Georgia Sea Grant (GASG) has a long history of highly effective work with the state's fisheries and an impressive body of research into the complex interrelationships of salt marsh ecosystems. GASG made its reputation helping fishermen understand and comply with the proliferation of federal fisheries regulation that began in the 1970s, while at the same time doing seminal ecological research that convinced citizens and legislators to protect marsh habitats. Georgia Sea Grant sought its place in the middle – helping shrimpers make mandated, but clumsy, excluder devices actually work, on the one hand, and on the other, showing skeptical politicians and developers how protecting the coastal ecosystem was in the interest of local economies. This required building trust. This was the Georgia Sea Grant founded by Dr. Ed Chin.

At the heart of much of GASG's early work was the 72-ft. former shrimp trawler, the *R/V Georgia Bulldog.* The *Bulldog* enabled much of GASG's most impactful outreach and fisheries research. In many ways, the *Bulldog* remains the most visible symbol of Georgia Sea Grant's connection to coastal communities. But the *Bulldog* now shares a waterfront with increasingly fewer shrimp boats and more and more condos and luxury marinas; times are changing and Georgia Sea Grant with them.

Today, Georgia Sea Grant works across a broader spectrum of issues and concerns - still finding its place in the middle. Whether seeking sustainable development options that work both economically and environmentally, or helping communities make hard but fair choices to prepare for sea level rise, Georgia Sea Grant is making vital contributions to the future of coastal Georgia. There should be no doubt that it will continue its historic concerns, promoting a sustainable seafood industry and developing a deeper ecological understanding, but Georgia Sea Grant must now respond to high levels of projected growth and the increasing vulnerability of its coastal communities to sea level rise.

In the early days, Dr. Chin integrated research, outreach and education, chiefly, by directing all functions himself. But on his retirement, the University of Georgia created separate directorships for Sea Grant and the UGA Marine Extension Service (MAREX). Over time, the research became the province of Sea Grant and outreach and education the province of MAREX. Sea Grant funded some of MAREX's outreach and education, and MAREX extended some of Sea Grant's research. Sea Grant reported to UGA's Vice President for Research and MAREX to UGA's Vice President for Public Service and Outreach. Predictably, there was estrangement and, ultimately, personal differences. The previous PRP strongly recommended that his relationship be repaired and the integrated program approach be restored.

In response, GASG has changed dramatically over the last four years. The program returned to Dr. Ed Chin's original structural model – a single director over all aspects of the program. Upon the retirement of MAREX director Dr. Randy Walker and the return to research of Georgia Sea Grant's Dr. Chuck Hopkinson, Dr. Mark Risse became joint director of both organizations, and the combined program was placed under the UGA's Office of Vice President for Public Service and Outreach. To ensure tighter integration, all units participate in strategic planning and in setting performance measures. Only research pre-proposals deemed "extendable" by a panel of stakeholders are invited to submit full proposals. For the 2012 RFP, PIs invited to submit full proposals were informed that their proposal must include an outreach plan and were given an extension contact to help them develop the plan. Morale is high throughout the organization and increased impact and visibility indicates that these measures are working.

GEORGIA SEA GRANT- SAFE AND SUSTAINABLE SEAFOOD SUPPLY

As stated in the general program summary, Georgia Sea Grant's (GASG) work with the seafood industry has been at the core of its identity from the beginning. Although GASG has broadened its focus to include other areas, outreach to shrimpers and crabbers, seafood safety training, research in aquaculture and increasing public awareness of fisheries issues remain central to what GASG does today.

Outreach to Shrimpers and Crabbers

One need look no further than GASG's work with TEDs and BRDs to find a classic example of Sea Grant operating as an honest and trusted broker of information. Before the environmental regulations of the 1980s required the use of TEDs, GASG was already working with shrimpers, including the inventor of the original TED, Georgia shrimper Sinkey Boone, on net designs that reduced by-catch that damaged shrimp catch and made trawling inefficient. Boone's first excluder device was intended to exclude cannonball jellyfish that were overwhelming shrimp nets. This work put GASG in perfect position – between federal regulators and wary and independent shrimper – to broker information and seek collaboration between the two parties. Historically, the most visible role GASG has played on the Georgia coast has been in helping shrimpers meet these requirements and doing the research that wisely guided regulation.

Even though TEDs have been required on all shrimp nets since the 1980's, shrimpers have continued to tinker with designs to make them more efficient. However, federal regulators keep a close watch on fishing gear to make sure environmental standards are met. The late Sinkey Boone's final design improved on the original TED by allowing sea turtles to escape more quickly, while also reducing unwanted bycatch of finfish, sharks, rays and ecologically important invertebrates like horseshoe crabs. However, he was unable to do the testing necessary for National Marine Fisheries Service (NMFS) approval of the device. GASG used its *R/V Georgia Bulldog,* a former shrimp trawler, to test the device and was instrumental in securing NMFS approval. **RESULT: In June 2012, NMFS (NOAA) approved the "Boone Big Boy" TED for use in the national shrimp fishery.**

Hand-in-hand with working on shrimp net design and regulation, GASG makes yearly, one-on-one visits to hundreds of commercial shrimpers to make sure they understand how to properly use federally-mandated TEDs and BRDs in order to comply with regulations and optimize fuel and catch efficiency. **RESULT: These gear audits help shrimpers avoid costly fines (e.g. one unintentional violation could cost $17,000, putting a shrimper out of business), improve their operations and bring issues to the attention of GASG.**

Fisheries staff also offer demonstrations in welding and winch repair, assistance in completing permit applications, identifying migratory shark species, training in marine electronics, and the use of fuel-efficient trawl door designs. **RESULT: From 2011-2013, 173 commercial fishermen received hands-on technical training at the MAREX Brunswick facility.**

In addition to technical assistance with gear, GASG helped commercial shrimpers participate in the federal Trade Adjustment Assistance program (TAA), which helps farmers and fishermen sharpen their business skills to compete with imported products. Participants were required to take 12 hours of specialized training at MAREX or online. Many participants were husband and wife teams who learned to use the internet for the first time as they worked with GASG staff to

complete the program requirements. After completing the coursework, shrimpers were paired with personal business experts to help them develop individualized business plans. **RESULT: GASG has helped 122 of 180 eligible Georgia participants complete the full program requirements, making each one eligible to receive $12,000 to improve his or her business.**

Blue crab is Georgia's second largest fishery. The fishery is fighting to come back after an outbreak of the *Hematodinium* parasite, diagnosed by GASG research a decade ago. Crab abundance has increased but the industry still struggles. As if microbial parasites weren't enough, there have been recent complaints in some locations that diamond-backed terrapin were poaching crabs. GASG fisheries specialists at the Brunswick station developed a terrapin excluder for crab traps. **RESULT: GASG delivered over 300 terrapin excluders to local crabbers.**

Aquaculture

Although Georgia's 16 shellfish leases only generate $850K in revenue in 2013, shellfish aquaculture has great growth potential. Around 2000, GASG developed clam aquaculture techniques specific to Georgia coastal conditions, then purchased seed clams and grow-out bags and persuaded three coastal fishers to allow GASG to set up small-scale demonstration clam farms on each of their respective shellfish-approved growing leases. Leaseholders were taught the GASG technique and how to harvest clams once they reached market size. Success literally bred success and Georgia now has a growing clam fishery.

GASG next set its sights on Georgia's collapsed oyster industry. In 1908, Georgia led the nation in oyster landings but by mid-20th Century historic oyster beds had been destroyed by over harvesting. The remaining silt and mud bottoms in the state's intertidal waters left little for oyster spat to attach to and grow. Whenever a hard substrate was found, abundant spat attached to earlier-colonizing oysters leading to densely clumped clusters of oysters not fit for premium, "halfshell" trade.

GASG began its work with oyster aquaculture as it had with clam aquaculture by developing a grow-out technique that would succeed in Georgia's unique conditions. The technique came from the GASG research project, "Overcoming Constraints to the Development of a Sustainable Eastern Oyster, *Crassostrea virginica,* Aquaculture Industry in Georgia. " The key finding was that in 18 months spat grown at 0.5 meters below mean low tide, the limit of their natural range, produced large, marketable, single oysters, un-fouled by excess spat. Demonstration projects on "borrowed" shellfish leases followed. **RESULT: By 2012 three new oyster growers, Sapelo Sea Farms, Spatking Oysters and Whitehouse Seafood, were bringing limited numbers of "single" oysters to market, with one grower reporting revenue of $40K from a pilot project.**

Oyster aquaculture proved to be more complex than clam aquaculture and researchers at GASG's Shellfish Laboratory on Skidaway Island, funded by an NSGO Aquaculture grant, have been working with growers on the issues that have arisen, three in particular – spat capture, grow-out hut design and state regulation. GASG researchers are working directly with the three pilot growers to perfect the quantity of spat capture and the size and quality of grow-out. GASG research also showed that, unlike oysters in the northern US, Georgia oysters grow year round and reach sexual maturity within three months, with spat settling in the spring, maturing by

summer and spawning through October. This cycle can take years in colder climates. **RESULT: In 2012, as a result of Georgia Sea Grant research, the Georgia DNR reduced the minimum size limit for commercial oyster harvest from three to two inches. This change removes a hurdle for Georgia shellfish growers and enables a significant increase in the production of oysters for the single shell, "cocktail" market.**

Seafood Safety

GASG's role in ensuring the safety of seafood caught or processed in the state enables an industry that, according to NOAA figures, accounts for 2 million jobs and $47M in income.

GASG plays a central role in Hazard Analysis Critical Control Point (HACCP) Seafood safety training. The FDA specifies that certain seafood processing and handling activities be done by an employee certified with HACCP training. The GASG Brunswick station Brunswick Station is one of only a few locations in the U.S. to offer HACCP training. **RESULT: GASG certifies about around 80 HACCP professionals a year, 206 in the review period, enabling approximately 200 Georgia seafood processors and dealers and 148 retailers to operate.**

In addition to offering this training, GASG seafood specialist Tori Stivers serves on the National Seafood HACCP Alliance, which oversees seafood HACCP courses and updates standard curriculum and resources used in all approved courses, as well as implements train-the-seafood-trainer courses. **RESULT: GASG's leadership position allows input into revisions of curriculum that may better meet Georgia seafood industry needs and informs GASG staff well in advance of planned changes in training protocol.**

Thanks also to Specialist Stivers, GASG has been a leader in raising awareness of *Vibrio vulnificus (Vv)* infection among high-risk consumers, health care professionals, fishermen, and others in order to help prevent serious, potentially fatal infections. Stivers manages the SafeOysters.org website and produces extension publications, other resources and extensive outreach that has been very successful in raising awareness of *V.vulnificus*. **RESULT: When two commercial fishermen were seriously injured in a boat explosion off the Georgia coast on June 22, 2013, one of them remembered what he had learned from a GASG outreach program about the risk of *Vv* wound infections. He relayed that information to hospital doctors who immediately placed both men on antibiotics to prevent infection. The fishermen claim *Vibrio* education saved their lives; whether these fishermen were actually infected with *Vv* was not determined but their notification to emergency physicians of possible exposure led to proper treatment and attests to the success of GASG awareness programs.**

Stivers also collaborated with Sandy Shepherd, Seafood Safety Officer of the Georgia Department of Agriculture, to offer a three-hour training course on Vibrio vulnificus for shellfish inspectors. **RESULT: 40 inspectors from Dekalb and Cobb counties and Macon and Atlanta were certified in the new program.**

While the Georgia's is not among the nation's most contaminated coastlines, the Brunswick area has four superfund sites. Unfortunately, GASG had to be the bearer of bad news to crabbers and recreational fishermen in the Brunswick vicinity when during routine sampling it discovered high PCB concentrations in the hepatopancreas of the crabs caught near Brunswick's LCP

superfund site. In crabs, PCP is captured in the hepatopancreas, but does not contaminate the meat. Researchers then developed a procedure to extract the hepatopancreas from crabs and make them safe for consumption. **RESULT: GASG trained 10 cooperative extension diet and nutrition agents to pass on this information. They also did a hands-on training session at the local high school where 100 students learned how to prepare crabs safely. Students prepared crabs themselves and learned how to pass the technique on to family members. GASG reported the contamination to the GA DNR, which ultimately banned fishing near the LCP site.**

A high mercury level from seafood consumption is a concern for pregnant women and nursing moms because excessive mercury can affect the development of a baby's brain, impacting memory, language, and attention. The GASG Brunswick station purchased equipment that uses a new process that can give mercury profiles from hair samples sent in by mail. Although the program was developed to serve women in Georgia, there has been national and international demand for this service. **RESULT: This program has served 1691 participants from 502 cities in 40 states in the U.S. Internationally, the service has helped participants in 14 additional countries. Participants receive free re-testing and personalized information until their mercury level falls in the desired range. Of participants who have already submitted re-test samples after participating in this program, 100% show decreasing mercury levels. Most importantly, program participants report a sense of relief and confidence when eating fish and seafood and cooking for their families.**

Public Outreach and Education

The R/V Georgia Bulldog is the main attraction at festivals from Fernandina, FL to Beaufort, SC. Thousands of visitors tour the vessel each year to learn about the shrimping industry and GASG's contributions to coastal science, culture and economy. Staff often bring along live touch tanks with horseshoe crabs and whelks, a mobile aquarium with local sea life and a real turtle excluder device. The R/V Georgia Bulldog also serves as an at-sea educational platform for community groups to learn about commercial shrimping and fisheries research. Sample trawls allow students and guests to learn to identify local coastal species. Audiences have included students from the College of Coastal Georgia (CCGA), U.S. Border Patrol, culinary students, seafood processing executives, seafood safety managers, seafood distributors, chefs from across the nation and thousands of K-12 students.

PIER PRP Program Focus Area Report

Georgia Sea Grant

Safe and Sustainable Seafood Supply

Program Focus Area: SAFE AND SUSTAINABLE SEAFOOD SUPPLY

Program Goals

1. A sustainable supply of local seafood to meet public demand
2. A healthy Georgia seafood industry that harvests, produces, processes and markets seafood responsibly and effectively
3. Informed consumers who understand the importance of ecosystem health and sustainable harvesting practices to the future of Georgia fisheries, who appreciate the health benefits of seafood consumption and who understand how to evaluate the safety of the se

JUMP TO REPORT SECTION

Full Text of Impacts
Program Performance Measures
Objectives

Impacts and Accomplishments toward Program Goals

1. **Program Goal: A sustainable supply of local seafood to meet public demand**
   Impact(s)
   - 17287 - Sea Grant research changes shellfish regulation to allow for increased production
   - 6679 - Overcoming Constraints to the Development of a Sustainable Eastern Oyster, Crassostrea virginica Aquaculture Industry in Georgia
   - 6605 - Marine Advisory

   Accomplishment(s)
   - 15951 - Sea Grant perfects device to capture spat and grow out oysters
   - 15542 - Trade Adjustment Assistance for Impacted Fishery
   - 15541 - Technical Training for Commercial Fishermen

2. **Program Goal: A healthy Georgia seafood industry that harvests, produces, processes and markets seafood responsibly and effectively**
   Impact(s)
   - 19062 - Training in Seafood Processing Safety Enables Industry to Stay in Business
   - 17416 - Sea Grant Instrumental in Offering New Turtle Excluder Device Option
   - 6679 - Overcoming Constraints to the Development of a Sustainable Eastern Oyster, Crassostrea virginica Aquaculture Industry in Georgia

   Accomplishment(s)
   - 19065 - Commercial Fishermen Given Technical Training
   - 19063 - Georgia Sea Grant Helps Set Seafood Safety Standards
   - 17415 - Sea Grant Training Helps Fishermen Avoid Costly Fines
   - 15951 - Sea Grant perfects device to capture spat and grow out oysters
   - 15542 - Trade Adjustment Assistance for Impacted Fishery
   - 15541 - Technical Training for Commercial Fishermen
   - 6603 - Marine Advisory
   - 6599 - Marine Advisory
   - 6595 - Marine Advisory
   - 6593 - Marine Advisory

3. **Program Goal: Informed consumers who understand the importance of ecosystem health and sustainable harvesting practices to the future of Georgia fisheries, who appreciate the health benefits of seafood consumption and who understand how to evaluate the safety of the se**
   Impact(s)
   - 19061 - Georgia Sea Grant Helps Prevent Deadly Vibrio Infection in Fishing Accident
   - 19059 - Mercury Hair Testing Guides Mothers and Pregnant Women to Safe Seafood Consumption and Alleviates Unnecessary Concern
   - 13966 - DEVELOPMENT OF A RESEARCH PLAN FOR THE SOUTH ATLANTIC REGION
   - 6608 - Administration

   Accomplishment(s)
   - 17419 - Sea Grant Research Vessel Also Educates Public
   - 6791 - Communications
   - 6676 - GEORGIA COASTAL RESEARCH COUNCIL

- 6607 - Marine Advisory
- 6604 - Marine Advisory
- 6595 - Marine Advisory
- 6593 - Marine Advisory

Back to Top

Full Text of Impacts and Accomplishments

19065 - Commercial Fishermen Given Technical Training
Georgia Sea Grant and Marine Extension fisheries staff offered demonstrations in welding and winch repair; assistance in completing permit applications and identifying migratory shark species; and training in marine electronics and the use of fuel-efficient trawl door designs. These efforts help keep local fishermen in business. In 2013, 78 commercial fishermen received hands-on technical training at the MAREX Brunswick facility.

Back to Goals

19063 - Georgia Sea Grant Helps Set Seafood Safety Standards
Georgia Sea Grant and Marine Extension's seafood specialist accepted an invitation to serve on the National Seafood HACCP Alliance steering committee, which met in August of 2013. This committee oversees seafood HACCP courses and updates standard curriculum and resources used in all AFDO-approved courses, as well as implements train-the-seafood-trainer courses. This will allow GA Sea Grant staff to be informed well in advance of planned changes in training protocol, as well as enable input to revisions of curriculum that may better meet Georgia seafood industry needs.

Back to Goals

19062 - Training in Seafood Processing Safety Enables Industry to Stay in Business
Relevance: Federal regulations require that all facilities processing or distributing seafood have employees certified in Hazard Analysis Critical Control Point (HACCP).

Response: Georgia Sea Grant and Marine Extension's Brunswick Station is one of only a few locations in the U.S. to offer Hazard Analysis Critical Control Point (HACCP) Seafood Safety Training. In October 2013, the facility offered a three-day training course that enabled 39 individuals to achieve a certificate of HACCP course completion from the Association of Food and Drug Officials (AFDO) and Seafood HACCP Alliance. Improved service will be provided by the new HACCP webpage (www.marex.uga.edu/haccp_training), launched this year, which provides general information on HACCP training as well as upcoming course registration information and was developed by our seafood specialist.

Result: With seafood HACCP training from Georgia Sea Grant and Marine Extension, approximately 200 Georgia seafood dealers and 148 retailers are permitted to operate.

RECAP: Georgia Sea Grant and Marine Extension's federally-mandated seafood safety training allows state's seafood dealers and retailers to stay in business. Back to Goals

19061 - Georgia Sea Grant Helps Prevent Deadly Vibrio Infection in Fishing Accident
Relevance: Although an average of only 90 cases of human infection by the naturally-occurring marine bacterium Vibrio vulnificus occur annually in the U.S., approximately half of them result in death. The estimated cost of one case exceeds $3 million dollars. Because cases are relatively rare, people who are at high risk for infection, as well as medical professionals, may not be aware of how to avoid and successfully treat infections.

Response: Since 2004, Georgia Sea Grant and Marine Extension have been a leader in raising awareness of V. vulnificus infection among high-risk consumers, health care professionals, fishermen, and others in order to help prevent serious, potentially fatal infections. SafeOysters.org website, extension publications, other resources and extensive outreach to targeted groups are products of this continuing effort.

Results: When two commercial fishermen were seriously injured on June 22 in a boat explosion off the Georgia coast, one of them remembered what he had learned about the risk of Vibrio wound infections from a Georgia Sea Grant and Marine Extension outreach program for fishermen. He relayed that information to hospital doctors who immediately placed both men on antibiotics to prevent infection. The fishermen claim Vibrio education saved their lives.

RECAP: Georgia Sea Grant and Marine Extension raised awareness of V. vulnificus and prevented possible fatal infection in two Georgia commercial fishermen. Back to Goals

19059 - Mercury Hair Testing Guides Mothers and Pregnant Women to Safe Seafood Consumption and Alleviates Unnecessary Concern
Relevance: Mercury consumption is a concern for pregnant women and nursing moms because excessive mercury can affect the development of a baby's brain, impacting memory, language, and attention. Unfortunately, women in their childbearing years are often bombarded with confusing

messages about mercury.

Response: The newly developed mercury hair testing program provides a simple and affordable screening method for women of childbearing age. Participants from across the nation can mail in samples and receive results accompanied by educational materials designed specifically to encourage healthy seafood consumption. The goal is to help participants make informed choices and eat seafood with confidence.

Although the program was developed to serve women in Georgia, there has been national and international demand for this service. In addition to testing, Georgia Sea Grant and Marine Extension provided technical assistance and outreach support to an NGO in the Philippines that was addressing the emerging issue of mercury exposure due efforts by local women to remove and recycle the valuable copper in light bulbs, thus exposing themselves to the bulbs mercury content.

Result: This new program has served 1691 participants from 502 cities in 40 states in the USA. Internationally, the service has helped participants in 14 additional countries. Overall, we have provided testing for 676 women of childbearing age. In this target category, 9.5% of women had mercury levels above the recommended guideline. These participants receive free re-testing and personalized information until their mercury level falls in the desired range. Of participants who have already submitted re-test samples after participating in this program, 100% show decreasing mercury levels. Most importantly, program participants report a sense of relief and confidence when eating fish and seafood and cooking for their families.

Back to Goals

17419 - Sea Grant Research Vessel Also Educates Public

The R/V Georgia Bulldog was a main attraction at the 2012 annual Seafood Festival in Beaufort, South Carolina. Over 2,800 event visitors toured the vessel, spoke with staff and learned about the role MAREX has played within the shrimping industry. Also, the annual "Isle of Eight Flags" shrimp festival in Fernandina, Florida featured MAREX Brunswick Station again this year as a primary exhibitor. MAREX and Georgia Sea Grant brought live touch tanks with horseshoe crabs and whelks, the mobile aquarium with local sea life, a real turtle excluder device and an updated shrimping display to fill the MAREX educational space. Spanning three days, an estimated 19,500 festival attendees visited the MAREX educational exhibit.

The R/V Georgia Bulldog also served as an at-sea educational platform for several community groups totaling 115 visitors aboard. Groups learn about commercial shrimping and collaborative fisheries research. Sample trawls allow students and guests to learn to identify local coastal species. Audiences included students from the College of Coastal Georgia (CCGA), U.S. Border Patrol agents undergoing training in underwater operations, culinary students, Rich Sea-Pak executives, seafood safety management of King and Prince Seafood, and seafood distributors and chefs from across the nation.

Back to Goals

17416 - Sea Grant Instrumental in Offering New Turtle Excluder Device Option

Relevance: All commercial shrimpers must use turtle excluder devices approved by the National Marine Fisheries Service (NMFS) or face costly fines. The late Sinkey Boone, inventor of the original TED, designed a device that improved on his original TED by allowing sea turtles to escape more quickly, while also reducing unwanted bycatch of finfish, sharks, rays and ecologically important invertebrates like horseshoe crabs. However, the testing necessary for NMFS approval of the device was never done.

Response: Georgia Sea Grant and UGA Marine Extension Service specialists compared the Big Boy TED to the industry standard during 44 two-hour trawls. The new TED reduced overall bycatch biomass by 46.6 percent. Working directly with the National Marine Fisheries Service to test the device, MAREX was instrumental in securing approval for the device.

Result: In June 2012, the National Oceanic and Atmospheric Administration (NOAA) approved the "Boone Big Boy" TED for use in the national shrimp fishery.

Back to Goals

17415 - Sea Grant Training Helps Fishermen Avoid Costly Fines

Every year, extension agents work one-on-one with several hundred commercial shrimpers to provide technical assistance on the proper use of federally mandated TEDs (Turtle Excluder Devices) and BRDs (Bycatch Reduction Devices). We also deliver information about new conservation gear options to ensure compliance with mandates and help with fuel efficiency. These interactions help shrimpers avoid costly fines (e.g. one unintentional violation could cost $17,000, putting a shrimper out of business) and improve their operations.

Fisheries staff also offer demonstrations in welding and winch repair, assistance in completing permit applications, identifying migratory shark species, training in marine electronics, and the use of fuel-efficient trawl door designs. In 2012, 53 commercial fishermen received hands-on technical training at the MAREX Brunswick facility.

Back to Goals

17287 - Sea Grant research changes shellfish regulation to allow for increased production
Relevance : The size limit for commercial harvest of oysters in Georgia historically has been set at three inches, in line with other oyster growing regions, to insure that oysters reach sexual maturity before harvest. This is an attempt to restore beds that were overharvested in the early twentieth century. Local shellfish growers maintained that Georgia oysters reproduced well before reaching three inches and that the three-inch limit curtailed their ability to capitalize on the "cocktail" oyster market, that valued smaller, more delicate, oysters.

Response: Georgia Sea Grant funded research to determine the age at which local oysters reproduce and to identify constraints on recruitment. Research shows that, unlike oysters in the northern US, Georgia oysters grow year round and reach sexual maturity within three months, with spat settling in the spring, maturing by summer and spawning through October. This cycle can take years in colder climates.

Result: In 2012, as a result of Georgia Sea Grant research, the Georgia DNR reduced the minimum size limit for commercial oyster harvest from three to two inches. This change removes a hurdle for Georgia shellfish growers and enables a significant increase in the production of oysters for the single shell, "cocktail" market. (SSSS#1 - 1 mariculture industry)

Back to Goals

15951 - Sea Grant perfects device to capture spat and grow out oysters
Georgia Sea Grant's extension partner UGA MAREX continues to refine techniques for restoring oysters as a significant fishery. Past work has determined the optimum tidal depth at which to grow spat into saleable single oysters. In 2011, MAREX took advantage of funding from a Sea Grant's national aquaculture initiative to perfect "huts" that will both capture spat and then be moved to the optimum location for grow out. The work tested types of huts made of various materials including wire, rope, concrete imbedded burlap and PVC for quantity of spat capture and size and quality of oyster at grow out. A collapsible A-frame of PVC was determined to be the most effective method. All work was done in conjunction with Whitehouse Seafood of Kingsland, GA, which plans on employing the huts next season.

Back to Goals

15542 - Trade Adjustment Assistance for Impacted Fishery
In 2011, Georgia Sea Grant's extension partner, UGA MAREX, worked with commercial shrimpers participating in the federal Trade Adjustment Assistance program (TAA), which helps farmers and fishermen sharpen their business skills to compete with imported products. Participants were required to take 12 hours of specialized training at MAREX or online. Many participants were husband and wife teams who learned to use the internet for the first time as they worked with MAREX staff to complete the program requirements. Courses about cutting costs, developing marketing plans, finding ways to diversify, connecting with consumers, and navigating regulations all helped shrimpers improve their businesses. After completing the coursework, shrimpers were paired with personal business experts to help them develop individualized business plans. MAREX has helped 122 of 180 eligible Georgia participants complete the full program requirements, making each one eligible to receive $12,000 to improve his or her business.

Back to Goals

15541 - Technical Training for Commercial Fishermen
Sea Grant/MAREX extension agents worked one-on-one with 313 commercial shrimpers to assist them with conservation regulations including proper installation of TEDs and BRDs, completing permit applications, and identifying migratory shark species. Staff also provided training in marine electronics and fuel-efficient trawl door designs. An additional 42 commercial fishermen received hands-on technical training workshops including welding demonstrations and winch repair trainings. (SSSS#2 = 313 fishermen)

Back to Goals

13966 - DEVELOPMENT OF A RESEARCH PLAN FOR THE SOUTH ATLANTIC REGION
SARRP #1:RELEVANCE - Research in the South Atlantic region is funded and conducted dozens of universities, institutes and federal and state programs and agencies. There is only sporadic coordination and prioritization of these efforts.
RESPONSE The Georgia-Sea-Grant-funded Georgia Coastal Research Council took the lead in securing and managing a NOAA grant to create the South Atlantic Regional Research Plan (SARRP). The region's Sea Grant programs are partners in the project. The intent of the plan is to identify, prioritize and coordinate research and research funding in the South Atlantic and to better orchestrate the efforts of agencies working in the region. Created with extensive, region-wide stakeholder input, the plan was released in April 2010. The plan was structured to mirror the focus areas of the Governors' South Atlantic Alliance (GSAA) to facilitate incorporation into that organization's action plan. The GSAA is a state and federal partnership to manage and protect the regions coastal resources.
RESULTS The GSAA's Issue Area Technical Teams were issued the SARRP plan as official guidance and in some cases were directed in their deliberations by SARRP team members. SARRP had a direct,

traceable influence on the formation of the GSAA's action and implementation plans. (HCE#1=4 communities, 1 state agency)

RECAP: Sea Grant planning effort insures that stakeholder concerns inform Governors plan for South Atlantic coast Back to Goals

6791 - Communications
COMM #4: In response to the Gulf of Mexico Deepwater Horizon oil spill, Georgia Sea Grant director Dr. Charles Hopkinson worked with university-based oceanographic experts to create a report advising state government on the current forms of oil released from the wellhead. The report, titled Outcome/Guidance from Georgia Sea Grant Program: Current Status of BP Oil Spill, budgeted released BP oil into categories of burned, skimmed, evaporated, degraded and remaining, as of August 17, 2010. Georgia Sea Grant created visual charts describing the report's conclusions and disseminated both the report and graphics to the Georgia Emergency Management Agency (GEMA), the Department of Natural Resources (DNR), and the Senate Subcommittee on Natural Resources, as well as coastal officials, local governments, NGOs, and community leaders. Working with the University of Georgia Office of Public Affairs, Georgia Sea Grant also released the report to media, which resulted in over 1,000 articles being published on Georgia Sea Grant's efforts to understand and analyze the oil spill (http://www.npr.org/templates/story/story.php?storyId=129306358).
(HRCC1=6 counties, 9 communities)

RECAP: Georgia Sea Grant report reaches local to international audiences Back to Goals

6679 - Overcoming Constraints to the Development of a Sustainable Eastern Oyster, Crassostrea virginica Aquaculture Industry in Georgia
(Power #1)RELEVANCE: In 1908, Georgia led the nation in oyster landings but by mid-20th Century historic oyster beds had been destroyed by over harvesting. The remaining silt and mud bottoms in the state's intertidal waters left little for oyster larvae, called spat, to attach to and grow. Whenever a hard substrate was found, abundant spat attached to earlier-colonizing oysters leading to densely clumped clusters of oysters not fit for premium, half-shell trade.

RESPONSE: Georgia Sea Grant funded a study designed to create a commercially-viable method of growing single (i.e., non-clumped) oysters that would be marketable to restaurants and individuals who desired to eat them on the half-shell. The study determined the optimum material on which to capture and grow spat to a size useful for culturing and the optimal density of oysters in the grow-out cages. The key finding was that oysters grown at .5 meters below mean low tide, the limit of their natural range, produced large, marketable, single oysters, un-fouled by excess spat, in 18 months.

RESULT: Three oyster-growing businesses began in 2010 specifically to employ the method devised by Georgia Sea Grant research. All three businesses began with small pilot projects to test the concept, initially hiring a total of 8.5 employees. All three report a highly successful trial and plans to increase investment and hiring in the coming year. One start-up reported $40,000 revenue from his small test project. Dick Roberts of Whitehouse Seafood in Kingsland, GA anticipate $1M in revenue for his new oyster operation within five years. (SSSS2/NPM4=17, NPM1=3 businesses/9 jobs, NPM2=1 tools used)

RECAP: Georgia Sea Grant research launches half-shell oyster industry in Georgia Back to Goals

6676 - GEORGIA COASTAL RESEARCH COUNCIL
ALBER #1: The Georgia Sea Grant-funded Georgia Coastal Research Council (GCRC) is a forum for the integration of coastal science and management in the State of Georgia. It provides mechanisms for improved scientific exchange and promotes the incorporation of best-available scientific information into resource management. The GCRC serves to integrate, translate, and disseminate research findings and technological discoveries [to] make wise management decisions, a strategy identified to promote sound science in the National Sea Grant Strategic Plan. This year, the GCRC recruited 10 new members raising the number of affiliated scientists to 159. Its website, containing monthly information about research funding, research and resource management job vacancies, conferences, new tools and resources and documents and projects of interest, logged 18,000 visitors who downloaded 50 documents.
RECAP: Georgia Sea Grant-funded organization integrates coastal science and management
Back to Goals

6608 - Administration
ADMIN#2: RELEVANCE - During the Summer of 2010, the potential effects of the Deep Water Horizon spill (DWH) on the South Atlantic coast were of great concern to Georgia Sea Grant (GSG) and other regional Sea Grant programs.

RESPONSE - In partnership with the other three South Atlantic (SA) states (FL, SC & NC), GSG organized two scientific workshops to characterize the threat: the first gathered regional physical oceanographers at the Skidaway Institute of Oceanography in Savannah to assess the risk of material from the spill becoming entrained in the Gulf Stream and entering in-shore waters along the SA; and the second, gathered bio and geo-chemists in Jacksonville to assess what state the oil would be in if and when it arrived. GSG administration led these efforts along oversaw the issue of white papers and shorter, citizen-oriented reports from each workshop. These reports were distributed to coastal communities, legislators, managers and other scientists in the South Atlantic region.

RESULTS - In August 2010, Sea Grant Director Chuck Hopkinson testified before the Georgia State Senate sub-committee on natural resources regarding the state's vulnerability to oil from the DHW spill. GSG was subsequently called upon by GA DNR to develop a monitoring plan for the state coastal waters. The plan was developed in a meeting of regional scientists at the Skidaway Institute of Oceanography.

RECAP: Georgia Sea Grant Organizes Regional Scientific Assessments of DWH Oil Spill Risk

Back to Goals

6607 - Marine Advisory

MAREX#17: Elementary students from Camden County 4H were invited to the Brunswick Station from May 4 to May 6, 2010. Over the course of three days, a total of 290 elementary school children visited an outdoor aquarium featuring blue crabs, shrimp, butterfly rays, puffer fish and more. They learned about marine life through hands-on experiences with local Atlantic stingrays, horseshoe crabs, flounder, whelks, hermit crabs, and spotted hake in touch tanks. Children were invited to explore our 72' shrimp boat, the R/V Georgia Bulldog, and to interview the crew about their experiences working on the boat. Finally, in groups of 30, children saw a formal PowerPoint presentation about local and global impacts of marine debris and played an interactive trivia game. Winners brought home marine debris themed re-usable grocery bags designed by artist Ed Hose. (SCD5=290)

RECAP: Georgia Sea Grant increases ocean literacy in Camden County Back to Goals

6605 - Marine Advisory

MAREX#15: RELEVANCE Georgia's oyster reefs historically offered sustenance, commerce, water-quality benefits, and erosion control in the state's coastal waters. Unfortunately, sedimentation and overfishing have reduced the reefs of a small fraction of their former extent.
RESPONSE - Georgia Sea Grant Marine Extension's G.E.O.R.G.I.A. program collects oyster shells from restaurants and oyster roasts, bags the shells and uses them to restore depleted reefs.
RESULTS - 1.5 acres were restored in 7 communities. (HCE2=1.5 acres, HCE3=7 communities, NPM7=7)

RECAP: Generating Enhanced Oyster Reefs in Georgias Inshore Areas (G.E.O.R.G.I.A) Back to Goals

6604 - Marine Advisory

MAREX#14: Georgia Sea Grant gave 40 Glynn Middle School students an experience they'll never forget in an Introduction of Fishing course that took them to Jekyll Island and taught them the right way to fish with a rod and reel and with a seine. The students got plenty of hands-on experience with both methods. The course emphasized responsible harvesting and seafood safety and put the students on sustainable course as future fishermen. (SSSS3=40; NPM5=40)

RECAP: Students learn by doing in Georgia Sea Grant Introduction to Fishing Back to Goals

6603 - Marine Advisory

MAREX#13: Georgia Sea Grant Marine Advisory Service responded to 108 requests for terrapin excluders. Georgia Sea Grant developed the terrapin excluder to prevent diamondback terrapins from entering crab traps without reducing recreational crab catch. (SSSS3=108, NPM5=108)

RECAP: Georgia Sea Grant device prevents terrapins from being caught in crab traps Back to Goals

6599 - Marine Advisory

MAREX#9: Georgia Sea Grant seafood specialist Tori Stivers collaborated with Sandy Shepherd, Seafood Safety Officer of the Georgia Department of Agriculture, to offer a three-hour training course on Vibrio vulnificus for shellfish inspectors. 40 inspectors from Dekalb and Cobb counties and Macon and Atlanta were certified. (SSSS2=40; NPM5=40)

RECAP: Georgia Sea Grant offers course in oyster disease for seafood inspectors Back to Goals

6595 - Marine Advisory

MAREX#7: Georgia Sea Grant's Marine Advisory Service tested crabs in the area of the LCP superfund site in Brunswick and found high concentrations of the PCB Aroclor 1268. Studies determined that PCB contamination concentrates in the hepatopancreas of the crab, not the meat. Researchers then developed a procedure to extract the hepatopancreas from crabs and make them safe for consumption. The Marine Advisory Service then trained 10 cooperative extension diet and nutrition agents to pass on this information. They also did a hands-on training session at the local high school where 100 students learned how to prepare crabs safely. They prepared crabs themselves and learned how to pass the technique on to family members. (SSSS3=300, NPM5=300)

RECAP: Georgia Sea Grant develops technique to make crabs in contaminated area safe to eat

Back to Goals

6593 - Marine Advisory

MAREX#6: Georgia Sea Grant's Marine Advisory Service tested seafood for PCB contamination in a control site near Darien and in Glynn County near the LCP superfund site. The tests results led the Georgia DNR to post warnings banning fishing near the LCP site. (SSSS6-2 counties)

RECAP: Georgia Sea Grant testing of contaminant levels in seafood leads to posting of warnings near superfund site Back to Goals

Back to Top

Program Performance Measures (2010 - 2013)

Program Performance Measure	Program Plan Target (2010-2013)	Reported	Program Comments
Number of counties where SG / Marex will test contaminant levels in seafood caught by GA anglers	2	2	2010 - SSSS#6 (xref 6593)
Number of counties with the relative incidence and severity of Vibrio contamination defined	6	6	2010 - SSSS#7 (xref 6600)
Number of fishermen, resource managers and seafood businesses (harvesters, aquaculturists, processors and recreational fishermen) who adopt and implement responsible harvesting and processing techniques and practices.	500	670	2010 - SSSS#2 (xref 6599, 6606, 6679) 2011 - SSSS#2 (xref:15541)
Number of GA HAACP trainers who will be certified to teach new HAACP techniques	2	2	2010 - SSSS#5 (xref 6601)
Number of mariculture industries enabled as a result of an improved testing plan for shellfish waters developed from a collaboration between GASG and GA DNR	2	1	2010 - SSSS#1 2012 - This is performance measure SSS#1. Explanation of how this measure is achieved may be found by referring to Impact(s) #17287.
Number of producers, distributors and consumers of seafood who modify their practices using knowledge gained in fishery sustainability, seafood safety and the health benefits of seafood.	1,000	3,624	2010 - SSSS#3 (xref 6595, 6603, 6604, 6679) 2011 - SSSS#3 (xref:15539) 2013 - For explanation of how these numbers were achieved, see the following impacts (listed by impact #): #19059 (1691) #19061 (2) #19062 (39)
Number of seafood producers and distributors trained in new HAACP regulations	200	206	2010 - SSSS#4 (xref 6602) 2011 - SSSS#4 (xref:15545) 2013 - For explanation of how these numbers were achieved, see the following impacts (listed by impact #): #19062 (39) #17418 (42)

Back to Top

Program Objectives (2010 - 2013)

Program Objective	Achieved (yes/no)	Program Comments
By 2013, 4 HAACP training workshops will be held in Georgia	Yes	2012 - The final of the 4 projected HACCP training workshops was delivered by MAREX/SG staff in 2012. See Impact 17418. 2013 - 2012: The final of the 4 projected HACCP training workshops was delivered by MAREX/SG staff in 2012. See Impact 17418.
By 2013, GA SG / Marex will collaborate with the US-FDA to develop histamine prevention training materials for seafood harvesters and processors	No	

By 2013, GA SG / Marex will train 2 GA HAACP trainers who will be certified in new HAACP techniques	Yes	2013 - See impact #6601. 2 MAREX staff certified to teach new HACCP techniques.
By 2013, one single-shell oyster mariculture operation is established with assistance from GA SG and Marex	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, one state agency develops an improved testing plan for shellfish waters	Yes	2012 - see impact #17287 2013 - 2012: see impact #17287
By 2013, SG / Marex will pilot test "Seafood Prep for Dummies", a hands-on cooking class about preparing local species	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, SG / Marex will test contaminant levels in seafood caught by GA anglers in two coastal counties	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, SG web page on the benefits and seasonal availability of local seafood has 100,000 hits annually	No	
By 2013, SG/ Marex will create a poster and brochure about PCBs in blue crabs for distribution to local seafood markets and boat ramps	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, SG/ Marex will install two exhibits across the state highlighting responsible and sustainable fishing methods, including the use of TEDs and BRDs	Yes	2012 - The Research Vessel R/V Bulldog brought exhibits highlighting responsible and sustainable fishing methods to several locations in the state. See Accomplishment #17419. 2013 - 2012: The Research Vessel R/V Bulldog brought exhibits highlighting responsible and sustainable fishing methods to several locations in the state. See Accomplishment #17419.
By 2013, SG/ Marex will pilot an "Introduction to Fishing" program designed to expose disadvantaged urban children to fishing and coastal ecology	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, SG/Marex will conduct 4 fishing clinics designed to educate first-time boat owners or operators in GA coastal waters	No	
By 2013, SG/Marex will provide crab cleaning demonstrations at various venues at least 3 times annually	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, the effectiveness educational materials in modifying seafood consumption patterns of high-risk consumers is determined in 6 coastal counties	No	
By 2013, the relative incidence and severity of Vibrio contamination is defined for 6 coastal counties in Georgia	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods
By 2013, two publications are distributed to 6 coastal counties that discuss access issues	Yes	2012 - Achieved in previous periods 2013 - 2012: Achieved in previous periods