

#### **Texas Sea Grant College Program**

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The Texas Gulf Coast provides a wealth of natural resources that drive the Texas economy, provide food and fuel for a rapidly growing human population, and sustain and nourish life. The quality and abundance of these natural resources are pivotal to sustained growth in Texas. Balancing the economic, environmental, and cultural benefits these natural resources offer is of the utmost importance to the state of Texas. The Texas Sea Grant College Program's research and engagement programs respond to this challenge by capturing the academic capacity of our universities, linking universities to the needs of Texans, building knowledge, creating innovative tools and services with a public purpose, translating research results to the public, developing the Texas workforce, sustaining industries, and solving real-world problems to improve human welfare and the health of our natural resources.

This plan aligns with the National Sea Grant College Program Strategic Plan 2018-2021 and supports the National Sea Grant College Program's core values, cross-cutting principles, focus areas, goals, actions, and desired outcomes. The 2018-2021 Texas Sea Grant strategic plan is unique to the needs of Texas and was developed in collaboration with the Texas Sea Grant Advisory Committee, Texas Sea Grant staff, Texas coastal stakeholders, and the general public. This plan capitalizes on Texas Sea Grant's unique capacities and strengths and establishes a prioritized direction to guide Texas Sea Grant in addressing critical state needs.



Figure 1: Location of Texas Sea Grant Offices and Personnel

### PROGRAM BACKGROUND

Texas Sea Grant is a collaboration of the National Oceanic and Atmospheric Administration (NOAA), the State of Texas, and universities across the state.

Texas Sea Grant is part of NOAA's National Sea Grant College Program, a network of 33 university-based programs in coastal and Great Lakes states and territories. Texas Sea Grant is headquartered at Texas A&M University in College Station; it also has staff members located at Texas A&M University at Galveston and Texas A&M University-Corpus Christi, and in several other communities along the coast (Figure 1).

Texas Sea Grant's competitive research grant program draws on the expertise of the state's top scientists. At the same time, its coastal and marine extension agents and extension specialists working in the field translate and communicate research results to stakeholders in ways that meet the real-world needs of Texans. Living and working in coastal communities themselves, Texas Sea Grant personnel are a conduit to the industries, local governments, and citizens there who help identify additional issues that would benefit from scientific study. This two-way flow (Figure 2) ensures that Texas Sea Grant's funded research projects result in innovative tools and services with practical applications and a public purpose.

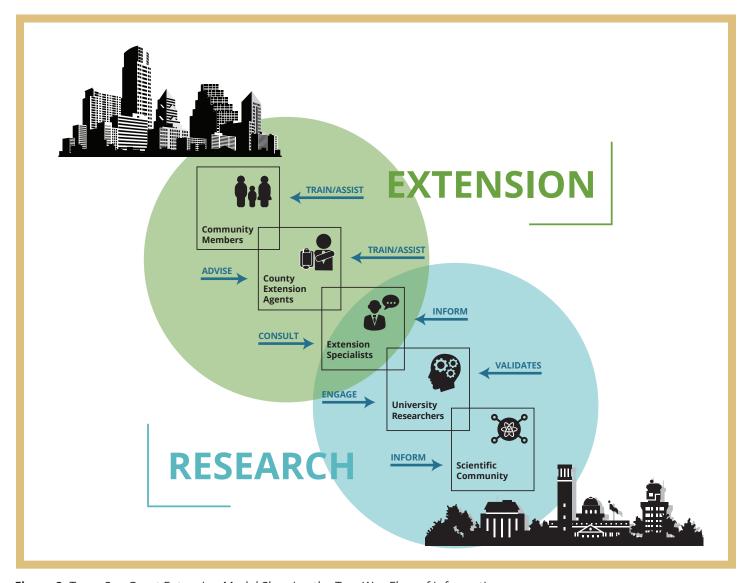


Figure 2: Texas Sea Grant Extension Model Showing the Two-Way Flow of Information



#### **TOURISM AND RECREATION**

- Texas has a 367-mile-long coastline and 3,300 miles of bayfront shoreline.
- Tourists visiting the Texas coast in 2014 spent \$19.7 billion, more than \$10.4 million at hotels and motels alone.
- The cruise business has been growing at Texas ports, generating more than \$1.3 billion for the Texas economy in 2014, a 5.6 percent increase since 2013. The Texas cruise industry also generated 22,689 jobs with a total wage impact of \$1.42 billion.
- Nature tourism contributed more than 6,613 jobs in the Rio Grande Valley alone in 2011.
- Top recreational fishing species include red drum, spotted trout, flounder, red snapper, tuna, wahoo, and marlin.
- Texas has numerous coastal national wildlife refuges that are home to iconic species including the endangered whooping crane.
- The Great Texas Coastal Birding Trail, the largest nature trail in the nation, has more than 300 birding sites available along the Texas coast.



#### **CRITICAL WATERWAYS**

- The Gulf Intracoastal Waterway (GIWW) is the nation's third-busiest inland waterway, and the Texas portion handles more than 63% of its traffic.
- Approximately \$25 billion in cargo passes through the Texas portion of the GIWW each year.



#### **FISHERIES**

- In 2014, landings revenue for Texas Gulf shrimp totaled \$242 million.
- In 2014, Texas commercial fisheries brought in \$2.8 billion in sales impacts, \$826 million in income impacts, \$1.2 billion in value-added impacts, and 33,880 jobs.
- In 2014, recreational fishing generated \$1.8 billion in sales impacts, \$757 million in income impacts, and \$1.2 billion in value-added impacts in Texas.
- Top commercial fishing species include various shrimp, oysters, blue crab, red snapper, and black drum.



# THE ENVIRONMENT IN WHICH WE WORK<sup>1</sup>



#### POPULATION GROWTH AND DEVELOPMENT

- 6.1 million people lived in the 18 Texas coastal counties in the year 2010. This is nearly one quarter of the entire state's population.
- It is projected that 9.3 million people will live on the Texas coast or in the coastal zone by the year 2050, which is an increase of 52%.



#### **PORTS**

- Texas ports generate more than \$82.8 billion in economic value to the state.
- Three of the nation's six busiest ports by tonnage are in Texas,<sup>2</sup> and more than 500 million tons of cargo pass through Texas ports annually.
- Texas ports generate \$6.5 billion in tax revenues, support more than 1.4 million jobs, and account for 25% of the total state gross domestic product.



#### **ENERGY**

- The Texas Gulf Coast Refining District, located on the upper Texas coast, is home to 5,000 energy-related companies and 15 of the 20 largest oil pipeline companies in the country.
- Texas has 27 refineries that account for more than 29% of the country's total refining capacity.
- Texas exported more than \$59.1 billion in petroleum and coal products in 2014, supporting more than 1.1 million jobs through exports.







## **THREATS**



The Texas coast is at risk from powerful storm events including major hurricanes, and increasing coastal development exposes more people and community infrastructure to these dangerous hazards.

**Texas shores** are **retreating** by an average of 4 feet per year, with some areas experiencing losses greater than 30 feet per year. This **endangers communities**, **industry**, **critical infrastructure**, and **coastal habitats** by making them more **vulnerable** to **storm surge** and **flood damage**.



Gulf beach and bay shoreline erosion and subsequent habitat loss threaten bay systems, which are nursery areas for species important to commercial and recreational fishing, and productive estuarine marshes, wetlands and other habitat for wildlife, including resident and migratory waterfowl and shorebirds.



Gulf beach erosion and dune degradation diminish tourism and critical habitats and reduce public and emergency access.



Pollution and loss of critical habitats like wetlands, seagrass beds and oyster reefs, coupled with increasing development and sea level rise, compromise the productivity of Texas estuaries and the economically important ecosystem services they provide.



Population growth and coastal development and the subsequent loss of coastal habitats are causing a decline in water quality and quantity, both of which are essential for community sustainability and maintaining the healthy bay ecosystems crucial to many marine-dependent industries.



Texas Sea Grant's planning process used input from Texas Sea Grant staff, the Texas Sea Grant Advisory Committee, coastal stakeholders, and the general public. Strategic plan input was collected through program staff retreats, an Advisory Committee meeting, two surveys, and a strategic plan comment period.

Over the course of one year, Texas Sea Grant held three program staff retreats in January, April, and December to provide opportunities for staff to participate in the strategic planning process. The 2016 retreats focused on visioning, plan structure, program priorities, core values, cross-cutting principles, and program goals by Focus Area.

Texas Sea Grant held an Advisory Committee meeting in September 2016 to solicit input from committee members on a variety of strategic planning topics. Committee members were asked to help identify strengths, weaknesses, opportunities, and threats related to the program. They were also asked to help identify the top trends likely to impact the program and how Texas Sea Grant could address trends and issues within short-, medium-, and long-term timescales. Finally, the committee evaluated the Focus Areas and respective goals and voted on what to keep, amend, or remove.

The program launched an open-ended, anonymous online survey in October 2016 to identify the most important issues and challenges facing the Texas coast. The survey was distributed to Texas coastal stakeholders; 83 responses were received.

Texas Sea Grant implemented a second, statewide survey in December 2016 to assess public perceptions of

the Texas coast. A total of 1,006 Texas residents completed the online survey. The survey assessed respondents' relationship with the coast, activities participated in on the coast, and perceptions of the importance of several coastal issues: coastal access, coastal community development, commercial and recreational fishing, coastal environmental issues, coastal and marine industries, and job creation. The survey also addressed respondents' level of knowledge on various coastal issues and included demographic information.

The draft 2018-2021 Texas Sea Grant strategic plan was provided to all Texas Sea Grant staff and Texas Sea Grant Advisory Committee members for comment and revisions in February 2017. The final plan incorporates their responses.



## VISION

Texas Sea Grant envisions a future where people live, work and play along the Texas Gulf Coast in harmony with the natural resources that attract and sustain them, and where we use our natural resources in ways that capture the economic, environmental and cultural benefits they offer, while preserving their quality and abundance for future generations.



## MISSION

Texas Sea Grant's mission is to improve the understanding, wise use, and stewardship of Texas coastal and ocean resources.

To achieve this mission, Texas Sea Grant directs its research and engagement programs to benefit the people, businesses, and communities of Texas — from providing grants and scholarships that benefit students and develop Texas' workforce, to funding the state's innovative researchers to solve real-world problems, to deploying boots-on-the-ground extension professionals to help small businesses be more competitive in a global marketplace and coastal communities to grow sustainably and build resilience to impacts from storms and other hazards.

## **CORE VALUES**

Texas Sea Grant adheres to the following three core values in all of its programs and activities:

## RELEVANCE AND DISTINCTIVENESS

Because of Texas Sea Grant's foundations within and interaction with coastal stakeholders, its programs and activities are relevant to the current and future needs of these industries, communities, and people. This interactivity and immediacy set it apart from other entities and make it a trusted source of information.



## **PUBLIC SERVICE AND STEWARDSHIP**

Texas Sea Grant's central focus is to provide services that ultimately support the people of Texas through activities that help coastal and marine businesses and industries, support resilience in coastal communities, and enhance stewardship of the coastal ecosystems upon which these industries and communities depend.

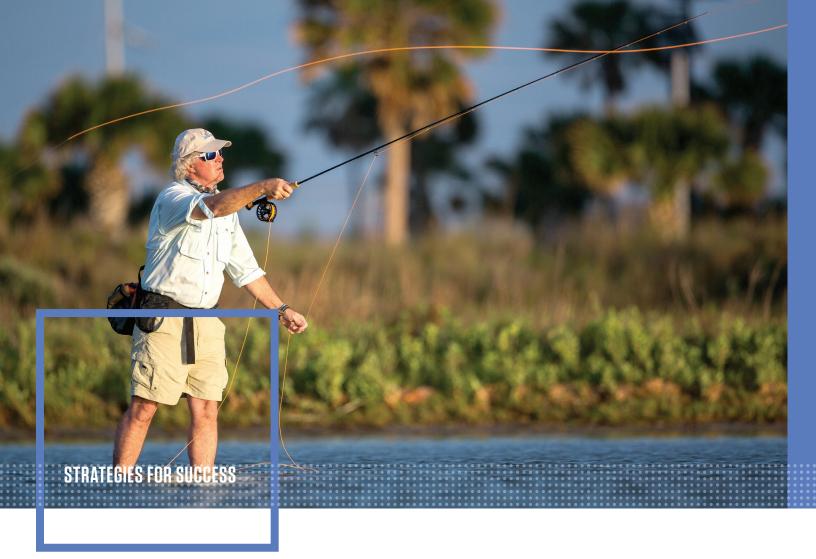


## INTEGRITY AND ACCOUNTABILITY

Texas Sea Grant strives for the highest standards of fairness and honesty, uses the public and private resources that it is given responsibly, and is reviewed annually to help direct its efforts and improve its performance.







The structure of Texas Sea Grant allows it to leverage resources and engage audiences in unique ways, which also allows it to implement strategies that are not available to other entities. These strategies cut across all of Texas Sea Grant's programming and activities:



#### Support Decision-Making with Science and Serve as Honest Brokers

Texas Sea Grant serves the state of Texas and its people as a non-partisan provider of the best available scientific information and technology, and helps decision makers gain access to the information and learn to use the technology.

#### Cultivate Partnerships

Texas Sea Grant collaborates and coordinates with a wide array of public, private, and non-profit entities, extending its reach while minimizing duplication of effort to make the best use of the resources available.

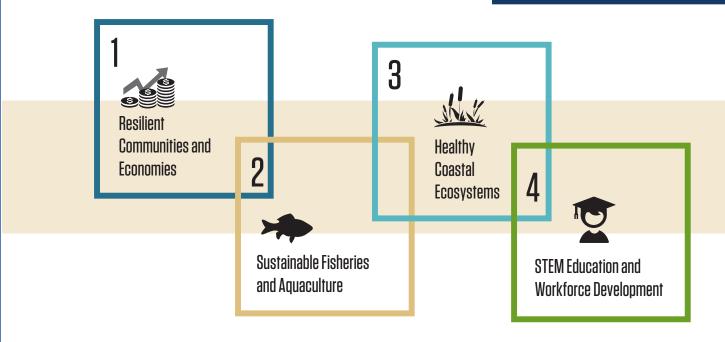
#### Enhance and Build Capacity of Communities

Texas Sea Grant provides support to enable stakeholders to help themselves, increasing their capacity to make better-informed decisions for wise use of coastal resources and enhancing community well-being.

#### Engage in Regional Issues

Working regionally and recognizing the interconnectedness of issues across the Gulf of Mexico and throughout multiple watersheds help the program address the most critical of these issues on the Texas coast.

OVERVIEW OF FOCUS AREAS, GOALS, ACTIONS, AND OUTCOMES



These Focus Areas evolved from the National Sea Grant College Program's 2018-2021 strategic plan and Texas Sea Grant's engagement with its Advisory Committee, stakeholder groups, and the people of Texas. The Focus Areas reflect the state and nation's most urgent needs for coastal and ocean communities and resources, NOAA's goals, and Sea Grant's unique strengths and core values. Focus Areas describe the overarching priorities for Texas Sea Grant and the national network. They provide a structure to organize relevant accomplishments, impacts, and outcomes with the applicable priority.

Each Focus Area has associated goals, actions, and desired outcomes. The goals describe the desired long-term result for each Focus Area. Actions are those undertaken by Texas Sea Grant to reach the goals. The outcomes are benchmarks that Texas Sea Grant can use to track progress toward achieving each goal.

Performance measures and metrics are quantitative ways of measuring the outcomes of the strategic plan. Texas Sea Grant reports its performance measures and metrics annually to the National Sea Grant Office. These results are used to inform the program evaluation process used by all state Sea Grant programs.





#### **Resilient Communities and Economies**

- 1. **Goal:** Coastal communities and industries increase their resilience to natural and manmade hazards to minimize economic disruption.
  - 1.1. **Action:** Assist coastal communities and industries directly by facilitating planning, transferring technology, and providing technical assistance to decision makers and residents.
    - 1.1.1. Desired Outcome: Coastal community residents and leaders and coastal industry decision makers are able to use data and tools for informed decision-making.
    - 1.1.2. **Desired Outcome:** Coastal communities and industries engage in comprehensive planning and adaptive management.
  - 1.2. Action: Educate and train coastal community residents and decision makers about programs, resources, tools, and best practices to prepare for hazards at the individual and community-wide level
    - 1.2.1. **Desired Outcome:** Coastal decision makers and individuals are knowledgeable of and have the ability to use resources and tools and implement best practices to prepare for hazards.
    - 1.2.2. **Desired Outcome:** Coastal decision makers and individuals make use of programs and best practices to decrease vulnerability to hazards.
  - 1.3. **Action:** Conduct applied research on industries, social vulnerability, coastal planning, risk perception, hazard mitigation, natural resources, technology to support marine-related industries, the economic impacts of coastal hazards, and the

- geophysical processes associated with hazards to support coastal resiliency.
- 1.3.1. **Desired Outcome:** Coastal decision makers have access to data and information based on sound science that can be implemented in planning processes.
- 2. **Goal:** Coastal community residents and decision makers increase their understanding of the importance of water resource issues to support resilient communities and healthy coastal ecosystems.
  - 2.1. Action: Lead and coordinate individual-, community-, and watershed-scale educational programs and demonstration projects on water quality, water availability, and the wise use of water resources.
    - 2.1.1. **Desired Outcome:** Community residents and decision makers are aware of best management practices for water resource management.
    - 2.1.2. **Desired Outcome:** Community residents and decision makers adopt best management practices for water resource management.
  - 2.2. **Action:** Facilitate multi-jurisdictional watershed planning to protect water quality and quantity and mitigate stormwater runoff.
    - 2.2.1. **Desired Outcome:** Community residents and decision makers participate in watershed planning activities.
    - 2.2.2. **Desired Outcome:** Community decision makers adopt and implement watershed plans.

## Sustainable Fisheries and Aquaculture

- 3. **Goal:** Texas seafood industries meet public demand through sustainable and profitable operations.
  - 3.1. **Action:** Conduct applied research on fisheries technology in collaboration with fishermen and facilitate technology transfer to support sustainable and profitable operations.
    - 3.1.1. **Desired Outcome:** Commercial fishermen are trained on and knowledgeable about sustainable and economically viable practices.
    - 3.1.2. **Desired Outcome:** Commercial fisheries implement sustainable practices.
  - 3.2. **Action:** Provide technical assistance to commercial fisheries to ensure compliance with state and federal regulations regarding sustainable harvesting techniques.

- 3.2.1. **Desired Outcome:** Texas shrimp fishermen are in compliance with state and federal regulations.
- 4. **Goal:** An informed public demands sustainable and locally sourced seafood in support of Texas industries.
  - 4.1. **Action:** Educate seafood markets and consumers about the importance of sustainably harvested and locally sourced seafood and the health benefits of seafood consumption.
    - 4.1.1. **Desired Outcome:** Seafood markets and consumers have the knowledge they need to evaluate sustainable seafood choices.
    - 4.1.2. **Desired Outcome:** Seafood consumers are aware of the nutritional benefits of seafood products.





## **Healthy Coastal Ecosystems**

- 5. **Goal:** Habitat, ecosystems, and the services they provide are monitored, enhanced and/or restored.
  - 5.1. **Action:** Collaborate with partners to lead and implement restoration and monitoring of habitats and living marine resources in the coastal zone.
    - 5.1.1. **Desired Outcome:** Coastal habitats and ecosystems are restored and/or enhanced.
    - 5.1.2. **Desired Outcome:** Participants in restoration activities are more knowledgeable about restoration techniques and the value of services provided by healthy ecosystems.
    - 5.1.3. **Desired Outcome:** Citizen science efforts provide current data about coastal ecosystems to resource managers and coastal decision makers.
  - 5.2. **Action:** Provide technical assistance and tools to resource managers to support science-based decision-making.
    - 5.2.1. **Desired Outcome:** Scientific understanding and technological solutions inform the management of natural resources.
  - 5.3. **Action:** Support research and fill information gaps in the current understanding of ecosystem management best practices.
    - 5.3.1. **Desired Outcome:** Research and extension activities reveal new information to better guide management decisions regarding habitat, ecosystems, and the services they provide.

- 6. **Goal:** Natural resources are sustained to support coastal communities and marine-dependent industries, including recreational and commercial fisheries, and tourism.
  - 6.1. **Action:** Educate coastal residents and decision makers on the services provided by healthy ecosystems that support industries and communities.
    - 6.1.1. **Desired Outcome:** Coastal residents and decision makers are more aware of the importance of water quality and the management of water as a natural resource.
    - 6.1.2. **Desired Outcome:** Coastal residents and decision makers are aware of the services provided by healthy coastal ecosystems and their economic benefits.
  - 6.2. **Action:** Inform and educate marine-dependent industries on sustainable practices for natural resource management and use.
    - 6.2.1. Desired Outcome: Marine-dependent industries recognize the importance of sustainable practices for the long-term economic health of their industry.
    - 6.2.2. **Desired Outcome:** Marine-dependent industries implement sustainable practices.

## STEM Education and Workforce Development

- 7. **Goal:** A STEM-literate public is informed by a continuum of formal and informal educational opportunities.
  - 7.1. **Action:** Provide formal and informal education to PK-12 students and furnish resources for use by PK-12 educators.
    - 7.1.1. **Desired Outcome:** PK-12 students increase their knowledge in coastal and ocean resource issues.
  - 7.2. **Action:** Collaborate with partners to educate and train citizen scientists who provide education and outreach to the public.
    - 7.2.1. **Desired Outcome:** Citizen science volunteers are well-informed about coastal and ocean resource issues.
    - 7.2.2. **Desired Outcome:** Informal education opportunities increase the public's knowledge of coastal and ocean resource issues.

- 8. **Goal:** A skilled workforce is engaged and able to address critical local and state needs.
  - 8.1. **Action:** Support and train undergraduate and graduate students for careers in coastal and ocean science, planning, policy, and resource management.
    - 8.1.1. **Desired Outcome:** Students complete their studies and find employment in STEM fields.
  - 8.2. **Action:** Introduce students to coastal and oceanrelated careers to address critical local and state needs and provide professional development for coastal and ocean industries' workforce.
    - 8.2.1. **Desired Outcome:** Students are aware of coastal and ocean-related career opportunities.
    - 8.2.2. **Desired Outcome:** Coastal and ocean professionals have increased knowledge and skills.





#### Resilient Communities and Economies Performance Measures

- Number of communities that adopt/implement sustainable economic and environmental development practices and policies as a result of Texas Sea Grant activities.
- Number of communities that adopt/implement hazard resiliency practices each year to prepare for and respond to/minimize coastal hazardous events.

#### Sustainable Fisheries and Aquaculture Performance Measures

 Number of fishermen, seafood processing personnel and/or aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Texas Sea Grant activities.

#### Healthy Coastal Ecosystems Performance Measures

- Number of resource managers who use ecosystem-based approaches in the management of natural resources as a result of Texas Sea Grant activities.
- Number of acres of coastal habitat protected, enhanced, or restored as a result of Texas Sea Grant activities.

#### STEM Education and Workforce Development Performance Measures

- Number of Texas Sea Grant products that are used to advance environmental literacy and workforce development.
- Number of people engaged in Texas Sea Grant-supported informal education programs.

 Number of Texas Sea Grant-supported university graduates who become employed in a job related to their degree within two years of graduation.

### **Cross-Cutting Performance Measures**

- Number of Texas Sea Grant tools, technologies, and information services that are used by our partners/ customers to improve ecosystem-based management.
- Economic and societal impacts derived from Texas
  Sea Grant activities (market and non-market; jobs and businesses created or sustained).

#### **Cross-Cutting Metrics**

- Number of peer-reviewed publications produced through Texas Sea Grant support.
- Texas Sea Grant staffing by functional area.
- Number of postsecondary students financially supported by Texas Sea Grant in higher education programs (undergraduate, graduate) and degrees received.
- Number of PK-12 students reached through Texas Sea Grant-trained educators or directly through Texas Sea Grant education programs.
- Number of PK-12 educators who participated in Texas Sea Grant education programs.
- Number of volunteer hours coordinated by Texas Sea Grant.
- Number of events sponsored or organized by Texas Sea Grant, and number of attendees.
- Number of public or professional presentations by Texas Sea Grant-supported individuals or staff members, and number of attendees.

### **APPENDIX**

#### **Definitions**

**Adaptive management:** A systematic approach for improving resource management by monitoring and learning from management outcomes. An adaptive approach provides a framework for making good decisions in the face of critical uncertainties and a formal process for reducing uncertainties so that management can improve over time.

**Action:** The tactic or means used to achieve the desired outcomes.

**Coastal communities:** Communities in the coastal zone (two counties inland from the shoreline), including cities, towns, counties and unincorporated areas; Texas Sea Grant's outreach to coastal communities includes decision makers, government officials, and residents.

**Core values:** Values that guide the behavior and actions of the Texas Sea Grant College Program.

**Ecosystem:** A dynamic and complex association of plant, animal, and human communities and the non-living physical components interacting as a functional unit; for the purpose of this strategic plan, "coastal ecosystems" refer to those within the coastal watershed, bays and estuaries, nearshore and offshore, and all other marine environments.

**Focus Areas:** Intersections where Texas Sea Grant's key components are shaped to address the state's most urgent ocean and coastal needs. Key components of Texas Sea Grant include:

- The mission, vision, core values and goals that inspire and motivate the organization.
- The value Texas Sea Grant delivers to the state and nation.
- The distinctive (unique) competency of Texas Sea Grant, that is, what the organization is best at delivering.

**Goal:** An aspirational concept that inspires a level of success in a Focus Area. A goal describes the desired long-term destination.

**Marine-dependent industries:** Industries that depend on marine resources from the Gulf of Mexico including commercial fishing, seafood processing, seafood retailing, recreational fishing, and outdoor recreation and tourism.

**Mission:** The purpose of the organization.

**Outcome:** An intended result or consequence.

**Performance measure:** A quantitative way of measuring an outcome with targets.

**Resilience:** The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events and changing conditions (e.g., severe storms, economic conditions, demographic shifts, or ecosystem changes).

**STEM education:** Education in science, technology, engineering, and mathematics.

**Vision:** A description of a future state. The vision explains the basis for developing other aspects of a strategic plan.

