Texas*

South Central Climate Resilience Forum

Apr. 15 - 17th

San Antonio, Texas

Mid-Coast Hurricane and Disaster Conference

Apr. 15 - 16th

*Victoria Community Center
Victoria, Texas*

New To The Team at Texas Sea Grant

We welcomed a variety of new faces to the Texas Sea Grant team in 2024 and 2025. Our team currently consists of 12 county agents and specialists located along the coastal counties. and 21 total staff including administration, research and communications staff.



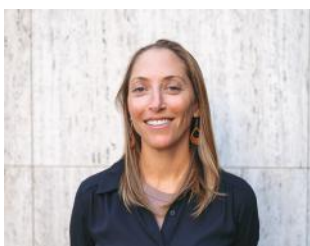
Nic Perez
*Communications
Specialist*
Corpus Christi,
Texas



Brandi Keller
*Coastal and Marine
Extension Agent*
Galveston County

Visit TexasSeaGrant.org
to learn what events and
outreach activities are
happening in your area.

*Which coastal
county?*



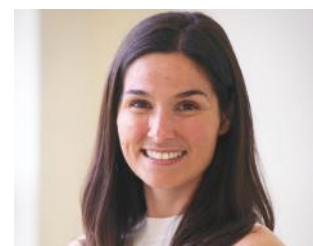
Chris Hale
Extension Director
Corpus Christi,
Texas



Megan Towery
*Communications
Director*
College Station,
Texas



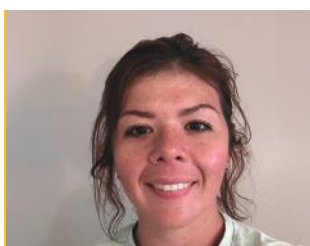
Sara Stewart
*Coastal and Marine
Extension Agent*
Cameron County



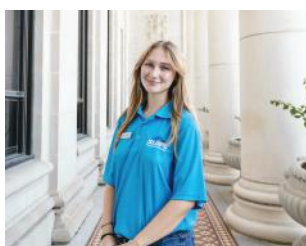
Joana Rocha
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Anna Weis
*Communications
Specialist*
Galveston, Texas



Sam Yasko
*Fisheries Research
Assistant*
Corpus Christi,
Texas



Abi Westerlin
*Communications
Student Assistant*
College Station,
Texas



Juliet Cattell
*Research Assistant,
Project*
Corpus Christi,
Texas

2025 COASTAL ICON:

JAY &
CHRISSY
KLEBERG

*Stewards of the Shore:
How the Klebergs Cham-
pion a Wild and Resilient
Texas Coast*



“

“While the Texas coast may have one of the longest coastlines in the country, it’s the people and the smallest of things that make it so special. I’ve fallen in love with it and hope that the same will happen to those who see this series.”

- Chrissy Kleberg



Jay and Chrissy walking the Bolivar Peninsula in a thunderstorm. Photo: Chasing the Tide.

STEWARDS OF THE SHORE: HOW THE KLEBERGS CHAMPION A WILD AND RESILIENT TEXAS COAST

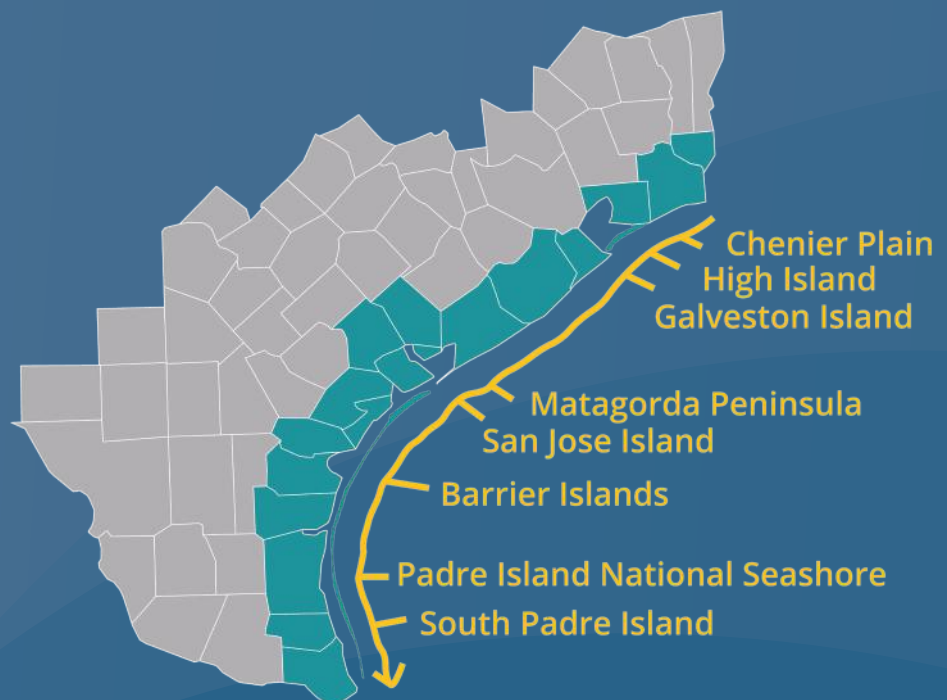
The wind carries a tang of salt and damp earth as it sweeps across the salt marshes of the Chenier Plain, rustling the oak motts that rise like green islands from the flat horizon. A heron lifts off, its wings beating against the sky, and in the distance, a shrill cry echoes from a rookery island dotted with spoonbills and pelicans. This is where our story of Jay and Chrissy Kleberg, Texas Sea Grant's 2025 Coastal Icons, begins.

Imagine standing along Texas's ever-shifting coastline, where wildness endures in the whisper of sea grass, the hum of insects, and the roar of waves breaking on empty barrier islands. To stand here is to feel the pulse of something ancient and alive. Jay speaks of the coast as if it's an old friend, shaped by history and resilience. From the engineered strength of Galveston's seawall to the rhythmic surf near Surfside's

A-frame homes, from Matagorda's silent lighthouse to South Padre's vibrant ties to the Rio Grande Valley, this coast tells stories through its land, water, and people.

Home to a quarter of the state's population and economy, the Texas coast is also its most biologically rich region. Its shifting salinity, ancient barrier islands, and

POINTS OF INTEREST DURING TREK



the immense South Texas sand sheet create one of the most diverse coastal environments in the world. Here, upland and marine environments meet to support everything from blue crab to redfish, and from oysters to migratory waterfowl. In this ever-changing zone, 95 percent of commercially and recreationally important Gulf species begin their lives, and millions of migratory birds make critical stopovers each year, according to the U.S. Environmental Protection Agency.



Klebergs walking in thunderstorm.
Photo: Karine Algnier.

The wind shifts as you travel farther south, where salt marsh fades into sand and the sky opens wide above a coastline in constant motion.

It's here, among rookery islands and hypersaline bays, that Jay and Chrissy Kleberg began a journey both physical and philosophical. In *Chasing the Tide*, their immersive coast-wide expedition and documentary project, they set out to walk the length of the Texas shoreline. What they found and hoped to share was a landscape rich in contrast and connection, where remote wilderness meets industrial



Polyesterene Cup on the beach at Padre Island. Photo: Chasing the Tide.



Why It Matters

"It's the responsibility of those who don't live on the coast to appreciate its significance, care for it, and support efforts to keep it wild and accessible for all Texans for all time."

- Jay Kleberg

A stranded suburban on Matagorda Peninsula. Photo: Chasing the Tide.



infrastructure, and where ecosystems and modern economies interact every day.

The goal of Chasing the Tide is to help people recognize that the Texas coast is not just a geographic boundary but a powerful symbol and essential reality of who we are as a state. Both our history and our future are deeply connected to the health of our coastal environments and the Gulf. Chasing the Tide is a meditation on the balance between conservation and development, between the ecological and the cultural, between what we've built and what remains wild. To walk it is to witness the natural systems that sustain not just wildlife, but a quarter of Texas's people and prosperity. "While the Texas coast may have one of the longest coastlines in the country," Chrissy says, "it's the people and the smallest of things that make it so special. I've

fallen in love with it and hope that the same will happen to those who see this series." For Jay and Chrissy, the coast is a mirror. Its shifting tides reflect where we've been and offer a glimpse of what lies ahead. Chasing the Tide is their way of showing that if we listen closely, the coast is speaking.

Bearing Witness to Plastic Pollution Along the Coast

Throughout their 370-mile journey, Jay and Chrissy Kleberg came face-to-face with one of the most urgent threats to the Texas coast: plastic pollution. As they moved south along the shoreline, plastic appeared frequently, whether it was tangled in dune grasses, buried in sand, floating offshore, or wedged into the wrack line. According to a report from the National Oceanic and Atmospheric Administration (NOAA) and Ocean Conservancy, Texas has ten times more marine debris than any other Gulf state and the highest average weight of debris per mile surveyed. Much of this is funneled to the state's coast by the Loop Current, a powerful oceanic current that brings trash from across the Gulf, the Caribbean, and even as far away as Africa and South America. On land, Texas's proximity to major watersheds also means debris travels from across the U.S., Canada, and Mexico, ending with "nearly every one of Texas' 30 million residents living in a watershed that empties into the Gulf of Mexico," as noted by marine debris expert Jace Tunnell in *Chasing the Tide*. "This means that in addition to trash from other parts of North America and the globe, the Gulf receives all of Texas' trash that ends up in a creek or river."

To understand and document the scope of the problem, Jay and Chrissy conducted litter surveys every 25 miles. When the written data collection slowed their progress, they began recording voice memos to track their findings in real time. Over the course of the expedition, Chrissy and Jay encountered everything from sunglasses and swim goggles to boats and refrigerators. At one point, they happened upon a submerged SUV in the sand. They saw plastic fragments mistaken for food by shorebirds and discovered plastic bottles and containers scarred with diamond-shaped bite marks from sea turtles and triggerfish, drawn to what they believed were jellyfish or prey. "That plastic could be coming from anywhere,

PLASTIC MARINE DEBRIS IN TEXAS: BY THE NUMBERS

Data provided by Jace Tunnell, Nurdle Patrol founder and Lead, Director of Community Engagement, Harte Research Institute



10X MORE MARINE DEBRIS

Texas coastlines accumulate significantly more debris than other Gulf states due to the Loop Current and eddies.



10 MILLION+ POUNDS REMOVED

Volunteers have collected over 10 million pounds of debris since 1986—most of it plastic.



95% TOTAL POLLUTION

Nearly all beach debris is plastic: bottle caps, straws, bags, and industrial nurdles.



MICROPLASTICS OUTNUMBER SAND GRAINS

Nearshore samples show microplastics exceeding sand grain counts, posing ecological and food-web risks.

from a city in Texas, the middle of the U.S., from another country, travel down a river, out into the ocean, and then wash back up on the beach,” explained marine debris expert and director of community engagement at the Harte Research Institute at Texas A&M University-Corpus Christi, Jace Tunnell, who joined part of their expedition. It was a haunting reminder that plastic pollution is not only persistent, it’s planetary.

According to Tunnell, plastic never truly disappears; it simply breaks down into smaller and smaller pieces, which now endanger over 900 marine species, including whales, fish, oysters, and sea turtles. These fragments also make their way into the human food chain, where researchers are only beginning to understand their long-term impact on health. This awareness, born of boots-on-the-ground observation and backed by scientific research, is central to why Jay and Chrissy Kleberg were named Texas Sea Grant’s 2025 Coastal Icons during Plastic-Free July. Their expedition is not only a tribute to the wild beauty and resilience of the Texas coast, but also a call to action. They urge Texans to reduce their reliance on single-use plastics, carry reusable bottles (especially since 90 percent of U.S. tap water is safe), avoid plastic bags, and take part in cleanups or conservation programs. They go on to mention the Adopt-A-Beach program which mobilized nearly 12,000 volunteers to remove 154 tons of debris along 265 miles of shoreline, while Keep Texas Beautiful cleared 28 miles of waterways and collected more than 1 million pounds of trash and recyclables. The Klebergs acknowledge that Texans aren’t solely to blame for the trash washing ashore, but they believe Texans can and should be leaders in reimagining a cleaner, healthier future for the Gulf.

The Work Continues with a Trash Free Gulf

That leadership is something Jay has carried forward through his role as Executive Director of the Gulf Trust. Building on the awareness sparked by *Chasing the Tide*, he now helps spearhead the Trash Free Gulf campaign — a large-scale initiative aimed at shifting how Texans think about their relationship with the Gulf. Backed by H-E-B’s Our Texas, Our Future as presenting sponsor, and supported by Mender, YETI, and conservation partners like Keep Texas Beautiful and Texas Parks and Wildlife Foundation, the 2024 campaign mobilized over 2,000 volunteers in 45 coordinated cleanups. Taking place from late April through early June, these efforts removed 30,000 pounds of trash across every major Texas watershed, intercepting debris before it could reach the Gulf.

The effort brought together an impressive coalition of partners: Keep Texas Beautiful affiliates, H-E-B employees, Texas Master Naturalist chapters, Colorado River Alliance, Surfrider Foundation, Allwater Guides, City Kids Adventures, Fort Worth Nature Center, Frontera Land Alliance, San Antonio Bay Partnership, UTRGV, Stewards of the Wild, Sibley Nature Center, the City of Port Arthur, Galveston Bay Foundation, and many more. “It proves that statewide impact begins with local action,” Jay says. For Jay, this work is a way to ensure that the message of *Chasing the Tide* doesn’t end at the shoreline. It’s about building a movement where personal responsibility, community action, and coastal health are deeply intertwined, and where every bottle picked up is a small victory for the Gulf.

The Gulf Trust's broader mission is to secure a vibrant Texas coast and Gulf for future generations. Backed by science from partners like the Harte Research Institute, the organization focuses on turning data into action, similar to Texas Sea Grant's applying research to benefit coastal communities. On the Upper Coast, they're working to restore the Chenier Plain. On the Mid-Coast, they're supporting wild oyster reefs and training high school students for maritime careers. In the Lower Laguna Madre, they're funding research into illegal, unreported and unregulated fishing—a major problem responsible for the poaching of an estimated 780,000 pounds of red snapper each year, costing the U.S. economy up to \$12 million.

Following a successful launch, Trash Free Gulf is now an annual campaign. While 2026 cleanup details will be announced later this year, those interested in volunteering can visit trashfreegulf.com or email info@gulftrust.org. You can also follow the Gulf Trust on Instagram, Facebook and LinkedIn.

Similarly, many Sea Grant agents across the Texas coast are helping coordinate local efforts through the Texas General Land Office's Adopt-A-Beach program. To find out how you can get involved in a cleanup near you, or how your community can be part of this growing movement, check in with your county's Texas Sea Grant agent.

A Note about the Rest of the Documentary

While plastic pollution served as a powerful throughline in *Chasing the Tide*, it was just one lens through which the Klebergs explored the interconnected challenges facing the Texas coast. Along the way, they witnessed the quiet but steady progress of post-storm recovery, passing through areas

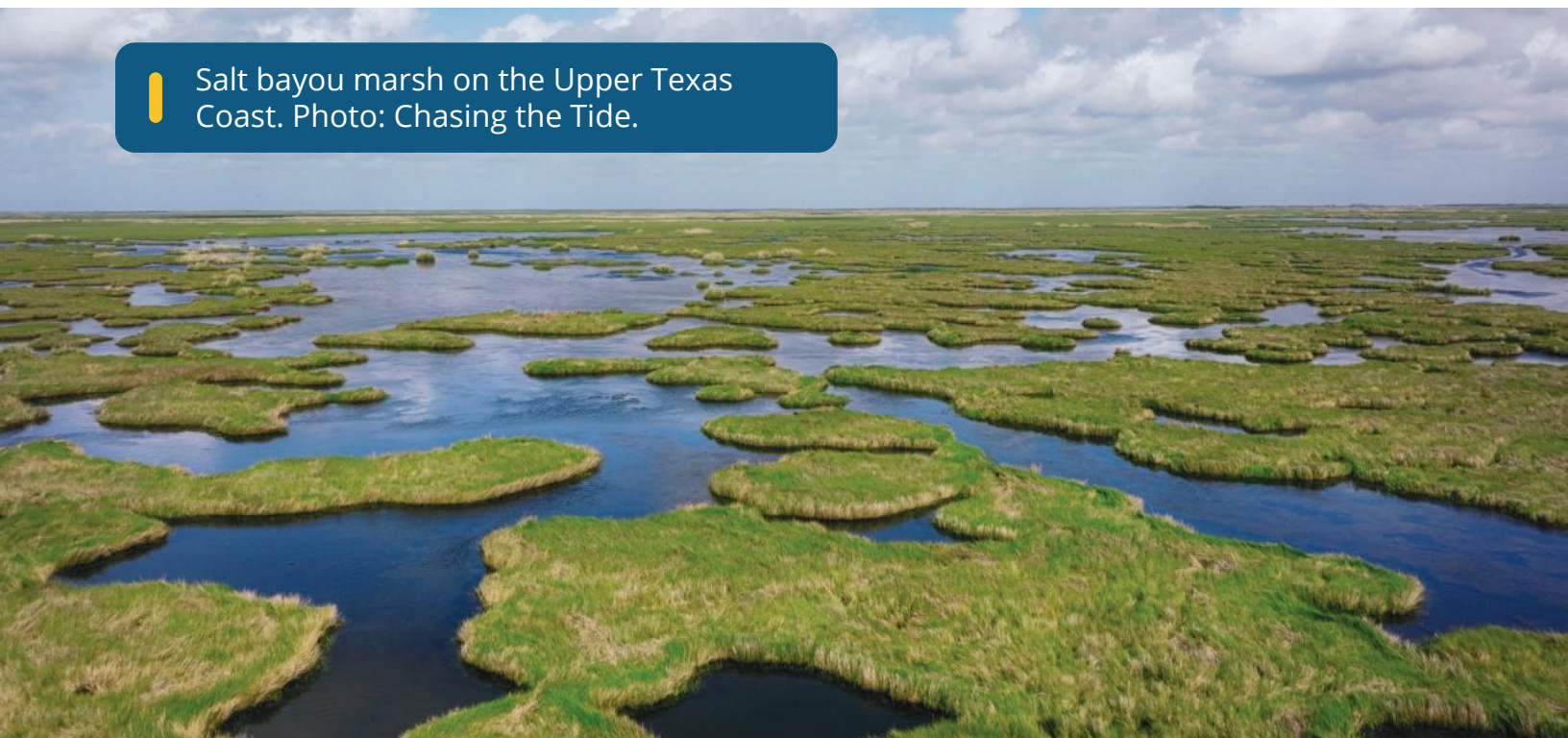
where dune systems are being rebuilt with support from the Texas General Land Office. When they traversed one of Texas' newest beaches, McFaddin Beach, the Klebergs reported they walked on "the last stage of the Salt Bayou Watershed Restoration Project, one of the largest coastal restoration projects in the nation." They also met volunteers and biologists from Sea Turtle Inc., working tirelessly to protect nesting sea turtles and rescue injured ones in some of the coast's most vulnerable areas. The journey brought them face-to-face with coyotes carrying red wolf genetics, anglers and beachgoers, researchers, and even the only couple who live year-round on the remote Matagorda Peninsula. Whether rebuilding dunes, protecting wildlife, or preserving culture, the people they met were united by a common goal and a shared connection to the coast. The full-length documentary can be streamed via PBS, Amazon Prime, Apple TV, and YouTube TV.

What's Next for the Klebergs and the Gulf

Next, the Klebergs will embark on the second season of *Chasing the Tide*, set to begin filming this fall with a planned release on PBS in spring 2029. This new chapter will take them beyond Texas, circumnavigating the Gulf of America—from the mouth of the Rio Grande through the raptor flyways of Veracruz, the cenotes of the Yucatán, coral reefs of Cuba, and along the U.S. Gulf Coast by sea kayak. The journey will spotlight natural history, cultural stories, and the deep interconnectedness of Gulf communities and ecosystems. For updates on upcoming episodes, behind-the-scenes content, and future projects, follow along at chasingthetideseries.com.

When reflecting on resilience, of both people and nature, Jay and Chrissy Kleberg point to the communities that rebuild after every storm, from the devastating 1900 Galveston hurricane to the recent blows of Hurricane Harvey and Tropical Storm Beryl. It's a defining trait of the Texas coast. For Chrissy, a former field biologist with The Peregrine Fund, that resilience was also visible in the return of the Aplomado falcon, the only falcon on the endangered species list in the U.S. After decades of reintroduction efforts and setbacks caused by major storms, the falcons are once again expanding their range, with this year marking the first-ever recorded nest on North Padre Island. It's a quiet victory that mirrors the coast's story: persistence, adaptation, and hope. "By walking Texas' shoreline, we hoped to better understand its character," says Jay. "What we learned is that every mile is different. It's ever-changing, and it's beautiful. Those who live here, with the sea at their doorstep, have figured that out. It's the responsibility of those who don't live on the coast to appreciate its significance, care for it, and support efforts to keep it wild and accessible for all Texans for all time."

 Salt bayou marsh on the Upper Texas Coast. Photo: Chasing the Tide.



TEXAS SEAFOOD TRAIL

From Texas Coast to Table



SOURCE-VERIFIED TEXAS SEAFOOD

For over 50 years, Texas Sea Grant has worked with fishers, markets, chefs, and coastal communities to support responsibly harvested Texas seafood.

The Texas Seafood Trail highlights businesses that champion sustainability, serving fresh Gulf species while helping protect our coastal ecosystems.

PARTNERS



Restaurants • Markets • Coastal Farms

Texas Seafood Trail Partners serve as ambassadors for Texas-caught species and gain statewide visibility for their commitment to sustainability.

Partner Benefits

- Official recognition as a Texas Seafood Trail Partner
- Visibility on the Trail website, interactive map & statewide campaigns
- Marketing toolkit: partner logo, window cling, menu decal, digital assets
- Staff resources: species/seasonality cheat sheets + optional training
- Networking opportunities with chefs & seafood leaders

VISITORS



No Second Guessing

Use our interactive map to discover restaurants, markets, and farms serving Texas-caught shrimp, oysters, red drum, blue crab, and more.

What You'll Experience:

- Fresh, seasonal seafood sourced from Texas waters
- Regional coastal flavors & local favorites
- Businesses committed to sustainable practices

DISCOVER THE MAP



Why it Matters

Your visit supports Texas fishers, coastal communities, and the long-term health of the Gulf.





EDUCATION

Healthy Coastal Ecosystems

TEXAS SEA GRANT SUPPORTS YOUTH COASTAL RESTORATION THROUGH PLAN-IT PROJECTS PARTNERSHIP

A growing regional education initiative is bringing high school students into the heart of coastal conservation. The Plan-It Projects, Plan-It Marsh and Plan-It Dunes, are empowering the next generation of environmental stewards through hands-on learning experiences that support the restoration of degraded marsh and dune habitats across the Gulf Coast.

A Program Rooted in the Gulf Coast

The Plan-It projects began making waves to positively impact degraded Gulf Coast marsh and dune habitat in 2022. Building upon the Plan-It Marsh classroom curriculum, originally developed in 2019-2020, a team

of extension specialists, including Dr. Stacy Hines in conjunction with faculty and staff at Mississippi State University's Coastal Research and Extension Center, refreshed and expanded the Plan-It projects. The programs were piloted with environmental science teachers from Mississippi high schools and funded through a grant from the U.S. Environmental Protection Agency's Gulf of America (formerly Mexico) Program.

The Plan-It projects paired classroom curriculum with training modules to teach students how to propagate and plant native marsh and dune vegetation. Throughout the



Saltwort planted and watered, 2024 Plan-It Marsh and Dune program. Photo: Ashley Cisneros, Texas A&M AgriLife Extension Service.

year, participating students are responsible for the care and cultivation of the plants, such as cordgrass and sea oats, gaining both technical skills and a personal connection to coastal conservation. The semester culminates in a field-based restoration project where students plant their vegetation at real-world sites to revitalize degraded marsh and dune habitat along the Gulf Coast.

The Plan-It Projects aim to address a critical need. Along the U.S. Gulf Coast, marsh and dune ecosystems are deteriorating due to increasing development, natural disasters, and other environmental stressors. Yet these habitats provide vital ecological and economic benefits. They improve biodiversity, enhance water quality, support fisheries and wildlife, and act as natural buffers, reducing the impacts of flooding, erosion, and storms. Restoration of these systems is essential, and through programs like Plan-It Marsh and Plan-It Dunes, youth are being equipped to take action.

Since 2022, 507 middle and high school students at 10 Mississippi schools gained STEM career knowledge and skills through direct participation in the Plan-It programs or through outreach



GRASSES ALONG THE TEXAS COAST



Source: CABI Compendium

Turtleweed / Saltwort (*Batis maritima*)

A low-growing, fleshy succulent that stabilizes saline marsh soils and provides habitat for wildlife.



Source: North Carolina Extension Gardener

Bitter panicum (*Panicum amarum*)

A dune grass that spreads quickly, tolerates salt spray, and stabilizes foredunes and secondary dunes.



Source: Texas A&M AgriLife Plan-it Dunes

Gulf cordgrass (*Spartina spartinae*)

Gulf cordgrass forms dense clumps and thrives in salty and brackish coastal environments, where its strong root system helps with erosion control.

educational events. 4,460 native plants were propagated to restore 10-acres of degraded marsh and dune habitat, increasing resiliency in 6 coastal communities.

Plan-It Comes to Texas

Plan-It Projects were launched in Texas in 2024 with support from the Gulf of America (formerly Mexico) Alliance. The Texas program is still facilitated by Dr. Hines, now Assistant Professor and Extension Rangeland Habitat Management Specialist at Texas A&M AgriLife Extension Service, with her new team in Corpus Christi, and various partners assisting through education and volunteering. April Taylor, Texas Sea Grant's Coastal Resilience Specialist based in Corpus Christi, has coordinated and collaborated on educator trainings and student engagement for two years and continues to play a key role in expanding the program throughout the state.

Taylor joined educators from six Texas schools at the Texas A&M AgriLife Extension and Research Center in Corpus Christi for a Plan-It Projects Teacher Workshop. Hosted

by Ashley Cisneros and Dr. Stacy Hines, the training allowed teachers to select between two project tracks: Plan-It Dunes, focusing on coastal dune restoration using native species like Bitter Panicum and Indian Blanket, and Plan-It Marsh, which centers on marsh habitat restoration using plants such as Saltwort, Black Needlerush, Gulf Cordgrass, and Smooth Cordgrass.

Two schools selected Plan-It Dunes, while four chose Plan-It Marsh. Participants agreed to schedule their restoration field trips for February 2025, aligning planting efforts with seasonal conditions that would give native plants the best opportunity to establish and thrive before spring.

During the workshop, teachers toured the on-site greenhouse to observe propagation methods and the native plants their students will grow and care for throughout the school year. The team educated several of the teachers on the propagation of coastal plants. These plants will be planted approximately two feet apart at selected restoration sites, with expectations that they will begin spreading within a year.



Group planting seedlings for restoration project.
Photo: Nic Perez, Texas Sea Grant

Texas' 2024 Plan-It program saw 271 students at 6 high schools participating. 122.5 volunteer contact hours were earned harvesting and potting 1,336 native marsh and dune plants to use in 2025 restoration trips.

Making the Program Widely Available

Texas Sea Grant remains committed to supporting community-based resilience efforts, and the Plan-It Projects are a clear example of the power of youth education in driving long-term ecological restoration. April Taylor, who has collaborated on trainings and educational outreach for Plan-It Projects in Texas since the program's arrival, will continue to support its growth in collaboration with Texas A&M AgriLife and other regional partners.



Saltwort growth. Photo: Ashley Cisneros, Texas A&M AgriLife Extension Service.



EDUCATION

Environmental Literacy and Workforce Development

A WEEK IN THE LIFE OF A FUTURE GULF FISHERMAN

At sunrise in Galveston Bay, a small cohort of aspiring fishermen boards a working vessel, the salty air mixing with the hum of engines. They are participants in the Gulf Commercial Fisherman Program (GCFP)—an intensive, week-long training initiative launched by Texas Sea Grant, in partnership with Florida Sea Grant and the Gulf of America Reef Fish Shareholders' Alliance—designed to introduce newcomers to the Gulf's commercial fishing industry. *[Pictured: Fishermen greeting one another ahead of training. Photo: Matt Kammann]*

For many participants, the program offers a first real glimpse into a career that is as challenging as it is rewarding. Over the course of the week, they practice safety procedures, learning to don life

jackets correctly, deploy and retrieve safety gear, and respond to emergencies at sea. Under the guidance of seasoned fishermen, participants handle lines and nets, developing techniques for catching, sorting, and storing Gulf reef fish efficiently while minimizing waste. They also study fish identification, learning to distinguish between species, measure them accurately, and follow regulations that support sustainable harvests.

Day 1

Stepping Aboard

The week begins in Galveston, Texas, with a mix of excitement and nerves. You meet your cohort of aspiring fishermen and are introduced to the program's instructors: experienced vessel owners, deckhands, seafood processors, and resource managers. After an orientation on the Gulf's commercial fishing industry, you're guided through the basics of safety at sea. Life jackets and emergency procedures are no longer abstract concepts; you practice deploying safety gear, responding to simulated emergencies, and understanding the importance of preparation before even leaving the dock.



Day 3

Understanding the Gulf

Midweek, the program shifts to the science behind the fishery. Classroom sessions cover fishery science, management, and habitat knowledge that inform daily fishing decisions. You learn from the experts how to plan a safe and productive trip, and how environmental changes impact fish populations. At the dock, resource managers and veteran fishermen share real-world stories, emphasizing that success on the water requires both skill and respect for the ecosystem.

Day 2

Gears, Lines, and Nets

The next day is hands-on. You step onto a working vessel and learn the mechanics of tying hooks and lines. Instructors demonstrate how to deploy and retrieve gear efficiently without damaging the catch, and how to maintain equipment for long-term reliability. You practice sorting and measuring fish, learning species identification and regulations that ensure sustainable harvests. By the end of the day, your hands are calloused, your head is full of terminology, and your confidence in handling gear is growing. [Pictured right: Fisheye BRD. Photo: Matt Kammann]



Day 4

Business and the Bigger Picture

Being a commercial fisherman is more than catching fish—it's running a business. Today, you explore the economic side: tracking expenses and profits, trip planning and understanding markets and quotas. Instructors walk you through seafood handling, from keeping fish fresh to delivering them to buyers. Discussions on sustainability and conservation illustrate how responsible fishing practices protect both fish populations and livelihoods. By the end of the day, you realize that every decision on deck, from gear choice to trip timing, affects both your bottom line and the Gulf itself.



Day 5

Time at Sea

The week culminates with a full day aboard a working vessel. You put everything you've learned into practice: deploying nets, identifying fish, maintaining gear, and working as a team under real-world conditions. Experienced fishermen mentor you at every step, offering tips honed over decades. You experience firsthand the challenges and rewards of life at sea, the rhythm of the ocean, and most of all the hard work required to bring in a healthy catch, as well as the satisfaction of seeing your knowledge and effort translate into results.

The Gulf Commercial Fisherman Program has already launched successfully, with sessions in Galveston, Texas, and Madeira Beach, Florida, and it continues to grow. Participants leave not only with practical skills but with mentorship, professional connections, and a deeper understanding of what it truly means to be a Gulf commercial fisherman. Texas Sea Grant and its partners plan to expand the program to new regions, develop additional resources, and build a lasting mentorship network, ensuring that the Gulf's fleet remains strong and its next generation of fishermen is ready for the challenges and rewards ahead. [Pictured: Shrimp after catch. Photo: Matthew Kammann.]



“This program gives participants the tools and confidence they need to succeed on the water. It’s about preparing them for every aspect of the job, from safety and gear handling to business decisions and environmental stewardship. The commercial fishing industry told us they needed a program like this, and we built it with their input. When someone finishes this training, captains know they’re getting a deckhand with a solid foundation, someone who understands the work, the expectations, and how to contribute on day one.”

*- Matt Kammann, Texas Sea
Grant Fisheries Specialist and
Program Lead*



EDUCATION

Environmental Literacy and Workforce Development

OPENING THE CHANNEL TO THE NEXT GENERATION OF COASTAL PROFESSIONALS

The rumble of a tugboat carries across the Port Arthur waterfront as a small group of teenagers steps onto the dock, clipboards in hand and lifejackets buckled tight. For many, it's their first time this close to a working port and their first look at the careers that keep the Texas coast moving. That kind of moment is what Nikki Fitzgerald, Texas Sea Grant and Texas A&M AgriLife Extension agent for Jefferson and



Chambers counties, works all year to create. "My job as a county extension agent is to be able to do whatever my county needs," Fitzgerald said. "Whether that is working with our crawfish farmers, our shrimpermen, our oystermen, crabbermen, I'm always there to help." *[Pictured: Camp Seaport lifejacket, safety, and knot-tying class. Photo: Nikki Fitzgerald.]*

From the Classroom to the Coast

In collaboration with the Port of Port Arthur, Texas Sea Grant runs the Youth STEAM Workforce Education program, a two-part initiative that introduces high school students to the wide range of jobs available in the maritime industry and on local waterways. Organized and facilitated by Texas Sea Grant staff for more than 15 years, the program combines classroom-based STEM learning with hands-on field experiences that connect students directly to the coastal workforce. The summer component, Camp Seaport, is a free, five-day program hosted at the Port Arthur International Seafarers' Center. Each July, local high school students step into the heart of a working port to see firsthand how the maritime industry keeps the Texas coast moving.

Over the course of the week, students rotate through hands-on learning experiences that highlight every aspect of port life. They practice navigation and knot-tying alongside mariners, learn how cargo moves safely and efficiently through the port, and hear directly from pilots, engineers, and ship crews about their daily work. Out on the water, students ride with the U.S. Coast Guard to see vessel operations up close, visit an environmental floating classroom on the Neches River to explore how healthy waterways support commerce, and board a Beaumont Reserve Fleet ship to discover the variety of careers that keep maritime operations running smoothly.

Each student leaves Camp Seaport with a deeper understanding of how science, technology, and teamwork power the maritime industry—and with a clearer sense of how their own future could fit into that world.

The experience continues in February with a multi-week indoor session where

students conduct STEM-based activities, like building a kayak out of recycled corrugated board, to deepen their technical skills and understanding of maritime operations. Program evaluations show a marked increase in students' awareness of maritime career opportunities and the pathways available to pursue them.

Building a Local Workforce

The program has also built strong local support: industry partners contribute more than \$30,000 annually in donations that fund scholarships for camp alumni pursuing college degrees, workforce education programs, or military service. Graduates of the camp have returned to the community as longshoremen, political leaders, and members of the Coast Guard.



“We give local high school students the opportunity to experience a free five-day camp surrounded by everything maritime.”

- Lachelle Edwards, Director of Public Affairs and Communications, Port of Port Arthur



Nikki Fitzgerald listening to a student testimony in class. Photo: Nikki Fitzgerald.

"Camp Seaport is our 501(c)(3) program hosted by the Port of Port Arthur," explained Lachelle Edwards, the port's Public Affairs and Communications Manager. "We give local high school students the opportunity to experience a free five-day camp surrounded by everything maritime. Through Texas Sea Grant, we have specialists come in and allow those students to experience STEM-related activities and workforce education." For the Port of Port Arthur, the camp is more than outreach—it's a bridge to opportunity. "The city of Port Arthur is an economically disadvantaged community," Edwards said. "To give students this opportunity to be exposed to something that they may not have had the opportunity to do elsewhere is an opportunity that we do not take for granted. We're very grateful for Texas Sea Grant and their partnership throughout the years."

Learning that Lasts

Since Camp Seaport began in 2008, the program has connected hundreds of local students to maritime and coastal careers.

"The partnership through Texas Sea Grant and the Port of Port Arthur has sustained for the last 16 years, and we look forward to many more opportunities and many more years to come to continue impacting the lives of students," Edwards said.

Fitzgerald's broader extension work continues that mission year-round. She partners with emergency management teams on coastal resilience projects, supports local fishermen with safety and sustainability training, and engages volunteers in habitat restoration. Whether teaching, restoring marsh grass, or guiding a new generation of mariners, she embodies Sea Grant's model of science in service to the community.



2024 Camp Seaport Summer Class and Nikki Fitzgerald. Photo: Nikki Fitzgerald.

2025 JOHN A. KNAUSS MARINE POLICY FELLOWSHIP PROGRAM



ABOUT THE FELLOWSHIP

The Sea Grant John A. Knauss Marine Policy Fellowship Program was established by Congress in 1979 and is named in honor of one of Sea Grant's founders, former NOAA Administrator John A. Knauss. The fellowship offers a unique educational experience to graduate and professional students who have an interest in ocean, coastal, and Great Lakes resources and in the national policy decisions affecting those resources.



DURATION

The program matches the students with hosts in the legislative or executive branch of the federal government for a one-year, paid fellowship (13-month award term) in the Washington, D.C. area.



FELLOWSHIP BENEFITS

The Knauss Fellowship provides hands-on learning, professional networking, career advancement opportunities, exposure to interdisciplinary work, all while making an impactful contribution to meaningful programs. The Knauss network is over 1,500 strong and encourages mentorship and collaboration.

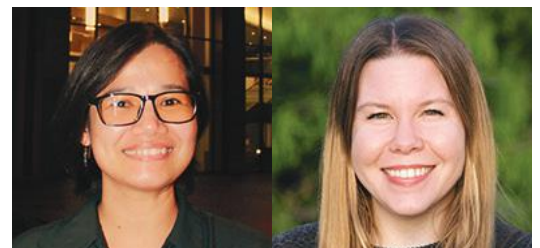
2025 Knauss Fellowship Winners

Roselyn De Chavez Aguila

Ph.D. candidate of Marine Biology, Texas A&M University at Galveston; Bachelor of Science in Biology and a Master of Science in Biological Sciences.

Alyssa Schultz

Ph.D. candidate of Geography at Texas A&M University; Bachelor in Wildlife and Fisheries Sciences degree, with a minor in Oceanography.



Updates on the annual John A. Knauss Fellowship can be found on the funding page of the Texas Sea Grant website.

Coastal Science. Community Solutions.

With boots on the ground in communities across the Texas coast, our extension agents, educators, and researchers serve as trusted local resources. We live and work in the same communities we serve, creating long-lasting relationships and delivering science-based solutions where they're needed most.

Whether we're helping shrimpers navigate changing regulations, supporting homeowners with hurricane preparedness, or connecting students to coastal career pathways, our team is committed to real-world impact.

What is Extension?

Extension can be defined as sustained interaction with specific audiences using education, outreach, and engagement techniques to transfer science-based knowledge that informs decision making or changes behavior.

The key to understanding Extension is that there is a two-way transfer of knowledge between researchers and community stakeholders. The Texas Sea Grant extension program aims to transform knowledge into action to facilitate the most informed decision-making along the coast. This is implemented by placing a team of extension agents and specialists in Texas coastal communities. Extension agents and specialists act as a bridge between communities and researchers, communicating the needs of communities to the researchers and translating the science back to the communities.



Promoting sustainable use of coastal resources

By providing science-based information and best practices, extension helps ensure the long-term health and productivity of our oceans, coasts, and Great Lakes for both economic and environmental benefits.



Strengthening coastal economies

Extension programs support industries by providing training, technical assistance, and guidance on sustainable business practices.



Enhancing environmental stewardship

Sea Grant educates the public and stakeholders about coastal ecosystems, conservation strategies, and the impacts of human activities, fostering a greater sense of responsibility for these valuable resources.



Building resilient communities

Sea Grant Extension plays a vital role in helping coastal communities prepare for and adapt to coastal hazards such as storms, flooding, and sea-level rise through education and outreach on mitigation and adaptation strategies.



Improving public understanding of science

By translating complex scientific information into accessible formats, Sea Grant Extension helps the public make informed decisions about coastal issues.



Facilitating communication and collaboration

Extension agents serve as neutral conveners – honest brokers of science-based information – bringing together diverse groups of stakeholders to discuss challenges, share knowledge, and work towards common solutions.



Addressing current and emerging issues

Sea Grant Extension is flexible and responsive to new challenges facing coastal communities, such as environmental impacts, marine debris, and invasive species.



OUTREACH & EXTENSION

Environmental Literacy and Workforce Development

DOLPHIN CHALLENGE: A COMPETITION OF WITS FOR THE NEXT OCEAN LEADERS

2025 Dolphin Challenge Participants. Photo: Brandi Keller

Each spring, bright young minds from across Texas and surrounding states gather in Galveston to put their ocean knowledge to the test. The Dolphin Challenge, Texas' regional competition for the National Ocean Sciences Bowl (NOSB), is an academic launching pad for future scientists, educators, and environmental leaders — this year's theme: Sounding the Depths: Understanding Ocean Acoustics.

A Launchpad for Ocean Education

Hosted by Texas Sea Grant at Texas A&M University–Galveston in collaboration with Sea Camp, the Dolphin Challenge is part of a nationwide program designed to address a critical gap in Earth and environmental sciences in U.S. classrooms. By immersing students in the science of the ocean and coast, the competition promotes ocean literacy and encourages participants to consider careers in marine and environmental fields. Texas A&M AgriLife Extension and Texas Sea Grant Coastal and Marine Agent, Brandi Keller, is the Regional NOSB Coordinator for coastal Texas. “Students leave the Dolphin Challenge with a new appreciation for how interconnected our oceans are with global systems,” says Keller. “It’s about

more than winning — it’s about inspiring the next generation of ocean leaders.”

Behind the Scenes of a Statewide Effort

Keller serves as both organizer and ambassador for ocean science education in her role as Regional NOSB Coordinator. She handles everything from planning the competition schedule and securing the venue to recruiting and training the many volunteers who serve as moderators, judges, and scorekeepers. She also engages schools and coaches, manages team registration, and ensures the event follows national guidelines while providing students with enriching opportunities such as lab tours and interactions with scientists. Acting as the link between Texas Sea Grant's regional competition and the National Ocean Sciences Bowl, the coordinator helps winning teams advance to the national finals while fostering partnerships, sponsorships, and community support that make the Dolphin Challenge a success year after year. Keller was also able to offer a unique element of expertise to this year's competition in underwater acoustics. She



Brandi Keller, Coastal and Marine Agent



Texas A&M AgriLife Extension and Texas Sea Grant Coastal and Marine Agent, Brandi Keller, is the Regional NOSB Coordinator for coastal Texas. She hosts the event in Galveston County each spring.

drew on her experience with the United States Navy and offered valuable insight to develop and review the questions for the National Ocean Sciences Bowl finals.

The format is rigorous and exciting. Teams of high school students face off in a quiz-bowl style contest, answering rapid-fire toss-up questions as well as more complex, collaborative bonus questions.

Subjects span the breadth of ocean sciences, from marine biology and chemistry to physical oceanography, geology, and even marine policy. Success requires not only quick thinking but also teamwork, problem-solving, and the ability to apply classroom knowledge to real-world issues. *[Pictured: 2025 Dolphin Challenge Winners, Galveston, Texas.]*



Connecting Students to the Scientific Community

Beyond the buzzers, the event also connects students to the broader scientific community. Past competitions have included tours of Texas A&M–Galveston’s research facilities, interactions with scientists, and presentations on pressing environmental challenges in the Gulf. Volunteers from groups such as the Galveston Bay Area Master Naturalists help make the experience possible, serving as moderators, judges, and mentors for the competing teams. Once a student participates in any regional competition, they qualify for the NOSB Scholarship Program. In addition, they become connected as a NOSB alum, sometimes going on to be moderators and judges themselves for future competitions.

Do You Have Coastal Knowledge?

Q: Dolphins are mammals, but unlike humans, they must consciously surface to breathe. What part of their brain allows them to sleep while still staying partially alert to breathe?

Answer: Unihemispheric slow-wave sleep (they let one half of the brain sleep at a time).

Q: Many dolphins use echolocation to hunt. What structure in a dolphin’s head focuses the sound waves they emit?

Answer: The melon.

Q: Bottlenose dolphins often pass around a specific marine creature to use as a tool and plaything—and sometimes to dislodge parasites from their skin. What animal is it?

Answer: A pufferfish.

The stakes are high. Winners of the Dolphin Challenge earn a coveted spot at the National Ocean Sciences Bowl finals, where they represent Texas on the national stage against top teams from across the country. The experience builds leadership, confidence, and connections that last far beyond high school. Congratulations to the 2025 Winners — Seth Alfaro, Saara Bindingnavele, Unal McLauchlan, Anuar Medina, and Vera Hsiang — coached by Leslie Peart and Lorinda Hamilton.

For Texas Sea Grant, the Dolphin Challenge is a perfect fit with its mission to build resilient communities and a scientifically literate workforce. By engaging students in ocean sciences early, the program cultivates curiosity and passion that can translate into lifelong careers protecting and studying the world's oceans.

Note: The NOSB is an academic competition of the Center for Ocean Leadership (COL), a University Corporation for Atmospheric Research Community Program.

The 2025 Dolphin Challenge champions gather around the iconic turtle sculpture at Texas A&M–Galveston. Photo: Brandi Keller, Texas Sea Grant





OUTREACH & EXTENSION

Environmental Literacy and Workforce Development

SEA TURTLE 101 BRINGS OCEAN SCIENCE TO COASTAL CLASSROOMS



 Amy Nowlin teaching about Sea Turtles.
Photo: Amy Nowlin

Making a Splash in Mid-Coast Texas

When Texas A&M Agrilife Extension and Texas Sea Grant Coastal and Marine Agent Amy Nowlin launched her Sea Turtle 101 program, she wanted more than to share facts. Her goal was to spark curiosity, creativity and action in coastal communities. Judging by the excitement in libraries, museums and community events across the Mid-Coast, she is doing exactly that.

So far, Nowlin has brought Sea Turtle 101 to the City by the Sea Museum in Palacios and the Bay City Library – Sargent Branch. This fall, the program will appear in the Palacios Library's Science Rocks after-school series and the YMCA's after-school programming. It will also headline Jackson County's new GatorFest in September. She is exploring ways to share the program through the Mid-Coast Texas Master Naturalist chapter as well.

Discovering the world of sea turtles

The program covers a wide range of topics, beginning with fun and surprising facts about these ancient marine reptiles. Participants learn to identify the major species of sea turtles, explore their migratory

patterns, and gain a basic understanding of their anatomy and the functions of their unique physical structures. The lesson also includes an overview of nesting behavior and the many challenges sea turtles face throughout their life cycle, including the harmful effects of ingesting plastic pollution. *[Pictured: Amy Nowlin presenting.]*

Hands-on science and engineering

The science, technology, engineering and math (STEM) enrichment activity challenges participants to think like wildlife engineers. Using everyday materials, they design and build prototype prosthetic flippers





for injured sea turtles. The activity blends biology and engineering, showing how creative thinking can solve real-world conservation problems. "I'm always amazed at how creative students can be during the sea turtle prosthetic STEM lesson. You never know—one of their ideas could inspire the next big innovation!"

Seeing conservation tools in action

The program also introduces participants to important conservation tools used in commercial fisheries, such as turtle excluder devices (TEDs) and bycatch reduction devices (BRDs). Participants can see actual examples of these devices up close and learn how they function. Through demonstrations and discussion, they gain insight into how these innovations help reduce bycatch and protect sea turtles and other non-target species.

At the conclusion of the program, each participant receives a copy of the "Barney and the TED" coloring book, sponsored by Texas Sea Grant. This engaging and educational resource follows the story of Barney the sea turtle as he navigates a series of real-world challenges faced by sea turtles in the ocean. The book reinforces key concepts from the program in a fun, age-appropriate way, helping to extend learning and spark continued interest in marine conservation.

Why it matters for coastal communities

Sea turtles do more than capture attention. They help maintain healthy ocean ecosystems by trimming seagrass beds and balancing marine food webs. Sea Turtle 101 gives people the knowledge and tools to protect these animals, building a sense of stewardship for the Gulf Coast. Informed communities can make decisions that safeguard marine life and support local livelihoods.



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OUTREACH & EXTENSION

Resilient Communities and Economies



INFRASTRUCTURE DISASTER MANAGEMENT TRAININGS STRENGTHEN CALHOUN AND CAMERON COUNTY COMMUNITIES

When disaster strikes, recovery often depends on how well communities have prepared for the unexpected. Along the Texas coast, that preparation takes shape not only in emergency response plans but in the relationships, shared knowledge, and coordination built before a crisis ever begins.

In 2024 and 2025, Texas Sea Grant's Coastal Resilience Team, specialists April Taylor and Madgellen Cleary, helped strengthen that foundation in Cameron County, partnering with the Texas A&M Engineering Extension Service (TEEX) Infrastructure Training and Safety Institute to host a series of disaster management trainings designed to help local leaders protect critical infrastructure and maintain essential services when disaster hits.

"These courses bring together the emergency managers with people who keep our communities running—utility

operators, healthcare administrators, and public works—and give them a chance to think through disaster response and recovery together," said Taylor. "It's about educating the key sectors on emergency management and hazard mitigation planning before the disaster strikes."

Texas Sea Grant specialists served as the local voice for these communities and partner with TEEX to ensure these valuable resources are accessible and relevant to the people who live and work in both Calhoun and Cameron counties. Each course focused on a different sector of critical infrastructure identified by the National Infrastructure Protection Plan (NIPP)—healthcare, electric power, public services, and water and wastewater utilities. If attendees completed all 4 courses, they received an Infrastructure Disaster Management Certification from TEEX.

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The Disaster Management for Healthcare course brought together emergency management and hospital officials to explore strategies for ensuring the resiliency of healthcare services during catastrophic events. Participants examined how hospitals depend on other infrastructure, such as water, power, and transportation, and discussed strategies to maintain operations during disruptions. The session drew 15 attendees from 4 counties and 9 communities.

Another session, Disaster Management for Electric Power Systems, emphasized the role of energy providers in maintaining stability during emergencies. 8 attendees from 4 counties and 5 communities took part, learning how to coordinate response efforts and mitigate the cascading impacts of power outages, a vital skill in coastal areas vulnerable to hurricanes and flooding.

The Disaster Management for Public Services course focused on local government operations and infrastructure management, engaging 31 attendees from 7 counties



“Resilience starts locally,” Cleary said. “The fact that we have people who are in need and want these classes to help prepare their community for any form of disaster is truly amazing. TEEX makes sure to provide a safe environment for these groups to speak openly about the struggles they need help with.”

- Madgellen Cleary, Texas Sea Grant Coastal Resilience Specialist



and 17 communities. Public works professionals and emergency coordinators worked in multidisciplinary teams to apply real-world disaster scenarios, accounting for nearly 500 contact hours of hands-on learning.

Finally, the Disaster Management for Water and Wastewater Utilities course brought together 32 participants from two counties and eight communities, dedicating more than 500 contact hours to strengthening the resilience of one of the region’s most critical systems. Participants explored coordinated strategies to ensure the continuity of water and wastewater services—essential to public health and economic recovery—during and after disasters. A major highlight was the participation of the city of Seadrift, which has been facing water quality challenges and recently declared a disaster. Through this class, Texas Sea Grant collaborated with the city and connected officials with partners from Clean Coast Texas. Cleary said, “It is difficult to imagine a community facing challenges with access to safe drinking water while also enduring the broader impacts of a disaster. Through listening to their needs

and collaborating with the local TDEM representative, it became clear that there was a strong opportunity for partnership between Clean Coast Texas and the city of Seadrift.”

The final class was officially added in February 2025. It was not mandatory for participants who had already started the series, but it met a clear need and was heavily requested by communities in Calhoun County. The course, Disaster Recovery Public Assistance Programs, focused on federal disaster recovery programs administered by FEMA that provide funding to state, local, tribal, and territorial governments, as well as eligible nonprofits, to support response and recovery after a declared disaster. These programs help communities repair or replace damaged public infrastructure—such as water systems, roads, and public buildings—restore essential services, remove debris, and implement mitigation measures that reduce future risk. Public Assistance funding is typically cost-shared, with FEMA covering a portion of expenses and the applicant contributing the remainder.

The resilience team coordinated logistics, recruited participants, and ensured representation from the respective areas. They also supported the courses by providing refreshments and distributing post-course surveys to collect feedback and measure long-term impact.

Taylor said that while the trainings delivered valuable knowledge, they also revealed a larger need for emergency managers to engage with other key colleagues in critical infrastructure and to hear directly from key sub-sectors of critical infrastructure about their unique challenges and priorities. The post-course surveys are just the first step to capture those perspectives, which will guide the development of future Texas Sea Grant coastal resilience programs.

“Especially helpful are the exercises that allow us to engage with other people from different companies. It provides a different perspective as well as the opportunity to gain knowledge on how other companies manage their disaster plan,” one attendee commented.

For the resilience team, the training series is part of a larger effort to help Texas communities adapt to an evolving coastal landscape shaped by stronger storms, rising seas, and increasing development pressures.

“Resilience starts locally,” Cleary said. “The fact that we have people who are in need and want these classes to help prepare their community for any form of disaster is truly amazing. TEEEX makes sure to provide a safe environment for these groups to speak openly about the struggles they need help with.”

Through these partnerships with TEEEX, Texas Sea Grant continues to strengthen the capacity of Texas’s coastal communities



INVEST IN THE FUTURE OF THE TEXAS COAST

Texas Sea Grant is expanding engagement with industry partners, donors and community organizations to grow our capacity and deepen our impact along the Texas coast. While we've primarily relied on federal and state funding, we're open to external partnership opportunities—including sponsored placements such as magazine ads—to further support our research, extension, and education efforts.

If you or your organization is interested in exploring a partnership or supporting our mission, we'd love to connect. Email us at seagrant@tamu.edu.

Your contribution may look like:



Internship and scholarships for early-career scientists (undergrad and/or graduate students)



Expanded and enriched extension opportunities



Coastal restoration and research



Supporting specific coastal industry needs, like the emerging Texas oyster mariculture industry



TEXAS A&M UNIVERSITY
Division of Research



[HTTPS://TEXASSEAGRANT.ORG/FUNDING/GIVING/](https://texasseagrant.org/funding/giving/)

Texas Sea Grant is a department of the Texas A&M University Division of Research. It's part of the National Sea Grant College Program, a network of university-based programs across the U.S. supported by the National Oceanic and Atmospheric Administration (NOAA).



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