



Texas Sea Grant 2019 SITE REVIEW BRIEFING BOOK



AT TEXAS A&M UNIVERSITY



Cover photo by Seth Patterson.

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Every four years state Sea Grant programs are evaluated by a site review team composed of members of NOAA's National Sea Grant Office and other experts named by NOAA. This is a requirement for Texas A&M University's designation as the Sea Grant College of Texas. Programs are evaluated for their leadership, organization, relevance, education and training, advisory services, partnerships, productivity, and for the programmed team approach they use across their organization to address coastal and ocean issues of concern to the state. We are pleased to provide this site review briefing book to illustrate the high-quality and balanced program of research, education, training, and advisory services in fields related to coastal and ocean resources that Texas Sea Grant has led for the period 2014-2017. The work described herein would not have been possible without the support of hundreds of partners, who helped us leverage our federal resources and extend our reach beyond the limits of any single organization. Thanks to our Texas Sea Grant team and partners, we have helped Texans use our coastal and ocean resources in ways that capture the economic, environmental, and cultural benefits these resources offer, while preserving their quality and abundance for future generations.

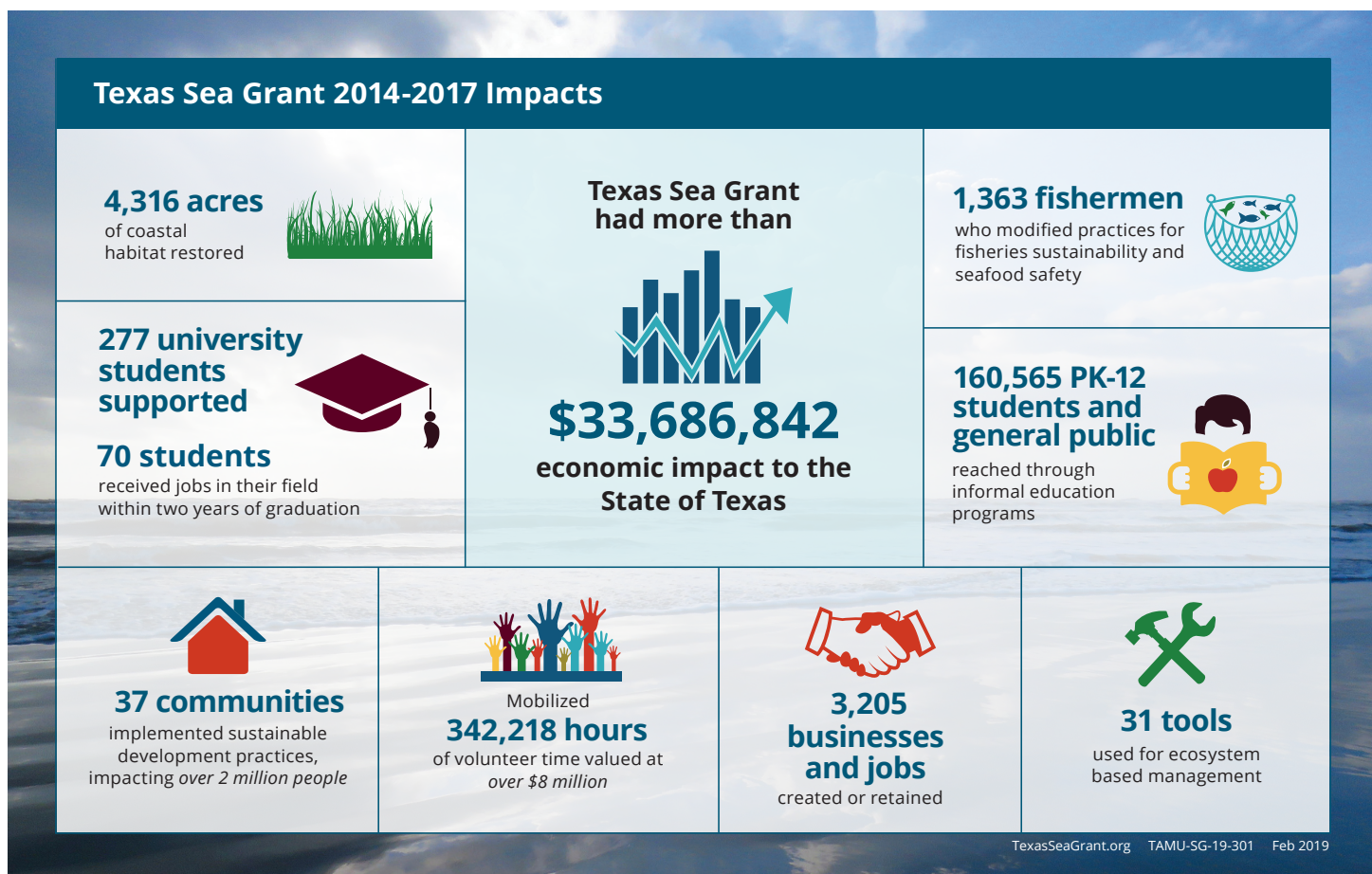
TABLE OF CONTENTS

Program Management and Organization	1
Stakeholder Engagement	8
Collaborative Network Activities	17
Performance	21

Supporting Coastal Communities, Businesses and Texans

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

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



Organization

The mission of the Texas Sea Grant College Program at Texas A&M University is to improve the understanding, wise use and stewardship of Texas' coastal and ocean resources. To achieve this mission, Texas Sea Grant (TXSG) directs its research, outreach, and education programs to benefit the citizens, businesses, and communities of Texas – from providing grants and scholarships that benefit students and workforce development, to funding Texas' innovative researchers to solve real-world problems, to deploying a boots-on-the-ground extension team that helps industry be more competitive in a global marketplace and coastal communities grow sustainably and build resilience against impacts from storms and other hazards.

This unique partnership unites the resources of the federal government, the State of Texas, industry, and universities across the state to create knowledge, innovative tools, products and services that benefit the Texas economy, environment and citizens.

During the 2014-2017 strategic plan period, TXSG used a programmed team approach to integrate research and extension across four focus areas to achieve 11 goals and 17 national performance measures. This approach is best illustrated in Figure 1, which shows the connections between TXSG's research and engagement programs. This bi-directional flow of information is how TXSG captures the academic potential of Texas' universities, links universities to the needs of Texans, and translates research discoveries to the public. This approach ensures TXSG's relevance to local, state, regional and national opportunities and problems in ocean and coastal environments.

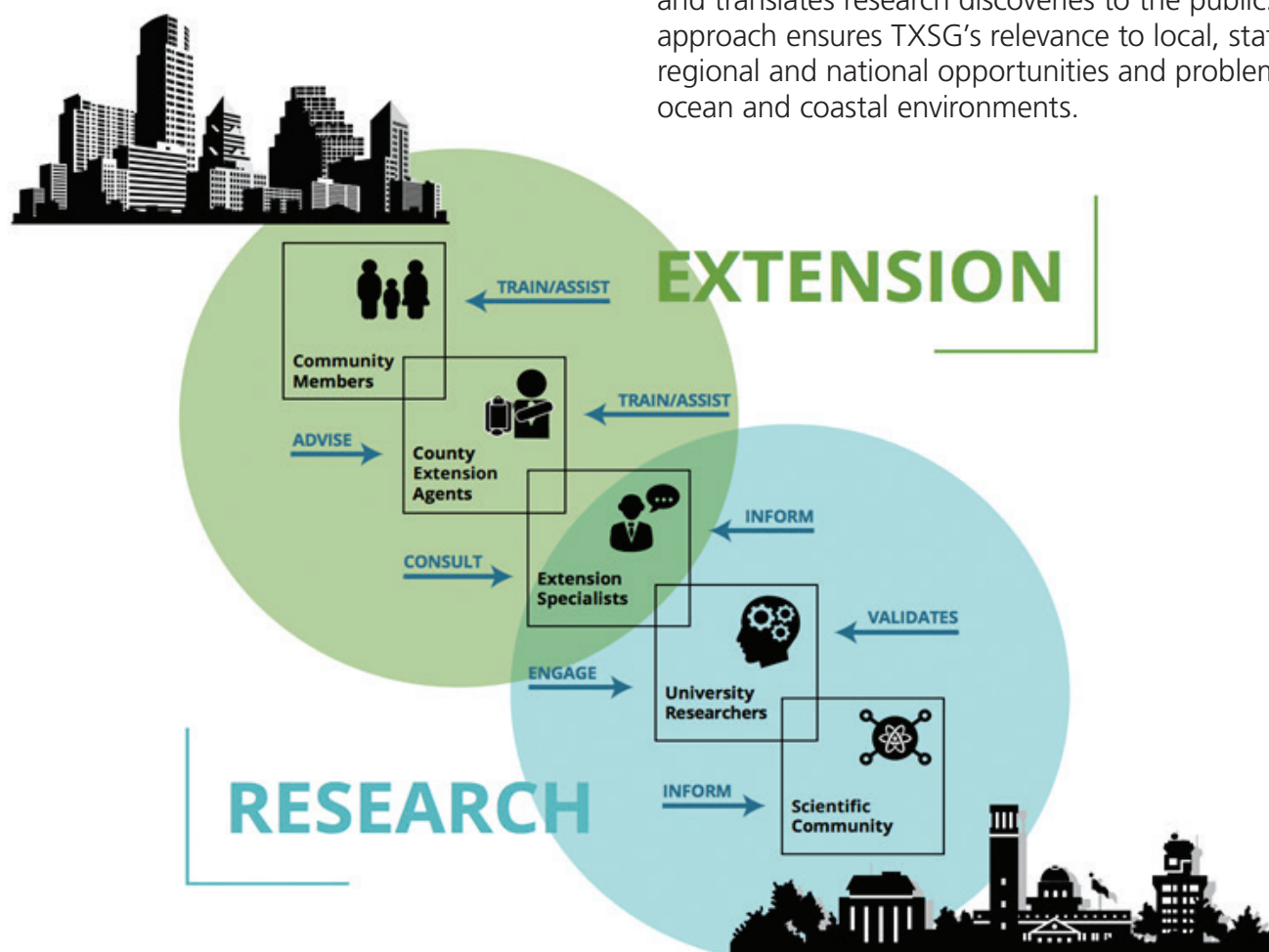


Figure 1. Integration of Research and Extension Model.

PROGRAM MANAGEMENT AND ORGANIZATION

Management Team

SUMMARY: The management team leads a viable and productive Sea Grant program with oversight and coordination of the research, extension, outreach, education, and communication functions of the program. This includes long-term planning, visioning and setting priorities, day-to-day implementation of projects, support of extension staff and sponsored researchers, evaluation of programs, and the engagement of partners and stakeholders at the local, state, regional, and national levels in collaborative projects pursuing the program's strategic plan goals. The management team is located at TXSG's headquarters office in College Station, Texas on the Texas A&M University campus.

DIRECTOR: Dr. Pamela Plotkin has overall administrative responsibility for the program and provides comprehensive vision to ensure that the program's activities are aligned with the National Sea Grant Office (NSGO) and the National Oceanic and Atmospheric Administration (NOAA) and address the goals of the TXSG strategic plan. In addition, the Director explores new relationships with partners and stakeholders, strengthens existing partnerships, enacts formal partnership agreements, works with the TXSG Advisory Committee, determines the research and administrative content of the program's omnibus proposal, and ensures that the funded activities are satisfactorily completed. Dr. Plotkin is also a Research Associate Professor in the Department of Oceanography, who maintains a moderately active research lab and advises students.

SENIOR ASSOCIATE DIRECTOR FOR PLANNING AND EXTENSION: Ms. Heather Wade leads strategic planning, implementation, and reporting for the entire program; provides vision for; supervises and coordinates the activities of the TXSG extension specialists and county agents; coordinates with extension partners; builds new relationships with partners and stakeholders; and works closely with the Director to integrate extension into the research program. Ms. Wade also Co-Directs the Community Resilience Collaborative (CRC) an integrated research and extension program that leverages local and

scientific knowledge in planning and other decision-making processes to increase resilience of coastal communities.

ASSISTANT DIRECTOR FOR RESEARCH AND FISCAL ADMINISTRATION: Ms. Mia Zwolinski manages requests for and review of proposals for TXSG competitive research grants, fellowships and scholarships, reviews and approves post-award actions, monitors subrecipients, leads the fiscal development of the program's omnibus proposal, serves as liaison between funded researchers and TXSG's communications staff, coordinates pre-award administration of proposals submitted to external sponsors, and serves as the program's fiscal officer.

COMMUNICATIONS MANAGER: Ms. Sara Carney develops, manages, and executes the program's communication, public relations, marketing, public awareness, branding, and messaging activities. This includes managing major projects directed at print, broadcast, and social media, developing a communications strategy for the program and evaluating its effectiveness, implementing innovative uses of new communications technologies and social media to optimize delivery of coastal and ocean science-related content to engage the public, and leveraging resources with communications teams from the university, NSGO, and partner organizations.

Advisory Committee Membership and Function

SUMMARY: TXSG's Advisory Committee (AC) serves a vital role to provide vision and guidance to the program. The AC's work is guided by the Advisory Committee Charter: <http://texasseagrant.org/about/advisory-committee/>. The members bring a wide range of experience and diverse perspectives to the program; they include representatives from industry, academia, local, state, and federal government, associations and non-profits. With the exception of 2017 when Hurricane Harvey devastated Texas, the management team has met annually with the AC. The role of the AC is to:

- identify needs, opportunities and priorities that can or should be addressed;
- help create new connections, collaborations, partnerships and funding opportunities that will potentially further the mission or provide resources;
- advise on vision, mission, strategic plan, goals and priorities;
- educate and inform state and national decision-makers of the relevance and value of TXSG; and
- provide input to evaluate progress towards strategic plan and periodic internal and national program reviews.

CURRENT MEMBERS

MEMBER	POSITION	AFFILIATION
Quenton Dokken, Ph.D.	Executive Director	Tarleton State University, Texas Institute for Applied Environmental Research
Benny Gallaway, Ph.D.	Advisory Committee Chair and President	LGL Ecological Research Associates
Andrea Hance	Director	Texas Shrimp Association
Robin Riechers	Director of Coastal Fisheries	Texas Parks and Wildlife Department
Greg Stunz, Ph.D.	Executive Director, Endowed Chair in Fisheries and Ocean Health, and Professor of Marine Biology	Texas A&M University-Corpus Christi, Harte Research Institute for Gulf of Mexico Studies, Center for Sportfish Science and Conservation
John Tracy, Ph.D.	Director	Texas A&M University, Texas Water Resources Institute
Jace Tunnell	Director	University of Texas, Marine Science Institute, Mission-Aransas National Estuarine Research
Shannon Van Zandt, Ph.D.	Nicole & Kevin Youngblood Professor of Residential Land Development and Interim Department Head, Landscape Architecture & Urban Planning	Texas A&M University
Kate Saul	Coastal Policy and Audit Team Lead	Texas General Land Office
Parr Rosson, Ph.D.	Interim Director	Texas A&M AgriLife Extension Service

PROGRAM MANAGEMENT AND ORGANIZATION

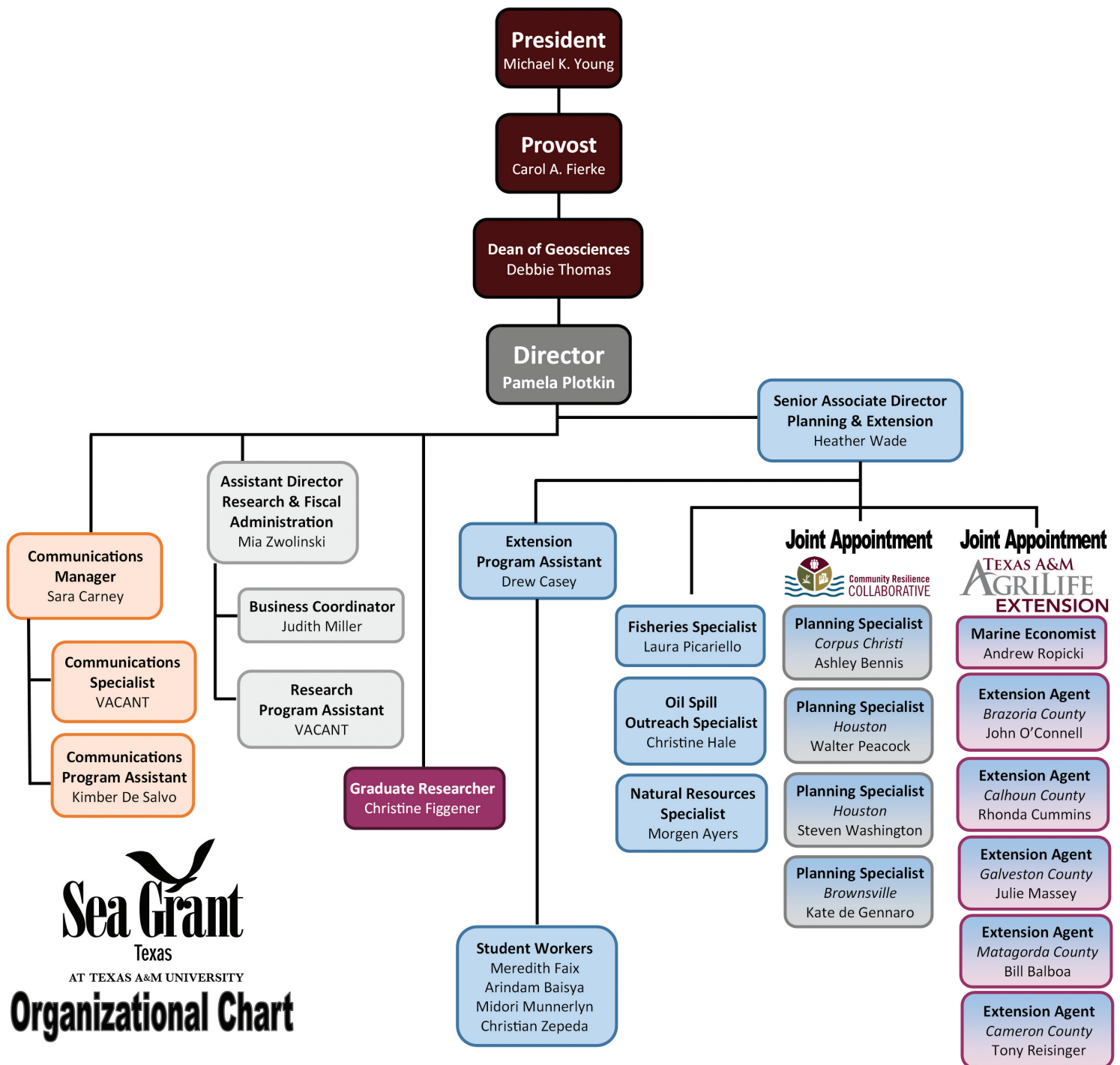


Figure 2. Texas Sea Grant organizational chart.

Program Setting within the University

SUMMARY: TXSG is a non-academic unit in the College of Geosciences at Texas A&M University. The Director of TXSG reports to the Dean of the College and works across the institution to engage with other high-level administrative leaders and offices across the Texas A&M System, including Texas A&M's Office of Government Relations and Office of the Vice President for Research, Texas A&M AgriLife Extension Service, the Texas A&M University System's Office of the Vice Chancellor for Research and many others. The program's extension team is located in coastal communities from Beaumont to Brownsville. Extension staff work in various locations, including county extension offices, Texas A&M University at Corpus Christi, and in partner NGO organizations.

Recruiting Talent

SUMMARY: Recruiting talent was an important part of TXSG's efforts to achieve the goals set in its 2014-2017 strategic plan. Funded research contributed to the program's success in all four focus areas as well as toward cross-cutting goals. The program also made significant investments to develop a future workforce skilled in science, technology, engineering, mathematics, and other disciplines critical to local, state, regional, and national needs (Strategic Plan Goal:11). Through its competitive Request for Proposals (RFP) process, TXSG funded 14 proposals, awarded to seven different universities, totaling \$3,066,872, with the majority of the awards (70%) made to new PIs; researchers who had never received a competitive research award from TXSG (Table 1). This research resulted in 113 peer-reviewed publications during the strategic plan period. The impacts and accomplishments of these research projects and their integration with the program, are included in the PIER briefing book and in this site review briefing book, and they will be featured during the site visit.

Process

To actively solicit proposals from a wide range of disciplines from universities and colleges, state agencies, and other organizations across the state, TXSG contacted more than 200 individuals at 48 Texas universities and colleges and 10 other entities at the beginning of the RFP process for the 2014-2016 and 2016-2018 funding cycles. This has resulted in both a large number of institutions and an increasing proportion of new researchers participating in its research program. TXSG was so successful recruiting talent that the number of pre-proposals received for the 2014-2016 research competition exceeded 100, and the number of full proposals received was nearly 100 (Table 1). In an effort to reduce the number of pre-proposals and full proposals received in future competitions and at the behest of the NSGO, TXSG reduced the scope of its RFPs from an open call

for research proposals that fit within the program's four focus areas to a call for proposals with specific research priorities identified by the program using data collected during public surveys to identify issues of concern for Texas' coastal and ocean resources. As a result, the number of pre-proposals and full proposals received for the 2016-2018 competition was significantly less than the prior competition. During both competitions, TXSG emphasized that it was seeking meritorious outcome-oriented research projects that span broad areas of natural, social, behavioral, economic, and physical sciences: address one or more of the four focus areas: integrate research with extension: and have public relevance to Texas.

The process used to review, advance and award proposals included two steps: pre-proposal review and full proposal review.

PROGRAM MANAGEMENT AND ORGANIZATION

PRE-PROPOSAL REVIEW: An internal review team comprised of the Director, the Research Coordinator and several members of the Extension Team evaluated pre-proposals to determine for each if: 1) the pre-proposal followed the RFP guidelines, 2) the proposed project was a research project, 3) the proposed research aligned with one or more of the four focus areas/research priorities, and 4) the proposed research was publicly relevant. All pre-proposals that met these criteria were encouraged to be developed into full proposals. All pre-proposals that did not meet these criteria were discouraged.

FULL PROPOSAL REVIEW: There were two parts to the full proposal review process: the ad hoc review and the technical review. During ad hoc review, each full proposal was sent to three reviewers outside of Texas with expertise in relevant fields of research represented in the proposal. All proposals were evaluated on the basis of rationale, scientific or professional merit, innovativeness, qualifications, and past record of investigators, alignment with program focus areas and research priorities, public relevance, and programmatic justification. Ad hoc reviewers submitted an evaluation of each full proposal.

During technical review, TXSG convened two Technical Review Panels (TRP). The program sought a diverse group of active researchers from a range of institution types, including academia and government, representing early, mid- and senior career stages, to serve on the panels. The TRP met over a two-day period to review, discuss, and rank the full proposals. Before meeting, the panelists received copies of all full proposals and the ad hoc reviewers' comments, and they were assigned as a primary or secondary reviewer

for proposals in their areas of expertise. Each full proposal was thus assigned a primary and secondary reviewer and was evaluated on the basis of the same criteria used by the ad hoc reviewers. During the panel review meeting, the primary reviewer took the lead in summarizing his or her assigned proposals, discussed the merits, and summarized the ad hoc reviewers' comments. The secondary reviewer documented the discussion and results. As each full proposal was discussed, the panel categorized it as "recommend for funding", "not recommend for funding", or "undecided." After the last proposal was discussed, the panel reached a consensus about the strengths, weaknesses, and rank of the proposals. The highest-ranking proposals were awarded. In the 2018-2020 competition, the Director deviated from this practice and made the final decision based on the TRP's recommendations and new and emerging needs of the state of Texas as a result of Hurricane Harvey.

Significant investments in science and technology also occurred outside of the competitive RFP process. During the strategic plan period TXSG invested an additional \$453,651 in awards to 111 individuals, from nine institutions. These funding opportunities are described below.

Non-Competitive Research Funded by Texas Sea Grant

From 2014-2017, TXSG also funded 15 small requests outside of the competitive RFP process. These awards ranged from \$1,438 to \$129,557 and totaled \$261,599. The large award (\$129,557) was made possible by additional funds that were provided by the NSGO as part of a "mini-bus supplement." The NSGO suggested that the program use the results of the 2014-2016 research competition, and support one of the proposals that fell below the pay line with these additional funds. The other 14 small requests were unexpended research funds leftover from prior research competitions and some additional funds made available from the NSGO.

Table 1. Proposals Submitted to and Funded by Texas Sea Grant

FUNDING PERIOD	PROPOSAL STAGE	# PROPOSALS	# INSTITUTIONS REPRESENTED	# NEW/ CONTINUING PIS
2014-2016	Pre-proposals	122	21	
	Full Proposals	91	17	
	Funded Proposals	6	4	4/2
2016-2018	Pre-proposals	82	18	
	Full Proposals	33	8	
	Funded Proposals	8	4	6/2

Recruiting Talented Early-Career Scientists

TXSG made significant investments to develop the science and technology workforce for the future by funding undergraduate and graduate university students to conduct research through its Grants-in-Aid of Graduate Research Program and the TXSG Scholars Program. These programs are funded from returned indirect costs generated from the program's sponsored grants and contracts. These funding opportunities are available only to universities willing to waive their indirect costs to receive these funds, and manage the funds on behalf of the students so that the students do not have to count these awards as taxable income. The research impacts and accomplishments of these students are significant and will be highlighted during the site review.

Undergraduate Research: The Texas Sea Grant Scholars Program

Following suggestions made by the Site Review Team in 2011, the TXSG Scholars Program was the first of TXSG's efforts to support Texas students with the aim of developing a cadre of ocean and coastal leaders in Texas. As a recognized "high-impact practice," undergraduate research experiences increase undergraduate student learning and success while students are at Texas A&M University and long after graduation.

TXSG developed a partnership with Texas A&M University's Office of Honors and Undergraduate Research (recently renamed LAUNCH), whose programs are highly visible and successful and have been instrumental in integrating undergraduates into research and learning at Texas A&M University's main campus and at the Galveston campus.

Undergraduate students undertake independent research under the mentorship of a Texas A&M University faculty member. To be accepted into the TXSG Scholars Program, students must submit a research proposal related to the marine environment in any discipline. Students selected for the program are provided with \$1,300 in financial support to

complete their research project. They are also expected to participate in workshops on research communication, research skills and thesis writing, and attend the annual Texas A&M Marine Science Symposium and Retreat, where they interact with TXSG staff and other TXSG-supported researchers. The TXSG Scholars also present their results at the annual Texas A&M University Student Research Week in March. Students are encouraged to participate in a one-hour writing-intensive thesis-writing seminar and submit their results to *Explorations: The Texas A&M Undergraduate Journal*. Finally, all TXSG Scholars are expected to prepare a formal research thesis, which is deposited in the university's digital repository. From 2014-2017, TXSG awarded \$26,246 to 30 undergraduate students (Strategic Plan Goal: 11).

Grants-in-Aid of Graduate Research Program

TXSG's Grants-In-Aid of Graduate Research Program was launched in 2013 with the aim of promoting scientific excellence and achievement by providing small research awards to graduate students enrolled in Texas A&M University, Texas A&M University at Galveston, or Texas A&M University-Corpus Christi, whose research is ocean- or coastal-related in any discipline. TXSG releases a Call for Proposals in late spring each year and the proposals are reviewed by scientists in relevant fields of research and evaluated based on the intellectual merit and the broader impacts of the research.

Grant recipients conduct field and laboratory research and present their results at professional conferences. They also participate in the annual Texas A&M University Marine Science Symposium and Retreat, where they interact with TXSG staff and other TXSG-supported researchers. This program encourages and facilitates research among young investigators, provides them the opportunity to train in research and engagement, and is an important investment in the future of STEM fields and the workforce of the state and nation. From 2014-2017, TXSG awarded \$165,806 to 66 graduate students (Strategic Plan Goal: 11).

STAKEHOLDER ENGAGEMENT

SUMMARY: TXSG has close ties with federal agencies, state agencies, and administrations; local authorities; business and industry; and other educational institutions. These strong relationships ensure the relevance of TXSG's program, gives assistance to the broadest possible audience, to involve a broad pool of talent in providing this assistance, and assist others in developing research and management competence. During the strategic plan period, TXSG collaborated with 351 unique partners: 133 local partners, 116 state partners, 16 regional partners, and 70 federal partners. TXSG worked with a diverse group of partners as well, collaborating with 93 academic institutions, 51 industry and business groups, 70 non-governmental organizations, 115 government agencies, 10 other sea grant programs, and 11 partners classified as "other." These partnerships enabled TXSG to achieve success in all of the goals in the 2014-2017 strategic plan.

TXSG continues to strengthen existing partnerships and develop new ones. Below are three examples of newly formed partnerships that began during the strategic plan period. These will continue to provide successful integrated research and extension programming to benefit Texas communities, our partners, and stakeholders.

Community Resilience Collaborative

Texas communities face complex planning challenges that require access to specialized information and skilled experts. Many of the state's smaller communities lack the resources and capacity to utilize this specialized information or to bring in experts to assist in resiliency planning. This situation was exacerbated by the devastation caused by Hurricane Harvey in 2017. During the storm, more than 250,000 structures were flooded; combined with severe damage to infrastructure and industries, Harvey inflicted approximately \$198 billion in damages. The rebuilding efforts and the long-term resiliency planning needs of these Texas communities is more than local officials can reasonably manage. In response to this need, TXSG launched the Community Resilience Collaborative (CRC) program in September 2017, in collaboration with Texas A&M University's Texas Target Communities (TTC) and with assistance from rapid response funds from the NSGO. The CRC is designed to provide technical assistance for planning, outreach and education aimed at coastal communities, particularly resource managers, land use planners and emergency managers who deal with hazard mitigation. In the first few months after the storm, CRC team members assessed storm damage, made recommendations for enhancing community resilience, and trained

local officials in the use of best practices, resources, and tools to mitigate future disasters. In addition, 17 affiliated outreach centers, academic entities, and federal programs joined the collaborative. The CRC also enlisted 21 Texas A&M University faculty affiliates who add to the dedicated CRC team's list of experts. To date, the CRC has seven formally trained planners on staff, one certified floodplain manager and Natural Resources Specialist, and a network of five county extension agents. The CRC is assessing how to grow its team over the next four years. The CRC is supported by TXSG, TTC, Texas A&M University's Department of Landscape Architecture and Urban Planning (LAUP), the Institute for Sustainable Communities (ISC), and the Hazard Reduction and Recovery Center (HRRC) (Strategic Plan Goals:6,7,8,9).

Harte Research Institute and the Coastal Bend Bays and Estuaries Program

During the strategic plan period, TXSG supported an integrated research-extension project in Baffin Bay led by Dr. Michael Wetz, an Endowed Chair at the Harte Research Institute for Gulf of Mexico Studies, to address concerns from local stakeholders that water quality degradation is affecting the health of the bay and its fisheries. The TXSG-funded research



featured a citizen science water quality program, as well as experiments to quantify the sources of organic matter fueling oxygen consumption in the bay. These activities identified watershed influences on water quality in the system needed for developing mitigation strategies. Dr. Wetz launched the Baffin Bay Working Group, a coalition of scientists, citizens, state resource agencies, NGOs, and TXSG Extension Team, collaborating to save Baffin Bay. The coalition is informing resource managers, communities, and stakeholders about the influences on water quality in the bay, with the aim of developing mitigation strategies for restoration. Some strategies identified and implemented include: educating local municipalities about the effects of wastewater discharge in the bay and how to minimize discharge, educating landowners about the effects of increased organic matter in the bay and how agricultural land-use practices can reduce these inputs, and seeking conservation easements from adjacent landowners. The coalition aims to develop a long-term watershed protection plan and hire a watershed coordinator for the bay to expand the group's research and engagement activities. The TXSG extension team is collaborating on the project to provide land use and restoration technical assistance and outreach to stakeholders, landowners, and surrounding communities. The Coastal Bend Bays and Estuaries Program, one of the leading NGOs in the Baffin Bay Working Group, has partnered with TXSG to support a Natural Resources Specialist position, which makes it a joint position between the two programs (Strategic Plan Goals:1,2,3,8,10).

Southern Climate Impacts Planning Program

After Hurricane Harvey, TXSG began a partnership with the NOAA RISA Team, Southern Climate Impacts and Planning Program (SCIIPP). SCIIPP is comprised of groups from the University of Oklahoma and Louisiana State University. SCIIPP is partnering with TXSG to conduct post-Hurricane Harvey business disruption research and to support a climate extension specialist to work as part of the CRC team to connect SCIIPP research and engagement activities with Texas coastal communities and organizations. The climate extension specialist will assess changes in the frequency of events that may change hazard profiles in communities within the region, learn how under-utilized community resources can be brought into planning to build preparedness and resilience, assess the impacts of storm surge and flooding events on infrastructure, compare perceptions of risk related to flooding, and hurricane storm surge to flooding from inland rainfall, storm and flood risk assessment, and identify information needs from seasonal to sub-seasonal forecasts. The specialist will work with other TXSG staff to improve application of climate information from SCIIPP and to convey needs for information, products, tools, and research from TXSG, other partners, and stakeholders to the broader SCIIPP team (Strategic Plan Goals:6,7,9).

STAKEHOLDER ENGAGEMENT

The following are select examples of some of TXSG's other partnerships to further illustrate how the program has engaged with diverse stakeholder groups and the partnerships that the program leverages to achieve its mission. After each example, there is a number in parentheses that corresponds with the program's select 80 impacts and accomplishments provided in the PIER Report. For more details about a specific example provided and the associated partners, we encourage the Site Review Team to refer to their PIER Report, Appendix C "Expanded Impacts and Accomplishments." Many of the partners, stakeholders, and project impacts and accomplishments listed below will be profiled during the site visit.

Restoring Coastal Habitat in Texas Bays and Estuaries

SUMMARY: Between 2014 and 2017, 142 resource managers used ecosystem-based approaches to manage land, water, and living resources as a result of TXSG activities. In addition, 4,316 acres of coastal habitat were protected, enhanced, or restored. TXSG participated in a variety of restoration efforts including coastal habitat and hydrological restoration, beach clean ups and the removal of trash and marine debris, monofilament recovery and recycling, wetland restoration and nursery establishment, oyster reef restoration, habitat restoration and resiliency planning, and economic evaluation of restoration projects (Strategic Plan Goals:1,2,3).

EXAMPLES OF KEY PARTNERSHIPS:

1. NOAA Restoration Center and the four Gulf of Mexico Sea Grant Programs partnered to identify hydrological restoration sites. During the regional program four hydrological restoration projects were funded. The projects included removing a large, outdated flood control barrier in New Orleans, altering sheet flow to a more natural state in the Apalachicola-Chattahoochee-Flint River system, removing mosquito ditches that adversely impacted a mangrove forest in Tampa Bay, Florida, and installing culverts in a dirt road to restore tidal exchange between multiple bodies of water in Calhoun County, Texas (Fish Pass). This program funded partners that restored 3,085 coastal acres through hydrological restoration activities. The projects directly benefited at least 13 freshwater and 20 saltwater species. In addition, the projects provide enhanced recreational opportunities, such as fishing and accessing more waterways via kayak and canoe (22837 and 22838).
2. The Galveston Bay Chapter of the Texas Master Naturalists and TXSG restored hundreds of acres of wetland and prairie habitats in the Houston-Galveston region, providing a \$7.5 million economic impact (27100).
3. TXSG established an oyster reef restoration project that is designed to recycle empty oyster shells to create additional community oyster reefs and bird nesting island habitat. TXSG-led Texas Master Naturalist volunteers participated in establishing the reefs and nesting sites and coordinated with state agencies to determine reef locations (25271).
4. TXSG staff-led state and federal resource agency staff, local government, NGOs, and private-sector stakeholders in a regional habitat and resilience planning effort to identify current and future threats to coastal habitats, biological productivity, and coastal storm resilience. The regional strategic habitat restoration and coastal protection plan will improve Matagorda County's competitive position for federal restoration and construction grants and function as a guidance document to help protect local communities and sustain coastal environments (23240).
5. TXSG led a team to evaluate the economic and human dimensions' impact of the Half Moon Reef restoration. The team designed and implemented an in-person survey to evaluate the economic impacts of the restoration, angler awareness and satisfaction, and

angler support for reef restoration. Additionally, the team designed online surveys to understand the effects of the restoration on anglers' sense of place and area fishing guides' advertising and business practices. The three surveys were designed and implemented in 2015. Approximately 150 in-person surveys were completed, representing more than 300 anglers (23362).

6. TXSG staff collaborated with the Texas Parks and Wildlife Department (TPWD) and local county officials to remove and relocate the Palacios oyster reef. During the relocation, live oysters and previously buried shells

were spread adjacent to existing reef and enhanced about three acres of reef habitat; in addition, 30 tires found beneath the reef were removed and recycled. TXSG, in collaboration with state and local officials, preserved existing oyster reef habitat and created additional habitat. The oyster relocation was the first step of a comprehensive plan to reestablish healthy oyster populations along the Palacios waterfront, minimize impacts to existing reef habitat, and restore historic reef habitat (21698).

Development and Enhancement of Decision-Support Tools

SUMMARY: TXSG supported the development of useful decision-support tools backed by sound science. Tools supported by the program included an ecological geographic information systems online atlas, an ecosystem services valuation tool, an ecosystem services value prediction model, a public access atlas and database, and a red snapper management tool (Strategic Plan Goals: 1,2,3,6,7,8,9).

EXAMPLES OF KEY PARTNERSHIPS:

1. TXSG led a partnership of several state and private entities to update and maintain the Galveston Bay Status and Trends Database, a critical resource that collects biophysical and social data for the Galveston Bay area and is used by resource managers in the region to make effective economic and environmental decisions regarding the use of the Bay's natural resources and any potential impacts from local industry. The Status and Trends Atlas can be viewed at: <http://www.texascoastalatlas.com/AtlasViewers/StatusAndTrends/SnTatlas.html> (22834).
2. TXSG supported GecoView, an online Gulf of Mexico Ecosystem Services Viewer developed by the Harte Research Institute for Gulf of Mexico Studies, which places monetary values on ecosystem services provided by marshes, mangroves, and oyster reefs in the Gulf of Mexico. GecoView can be viewed at: <https://gomaportal.tamucc.edu/gecoview/> (21739).
3. TXSG's staff economist worked with economists from the other Gulf Sea Grant Programs, NOAA, and the EPA to develop an ecosystem service value trajectory economic simulation tool (ESV-TEST) for multiple services, habitats, and locations and determined that benefit transfer across habitats appeared to work fairly well along the Gulf Coast. The Bureau of Ocean Energy Management provided \$1.6M to expand the tool. The detail report can be found here: http://texasseagrant.org/assets/uploads/resources/16-206_GOMT16001__web.pdf (27118).
4. TXSG partnered with the TGLO and coastal communities to inventory all beach and bay public access points to Texas coastal waters. The results of this award-winning project can be seen at: www.txcoasts.org. (21724).
5. TXSG held a series of workshops to collect stakeholder input on the development of a Management Strategy Evaluation-based decision-support tool for red snapper management in the Gulf of Mexico. The workshops gathered industry leaders and the tool's developers to recommend improvements for the tool (27051).

Addressing Water Quality and Watershed Protection

SUMMARY: TXSG participated in diverse activities to address water quality and watershed protection issues in the state. These activities included funding critical research to understand the dynamics and nuances of water quality issues in Texas bays and estuaries, developing partnerships with key water organizations like the Texas Water Resources Institute (TWRI), and developing citizen science monitoring teams to help data collection efforts in areas with severe water quality degradation. The TXSG Extension Team worked on projects ranging from establishing storm water treatment green infrastructure projects to general education and outreach on best management practices (Strategic Plan Goals:1,2,3,6,8,10)

EXAMPLES OF KEY PARTNERSHIPS:

1. A TXSG-funded research project studied the causes of water quality degradation and hypoxia in Baffin Bay and Oso Bay, two vital commercial and recreational fishing bays in South Texas. The study determined the primary drivers of water quality degradation specific to each of the two systems and these results are assisting state agencies and concerned stakeholders to explore solutions to the water quality issues in both (27115).
2. A TXSG-funded study developed models for submarine groundwater discharge (SGD) rates into the Nueces Bay Estuary. The estuary is ecologically compromised due to habitat loss. The SGD project is informing the Texas Water Development Board's (TWDB) efforts to restore the estuary and will be incorporated into the agency's Groundwater Availability Models for coastal aquifers (27036).
3. A TXSG-funded study using a five-year series of phytoplankton images from a continuous automated imaging system in Port Aransas, Texas, suggests that looking for specific species that are known prey of a toxic algae species, may also be a useful predictor for harmful algal blooms in Texas (21722).
4. TXSG-funded researchers have identified patterns in water quality, benthic communities and the food web in Baffin Bay that may play a role in the health and survival of the black drum in the bay (25268).
5. The Tres Palacios River, which flows into the Lavaca-Matagorda Estuary, has been listed as an impaired waterbody. TXSG worked with TWRI to create the Tres Palacios Watershed Monitoring Team, which enlisted the help of a group of citizen scientists to monitor water quality at multiple locations along the watershed (26954).

Planning for Resilience in Coastal Communities

SUMMARY: Between 2014 and 2017 TXSG assisted 37 communities to implement sustainable economic and environmental development practices and policies. Further, the program helped 22 communities implement hazard resilience practices to prepare for, respond to, and minimize coastal hazards. Activities supporting this work included facilitation of resilience indices in communities, the development and implementation of scenario planning workshops, contributing to statewide planning initiatives, developing locally specific social vulnerability indices, conducting outreach on climate change impacts, facilitating planning processes, and providing technical assistance to review plans and ordinances (Strategic Plan Goals: 1,2,3,6,7,8,9,10).

EXAMPLES OF KEY PARTNERSHIPS:

1. TXSG helped the community of Aransas Pass prepare for coastal hazards by conducting a hazard resilience self-assessment and providing technical expertise in the development of the city's comprehensive resilience plan (21677).
2. TXSG facilitated CHARM workshops in seven counties, bringing together decision-makers and stakeholders from communities to explore mapped flood risks and to analyze impacts that hazards might have on future development (27029).
3. TXSG assisted the Federal Emergency Management Agency's (FEMA) National Exercise Division to develop a workshop in Houston aimed at promoting climate change adaptation and resiliency planning in the region. TXSG's Coastal Planning Specialist was an invited panel speaker at the Houston event and delivered a talk about best practices for collaborative approaches to community-based climate preparedness (21725).
4. TXSG planning professionals facilitated efforts by Aransas County and its communities to complete and formally adopt a coordinated, multi-jurisdictional floodplain management plan to reduce flood risk and improve recovery in their communities shortly before Hurricane Harvey made landfall in their county. After the storm, TXSG's new CRC program helped the county implement the plan, which is aiding the county's hurricane response and recovery efforts (27091).
5. Rockport has significant acreage of developed and soon-to-be developed areas located within flood hazard areas. TXSG provided technical and informational support to the City of Rockport as it considered and adopted a flood hazard area "Freeboard Ordinance." In the future, homes and businesses in the City of Rockport will be less likely to flood and suffer physical and economic impacts from flooding, storm surge, and sea level rise (22883).

Facilitating Aquaculture in Texas

SUMMARY: Aquaculture continues to grow in the State of Texas. TXSG has participated in key research and extension projects that are helping to move aquaculture in a productive direction that is guided by the best available science. Oyster aquaculture, not currently permitted by the State of Texas, is now entering into a trial phase thanks to contributions by TXSG-supported research and TXSG's extension team who have contributed to oyster facilities planning, aquaculture economic analyses, facilities siting priorities identification, and facilitated dialogue between the state agencies and stakeholders about the feasibility of oyster aquaculture (Strategic Plan Goals: 4, 5, 6, 11).

EXAMPLES OF KEY PARTNERSHIPS:

1. In collaboration with researchers at Harte Research Institute, TXSG facilitated meetings with the oyster industry and regulatory agencies to evaluate the feasibility of an oyster aquaculture industry in Texas. TXSG staff helped develop a proposal to support a new "Palacios Oyster Resource and Recovery Center." This proposal was awarded \$6 million in RESTORE Act funds and the Center will launch in 2019 (26934).
2. Currently, the majority of marine baitfish used in Texas are harvested from wild stocks. In collaboration with a TXSG-funded researcher, TXSG conducted an economic analysis of three aquaculture methods used to raise pigfish, a popular baitfish in Texas, and found that one method could be profitable. These findings could reduce pressure on wild fish stocks and increase profitability and viability of Texas aquaculture farms (27012).

STAKEHOLDER ENGAGEMENT

3. A TXSG-funded study of the genetic analysis of red drum in the Gulf of Mexico and southeastern U.S. found significant differences between red drum from the Atlantic, eastern Gulf and western Gulf. The results suggest that aquaculture facilities in the Gulf should carefully consider the geographic locations from which their breeding stock are collected to minimize genetic impacts on the local wild stocks (25266).
4. To reduce the dependence on dietary ingredients such as fishmeal and fish oil in the aquaculture production of red drum, which are nutritious feedstuffs but expensive, a TXSG-funded research project developed diet formulation technology to assess less expensive plant-based diets. In a final production trial, diets with 86% of fishmeal replaced with plant feedstuffs were able to support red drum production similar to that of fish fed a diet of fishmeal. This cost reduction could increase the economic viability of aquaculture industries (23103).
5. A TXSG-funded research project developed and pioneered a super-intensive indoor shrimp aquaculture technique, the bio-floc system, implemented by three commercial shrimp operations, sustaining three businesses and 112 jobs plus creating 20 additional jobs, for a combined economic impact of \$10.2 million (23232).

Improving the Gulf Shrimp Fishing Fleet's Sustainability and Protecting Endangered Species

SUMMARY: In a four-year period, TXSG worked with 1,363 fishermen, seafood processors, and aquaculture industry personnel to modify their practices using knowledge gained in fisheries sustainability and seafood safety. This resulted in 1,605 businesses created, 193 businesses retained, 227 jobs created, and 1,180 jobs retained as a result of TXSG activities (Strategic Plan Goals:4,5,6,11).

EXAMPLES OF KEY PARTNERSHIPS:

1. TXSG trained the shrimp fishing industry across all the Gulf states how to install and operate TEDs and reviewed gear adjustments as needed to ensure the industry complies with federal regulations, avoids fines, and has access to markets and consumers seeking sustainably harvested shrimp. TXSG helped 661 vessels and engaged with 2,138 industry personnel. These efforts contributed to the 50% overall reduction in the Gulf of Mexico's sea turtle retention rate according to NOAA-OLE data from 2014 to 2017 (22882, 27105).
2. Supported by a grant from NOAA's National Bycatch Reduction Engineering Program, TXSG staff field-tested multiple by-catch reduction device (BRD) models to determine their potential effectiveness at reducing bycatch while also limiting the loss of shrimp catch compared to BRDs that are currently certified and in use. Results from the tests were disseminated to state and federal natural resource agency staff and to shrimp fishermen throughout the region. One device was subjected to formal federal certification trials by the Gulf and South Atlantic Fisheries Foundation (22869).
3. TXSG-facilitated discussions between state marine fishery regulatory agencies and inshore shrimp fishermen led to trawling regulations and shrimp size restrictions being modified to allow for longer fishing times and potentially increased catches (23233).
4. Technology transfer of lightweight materials developed for trawlers resulted in 251 shrimp trawlers adopting the use of cambered doors, resulting in approximately 3,185,498 gallons of fuel saved, which equates to \$6.84 million in savings. In addition, during the same time period 1,519 vessels used advanced webbing, resulting in an estimated 5,000,464 gallons of fuel saved, equating to \$10.22 million in savings. TXSG fisheries specialists helped the industry to achieve over \$17 million in savings

through fuel-saving trawl gear technology transfer (22881).

5. TXSG partnered with Texas A&M AgriLife Extension Service to deliver 26 “Cooking with Seafood” demonstrations to educate citizens about local seafood sustainability, availability and preparation. The program had a total of 678 participants. Survey results indicated that the demonstrations increased

the majority of participants’ awareness on the source of their seafood, the ease of cooking seafood at home, the knowledge on safe handling of seafood, and the amount of seafood the participants buy. Big Bear Shrimp and Seafood, a local seafood retailer, reported increases in retail sales since the program and partnership began (26920).

Providing Hurricane Harvey Response and Recovery Support

SUMMARY: TXSG devoted a significant amount of effort to Hurricane Harvey response and recovery efforts. This included a combination of research and extension activities that will continue to have an impact on Texas and its communities in the years to come. TXSG funded four rapid response research grants to study impacts of the storm on Texas. The TXSG Extension Team saw an unprecedented amount of growth and activity post Harvey. This included the establishment of a rebranded coastal planning program, assisting fishing fleets in boat recovery, distribution of thousands of hazards education and outreach materials, providing technical assistance to coastal communities in recovery planning, and providing assistance to federal agencies in damage assessment activities across a variety of sectors (Strategic Plan Goals:1,2,3,6,7,8,9).

EXAMPLES OF KEY PARTNERSHIPS:

1. The CRC, launched in September 2017 in response to Hurricane Harvey, brought together experts and organizations to assist Texas coastal communities in their natural and technological hazard mitigation and coastal resource protection and management (27088).
2. TXSG’s rapid response funding of the Galveston Bay Dolphin Research and Conservation Program allowed researchers to conduct post-hurricane surveys to study the impacts of the massive freshwater inflows from Hurricane Harvey’s record rainfall on the bay’s bottlenose dolphin (*Tursiops truncatus*) population (27097).
3. TXSG assisted the Aransas County Long Term Recovery Team, formed in response to the damage caused by Hurricane Harvey, to draft a post-Harvey recovery plan that will be submitted to the Texas General Land Office in 2018 for recovery grants and funds (27034).
4. TXSG funded a research project to survey public perception of the resilience of their communities in four coastal counties. While the results were being analyzed, Hurricane Harvey impacted three of the four counties, so the researchers conducted a follow-up survey to ascertain how the survey participants’ perceptions had changed after the storm. The results are being analyzed and will be communicated to stakeholders (27079).
5. TXSG staff helped the NMFS and TPWD analyze the economic impacts of Hurricane Harvey on Texas commercial fishermen and fishing-related businesses. Surveys were completed by 817 businesses and individuals involved in commercial and for-hire fishing, seafood processing and dealing, seafood retailing, bait and tackle shops, and other related businesses including marinas. Based on the results from the survey, TPWD and NMFS estimated that Texas fishing operators and fishing-related businesses suffered \$58 million in total damages, 1,705 immediate job losses, and \$36.2 million in lost revenue. The results of this analysis prompted Texas Governor Greg Abbott to request a fisheries disaster declaration for Texas, which was approved by Commerce Secretary Wilbur Ross on March 27, 2018 (27037).

Furthering Environmental Literacy and Workforce Development in Texas

SUMMARY: In a four-year period, TXSG developed 70 products used to advance environmental literacy and workforce development, engaged 76,714 people in informal education programs, 70 TXSG-supported university students became employed in a job related to their degree within two years of graduation, and the program produced 298 publications to educate the public about Texas' ocean and coastal resources. Activities include, but are not limited to K-12 education, informal education of adults and the general public, development of education and outreach products and information services, and supporting research for undergraduate and graduate students (Strategic Plan Goals: 1,2,3,4,5,6,7,8,9,10,11).

EXAMPLES OF KEY PARTNERSHIPS:

1. TXSG and the Galveston Bay Chapter of the Texas Master Naturalists provided several trainings on relevant and cutting-edge science to volunteers who informed outreach activities in the region (21709).
2. TXSG worked with partners through the National Climate Assessment Network to develop tools that can be used by teachers to incorporate climate science into existing classroom curricula. The project resulted in two web-based tools, one focused on coastal areas and the other on the ocean environment, that present current science on how changing climate impacts both of these ecosystems. They provide a list of essential principles and key messages that can be used by K-12 educators in the classroom when teaching about coastal and marine environments and can be accessed at the following websites: <http://www.climate.gov/teaching/coasts-region>; <http://www.climate.gov/teaching/ocean-region> (21715).
3. TXSG produced a series of illustrated posters designed to educate K-12 students and adults about coastal and ocean ecosystems, habitats, and wildlife and sent more than a thousand copies of the posters to formal and informal educators in the state and region (26927).
4. TXSG extension staff developed programming to provide needed coastal education in Matagorda County and along the Colorado River watershed about coastal ecology, water stewardship and the importance of in-stream and downstream flows. Programming included a diverse curriculum of aquatic and marine sciences; use of the Texas A&M AgriLife Stream Trailer, a mobile working model that demonstrates stream processes and best management practices for protecting and restoring streams and rivers; local watershed models; static displays of marine organisms; hands-on water quality and biological sampling; seafood (fish, shrimp, oysters, and crab) selection, cleaning and preparation; basic fishing techniques and tackle selection; and conservation and watershed stewardship. Staff engaged more than 1,257 individuals (1,169 youth and 88 adults/educators), during 128 events, primarily as part of public school K-12 STEM curriculum, but also through 4-H and the summer camps of Texas Brigades, a youth leadership program that emphasizes knowledge in hunting, fisheries and land stewardship (27039).
5. TXSG funded a research project at the University of Texas Marine Science Institute (UTMSI) to identify techniques that would result in the successful culture of pigfish (*Orthopristis chrysoptera*), also known as piggy perch, a popular bait fish in Texas. Researchers partnered with TPWD's Marine Development Center in Corpus Christi, which produced a stock of three- to five-inch pigfish. TXSG extension staff arranged with the Brazoria County Parks Department (BRCP) to stock a designated pond in a local park for a catch-and-release recreational fishing center for youth, and TPWD transported 10,000 fish to the park. After Hurricane Harvey flooded the park, it was unknown how many fish remained in the pond, so TPWD moved another 4,000 fish from their facility to the pond. San Luis Pass County Park in Freeport held its first "Kids Fishing for Fun" event in early November 2017. Parents from around the area brought their children to learn fishing techniques from BCPD's experience anglers, and the county agency will continue to host regular fishing tournaments and events at the pond (27092).

Collaborations with NOAA, the Sea Grant Network and other agency partners provide TXSG with opportunities to leverage resources with tremendous co-benefits to all partners and our stakeholders. Select examples of TXSG's activities with these partners during the strategic plan period are provided below. Further evidence of TXSG's collaborations with NOAA, the Sea Grant Network, and other agency partners is provided in the last section of this briefing book in "Leadership by Staff on Boards and Committees on page 21."

National Weather Service's Weather-Ready Nation

One of the first Weather-Ready Nation Ambassadors in the Sea Grant network, TXSG initiated Weather Ready Texas in 2016. Affiliated with the Weather-Ready Nation initiative, begun by the National Weather Service (NWS) to improve forecasts and increase weather-readiness nationwide, and building upon TXSG's existing rip current outreach efforts, Weather Ready Texas is a social media platform used to distribute preparedness and safety information from the Weather-Ready Nation initiative targeted to seasonal events and current weather conditions around Texas. Several thousand bookmarks were designed and printed by TXSG to publicize the social media accounts and distributed at multiple events to promote the program. The Weather Ready Texas program has prompted meetings with two NWS offices in Texas coastal cities, Houston and Corpus Christi, to discuss future collaborations to strengthen this partnership (Strategic Plan Goals: 9, 10).

National Marine Fisheries Service

Building on TXSG's existing relationship with the NMFS, TXSG participated in an exchange program with the NMFS-Pascagoula Lab's Gear Monitoring Team, funded by the SG-NMFS Exchange Program, to train TXSG county marine agents located in five coastal Texas counties to assemble, install, and inspect TEDs. These agents can now assist shrimp fishermen in 10 Texas shrimp industry homeports (Port Arthur, Sabine Pass, Matagorda, Sargent, Palacios, Port Lavaca, Port O'Connor, Seadrift,

Brownsville, and Port Isabel) by conducting voluntary inspections of TEDs, advising crews and making gear adjustments as needed. Their work supports the efforts of TXSG's Fisheries Specialist, who continues to provide similar assistance to shrimp fishermen in Texas and other Gulf states (25225) (Strategic Plan Goals: 4, 5, 6, 11).

Sea Grant Network Collaborations

TXSG remains an active member and collaborator of the National Sea Grant Network. The program participates in the Sea Grant Association and the director is a member of the Sea Grant Association External Relations Committee. The Senior Associate Director (and Extension Program Leader) is a member of the Sea Grant Extension Assembly. The Assistant Director participates in both the Research Coordinators Network and the Fiscal Officers Network. Furthermore, all extension personnel participate in multiple groups across the network. These include, but are not limited to, the Fisheries Extension Network, the Sea Grant Climate Network, the Sustainable Coastal Communities Development Network, and the Social Science Community of Practice.

TXSG was also an active participant in the Network Visioning Initiative that was supported by the National Sea Grant Office. Six staff members participated in three different visioning exercises: Community Response to Coastal Flooding, Weather and Climate Enterprise, and Fisheries and Aquaculture. Participation included attending the visioning meetings, workshops, conference calls, and reviewing/writing visioning documents.

Sea Grant Regional Collaboration: Gulf Climate and Resilience Community of Practice

The Climate and Resilience Community of Practice (CRCoP) is a partnership among the four Gulf of Mexico Sea Grant Programs. The CRCoP is a network of planning practitioners, climate science outreach experts, community officials, and subject matter students who work together to provide the best guidance and tools. TXSG participates in the planning and implementation of the CRCoP annual meeting, highlighting local resilience events like Hurricane Harvey. The partnership has produced reliable resources like the 2015 climate resilience interactive guide, Gulf TREE. TXSG's leadership in the annual event has expanded the network's access to Texas communities, decision-makers, and professionals. Aided by the creation of the CRC and the addition of four new planning specialists, TXSG is providing insights into local issues and enriching the dialogue with information about climate change-related coastal hazards and best practices. TXSG works with other NOAA partners to continue the CRCoP, including the NWS, Office for Coastal Management (OCM), NMFS, Flower Garden Banks National Marine Sanctuary (FGBNMS), and the Mission-Aransas National Estuarine Research Reserve (MANERR) (Strategic Plan Goals:6,7,8,9).

Sea Grant Regional Collaboration: Gulf of Mexico Sea Grant Programs Oil Spill Outreach Team

The Deepwater Horizon Oil Spill in 2010, the largest in U.S. history, released an estimated 200 million gallons of oil into the Gulf of Mexico and more than 1.84 million gallons of dispersants. Lingered questions remain about the impact of the spill on the environment, economy, and society. TXSG partnered with the other Gulf Sea Grant programs and the Gulf of Mexico Research Initiative (GoMRI) to develop a regional oil spill science extension program. A region-wide strategy was developed to solicit input from target audiences, and TXSG took the lead on working with natural resource managers

in the subject area of environmental impacts. The regional team received the Sea Grant National Superior Programming Award for its work to synthesize research results related to the 2010 spill. Since its creation in 2014, the team has conducted a multi-pronged effort to share the results of peer-reviewed research about the Deepwater Horizon oil spill to Gulf communities and economies that rely on healthy marine environments. The team has delivered 24 science seminars with more than 100 invited speakers and 2,000 attendees. This team published more than two dozen science-based publications on various aspects of the spill (Strategic Plan Goals:1,2,3,4,5,6,7,8,9,10).

FEMA Cooperative Technical Partnership: Community Engagement and Risk Communication

From 2014 to 2018, TXSG led a Cooperating Technical Partnership with FEMA to conduct a Community Engagement and Risk Communication program. TXSG collaborated with 41 communities, engaged with over 500 decision makers, and conducted 22 workshops. TXSG and partners worked closely with FEMA, the Texas State Department of Insurance, the U.S. Army Corps of Engineers, and the Texas Division of Emergency Management to coordinate the workshops. Each of these aforementioned groups gave presentations during the workshops on best practices in hazard mitigation, principles of resilient place making, and how each of their organizations can support local hazard-mitigation efforts. The majority of the workshop was dedicated to using the CHARM GIS mapping platform, developed by Texas A&M AgriLife Extension Service's Texas Community Watershed Partners, and made possible by a significant investment of TXSG resources. The platform allows communities to digitally draw different growth and development scenarios on a map of their community and see the possible implications, in real time that these scenarios will have for increasing or decreasing disaster risk. Post-workshop survey results found that the vast majority of participants increased their understanding of resiliency, land use and risk, the



role of urban planning in hazard mitigation, and non-local resources that can help them advance mitigation in their communities (Strategic Plan Goals:6,7,9,10).

Mission-Aransas National Estuarine Research Reserve (MANERR)

TXSG collaborated with the MANERR on multiple programs and projects during the strategic plan period to conduct research, provide outreach, and educate Texans. TXSG partnered with MANERR's Coastal Training Program to provide outreach, education, and technical assistance in the area of community resilience and planning. The two programs partnered together to host over a dozen workshops, set up several regional working groups, and provided assistance to over a dozen communities in the area. Some of this work is ongoing today and will continue for the foreseeable future. In addition, TXSG collaborated with MANERR on a COCA-funded grant titled "Climate Change in the Mission-Aransas Reserve: Evaluating Vulnerability of Coastal Ecosystem and Communities Using Long-Term Data Sets and Development of Relevant Adaptation Strategies." The goal of this project was to assess

vulnerability of the Mission-Aransas Watershed to climate change and its associated impacts. The City of Aransas Pass integrated the results of this project into their Comprehensive Resiliency Plan (Strategic Plan Goals:1, 2, 3, 6, 7, 8, 9, and 10).

Texas Coastal Management Program

TXSG is an active member of the Texas Coastal Management Program (TCMP). The Director of TXSG is an active member of the TCMP Coastal Coordination Council. Several TXSG staff service on the TCMP's Technical Advisory Committee (TAC), with the most active project TAC members contributing to the Texas Coastal Resiliency Master Plan (TCRMP). Over the course of four years, TXSG has participated in over a dozen resilience workshops aimed at educating coastal decision-makers on tools and strategies for increasing resilience and providing input on the TCRMP. The TCMP has been a critical partner in TXSG coastal planning efforts, most notably providing significant support to the Coastal Planning Program in areas of conducting public access research and providing resiliency planning assistance to coastal communities (Strategic Plan Goals:1,2,3,6,7,8,9).

COLLABORATIVE NETWORK AND NOAA ACTIVITIES

Success in Sea Grant National Competitions

TXSG was successful in Sea Grant national competitions that provided additional support to state programs for research, symposia, training and fellowships (Tables 2 and 3). These included awards from the NOAA-Sea Grant Aquaculture competition, the NOAA-National Sea Grant Law Center Symposium Series Competition, the NOAA-Sea Grant-NMFS Exchange Program, and the John D. Knauss Marine Policy Fellowship Program.

Table 2. NOAA-Sea Grant National Competitions

YEAR	FUNDING OPPORTUNITY	# PROPOSALS SUBMITTED	# AWARDS RECEIVED	PI	INSTITUTION	AWARD AMOUNT
2014	Aquaculture	2	1	Lee Fuiman	University of Texas Marine Science Institute	\$282,214
2015	NSGLC Symposium Series	1	1	Richard McLaughlin	Texas A&M University - Corpus Christi	\$10,000
2015	SG-NMFS Exchange Program	1	1	John Mitchell	Southeast Fisheries Science Center, NOAA Fisheries	\$22,623

Table 3. NOAA-Sea Grant John D. Knauss Marine Policy Fellowship Competition

COMPETITION YEAR	FELLOWSHIP AWARD YEAR	# OF APPLICATIONS SUBMITTED TO TXSG	# OF APPLICATIONS SUBMITTED TO NSGO	# OF AWARDS	FELLOW	INSTITUTION
2013*	2014	3	3	1	Kimberly Bittler	UTMSI
2014	2015	6	6	1	Kaitlyn Schroeder	TAMUCC
2015	2016	3	3	1	Natalie Spear	TAMUG
2016	2017	8	5	1	Matthew Dzugas	UT-Austin
Total		20	17	4		

Leadership

TXSG is a recognized intellectual leader in ocean and coastal-related science, management, and planning in the State of Texas. The research program is recognized as one that supports outcome-oriented research that spans broad areas of natural, physical, social, behavioral, and economic sciences and engineering, and makes research investments that will generate new discoveries that are applied to solve real-world problems identified by stakeholders and partners and will lead to substantial long-term impacts in Texas. The extension team is a trusted source of science-based information that is applied to the management of Texas' natural resources across the coastal counties and communities in which they serve. TXSG staff are regularly sought out to consult with local agencies, state and federal agencies, universities, NGOs, industry, and international organizations, and they play significant leadership roles on committees, task forces, advisory boards, and councils. Their leadership state-wide, regionally, nationally, and internationally is illustrated by the following list of committees they served on, and the awards they received during the strategic plan period.

LEADERSHIP BY STAFF ON BOARDS AND COMMITTEES

International, National, and Regional

Gulf of Mexico Fishery Management Council Scientific and Statistical Committee Socioeconomic Panel (Ropicki)	Gulf of Mexico Alliance, Wildlife and Fisheries Team (Plotkin, Picariello)	Gulf States Marine Fisheries Commission, Vice Chair, Outreach and Education Committee (Balboa)	Texas A&M AgriLife Extension Service Regional Career Ladder Review Committee (Massey)
National Association of Counties Community Resilience Advisory Council (Wade)	Gulf of Mexico University Research Collaborative (Plotkin)	Gulf Sea Grant Oil Spill Outreach Team (Hale)	Gulf States Marine Fisheries Commission Sea Grant Fisheries Extension Committee (Reisinger)
National Academy of Sciences Ad Hoc Committee, "Effective Approaches for Monitoring and Assessing Gulf of Mexico Restoration Activities" (Plotkin)	Gulf of Mexico Coastal Ocean Observing System (Plotkin)	Gulf Sea Grant Oil Spill Outreach Team Lead for Caribbean and International Outreach (Hale)	Southern Climate Impacts Planning Program (Wade, Plotkin)
Association of Public and Land-grant Universities, Board on Oceans, Atmosphere, and Climate (Plotkin)	Gulf of Mexico Alliance Resilience Team (Wade)	Gulf Sea Grant Oil Spill Outreach Team Lead for Natural Resource Managers, Fishers, and Non-Governmental Organizations (Hale)	American Planning Association Foundation Grant Committee (Peacock)
IUCN, SSC, Marine Turtle Specialist Group (Plotkin)	Gulf of Mexico Alliance Water Resources Team (Wade, Ayers)	Gulf Sea Grant Oil Spill Outreach Team Lead for Natural Environment (Hale)	
	Gulf of Mexico Education and Engagement Team (Wade, Casey)	National Academies and Sea Grant Project Planning Committee Chair (Hale)	
	Gulf of Mexico Fisheries Management Council Texas Representative, Outreach and Education Committee (Balboa, Picariello)		

LEADERSHIP BY STAFF ON BOARDS AND COMMITTEES

State and Local

Texas American Planning Association Hurricane Harvey Task Force (Wade, Bennis, Peacock)

Texas Coastal Management Program Technical Advisory Committee (Wade, Plotkin, Peacock, Bennis, De Gennaro, Reisinger, Balboa)

Extension Disasters Education Network Delegate (Wade)

FEMA Mitigation Assessment Team for Hurricane Harvey (Wade, De Gennaro, Peacock)

Texas A&M University Women's Faculty Network Mentor (Plotkin)

Texas A&M University Council of Principal Investigators (Plotkin)

Texas A&M University Press Faculty Advisory Committee (Plotkin)

Texas A&M University College of Geosciences Executive Committee (Plotkin)

Texas A&M University Department of Oceanography Advisory Committee (Plotkin)

Texas One Gulf Center of Excellence (Plotkin)

Geochemical and Environmental Research Group Ocean Science Team (Plotkin)

International Sea Turtle Society Board of Directors (Plotkin)

Texas Department of Agriculture Shrimp Advisory Committee (Plotkin)

Texas General Land Office Texas Coastal Coordination Council (Plotkin)

Baffin Bay Workgroup (Wade, Ayers, Bennis)

South Texas CRS Users Group (Wade)

Eagle Ford Shale Task Force (Wade)

Texas A&M AgriLife Aransas County Leadership Advisory Board (Wade)

Climate and Planning Extension Network (Wade)

Sustainable Coastal Community Development Network (Wade)

GOMA Resilience Toolkit and Communications Working Group (Wade)

Texas Floodplain Management Association Community Rating System Committee (Wade)

Texas General Land Office Coastal and Marine Spatial Planning Data Standards Committee (Wade)

FEMA Texas Coastal Hazard Analysis Resources and Technology Team (Wade)

Houston-Galveston Area Council Matagorda Bay Natural Resources Committee (Balboa)

Texas Floodplain Management Association, Outreach Committee Chair (Ayers)

Science and Spanish Club Network (Ayers)

Rockport-Fulton Comprehensive Plan Update Committee and Task Force (Hale)

Texas A&M AgriLife Extension Service State Career Ladder Review Committee (Massey)

Texas Master Naturalist Galveston Bay Chapter Advisor (Massey)

Brownsville/Port Isabel Shrimp Producers Association Advisory Board (Reisinger)

Laguna Madre Fly Fishing Assn. Advisory Board (Reisinger)

Lower Laguna Madre Foundation Advisory Board (Reisinger)

Ocean Trust Native Plant Center South Padre Island Advisory board (Reisinger)

Rio Grande, Laguna Madre Bay Basin Area Stakeholders Committee Chair (Reisinger)

Rio Grande Valley Chapter Texas Master Naturalist founder, sponsor, advisor, and board member (Reisinger)

Texas Master Naturalist South Texas Chapter sponsor, advisor, and board member (Reisinger)

Texas Coastal Naturalist, founder, sponsor, advisor and member (Reisinger)

Texas International Fishing Tournament Advisory Board (Reisinger)

Texas (Fishing) Tournament Directors Foundation Advisory Board (Reisinger)

Texas Red Tide Rangers, founder, sponsor, and advisor (Reisinger)

Texas State Technical College Harlingen, Biology Advisory Committee (Reisinger)

University of Texas at Brownsville Biological, Chemical and Safety Committee, community stakeholder representative (Reisinger)

University of Texas at Brownsville Institutional Biosafety Committee community stakeholder representative (Reisinger)

University of Texas at Brownsville Math, Science and Technology External Advisory Board Member (Reisinger)

University of Texas at Brownsville Science, Technology, Engineering, and Math Club advisor (Reisinger)

University of Texas Rio Grande Valley Biological, Chemical and Safety Committee, external community stakeholder representative (Reisinger)

University of Texas Rio Grande Valley Institutional Biosafety Committee external community stakeholder representative (Reisinger)

Valley Proud Environmental Council Board of Directors (Reisinger)

Valley Proud Environmental Council Advisory Board (Reisinger)

Valley Sportsman Club Advisory Board and Life Member (Reisinger)

Surftober Fest Planning Committee (Bennis)

San Antonio Bay Foundation Board of Directors Secretary (Cummins)

Texas Chapter of the American Shore and Beach Preservation Association Board of Directors (Cummins)

Lavaca Bay Foundation Board of Directors Ex-officio Member (Cummins)

Sea Grant and NOAA

National Sea Grant Law Center
Advisory Committee (Ropicki)

LSU Center for Natural Resource
Economics and Policy Cooperator
(Ropicki)

Gulf of Mexico Climate and Resilience
Community of Practice (Wade, Peacock,
Bennis, Washington, De Gennaro)

Sea Grant Extension Assembly (Wade)

Sea Grant Association External
Relations Committee (Plotkin)

Sea Grant Association At-Large Board
Member (Plotkin)

Sea Grant Week Planning Committee
(Plotkin)

National Weather Service Sky Warn
Collaborator (Ayers)

NOAA Environmental Cooperative
Science Center Advisory Board
(Reisinger)

Sea Grant Facilitation Community of
Practice (Hale)

Sea Grant Community Science Network
(Casey)

NOAA Environmental Cooperative
Science Center Advisory Board
(Reisinger)

Sea Grant Research Coordinators
Network (Zwolinski)

Sea Grant Fiscal Officers Network
(Zwolinski)

Sea Grant Social Science Network
(Wade)

Sea Grant Climate Network (Wade)

Gulf Sea Grant Oil Spill Science
Outreach Team (Hale)

Program Awards and Honors

Marine Resource Economics
2015 Outstanding Article
Ropicki, A., and S. Larkin. 2014.
"Social Network Analysis of
Price Dispersion in Quota Lease
Markets." *Marine Resource
Economics* 29(2): 157-176. (Ropicki)

Dean's Distinguished Achievement
Award, Texas A&M University,
College of Geosciences, 2015
(Plotkin)

Faculty Academic Accomplishment
recognition for improving
resiliency in our communities, the
environment and economy, Texas
A&M University, 2015 (Plotkin)

Harte's Heroes, Harte Research
Institute for Gulf of Mexico
Studies, 2014 (Plotkin)

Sea Grant Superior Outreach
Program Award (2018, for 2014-
2017 work) (Hale)

Texas A&M AgriLife Extension
Service, Certificate of Service, 2016
(O'Connell)

Texas A&M AgriLife Extension
Service, Water Certificate, 2016
(O'Connell)

Environmental Protection Agency,
Gulf Guardian Award for Gulf
of Mexico Coastal and Ocean
Observing System Citizen Science
Data Portal, 2017 (O'Connell)

Governor's Commission to Rebuild
Texas, Certificate of Appreciation,
February 1, 2018 (O'Connell)

Distinguished Service Award,
National Association of County
Agricultural Agents, 2016 (Massey)

Distinguished Service Award,
Texas County Agricultural Agents
Association, 2016 (Massey)

Superior Service Award, Texas A&M
AgriLife Extension Service, 2014
(Massey)

Featured Artist for Gulf States
Marine Fisheries Commission 65th
Annual Meeting, Point Clear,
Alabama, 2015 (Reisinger)

Interdisciplinary Program Award,
Zika Program Outreach, District
12, Texas A&M AgriLife Extension
Service, 2017 (Reisinger)

Texas House Congratulations
Resolution, 2015 (Cummins)

Port Lavaca Chamber of Commerce
Woman of the Year, 2015 (Cummins)

Distinguished Program Achievement
Award in Community and Resource
Development, Texas Extension
Specialists Association, 2017
(Cummins)

FEMA Hazard Mitigation Outreach
and Education Certificate of
Appreciation, 2017 (Wade)




Sea Grant
Texas

AT TEXAS A&M UNIVERSITY