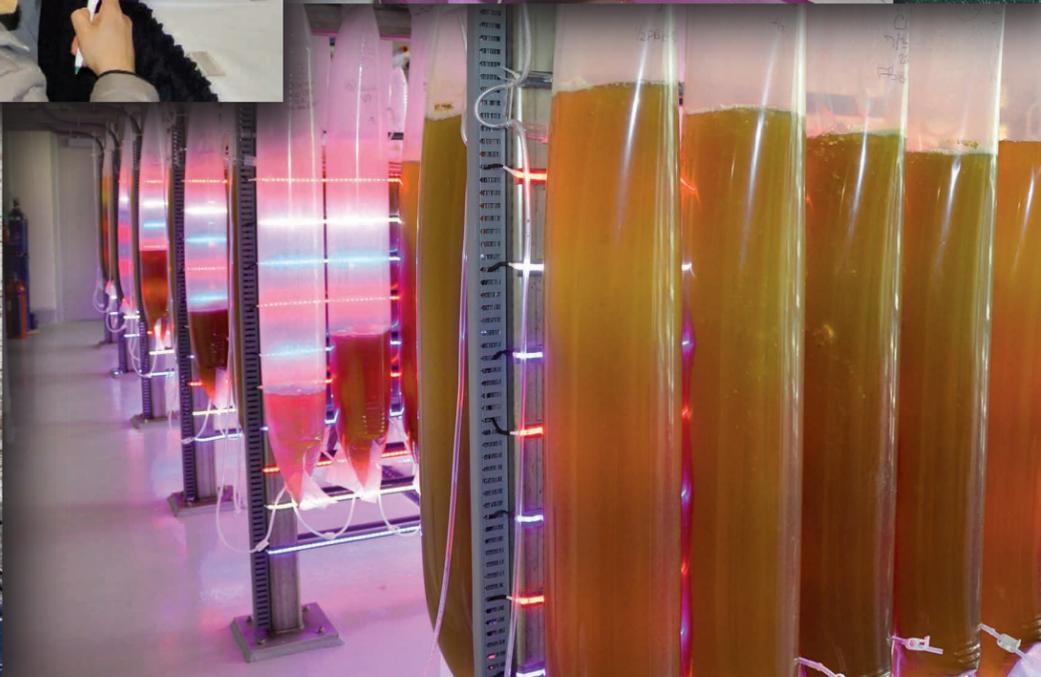




LOUISIANA SEA GRANT STRATEGIC PLAN (2018-2021)





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CONTEXT

The environmental crises of Louisiana's deltaic plain—which includes the Mississippi River Delta and the Chenier Plain—include some of the most challenging coastal issues in North America. The region faces the nation's largest rates of wetland loss (currently 44 km²/year as noted by Couvillion et al., 2016), highest rates of relative sea level rise, extensive nearshore eutrophication, continued recovery from the largest oil spill in U.S. history and coastal communities that remain vulnerable to extreme events such as river flooding and storms. Four hurricanes, two major river floods, annual hypoxic events and the Deepwater Horizon Oil Spill have all affected coastal Louisiana since 2005. Thus, Louisiana Sea Grant's most recent experience has been one of crisis management. This becomes even more significant considering that Louisiana's coastal resources include the largest fishery (commercial and recreational) in the contiguous U.S., the nation's largest supply of domestic energy and the largest port complex (by tonnage) in the country.

Additionally, the State of Louisiana and resource science and management communities have been involved in planning initiatives for coastal restoration since the development of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) and the Coast 2050 vision in the 1990s. In 2002, the Louisiana Coastal Area (LCA) program was initiated to develop a comprehensive restoration plan for the Mississippi River Delta. It was submitted to Congress for consideration under the Water Resources Development Act which was authorized in 2005. The State Wetland Trust Fund that had been managing restoration projects under CWPPRA and other funding sources began addressing risk reduction from flooding caused by extreme events along the coast. The Coastal Protection and Restoration Authority (CPRA) has become the lead organization for protection and restoration planning including the 2012 State Master Plan (statute requires updates at five-year intervals). In addition, CPRA manages penalty funds allocated to the state through the RESTORE Act and is involved in decision-making for additional restoration funds available through the Natural Resource Damage Assessment (NRDA) Trustee Council's LA Trustee Implementation Group (TIG) and the Gulf Environmental Benefit fund

(GEBF). These three programs drive the planning focus for ecosystem restoration in response to the 2010 Deepwater Horizon Oil Spill. In summary, substantial funding associated with the RESTORE Act and other penalty funds will likely produce nearly two decades of ecosystem and restoration planning, along with changes in governance. While newly formed institutions will manage most of the research investments in this area, Louisiana Sea Grant (LSG) will continue pursuing a programmatic focus on ecosystem science that is both complementary to these efforts and consistent with our scientific mandate.

Since its inception in 1968, Louisiana Sea Grant has addressed many of the complex and often interrelated ecological, economic and social challenges that affect the State's coast. In the true sense of the term, coastal Louisiana is one of the largest and most active coastal regions in the country. The magnitude of the challenges in this dynamic, and more recently disturbed, natural and social landscape requires that limited resources available to LSG be distributed utilizing a practical and well-defined approach. Such an approach relies on partners in what has become an extensive network of state and regional universities, Federal and State resource management agencies, the private sector and citizen groups.

MISSION

Louisiana Sea Grant stimulates discoveries in university research, integrated with outreach that promotes innovation to improve management and adaptation of coastal communities, economies and environments.

THE 2018-2021 PLANNING PROCESS

Input for LSG's Strategic Plan 2018-2021 was obtained from multiple sources. Strategic planning efforts by key partners were consulted.

Notable at the Federal level were the:

- National Sea Grant Network Plan.
- RESTORE Act of 2012 (Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act), that dedicates 80 percent of all administrative and civil penalties related to the Deepwater Horizon Oil Spill to a Gulf Coast Restoration Trust Fund and outlines a structure by which the funds can be utilized to restore and protect the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, coastal wetlands and economy of the Gulf Coast region.
- 10-Year NOAA Sea Grant Aquaculture Vision.

At the regional level:

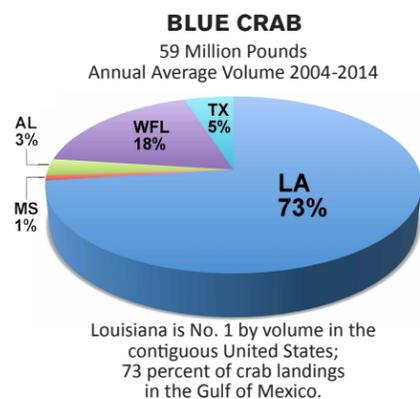
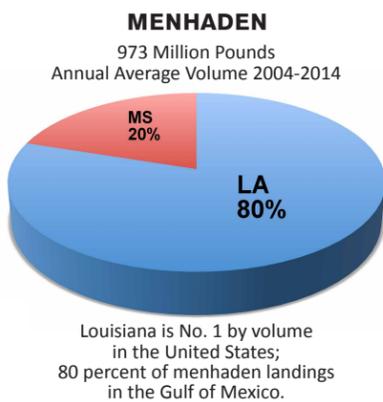
- Gulf of Mexico Research Initiative (GOMRI) that sponsors research and outreach to investigate the effects of oil spills on the environment and public health.
- The Gulf of Mexico Alliance (GOMA) is a five-state effort, led by the respective governors, to "enhance the ecological and economic health of the Gulf of Mexico through increased regional collaboration."
- Fisheries management plans and amendments of the Gulf of Mexico Fisheries Management Council.

Considerable input was also received from partners, including:

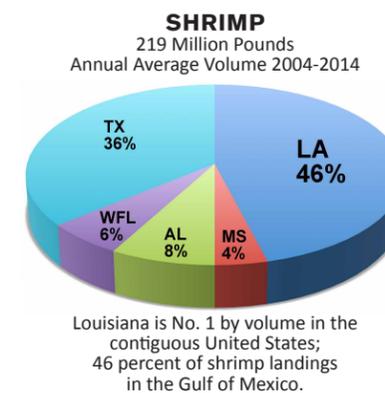
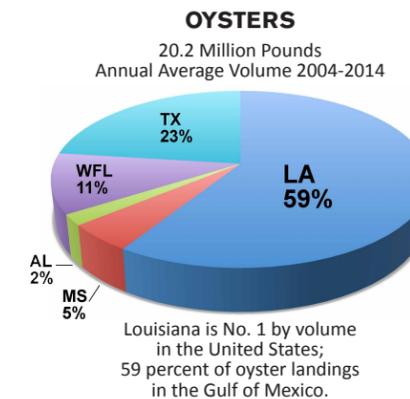
- The recently expanded 24-member Louisiana Sea Grant Advisory Council (Council). Its distinguished members represent academia, private sector, State and Federal government agencies and non-governmental organizations. The need for thinking strategically about LSG's role in addressing coastal needs was discussed at the October 2015 Council meeting and members were asked to read the 2014-2017 Strategic Plan before meeting in April 2016 to provide in-person input for the 2018-2021 planning process.

Those in attendance shared their diverse perspectives both on future Program priorities as well as possible strategies for achieving the Program's goals. The topics of fisheries and seafood production, resiliency, adaptation to change, and environmental literacy figured prominently in the discussions. Several members suggested that LSG continue focusing on its strengths—both research and outreach—in fisheries and natural resources issues. Industry representatives pointed out that a sustainable supply of quality seafood is critical and that aquaculture opportunities deserve continued attention. State and Federal agency members noted that coastal restoration plans will likely cause habitat changes that will affect fisheries and the communities that rely on them. LSG can help the coastal restoration planning process by addressing the deltaic ecosystem's "grand challenges"—particularly through research, education and outreach to better understand risk, uncertainty, options and trade-offs in the context of the anticipated fishery habitat changes.

Louisiana Sea Grant has been a leader in building awareness and providing tools to help make coastal communities more resilient. Research and outreach have helped address vulnerability and response to hazardous weather events and climate change. State agency and NGO leaders on the Council encouraged



Along with a 24-member programmatic Advisory Council, Louisiana Sea Grant maintains a Marine Education Advisory Panel and a Law & Policy Advisory Panel. The three bodies, along with stakeholders and partners, help the program chart its course.



LSG to continue these efforts with a focus on coastal restoration impacts and the need for adaptation. Coastal economies and communities are likely to experience significant changes as coastal projects are implemented.

All members agreed that environmental literacy is essential and LSG has played a prominent role in helping build awareness and understanding of the coastal issues faced by the State. These efforts are extraordinarily complex and must continue if future generations of voters and State and local leaders are to understand what's at stake and the trade-offs involved.

- Louisiana Sea Grant also received input from standing advisory committees for its Legal and Education programs. A total of 19 additional advisory committee members provided input on the importance of focus area, specific goals, objectives and strategies.
- Louisiana Sea Grant's Extension staff – collectively called the Marine Extension Program (MEP) – is an experienced and diverse group of 14 highly educated, personally motivated scientists with specialties including fisheries, aquaculture, seafood technology, watershed management, resource economics, geographic information systems and disaster planning and management. While the MEP Specialists are located on the Louisiana State University (LSU) campus in Baton Rouge, the MEP Agents are assigned to and reside within designated areas and have multi-parish jurisdictions. The MEP personnel were asked to coordinate and meet with diverse trusted, concerned and opinion-leading stakeholders to discuss issues of both immediate and future importance in coastal Louisiana. This information was reported out, taken under advisement by LSG's management team and incorporated into the 2018-2021 plan as appropriate.
- Louisiana Sea Grant, The Water Institute of the Gulf and the RESTORE Act Center of Excellence sponsored a Coastal Research Priorities town hall meeting in October 2016. It was attended by 130 researchers and resource managers and they discussed research and technology needs to address major coastal challenges of the Mississippi River Delta. The meeting's conclusions are summarized in the draft Research Strategy of the RESTORE Act Center of Excellence for Louisiana. Many of the attendees' suggestions are included in the goals and actions sections of the three focus areas—HCE, SFA and RCE—that will receive competitive research attention in the upcoming quadrennial.

VISION

Louisiana Sea Grant envisions vibrant, healthy coastal communities, economies and environments of the Mississippi River Delta and Chenier Plain that are resilient in the face of change.

Recurring Themes

Louisiana's coastal communities and businesses remain extremely vulnerable to land loss and hazardous events brought on by severe weather, climate change, changing land use patterns and the economic fluctuations brought on by the State's dependence on coastal fisheries and the heavily oil and gas based economy.

The 2005 and 2008 tropical storm seasons, for instance, revealed much about the region's growing exposure to severe weather, as did the historic Mississippi River flooding in 2011 and 2015 and the August 2016 Louisiana flood event that caused \$8.7 billion of damages in the Baton Rouge and Acadiana areas. In addition, the 2010 Deepwater Horizon Oil Spill severely affected coastal communities and the impacts appear to continue. There are lingering effects on fisheries harvests and seafood production that have demonstrated that disaster planning and response are of paramount importance.

Fisheries – notably shrimp, crabs and oysters, and seafood production – remain prominent economic drivers in coastal Louisiana. Efforts are being directed to help the industry recover from the Deepwater Horizon Oil Spill impacts and remain competitive. Emphasis is being given to promoting direct marketing; encouraging community-supported fisheries; professionalization/training of fishers; and producing safe, sustainable and high quality seafood and aquaculture development. Research is being directed at rebuilding degraded fishery habitats, responsibly and efficiently harvesting fishery resources, promoting resilient fishing communities and resolving fisheries management conflicts.

Water resource issues, primarily scientific/technological research and policy matters, are of great concern in coastal Louisiana. Flooding and recovery (including green, gray and hard infrastructure solutions and nonstructural issues such as Community Rating Systems and flood insurance) are frequently discussed but often lack a research underpinning. Constituents have also expressed concern over the availability of a safe and sustainable water supply for residential, commercial, agricultural and industrial purposes, especially in light of increasing regional demands, and addressing critical infrastructure in support of working waterfront economic activities such as fisheries, ports and navigation, and recreation and tourism.

The sheer magnitude and dynamic nature of these issues makes it imperative that LSG continue to help build an environmentally literate public that can contribute to the difficult decision-making process.

In summary, the Louisiana Sea Grant College Program addresses issues in the seventh largest delta in the world, representing many of the challenges in how natural resource management and human settlement can be maintained to support national and global economic activities. River deltas all over the world are sinking beneath sea-level rise, causing significant threats to natural and social systems. The Mississippi River Delta and Chenier Plain provide examples for many of the functions and feedbacks regarding how human river management has accelerated wetland loss in coastal deltaic basins, resulting in human settlements more at risk to natural and technological hazards.

Through this 2018-2021 planning process, and in keeping with its vision and mission, LSG has identified an ideal position within the State and region's academic, management and scientific community. This unique and critical position will help guide our thinking and investments over the next four years.

Cross Cutting Principles – Partnerships, Diversity and Inclusion

Louisiana Sea Grant supports the implementation of the Network Strategic Plan 2018-2021. It does so by applying the two adopted principles that will enhance Sea Grant's capabilities to meet future needs:

- Cultivate partnerships—Louisiana Sea Grant will use its distinct capacity to integrate the expertise and capabilities of its State, Federal and local agencies partners, as well as those from academia, residents, business, industry and nongovernmental organizations.
- Enhance diversity and inclusion—Louisiana Sea Grant will seek new and embrace diverse perspectives and viewpoints to enhance cultural understanding and enable the Network to pursue its vision and mission effectively and efficiently.

CORE VALUES

Louisiana Sea Grant eagerly supports the Network's core values of:

Being Visionary - Louisiana Sea Grant strives to advance innovative solutions to emerging science and stewardship challenges; Sea Grant will be an innovation leader and catalyst to spur innovation.

Seeking Collaboration - Louisiana Sea Grant promotes partnerships that leverage our strengths and values. We seek to coordinate and build resource relationships among our State, regional and national network partners that include other Sea Grant programs and State and Federal agencies. Louisiana Sea Grant maintains scientific neutrality, integrates diverse expertise and ultimately contributes science and knowledge to help inform stakeholders and support decision making.

Being Accountable - Louisiana Sea Grant is accountable to its stakeholders, LSU and other university partners statewide. It operates with integrity and transparency; maintains quality and relevance in administration, management and oversight.

Dedication to Sustainability - Louisiana Sea Grant emphasizes the importance of good stewardship and helps communicate the value of the services that coastal ecosystems and human communities provide to the Nation through biophysical and socio-economic research, outreach and education.

Louisiana Sea Grant activities embrace as many as 14 academic institutions, 19 coastal parishes, as well as other partners in State and Federal government, in addition to the private sector. Pictured: Graduate students set up a field sampling platform at Wax Lake.



LOUISIANA SEA GRANT FOCUS AREAS, GOALS, ACTIONS and DESIRED OUTCOMES

Louisiana Sea Grant intends to support activities in all four of the focus areas identified for the 2018-2021 Network Plan. They are:

- Healthy Coastal Ecosystems (HCE)
- Sustainable Fisheries and Aquaculture (SFA)
- Resilient Communities and Economies and (RCE)
- Environmental Literacy and Workforce Development (ELWD)

HEALTHY COASTAL ECOSYSTEMS

The maintenance and restoration of healthy ecosystems is fundamental to life along Louisiana's coast. Development, overfishing, sea level rise, subsidence, loss of barrier islands and other factors have resulted in water quality degradation and hypoxia, a decline of fisheries, wetlands loss, proliferation of invasive species, reduced storm and surge protection and a host of other challenges. Louisiana's invaluable coastal wetlands and forests have suffered severely from the combined effects of man's activities and nature's whims.

To help restore and preserve the State's coastal ecosystems, LSG will promote innovative research and outreach that increases our understanding of ecosystem function and implementation of appropriate designs for restoring lost function. Louisiana Sea Grant will stress three topics under the Healthy Coastal Ecosystem focus area: water quality, coastal restoration and coastal ecosystem health in the context of anticipated climate change impacts. Goals, actions and desired outcomes in this area relate to protecting, restoring and conserving natural resources and developing mechanisms to help natural resource managers make optimal decisions.

- ▶ **National Sea Grant Goal:** Habitat, ecosystems and the services they provide are protected, enhanced or restored.
- ▶ **Louisiana Sea Grant Goal:** Contribute to the protection, enhancement, or restoration of coastal Louisiana ecosystems.

Action 1: Develop and share scientific and socio-economic understanding, decision-support tools, technologies and approaches to protect, restore, and improve water quality in Louisiana's wetlands, rivers and estuaries.

- **Desired Outcome:** Scientific and socio-economic understanding and technological solutions inform and improve conservation and management of Louisiana's water resources.
- **Desired Outcome:** Greater public awareness of water quality issues and impacts to Louisiana's ecosystems.
- **Desired Outcome:** Improved coordination of Louisiana coastal and river watershed research to fill information gaps needed for decision-making.
- **Desired Outcome:** Water resource conservation priorities developed through stakeholder participation are addressed.

The maintenance and restoration of healthy ecosystems is fundamental to life along Louisiana's coast. To restore and preserve the State's coastal ecosystems, LSG promotes innovative research that increases understanding of ecosystem function and implementation of appropriate designs for restoring lost function.

Action 2: Promote and support innovation to sustain the habitat, diversity and the abundance of coastal ecosystems in Louisiana that are being affected by changes from relative sea-level rise and restoration activities.

- Desired Outcome: The development of a framework to help guide coastal protection and restoration efforts that support sustainable estuaries given the anticipated changes.
- Desired Outcome: The development of natural and/or bioengineered reef and shoreline protection techniques that enhance coastal restoration and protection project efforts.

► **National Sea Grant Goal:** Land, water and living resources are managed by applying sound science, tools and services to sustain ecosystems.

► **Louisiana Sea Grant Goal:** Natural resource managers use ecosystem-based data and stakeholder input to adapt to and address changes in coastal Louisiana ecosystems.

Action 1: Identify and promote case studies and adaptation strategies to enhance resilient ecosystems in the context of changing conditions to include the effects of increased river flow on food webs in receiving basins, and climate fluctuations and restoration activities on migration for animals utilizing coastal habitats.

- Desired Outcome: Managers and decision-makers have access to information related to projected changes within coastal ecosystems and how changes will impact coastal ecosystems.
- Desired Outcome: Managers and decision-makers can access case studies and training tools to improve their ability to plan, prepare and adapt to future ecosystem conditions.

Action 2: Support and share improved predictions of coastal processes (e.g. interior ponding, subsidence, sand shoreline dynamics and shore edge erosion of the marsh platform) under normal and storm conditions, factoring in projected sea-level rise scenarios and other climate change-related effects on these processes over time.

- Desired Outcome: Louisiana residents and decision makers have resources to make informed decisions about how to improve coastal ecosystem health and adapt restoration and protection efforts to changing conditions.
- Desired Outcome: Improve capability of predictive models that establish the relative contribution of factors, including physical climatic processes, which drive coastal change.
- Desired Outcome: Collaborations with partners and stakeholders support planning, research and technological solutions to address ecosystem resource management needs as a human enterprise.



Louisiana Fisheries Forward – established to improve the economic success and environmental sustainability of the State’s commercial fishing industry – provides fishermen, dealers and processors professional development opportunities through web-based videos, fact sheets, dock-side demonstrations and larger workshops. Pictured is the 2016 LFF Summit which drew more than 300 participants from the industry.

SUSTAINABLE FISHERIES AND AQUACULTURE

Louisiana has experienced a decline in many of its major fisheries while simultaneously seafood consumption nationwide has been on the rise. LSG, through its research, extension and education activities, and work with industry partners, has helped to stabilize and improve many sectors of the State’s fisheries seafood producing industries.

The NOAA Aquaculture Program states that aquaculture is in its infancy in the U.S., amounting to just over \$1 billion of a \$70 billion worldwide industry. This is especially so in Louisiana where aquaculture has the potential to expand economic opportunities which in turn will help meet the increased demand for seafood. But many questions need to be addressed for the industry’s full potential to be realized.

Seafood safety is a growing concern as international trade increases, and fish diseases and contamination of imports loom as larger problems. Louisiana Sea Grant plays key roles in advancing public understanding of the nature of these problems and opportunities. Through use of research, extension and education tools, LSG supports the kind of informed public and private decision making that leads to a sustainable supply of safe seafood well into the future.

► **National Sea Grant Goal:** Fisheries, aquaculture and marine and freshwater resources provide food, jobs and economic and cultural benefits.

► **Louisiana Sea Grant Goal:** Louisiana seafood producers meet public demand through safe, sustainable and profitable operations.

Action 1: Identify ways to maximize quality, sustainability, value, safety and use of Louisiana seafood within the context of adapting to economic, cultural, social and environmental changes that include: harvesting, aquaculture opportunities, processing, marketing strategies and development of underutilized fisheries, as well as local micro-processing capabilities.

- Desired Outcome: Partnerships enable the Louisiana seafood industry to adapt to economic and environmental changes and acquire innovative technologies to expand.
- Desired Outcome: The Louisiana seafood industry employs technologies and reinforces marketing strategies to ensure safe and sustainable seafood and products.

- Desired Outcome: Consumers have access to and purchase safe and sustainable seafood products.
- Desired Outcome: Increased understanding and technological solutions aid aquaculture management and production.

▶ **National Sea Grant Goal:** Natural resources are sustained to support fishing communities and industries, including commercial, recreational and subsistence fisheries and aquaculture.

▶ **Louisiana Sea Grant Goal:** Natural resources that support fishing communities and industries that depend on commercial, recreational and subsistence fisheries and aquaculture activities, are sustained through development of adaptation strategies for anticipated changes resulting from restoration activities and climate change impacts.

Action 1: Develop and promote understanding of: the effects of increased river flow on food webs in receiving basins; new fishery and aquaculture opportunities that could arise from coastal restoration (e.g., diversions) and climate change impacts.

- Desired Outcome: Resource and restoration management decision-makers, commercial and recreational fishermen and aquaculture interests have access to information about efficient, sustainable and responsible tools, techniques and uses of coastal and freshwater resources.
- Desired Outcome: Innovative solutions that increase understanding of climate impacts on fisheries and aquaculture are available and accessible to resource managers and fishing and aquaculture communities.
- Desired Outcome: Resource managers and fishing and aquaculture communities have access to science and socio-economic information and tools that promote outreach, collaboration and engagement to enhance their capability to adapt to future resource management needs.



In 2005, Hurricane Rita devastated the community of Delcambre. It was flooded again by Hurricane Ike in 2008. Facilitated by Louisiana Sea Grant, the LSU Landscape Architecture Department and the University of Louisiana at Lafayette Architecture and Design programs developed concept redevelopment plans for the town that were used in grant applications. The town received \$4 million toward waterfront redevelopment that includes a new boat launch, a seafood farmers' market pavilion and marina.

RESILIENT COMMUNITIES & ECONOMIES

Louisiana Sea Grant's resilient communities and economies efforts focus on four topic areas: climate change adaptation, community sustainability, pollution prevention and water resources. Anticipated outcomes of these efforts include increased availability of related tools and information to inform implementation of best management practices at the local and State levels. Climate change is among the top environmental challenges facing coastal Louisiana and impacts both aquatic and terrestrial ecosystems; it also poses threats to human lives, environments and economies. Louisiana Sea Grant will continue to help communities and individuals plan for and adapt to projected climate changes, taking into account the uncertainty in many of the projections.

Coastal communities provide vital economic, social and recreational opportunities for thousands of Louisianans, but population migration, especially since hurricanes Rita

and Katrina, have transformed the State's coastal landscapes and intensified demand for finite coastal resources. The increase in population along the north shore of Lake Pontchartrain, for example, has resulted in new housing developments, recreation facilities and other business activities that have deteriorated local ecosystems and made them more vulnerable to natural hazards, notably flooding.

Changes such as these are placing tremendous pressure on coastal lands, water supplies and traditional ways of life. To accommodate more people and activity and to balance growing demands on coastal resources, Louisiana must develop new policies, institutional capacities and management approaches to guide the preservation and use of coastal and ocean resources.

LSG will continue to assist a diverse and growing coastal population in applying the best available scientific knowledge and use its extension and education capabilities to support the development of healthy coastal communities that are economically and socially inclusive, are supported by diverse and vibrant economies and function within the capacity of their ecosystems.

▶ **National Sea Grant Goal:** Coastal communities use their knowledge of changing conditions and risks to become resilient to extreme events, economic disruptions and other threats to community well-being.

▶ **Louisiana Sea Grant Goal:** Louisiana's coastal residents and leaders use their knowledge of changing conditions and risks to adapt to the impacts and hazards of climate change and become resilient to extreme events, economic disruptions and other threats to community well-being.

Action 1: Increase understanding of how knowledge is communicated between local community residents and policy makers, and identify best adaptive practices and improved methods for facilitating the reciprocal exchange of knowledge between residents, community leaders, researchers and policy makers that aid comprehensive planning and adaptive management strategies to enhance community resilience.

- Desired Outcome: Members of the community, including the underserved, have resources available to be able to prepare and adapt to changing conditions and coastal hazards.
- Desired Outcome: Improved community leaders' understanding of changing conditions in their communities and implement adaptive strategies.

Action 2: Promote a greater understanding of adaptation capacity and mitigation strategies for communities to climate-related coastal hazards and restoration activities with a focus on incorporating traditional ecological knowledge (TEK) to enhance community resiliency and adaptive capacity with approaches that take into consideration impacts on diverse, underserved and underrepresented populations.

- Desired Outcome: Coastal residents have resources available to better understand the scientific and socio-economic process related to climate adaptation.
- Desired Outcome: Coastal residents and leadership have access to information needed to understand the factors affecting ecosystems and participate in adaptive management planning.
- Desired Outcome: Coastal residents and leadership employ adaptive management strategies and apply tools to engage diverse members of the community to improve resilience and community sustainability.

Action 3: Promote a greater understanding of the relationship between ecosystem services, quality of life, changing social conditions and community resilience within coastal habitats, particularly pertaining to habitat changes and shifts.

- Desired Outcome: Resources are available to help coastal residents and leadership better understand ecosystem services and associated values of coastal habitats in areas experiencing ongoing or predicted habitat shifts and coastal restoration activities.
- Desired Outcome: Decision-makers have access to information that clarifies the linkages and feedbacks between the natural and human components to evaluate long-term coastal resilience.

▶ **National Sea Grant Goal:** Water resources are sustained and protected to meet existing and emerging needs of the communities, economies and ecosystems that depend on them.

▶ **Louisiana Sea Grant Goal:** Communities make optimal decisions so that water resources meet existing and emerging needs of the communities, economies and ecosystems that depend on them.

Action 1: Investigate existing water policy (including comprehensive and hazard mitigation plans) and explore more beneficial alternatives that include issues of ownership in changing environments and conditions, and planning and implementation related to public safety and risk.

- Desired Outcome: Improved outreach and decision-support tools will help guide planning processes related to the State's water resources.
- Desired Outcome: Sustainable water resource use practices will be used by local officials when considering planning policies and procedures.

Action 2: Collaborate with stakeholders to develop and share best management practices (BMPs) and measures to protect and manage water resources.

- Desired Outcome: Communities and stakeholders have access to sound science, data, tools and services to understand and anticipate changes in water quality and quantity.
- Desired Outcome: Communities have diverse, sustainable economies and industries that support the existing and emerging water resource needs.
- Desired Outcome: Communities have access to science, tools and technologies to protect and sustain water resources and make informed decisions.



Since 1968, Louisiana Sea Grant has supported more than 1,050 graduate students. Thirty-four Coastal Science Assistantship Program (CSAP) students have been trained since 2008. And 161 Undergraduate Research Opportunities Program (UROP) students have been funded since 1992. Pictured are law school students who serve as legal interns in LSG's Law & Public Policy Program.

ENVIRONMENTAL LITERACY AND WORKFORCE DEVELOPMENT

An environmentally literate person is someone who has a fundamental understanding of the systems of the natural world, the relationships and interactions between the living and non-living environment and the ability to understand and utilize scientific evidence to make informed decisions regarding environmental issues. These issues involve uncertainty and require the consideration of economic, aesthetic, cultural and ethical values.

The scientific, technical and communication skills needed to address the daunting environmental challenges confronting our nation are critical to developing a national workforce capacity. Louisiana Sea Grant is well positioned to foster scientifically-literate citizens to serve as stewards of our local coastal and marine resources. LSG's team of educators and extension professionals is meeting the challenge of improving today's science education through its professional training for fishers, educators and innovative curriculum resources for students and teachers in K-16. Our classroom and community stewardship programs are developed for all learners, including underserved student and fisher populations in coastal Louisiana. Through programs such as Louisiana Fisheries Forward (LFF), LSG provides professional development and education opportunities to commercial and charter fishers on new fisheries technology and best practice methods. LSG also supports the professional development of undergraduate and graduate students through our peer student and youth mentoring and service programs, science communication competitions, conference travel awards and by offering fellowship programs and other career development opportunities.

▶ **National Sea Grant Goal:** An environmentally literate public that is informed by lifelong formal and informal opportunities that reflect the range of diversity of our communities.

▶ **Louisiana Sea Grant Goal:** Louisiana citizens will be increasingly environmentally literate.

Action 1: Engage the public in community adaptive management planning processes given changing conditions by providing best available information.

- **Desired Outcome:** Communities are knowledgeable and equipped with the best available science, technology and policy related information to be able to contribute to adaptive management to increased flood risk planning processes.
- **Desired Outcome:** Citizen science initiatives contribute to improving knowledge with respect to Louisiana's coastal ecosystems.

Action 2: Increase effective environmental literacy instruction for Louisiana's K-12 teachers and students through education and outreach programs.

- **Desired Outcome:** Students develop a sense of awareness, understanding and stewardship of our watersheds, coastal and marine ecosystems and resources.
- **Desired Outcome:** Louisiana teachers have the knowledge and tools to instruct students about our watersheds, coastal and marine ecosystems and resources.
- **Desired Outcome:** Teachers will integrate LSG curriculum or activities into in their instruction.

► **National Sea Grant Goal:** A diverse and skilled workforce is engaged and enabled to address critical local, regional and National needs.

► **Louisiana Sea Grant Goal:** College students, faculty, fishers and resource managers will have the knowledge and skills to become active, engaging and relevant participants in local, State or National dialogues about Louisiana's coastal issues.

Action 1: Increase opportunities for Louisiana's undergraduate and graduate students, as well as university faculty, to gain knowledge and experience in the science and management of Louisiana's watershed, coastal and marine resources and improve communication and community engagement skills.

- **Desired Outcome:** College-level courses, internships and other professional development opportunities provide students and faculty opportunities to increase literacy, outreach experience and preparedness for working on science and policy issues related to Louisiana's watershed, coastal and marine ecosystems—particularly students and faculty from underrepresented groups.
- **Desired Outcome:** Current and future undergraduate and graduate students, particularly those from underrepresented groups, are supported and have access to formal and experiential learning, training, research and community engagement experiences related to understanding Louisiana's coastal issues.

Action 2: Prepare a responsive and diverse workforce to advance and benefit from sectors that support the needs of Louisiana's coastal communities and ecosystems (e.g. industry, research, government, etc.), and to adapt and thrive in changing conditions.

- **Desired Outcome:** Employment in Louisiana's coastal resource enterprise expands and diversifies.
- **Desired Outcome:** The State's existing and future workforce can adapt to and thrive in changing environmental, social and economic conditions.
- **Desired Outcome:** Education and outreach programs will be available to support an environmentally literate workforce.



In 2017, Louisiana Sea Grant will host the 20th annual Ocean Commotion on the LSU-Baton Rouge campus. Annually, more than 2,000 kindergarten through eighth graders attend, along with more than 200 teachers and chaperones. Ocean Commotion offers students an opportunity to learn about a host of issues that range far beyond ocean-exclusive themes in a lively, hands-on learning environment. Typically, about 70 presenters from private business, universities, government agencies, museums, and public, non-profit and private educational organizations participate as exhibitors.

GLOSSARY

Definitions for the purposes of developing the Louisiana Sea Grant College Program Strategic Plan

Coastal Communities: Marine, coastal and Great Lakes communities served by the National Sea Grant College Program.

Core Values: Values that guide behavior and actions of National Sea Grant College Program.

Cross-cutting Principles: National Sea Grant College Program will strive to implement the strategic plan by embracing principles that will strengthen the organization.

Diversity: A collection of individual attributes that together help an organization pursue objectives effectively and efficiently.

Ecosystem: A dynamic and complex association of plant, animal and human communities, and the non-living physical components interacting as a functional unit.

Focus Areas: Focus areas are intersections where Sea Grant's key components are shaped to address the nation's most urgent ocean, coastal and Great Lakes' needs. Key components of Sea Grant College Program include:

- The mission, vision, core values and goals which inspire and motivate the organization.
- The promise of value Sea Grant delivers to the Nation.
- The distinctive (unique) competency of Sea Grant – 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.

Inclusion: An organizational culture that aims to connect individuals to the organization.

Mission: The mission communicates the purpose of the organization.

Objective: The tactic or path to achieve the goal.

Outcome: An intended result or consequence.

Performance Measure: Performance measure is a quantitative way of measuring an outcome with targets developed by each Sea Grant program.

Resilience: The ability to adapt to changing conditions and withstand—and rapidly recover from—disruption due to emergencies (e.g. storm events).

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



