NEW YORK SEA GRANT PRP REPORT INTRODUCTION

This Summary Report provides the context for assessing 80 program impacts and accomplishments that reflect New York Sea Grant's 2010-2013 Strategic Plan. Founded in 1970, NYSG is a collaboration of the State University of New York (SUNY) and Cornell University. Its core research, education and extension efforts draw upon the resources and capabilities of the broad array of the state's public and private institutions of higher learning. The main administrative office (staff of 7) is on a SUNY campus--Stony Brook University; the NYSG Extension Program (staff of 17) is administered out of Cornell University. A Board of Governors, comprised mainly of senior administrators from SUNY and Cornell, sets fundamental operating policies for NYSG and aids in strategic planning as does an agency/stakeholder group, the Program Advisory Council. Each NYSG Extension professional has a subject area focus and a program advisory network to help develop individual work plans.

New York's Diverse Coasts and Unique Challenges

About 17 million New Yorkers live in counties along the state's 3400 miles of shoreline. NY is the only state with significant shorelines on the Great Lakes (Lakes Erie and Ontario) and marine coasts, including the Hudson River, which is tidal to the Troy Dam north of Albany. Land use, demographics, urbanization, socioeconomic and cultural issues as well as salient coastal issues are unique to each geopolitical coast. Reflecting such diversity is a challenge as NYSG assembles its program, especially as NY is a strong "home-rule" state. Local governments from urban New York City to rural towns that dot the lakeshores have great influence on how coastal issues are addressed. To influence how coastal resources are managed and how coastal communities interact with these resources requires strong working relationships with each level of government. NYSG has these relationships.

Five Fundamental Tenets of NYSG's Approach to Achieving Its Mission

Identify the top concerns and play to your strengths: NYSG must strategically target its resources. Identify areas that are important to the State, for which there exist capable University-based research and outreach resources which may help NYSG leverage its funds.

Ambitiously set goals, but do not grossly overreach: Within a focus area, specify goals, objectives and outcomes that can produce clear and tangible improvements in the measurable metrics associated with the issue. Know that Sea Grant may need to catalyze others to achieve it.

Network and seek collaborations and partnerships: Collaborating leads to new insights and provides opportunities to grow. Sea Grant has an inherent degree of flexibility not shared by others; NYSG uses this to become a creative catalyst in designing/managing partnerships.

Integrate Research, Extension and Communications as fully and as early as possible: Sea Grant uniquely offers stakeholders a fully integrated approach to coastal issues and problems--a terrific strength. Resources brought into play early assures greater complementarity between them.

Remain Nimble: Opportunity may knock. The planning process is not omniscient. Retain capacity to respond in a creative and timely manner.

SAFE, SUSTAINABLE NEW YORK SEAFOOD SUPPLY

In its early years, NYSG, indeed the entire national program, was often termed, a bit derisively, "Fish Grant." While those days are long gone, working towards assuring sustainable recreational and commercial fisheries in New York State and the region remains a significant priority for NYSG.

Over the years, the term "sustainable' as applied to marine fisheries has come to include not just sustainable fishing practices in a limited sense, but assuring the existence of sustainable fishing communities in the broader sense, places where the history of fishing is real, where fishermen and fishing businesses, and ancillary businesses and industries that support them, can thrive, where the community is socially vibrant and "healthy" and fishing is a part of the community's identity.

In the Great Lakes, many recreational species are stocked. "Sustainable" there refers to ensuring a healthy, balanced stock of all species and thriving local communities which depend on the recreation and tourism activity.

During the 2010-2013 period, NYSG's Strategic Plan defined two aspects of safe, sustainable fisheries to guide the program's investments in this arena: securing sustainable coastal stocks of finfish and shellfish and assuring safe and high quality seafood and seafood products from profitable fishing and seafood businesses. In truth, each of these concerns has been reflected in NYSG's program for decades.

This section highlights some of NYSG's salient and most impactful activities and programs in the Safe, Sustainable Seafood Supply (SSS) during the report period. The text provides how NYSG is engaged in the issue, how aspects of the issue help shape and drive the nature and objectives of our efforts, what have been the results and who has benefited from these results. Specific example programs and activities are mentioned, but not described in detail. Rather the reader is referred to the numbered entries for the impacts and accomplishments in the *NYSG 2010-2013 PIER Safe Sustainable Seafood Supply Focus Area Report* (e.g., **SSS19030)** for a more complete description.

Securing Sustainable Stocks of Finfish and Shellfish

Hard clam stocks in most of New York's historically productive growing areas collapsed due to overharvest in the 1970s and 1980s. Attempts to restore the hard clam to these areas have thus far failed. A large population of clams remains in the uncertified waters of New York Harbor's Raritan Bay. The State Department of Environmental Conservation (DEC) oversees an annual program by which these clams are dug from Raritan Bay, transferred to and planted on certified grounds in eastern Long Island and made available to harvest after 21 days (depuration time).

Since the late 1980s this relay program has represented the bulk of the wild clams harvested in New York. In 2002, clams in Raritan Bay began to die *en masse*, apparent victims of a poorly described parasite (QPX, Quahog Parasite Unknown) that had recently been reported in New England.

Fearful of moving this disease agent to the clean waters of eastern Long Island, DEC shut down the relay program. NYSG immediately initiated research on the new disease at the newly-established Marine Animal Disease Laboratory (MADL) at Stony Brook University, which also began routine monitoring of QPX in clams in both Raritan Bay and eastern Long Island.

Hard clam infected with QPX

This began a sustained relationship between NYSG, MADL and DEC that eventually led to the re-opening of the relay program after 18 months, and the development of a number of protective measures that shippers and handlers of these clams can take to minimize the severity and duration of any infection that might pass unnoticed in transplanted clams **(SSS19030)**.

Researchers and Sea Grant Scholars play important roles at Stony Brook's MADL

Monitoring by MADL scientists has documented a significant decline in the presence of QPX in New York waters over the past decade. In the instance of the QPX outbreak, NYSG's role was more than just supporting research and monitoring. In 2000, NYSG's Director worked closely with DEC and Stony Brook University to craft a successful proposal to the NYS Legislature to establish the MADL at Stony Brook, largely in response to the catastrophic decline in the lobster population of Long Island Sound that began in 1998, which displayed aspects of a disease epizootic. When QPX struck a bit later, the MADL was there and ready.

Commercial fishing is statistically the most dangerous business in the United States, recently inching out coal mining for this dubious distinction. The Magnuson-Stevens Fishery Conservation and Management Act, as amended, requires the development of fishery regulations that do not put commercial fishermen at undue risk, and requires that fishermen attend mandatory safety-at-sea training. However, the drift of many fishing regulations (i.e., days at sea limits, very small trip limits, "catch it or lose it" catch quota allocations) is, in fact, to impel fishermen to fish in dangerous weather or sea conditions.

Beginning in 2010, NYSG Extension staff initiated a series of safety-at-sea workshops that have been widely attended by New York commercial fishermen **(SSS16960)**. These workshops were developed in cooperation with the US Coast Guard, the New York Center for Agricultural Medicine and Health, and several other organizations. More than 100 fishermen have attended these workshops.

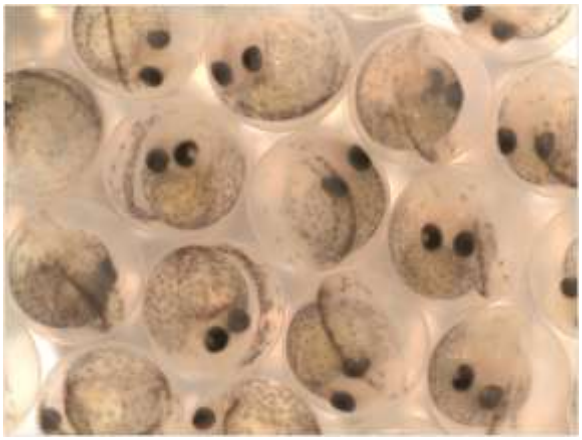
The correct way to enter the water wearing an immersion suit was taught at the Safety-at-Sea Workshops.

The NYSG staff person who initiated this program has been recognized by both the US Coast Guard and the Northeast Regional Sea Grant Consortium.

The emergence of the viral hemorrhagic septicemia virus (VHSV) in the Great Lakes Basin has been a serious issue for Great Lakes fisheries, threatening mortalities in economically significant fish species, and by extension, economic losses to commercial aquaculture and bait dealers. Although the virus has been noted since the 1930s in marine waters, the closed system of the Great Lakes makes fresh water species more vulnerable.

For nearly two decades, NYSG has supported seminal research by Cornell fish pathologists into finding how the virus is transmitted and how to curb its spread. In a recent project (SSS**18127),** researchers found that high concentrations of iodine treatment effectively eliminates viable VHSV from walleye eggs.

However, the common aquaculture practice of using tannic acid to keep walleye eggs from clumping together curtails iodine's disinfecting ability. Through meetings and workshops conducted by the researchers and NYSG extension, hatchery operators were educated about how including a tannic acid rinsing step would reduce potential transmission of VHSV and greatly improve biosafety protocols and decontamination methods.



A protocol for disinfecting walleye eggs developed by NYSG research can reduce potential transmission of VHS virus.

Taking a census of fish populations to mark trends in abundance, location and various population or life history parameters is an essential part of 21st Century fisheries management on the marine and Great Lakes coasts. Most of the science of such representative sampling and on sampling gear design, effectiveness and efficiency has been done on the marine coast. However, these issues are just as important in the Great Lakes.

NYSG developed and organized the first series of workshops for Great Lakes fishery professionals on the design, operation and maintenance of benthic trawl gears used in fisheries assessments **(SSS18375)**.

NYSG worked closely in these programs with scientists and gear designers from Memorial University of Newfoundland (MUN) whose Marine Institute is a leading center of commercial fishing gear design and testing. These workshops will continue. Several of the state and provincial agencies attending the initial workshops have entered into independent relationship with MUN to develop custom-designed trawls to meet their specific fishery program needs.

Strides in benthic trawling gear (above) have been made by designers from the Memorial University of Newfoundland and shared at Sea Grant-sponsored workshops attended by fishery professionals from the Great Lakes and beyond.

Sturgeon, with their diamond pattern of bony scutes, unique snout and barbels, have been an iconic fish species for centuries.

The Atlantic Sturgeon (*Acipenser oxyrinchus*), once abundant along the eastern seaboard is no longer. In 1998 the Atlantic States Marine Fisheries Commission adopted a 40-year fishing moratorium, and the Atlantic sturgeon became a “species of concern.” However, since 2012, certain segments of the Atlantic Sturgeon were federally listed as endangered.

That listing came about, in part, through the ongoing efforts of a NYSG researcher who can determine a sturgeon’s river of origin by using merely a small clip from its fin (**SSS15698).** Two different kinds of DNA markers (mitochondrial and nuclear) help determine the origin of the fish— whether from the Inner Bay of Fundy, North Carolina's Outer Banks or breeding grounds in between. Samples were also collected as bycatch from NOAA's Observer Program. The project identified distinct population segments or DPS. It was then determined that four of the five DPS of Atlantic sturgeon should be listed as endangered.

Ensuring Seafood Safety and Business Profitability

From the mid-1970s through the late 1980s, NYSG had a major program focus on Seafood Technology and New Product development, conducted mainly at several departments of Cornell University's College of Agriculture and Life Sciences. That program area came and went but NYSG continues to maintain close ties with New York's seafood industry.

In the report period, NYSG continued and expanded its renowned training for seafood industry employees in the Seafood Hazard Analysis Critical Control Point (HACCP) product control system **(SSS18377)**. This course of instruction, offered over the Internet and mandated by Federal and State authorities for all employees in the seafood industry, has reached nearly 8000 individuals since it was initiated by NYSG in 2000. More than just continuing to offer the course during the report period, NYSG Extension staff took steps to survey and document the effects of this training on the retention and creation of new seafood businesses across the United States. The originator of this course is in phased retirement from Cornell University and the NYSG Extension Program. His successor has very recently started with NYSG and will continue to strengthen and improve this very high visibility and impactful program.

The best efforts of HACCP notwithstanding, seafood contamination issues remain a pressing problem that at times requires going beyond the HACCP protocols to counteract. In 2010, after a decade of ground-breaking research, NYSG funded further research at Cornell University on the presence of the bacterium *Listeria monocytogenes* as a contaminant in many Ready-To-Eat seafood items, e.g., smoked salmon **(SSS18131)**. Severe *Listeria* infections in seafood are rare, but they can be deadly when they do occur. The researchers identified a number of bacterial growth inhibitors that, when used in combination, were successful in keeping *Listeria* contamination to a minimum.

Components of HACCP training

This work is being furthered with additional major research support from the US Department of Agriculture. Manufacturers of smoked seafood products in Brooklyn have adopted the procedures for treating their products with *Listeria* growth inhibitors to protect the health of customers.

Related to our commitment to healthy seafood, NYSG worked with partners across the country to develop a website for consumers**.** The Seafood Health Facts Website at http://seafoodhealthfacts.org provides consumers and health care providers with information on the risks and benefits of the seafood products **(SSS16958).** The award-winning site has been accessed by over 60,000 individuals helping them to make informed decisions about their seafood consumption.

PIER PRP Program Focus Area Report

New York Sea Grant

Safe and Sustainable Seafood Supply

Program Focus Area: SAFE AND SUSTAINABLE NEW YORK SEAFOOD SUPPLY

Program Goals

1. Sustainable coastal fisheries for New York commercial and recreational fishers.
2. high quality, seafood products from profitable New York seafood businesses.

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Full Text of Impacts
Program Performance Measures
Objectives

Impacts and Accomplishments toward Program Goals

1. **Program Goal: Sustainable coastal fisheries for New York commercial and recreational fishers.**
   Impact(s)
   - 18991 - Acoustics Unpacked: Analysis of the Combined Error Structure in Acoustic Surveys in the Great Lakes
   - 18376 - Helping to Diversify Marketing in New York's Family-Owned Fishing Businesses
   - 18127 - Sea Grant Research Helps in the Fight Against a Serious Fish Disease
   - 16949 - Trout and Salmon Identification Guide
   - 15698 - Vulnerability of Hudson River Atlantic Sturgeon to Coastal Bycatches
   - 15603 - Award-Winning Trawl Design Workshop Significant for Great Lakes Fisheries
   - 6649 - Preventing and Containing VHS in Aquaculture Operations
   - 6646 - I FISH NY: Sharing Fishing Facts & Fun in NYC and on Long Island
   - 6561 - Development and Application of a Quantitative PCR Technique to Establish QPX Dynamics in Clams and in the Environment

   Accomplishment(s)
   - 18380 - Promoting Best Practices to Minimize Post-Release Fish Mortality
   - 18378 - New York Sea Grant Improving Angler Stewardship
   - 18375 - UPDATE: New York Sea Grant Trawl Design Workshops Enhance Fisheries Management & Commercial Trawling

2. **Program Goal: high quality, seafood products from profitable New York seafood businesses.**
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   - 18377 - New York Sea Grant Training Courses Enhance Seafood Safety
   - 18376 - Helping to Diversify Marketing in New York's Family-Owned Fishing Businesses
   - 18131 - Sea Grant Research Helps in the Fight Against Listeria
   - 15689 - The Effects of Nutrients on Bloom Dynamics and Toxicity of Alexandrium, the Cause of Paralytic Shellfish Poisoning (PSP)

   Accomplishment(s)
   - 19411 - Mercury and Nutrients in Commercial Seafood: Local and National Trends and Mechanisms
   - 19030 - Development of mitigation strategies to reduce the impact of QPX disease on hard clam transplant fishery
   - 16960 - New York Sea Grant Helps To Promote Safety in the Commercial Fishing Fleet
   - 16958 - Seafood Health Facts Website Helps Consumers Evaluate Seafoodâ€™s Benefits and Risks
   - 6867 - Environmental Factors Affecting QPX Disease Development (CR)

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Full Text of Impacts and Accomplishments

19411 - Mercury and Nutrients in Commercial Seafood: Local and National Trends and Mechanisms

RELEVANCE

Seafood is a popular and healthful choice for people throughout the world. However many people are concerned about the risk from exposure to mercury when eating seafood. Mercury exposure especially in the form known as methylmercury is a known neurotoxicant. However risk varies based on the amount and type of seafood eaten and degree of sensitivity of the individual. Thus the extent to which

different seafood consumption patterns lead to elevated blood mercury levels is not well documented and risk at low levels of exposure is uncertain among the adult population.

RESPONSE
Sea Grant funded a project by a team led by Dr. Nicholas Fisher of Stony Brook University to examine the data used to assess the risks of exposure to mercury in commercial seafood. The research team collected and analyzed the data on mercury levels in fish from numerous peer-reviewed scientific publications and government agency reports.

RESULTS
The results of the work were used to develop a large-scale database of mercury concentrations of US domestic and imported seafood items. The database was published as a publicly accessible, online database for use by other scientists, public health managers and consumer information groups. The database is publicly available through The Knowledge Network for Biocomplexity repository developed by the National Science Foundation. Based on analysis done by the research team results suggest that avid seafood consumers are exposed to different concentrations of mercury and nutrients than the background U.S. population and consumption of specific seafood types influences the level of exposure to mercury and seafood nutrients. These findings advance understanding of the risk-benefits of consuming specific seafood types provide a framework to develop future dietary recommendations. Currently, the Seafood Mercury Database serves as the basis for consumption advice developed by several state agencies in the U.S. (WA, OR, NJ, CT MN and NYC), and other organizations including the Environmental Defense Fund, Monterey Bay Aquarium Seafood Guide, Great Lakes Consortium, the National Geographic Society and the Blue Ocean Institute.
RECAP: Sea Grant research provides a tool for researchers, public health officials and consumer groups to improve guidelines for limiting exposure to mercury when consuming seafood. Back to Goals

19030 - Development of mitigation strategies to reduce the impact of QPX disease on hard clam transplant fishery
RELEVANCE
The Raritan Bay to Peconic Bay hard clam transplant fishery is a multi-million dollar industry that supported nearly 200 direct jobs up till 2002. The fishery was suspended in 2002 in response to the first epizootic QPX disease in New York State. It now operates on a limited scale because of ongoing disease activity at the source population, causing continuous and considerable economic losses to the industry.

RESPONSE
Earlier Sea Grant studies demonstrated the significant impact of prevailing environmental factors on QPX parasite survival, disease development and clam mortality. Specifically, temperature conditions that significantly enhance clam resistance to the infection and facilitate parasite killing and clam healing was identified. Sea Grant funded this project to test the hypothesis that exposure of clams to brief heat shock during transplant operations would promote healing and recovery from the disease. The project involved a series of field experiments assessing the impact of transplant operations on QPX disease dynamics. These field studies were complemented by a series of laboratory investigations designed to evaluate the effect of heat treatments and air exposure on QPX disease progress and associated clam mortality.

RESULTS
The results demonstrated a decrease in QPX prevalence in clams exposed to a mild heat shock during transport. Warmer water temperatures in the Peconic Estuary also likely contribute to the improvement of clam health. Experiments demonstrated that the most effective and ideal heat shock treatment is exposure to 27 C for two hours. These results show that transplant and transport operations can be modified to improve healing of hard clams exposed to QPX. These results will be helpful to shellfish managers and clam aquaculturists in enhancing healing in hard clams.
RECAP: Sea Grant research provides practical information to the hard clam shellfish industry in New York that improves practices to minimize the impacts of QPX disease. Back to Goals

18991 - Acoustics Unpacked: Analysis of the Combined Error Structure in Acoustic Surveys in the Great Lakes
RELEVANCE
Recreational fishing in the Great Lakes provides important economic benefits to local coastal communities as well as great recreational opportunities to residents and visitors alike. Changes to the Great Lakes ecosystems such as invasive species, pollution, habitat changes among others are a challenge to fisheries managers trying to promote robust sustainable stocks of sport fish and their forage base. An important task to achieve this goal is regular sampling to estimate population levels and trends. Tools used include trawl surveys and acoustic surveys. Acoustic surveys use sonar to estimate fish populations by measuring the echoes from the animals. As the technology and techniques developed over the past few decades, differences in data collection and analysis made it difficult to compare results from different data sets and times. Uncertainties made it difficult to interpret research and survey results that are used for setting stocking and harvest levels. What was needed was a standard method that would reduce uncertainty, improve data collection, and comparisons between different surveys at different places and times.

RESPONSE
Over the course of three projects from the late 1990's, early 2000's and mid 2000's, a research team from Cornell University developed techniques, refinements, data, and methods that standardized the use of acoustic technology for conducting fisheries surveys. Data collected and analysis conducted provided information on the target strength (echoes) from mysids, alewife and rainbow smelt. This data along with improvements in data analysis, and refinements in survey methods led to reduced uncertainties in abundance estimates.

RESULTS
The results from this effort produced a standardized operating procedure (SOP) for conducting acoustic surveys for fisheries work. Initially this procedure was presented at conferences and in a published report. Eventually after feedback and refinements the SOP became a standard reference for the field published on a website (www.acousticsunpacked.org/) and as a chapter in the third edition of "Fisheries Techniques". Compared to the years before the SOP was developed and used the amount of uncertainty from acoustic survey data has been much reduced. The SOP has been adopted and used by researchers, state agencies the US Geological Survey and environmental consulting firms like Normandeau Associates. Information from the website such as target strength data, and guidelines for survey design, and data analysis have reduced the time and effort needed to design and conduct acoustic surveys. Because of this SOP it is now easier to compare surveys across the Great Lakes and share information. The SOP is gradually becoming a standard beyond the Great Lakes with the development of standard operating procedures for freshwater acoustics in Europe and in the marine environment. The development of the SOP has also led to improvements of the data analysis software used in acoustic surveys.
Due to the reduction in bias and uncertainty in calculating population abundances there is greater confidence in making stocking decisions. For example in Lake Michigan managers and stakeholders where able to come to an agreement to reduce chinook stocking levels. In Lake Erie acoustic survey data provided support for maintaining walleye stocking levels.
Experience from the work to develop the SOP contributed to a New York Sea Grant (NYSG) organized independent, technical review of the Lake Ontario prey ?sh assessment program to evaluate prey ?sh sampling design, data analysis, and the validity of prey ?sh abundance indices in 2003. From this review US Geological Survey was able to reduce sampling effort by 10% and reduced standard errors around the fish abundance estimates by 15%.
RECAP: Sea Grant research led to the development of a standardized operating procedure for conducting acoustic fisheries surveys in the Great Lakes which led to surveys with less bias and uncertainty in fisheries survey data that improved confidence in management decisions and saved effort for scientists, managers and agencies. Back to Goals

18380 - Promoting Best Practices to Minimize Post-Release Fish Mortality
Relevance: In order to meet conservation targets that have been established in the recreational black sea bass fishery, managers introduced new regulations to reduce bag limits. Concerns have been expressed regarding an increase in post-release mortality that is attributed to barotruama as a direct result of this change in the regulation. Angling advocates expressed interest and support for adopting techniques from other regions to reduce post-release mortality. However, not every release technique is sanctioned by managers who expressed the need for anglers to be educated in correct handling and techniques to reduce barotrauma symptoms in post-releases.

Response: New York Sea Grant partnered with the NMFS NE Recreational Fisheries Office, and the NY DEC worked together to plan a strategy to educate the angling community about the underlying concerns a regarding the use of various resuscitating techniques.

Results: A train-the-trainers workshop was administered to educate 26 DEC staff and university faculty researchers about common devices and practices being used to treat barotruama symptoms to reduce post-release mortality. Participants learned about cutting edge research and interacted with a hands-on display of common devices being used to address this problem. A display and information booth was administered at the annual NY Sportfishing Federation Angler Expo to educate anglers and encourage use of these devices. New York Sea Grant will also use these training resources to educate anglers when they meet. As these conservation techniques become more widely accepted, black sea bass post-release survivors will ultimately increase in the recreational fishery and have a positive impact on stock assessment and NY will allow anglers to keep more fish.

RECAP: New York Sea Grant provides training on how to reduce post-release mortality of key fish species. Back to Goals

18378 - New York Sea Grant Improving Angler Stewardship
Relevance: The new Marine Recreational Information Program (MRIP) was approved in the 2010 Magnuson-Stevens Reauthorization to improve recreational fisheries data collection. Successful implementation of this initiative is dependent upon the cooperation of anglers. As a first step in its phased implementation, both federal and state government managers acknowledged the need to educate anglers about these changes as a means to increase stakeholder compliance and confidence in fisheries management decision making.

Response: New York Sea Grant partnered with MRIP and the DEC to coordinate a local advisory committee to plan several activities to increase MRIP's visibility in NY through angler education and

outreach.

Results: One workshop was administered to key representatives in the angling community, where 27 representatives in the recreational fishing industry learned about key reforms being implemented to collect recreational fisheries data, that will ultimately improve the accuracy in stock assessments. Recommendations from the workshop were used to publish two brochures that were distributed to 3000 anglers with cooperation from the bait and tackle retailers network. NY Sea Grant partnered with MRIP to host an outreach information booth during a 3-day outdoor marine angler expo organized by the NY Sportfishing Federation (the largest event on LI) for the first time, where at least 2000 anglers received information and asked questions about the changes in data collection.

RECAP: New York Sea Grant proves to be a leader in partnerships to improve fisheries management decision making. Back to Goals

18377 - New York Sea Grant Training Courses Enhance Seafood Safety
Relevance: Seafood is a traditional and important part of a New Yorker's diet, and the seafood industry is an important part of the state's economy contributing several billion dollars annually. Each seafood business is required by FDA and NY State to have a HACCP based food safety plan in place, and certain activities associated with this plan must be conducted by a trained individual. To remain competitive and prosperous, this industry must use science-based systems to maximize the safety and quality of its products.

Response: Through collaboration with businesses, regulatory agencies, the national Sea Grant network, and universities, New York Sea Grant's outreach to the seafood industry includes on-site and distance education training programs, workshops, newsletters, and direct technical assistance. NYSG developed and manages an Internet training course for the nation in collaboration with the National Seafood HACCP Alliance to help seafood businesses meet federal and state training requirements.

Results: Since 2002, NYSG has been a leader in education about Seafood Safety. In 2010, NYSG was one of four Sea Grant programs in the US that received a $600,000 grant from USDA's National Integrated Food Safety Initiative to update the national Seafood HACCP Alliance training program. The program, developed in 1995, incorporates new scientific findings and regulatory requirements for a national network of qualified trainers. The following year, NYSG was a key member of the national team that conducted six workshops in the US to explain the updated guidance to 450 individuals from seafood businesses and regulatory agencies.

In 2010, NYSG was a key member of the national team that conducted three train-the-trainer courses for 75 food safety professionals from across the US. In 2011, NYSG also helped re-qualify 125 trainers who conduct HACCP training in the US and helped conduct a train-the-trainer course in Qingdao, China, for 60 Chinese food safety inspectors who will conduct industry training to ensure that seafood producers that export to the US implement the latest HACCP-based food safety control strategies.

Since the inception of the program through 2013, over 7700 individuals have enrolled in the Internet-based Seafood HACCP Training course, enabling them to meet the training requirements of the US Food and Drug Administration's seafood Hazard Analysis Critical Control Point regulation. These individuals were from firms of all sizes that manufacture, process, handle, store or distribute seafood products including large national firms such as Wal-Mart, Sysco and Restaurant Depot as well as small and very small local seafood companies. Individuals from federal regulatory agencies like the US Food and Drug Administration and state regulatory agencies also took this training course. During this same time period, NYSG conducted nine in-person training workshops in New York on seafood safety requirements for more than 230 individuals from seafood firms and federal and state food safety inspectors.

Similarly, 513 individuals have completed the online Good Manufacturing Practices course on basic food safety practices for food processors, wholesalers and warehouses.

In 2012 and 2013, NYSG conducted survey data from participants in the internet HACCP training course to help understand the economic impacts associated with this training. From these surveys, 477 individuals reported that they will be involved in developing a HACCP food safety plan for either new seafood products their company will handle or a new process their company is developing to enable them to expand their business. There were 395 individuals who reported that they used the training to develop a HACCP food safety plan for a new business that they or others will be starting. In addition, 403 individuals reported that they will use the training to conduct inspections or regulatory reviews thus, they received this training to retain their jobs.

RECAP: Over 7,700 individuals from seafood businesses across the US and in over 40 foreign countries have completed the Seafood Hazard Analysis Critical Control Point(HACCP) Internet training course since it was launched in 2002, which has enabled them to update, modify or improve their required HACCP based food safety control plans and train other employees to ensure that those plans are successfully implemented. Back to Goals

18376 - Helping to Diversify Marketing in New York's Family-Owned Fishing Businesses
RELEVANCE: Public awareness via mainstream media fuels the local food systems movement in NY.

Meanwhile, small fishing businesses do not feature a great amount of economic resilience and these families struggle to find new ways to reduce the seasonal patterns in their businesses. Commercial fishing vessels operate with strict trip limits or quotas, and landings are sold to wholesalers. Fishermen complain about low ex-vessel prices during peak fishing seasons, and many owners look for novel approaches to maximize the sales from their seafood products. Community supported fisheries (CSF) is one viable direct marketing strategy being successfully applied in fishing communities along the eastern seaboard to bring economic prosperity.

RESPONSE: New York Sea Grant implemented outreach beginning in 2010 to educate the public and fishing communities about the benefits of CSFs, where commercial fishing businesses sell portions of their catch to the public as shares. In 2012, outreach continued with participation at the CSF Fair in Huntington, NY, through an information kiosk, and outreach Sea Grant staff addressed inquiries from groups who expressed interest in starting their own CSFs.

RESULTS: New York Sea Grant was the only vendor to highlight seafood among a group of thirty vendors with an interest in agriculture at a Local Food Fair; more than 35 participants read the CSF poster display and received information about seafood nutritional benefits. Four CSFs have been established in New York since this outreach was initiated.
Specifically, Dock to Dish, a local entrepreneurial effort supported by New York Sea Grant, conducted a trial community supported fisheries business model, creating public opportunity to purchase seafood shares directly from commercial fishing enterprises. The Dock to Dish business model is comprised of more than 36 commercial fishermen and wild shellfish harvesters. Under the 2013 trial, six fishing vessels supplied seafood to eight households, and subscriptions for 2014 sold out due to overwhelming demand with a 300 future member wait list for Dock to Dish seafood. Additionally, a new local seafood marketing business launched on Long Island's east end; 150 subscribers in four east end communities will receive a regular supply of fresh seafood products and information to improve their seafood nutrition, and 12-14 restaurants on Long Island's North and South Forks and in New York City now will feature Dock to Dish locally-harvested seafood on menus.

RECAP: New York Sea Grant-supported initiatives are increasingly incorporating NY seafood products into local food systems, promoting direct marketing and strengthening NY fishing businesses.

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18375 - UPDATE: New York Sea Grant Trawl Design Workshops Enhance Fisheries Management & Commercial Trawling

RELEVANCE: Bottom trawling is widely used to provide fish abundance information to managers of the $4 billion Great Lakes fisheries, however, Great Lakes assessment programs' knowledge of on-bottom trawl operation and designs lags behind that of marine trawling programs.

RESPONSE: To increase awareness of trawl design parameters, New York Sea Grant has developed International Trawl Design Workshops for the Great Lakes.

RESULTS: Building on successes from the trawling education opportunity for 35 biologists and trawl vessel personnel in 2011, New York and Michigan Sea Grants organized a second workshop featuring renowned trawl design experts from the Memorial University of Newfoundland (MUN) in 2013. With National Sea Grant Office funding, that second workshop had a larger focus on the dynamics of fish behavior and trawl catches for 42 attendees including fisheries assessment staff from Ohio, Pennsylvania, Wisconsin, Michigan, Minnesota, Idaho and Ontario, and commercial trawlers.

Workshop participants report dramatically increased awareness of trawl design parameters among trawling program managers who subsequently successfully modify trawls to reduce mussel clogging and deploy gear mensuration and underwater cameras to evaluate performance. 2013 participants indicated plans to deploy additional sensing gear and requested New York Sea Grant-led trawl design workshops continue. Several state and federal program participants have sent trawl design plans to MUN for evaluation.

RECAP: New York Sea Grant has developed model programming for Great Lakes trawl design education

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18131 - Sea Grant Research Helps in the Fight Against Listeria

RELEVANCE
Listeria monocytogenes is a bacterium that causes a potentially severe foodborne disease which has the third highest rate of mortality among foodborne infections in the US. While this pathogen typically contaminates food at low levels that are unlikely to cause human disease, it can grow to levels that can lead to disease during refrigerated storage of many ready-to-eat (RTE) foods. While improved employee training and targeted sanitation procedures can significantly reduce the levels of L. monocytogenes on finished product, a complete Listeria control strategy includes the need to utilize effective Listeria growth inhibitors on RTE seafood products.

RESPONSE
In 2010 Sea Grant funded research by Dr. Martin Wiedmann and Dr. Teresa Bergholz from Cornell University to evaluate the ability of several common commercially available growth inhibitors to reduce growth of L. monocytogenes on cold smoked salmon. The results indicate that the combination of the growth inhibitors lactate and diacetate had the greatest effect on reducing L. monocytogenes growth

compared to other combinations. The research team also identified potential genetic markers that can be used to rapidly screen new inhibitors for efficacy against L. monocytogenes. This will allow for faster and less expensive testing of potential new inhibitors.

RESULTS
The results from this project have been used to obtain additional funding from the US Department of Agriculture to further study growth inhibitors against L. monocytogenes on RTE seafood. Information from the project has been used by smoked salmon processors in New York State such as ACME Smoked Fish (Brooklyn, NY) to help with growth inhibitor selection and application methods.

RECAP: Effective combinations of growth inhibitors for Listeria monocytogenes and development of genetic markers to screen future inhibitors help smoked salmon processors produce safer ready-to-eat seafood products. Back to Goals

18127 - Sea Grant Research Helps in the Fight Against a Serious Fish Disease
RELEVANCE
The emergence of viral hemorrhagic septicemia virus (VHSV) in the Great Lakes Basin has been a serious issue for fisheries in the Great Lakes. VHSV is considered to be an extremely serious disease for which no treatment exists. VHSV can cause serious fish mortalities resulting in significant economic losses, especially to commercial aquaculture and bait dealers.

RESPONSE
Sea Grant funded a project led by Dr. Paul Bowser and Dr. James Casey at Cornell University. The project conducted infection studies to investigate the natural in vivo infectious cycle for the Great Lakes isolate of VHSV (VHSV-GL). Operators of fish rearing and aquaculture facilities stood to gain from this work an improved understanding of the transmission of VHSV, necessary to help develop better biosafety protocols and decontamination methods.

RESULTS
The results of the study confirmed that using high concentrations of iodine (iodophore) treatment effectively eliminates viable VHSV from walleye eggs. Tannic acid, used in fish hatcheries to lessen the adhesiveness of walleye eggs so they don't clump together when they are incubated in egg hatching jars, deactivated the ability of the iodophore to disinfect the virus. In addition, tannic acid interfered with the state of the art qRT-PCR assay used to detect VHSV. Neither of these two capabilities had been previously documented for tannic acid treatment. It appears critical that hatchery operators perform copious water rinses of eggs that have been treated with tannic acid so that any residual acid is washed away from the external surface of the eggs. Once this is done, the iodophore treatment can be used to disinfect the eggs of VSHV and other fish pathogens. As a result of informing the aquaculture community and government hatcheries of these findings through meetings and workshops, hatchery operations were changed to include a tannic acid rinsing step.

RECAP: Fish culture and hatchery operations were changed to improve VHSV disinfection effectiveness as a result of Sea Grant research. Back to Goals

16960 - New York Sea Grant Helps To Promote Safety in the Commercial Fishing Fleet
RELEVANCE
Search and rescue operations for commercial fishermen cost the US Coast Guard (USCG) millions of dollars each year. There has been a steady increase in commercial fishing fatalities from 2000-2009, with an average of 17 fatalities on the East Coast each year. Under the guiding principles of the 1978 Magnuson-Stevens Fishery Conservation and Management Act to manage US marine fisheries, new regulations should not force commercial fishermen to take unnecessary risks while fishing. In 2010, Congress approved the USCG Authorization Act to establish mandatory safety standards in the commercial fishing fleet. In New York, commercial fishermen complain about traveling out-of-state to receive this training, which usually becomes expensive for small fishing businesses to underwrite. Until 2010, there was no formal Safety-At-Sea training offered in this state for more than 10 year.
RESPONSE
New York Sea Grant, with financial support from the New York Center for Agricultural Medicine and Health (NYCAMH) and other partners, including the US Coast Guard, Long Island Occupational and Environmental Health Center (LIOEHC), and Cornell Cooperative Extension of Suffolk County Marine Program, administered a Safety-At-Sea workshop at Inlet Seafood Packing House, Montauk, NY, in June 2010. This training featured instructors certified by the Alaska Marine Safety Education Association. New York Sea Grant, again, spearheaded a partnership in 2011 to conduct safety-at-sea training for commercial fishermen to encourage compliance with this regulatory requirement, while reducing the financial burden on fishing businesses. The second training course was offered in 2012 under the auspices of the US Coast Guard Station Montauk.
RESULTS
In 2010, captains and crew members who attended this one-day training learned about cold water survival strategies, practiced safety drills, donned immersion suits, deployed distress signals and a full size inflatable life craft, extinguished mock engine room fires, and learned about other damage control techniques. Fishermen obtained a formal inspection of their safety equipment which revealed a 21 percent failure rate to meet the US Coast Guards standards, and owners were encouraged to replace them. Of the more than 60 commercial fishermen and fisheries biologists attending the training, 14 percent had never participated in formal Safety-At-Sea drills. Through donations by LIOHEC, 15

commercial fishermen received new state-of-the-art personal flotation devices (PFDs) and one fisherman received a new immersion suit.
In 2011, approximately 18 fishermen attended the training to learn basic survival techniques. This year, the training was convened at the USGC Station Montauk, and with direct participation from the Long Island Occupational and Environmental Health Center (LIOEHC). Participants were taught special lifting and bending techniques to reduce common occupational injuries that are associated with this profession. This new module is in acknowledgement of the physical injuries that are sometimes incurred while working on a commercial fishing vessel. Participants provided their immersion suits for safety inspections, and the US Coast Guard also conducted commercial fishing vessel inspections. Participants appreciated that the training took place at a convenient location which helped them to save on travel expenses (hotel, meals, gasoline, etc.) for the entire crew (estimated at approximately $200 per person). In addition, participants received a new Personal Flotation Device (PDF) and a guided tour of the USCG cutter rescue vessel.

More than 100 commercial fishermen in the state have benefited from this program to date, helping to reduce the need for costly sea search and rescues. In recognition of the program's success, the USCG bestowed NYSG with a Certificate of Appreciation, as this service helps the USCG to fulfill one of its goals. Also, the Northeast Sea Grant Consortium selected NYSG's marine
RECAP: By making safety-at-sea training available at a local venue, New York Sea Grant helped over 100 commercial fishermen to comply with regulatory requirements at minimal cost and interruption to fishing businesses and was recognized by the US Coast Guard and the Northeast Sea Grant Consortium for its training programs that helped to keep commercial fishermen safe at sea, and thus reduce the need for costly at-sea search and rescues. Back to Goals

16958 - Seafood Health Facts Website Helps Consumers Evaluate Seafood's Benefits and Risks
RELEVANCE
Seafood is a nutrient-rich food. Research has shown that seafood consumption is closely linked to health benefits such as improved coronary health in adults and improved cognitive development in infants and children. While health benefits greatly outweigh risks for the general population, there is concern that contaminants in some species of fish may pose risks for some select populations.
RESPONSE
NY Sea Grant has worked with partners at universities across the U.S. to develop a Seafood Health Facts Website at http://seafoodhealthfacts.org to provide consumers and health care providers with information on the risks and benefits of the seafood products consumed in the U.S. This site has a tool that allows consumers to customize the information they need based on how much seafood they consume, whether it is from commercial sources or recreational catch.
RESULTS
In 2012, there were approximately 65,000 visitors to the Seafood Health Facts Website who viewed approximately 102,000 pages of content. It is impossible to accurately determine how many visitors have used this information to modify their seafood selections. However, if even a very conservative estimate of 1 to 10% of the visitors did modify their behavior, between 650 and 6,500 individuals made informed decisions that led to changes in their seafood consumption practices.

RECAP: The Seafood Health Facts Website, providing resources on the health benefits and risks associated with seafood products, was accessed by over 60,000 individuals to help them make informed decisions about their seafood consumption. Back to Goals

16949 - Trout and Salmon Identification Guide
Relevance
Lake Ontario fisheries are of considerable economic and social value to NY State. Ongoing educational efforts must promote wise and proper use of fisheries resources to ensure their sustainability for future generations. An impediment to achieving this goal is the commonly encountered misidentification of trout and salmon species in the Lake Ontario watershed. Proper fish identification is important to fisheries management to reduce unintentional harvest of species with more restrictive angling regulations. Annually, several hundred tickets are issued by NYSDEC for violations of fishing regulations, largely the result of fish misidentification.

Response
NY Sea Grant (NYSG) commissioned the development of full-color artwork of each trout and salmon species in the Lake Ontario watershed featuring different life history stages of these species in both pelagic and tributary habitats. In 2011, NY Sea Grant printed 5000 ID guides featuring the artwork. To date, more than 3000 copies have been disseminated to the greater angling community on both sides of the Lake.

Results
A measure of the brochure's success would be a reduction of angling violations, particularly in heavily fished waters such as the NY's Salmon River. Following the brochure's release, NYSDEC division of Law Enforcement observed a decrease in the number of angling violations from 578 to 434 between 2011 and 2012, representing a 25% decline.

RECAP: Correct fish identification is a critical part of successful fisheries management. In 2011, NY Sea Grant developed 5000 copies of a unique full-color identification brochure, featuring all life stages

of 8 salmon and trout species in the Lake Ontario watershed. Numbers of tickets issued for angling violations decreased by 25% following the release of this brochure. Back to Goals

15698 - Vulnerability of Hudson River Atlantic Sturgeon to Coastal Bycatches
RELEVANCE - The Atlantic sturgeon (Acipenser oxyrinchus) once supported lucrative commercial fisheries throughout much of its North American distribution including the Hudson River and Delaware River. These fisheries collapsed and as a result, a coast wide moratorium on the harvest of Atlantic sturgeon was implemented in 1998 to restore populations to historic levels. This measure has not been successful in restoring many populations to desired levels. Previous genetic studies have indicated that Atlantic sturgeon from most spawning coastal populations are genetically distinct. As a result, Atlantic sturgeon is currently being considered for federal listing as five distinct population segments (DPS) under the U.S. Endangered Species Act.

RESPONSE - A research team at the New York University School of Medicine under the direction of Dr. Isaac Wirgin conducted a study that used two different kinds of DNA markers, mitochondrial DNA (mtDNA) haplotypes and nuclear DNA (nDNA) microsatellites, to estimate the contributions of nine previously characterized reference spawning populations to mixed coastal aggregations in the Inner Bay of Fundy, Long Island Sound (and the lower Connecticut River), the Delaware Coast, off North Carolina's Outer Banks in winter, and samples collected as bycatch from NOAA's Observer Program. The team successfully estimated the contributions of each of the nine reference populations to these mixed coastal aggregations.

RESULTS - Based on the genetic information from this project about the estuary populations of Atlantic sturgeon, a review team assessed the status of the Atlantic sturgeon, and determined that four of the five DPS of Atlantic sturgeon should be listed as endangered as of February 2012.

RECAP: New York Sea Grant research on population genetics of the Atlantic sturgeon provided data to inform decisions to list some populations as endangered under the Endangered Species Act.
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15689 - The Effects of Nutrients on Bloom Dynamics and Toxicity of Alexandrium, the Cause of Paralytic Shellfish Poisoning (PSP)
RELEVANCE - The harmful algal bloom producing dinoflagellate Alexandrium fundyense produces the toxins known as saxitoxins that cause Paralytic Shellfish Poisoning (PSP). Though rarely fatal, PSP poisoning can have serious health effects for people who consume contaminated shellfish. When conditions are right to produce blooms of A. fundyense, shellfisheries need to be closed to protect public health. Thus such blooms cause economic hardships for shellfish harvesters and seafood businesses in coastal communities. Outbreaks of this dinoflagellate have caused closures and economic losses all along the eastern coast of the U.S. and in other parts of the world.

RESPONSE - Determining what conditions promote blooms of A. fundyense will improve shellfisheries management by providing managers with better information regarding when to close areas to shellfishing to best avoid unnecessary closures and economic losses. New York Sea Grant (NYSG) began funding research on A. fundyense in 2008 when Stony Brook University researcher Dr. Christopher Gobler conducted research to assess the effects of nutrients on bloom dynamics and toxicity and distribution of A. fundyense.

RESULTS - Results of the research provided information on the bloom dynamics in Long Island east end tributaries and bays, and the south shore. This study demonstrated that A. fundyense cells and saxitoxin are widespread through the tributaries and poorly flushed bays of the south shore and east end of Long Island during spring months. Further, the results of the project show that nitrogen loading promotes blooms in nutrient rich portions of Long Island's bays and tributaries and blooms may become more common and/or intense in the south shore and east end bays and tributaries. Another important finding is that established cyst beds may serve as seed populations for future blooms. The data and results from this research have been used by NYSDEC to improve their monitoring of shellfish, making their efforts more efficient and effective because of improved site selection and timing of monitoring.

RECAP: New York Sea Grant funded research has provided critical information on bloom dynamics of the red tide causing Alexandrium fundyense and thus allows for improved monitoring of shellfish beds and more accurate decision making about shellfishing area closures. Back to Goals

15603 - Award-Winning Trawl Design Workshop Significant for Great Lakes Fisheries
RELEVANCE -- Management of the $5 billion Great Lakes fisheries (greater than $600 million for Lake Ontario) depends on reliable fish abundance estimates derived from bottom trawls. Biologists, primary users of these estimates, have long suspected such data are affected by invasive mussels clogging the trawls, but had little information about trawl design until 2011.

RESPONSE -- In partnership with the US Geologic Survey and the Memorial University of Newfoundland (MUN), and funding through the Great Lakes Regional Research Information Network (GLRRIN), New York Sea Grant (NYSG) convened an intensive 3-day trawl design workshop for 35 biologists and vessel personnel representing state, federal and provincial agencies from the Great Lakes.

RESULTS -- The workshop, featuring internationally renowned experts, enabled participants to better understand trawl design, its effects on fish capture, and vessel operation. Participants viewed video simulations of a scale model Lake Ontario trawl conducted at MUN's flume tank--the world's largest. Flume tank simulations approximate results of field trials by 95%, thus saving months of intensive field testing of full-size trawls. All workshop participants indicated in an exit survey that they found the workshop highly beneficial and planned to apply the information to their trawl-ing programs, especially for forage and invasive fish assessment. Three new vessels will begin operation in 2012, and the workshop information will be used to design or modify new trawls to outfit those vessels.

RECAP: A groundbreaking international workshop placed New York Sea Grant in the leadership role in trawl design outreach in the Great Lakes. Moreover, the workshop will ensure that quality fisheries data information is obtained for managing the $5 billion Great Lakes fisheries. Back to Goals

6867 - Environmental Factors Affecting QPX Disease Development (CR)

RELEVANCE -
The hard clam pathogen known as Quahog Parasite Unknown (QPX) is a serious threat to hard clam populations from Canada to Virginia. The hard clam is among the most commercially important shellfish species in the U.S.

RESPONSE -
This project investigated the impact of environmental factors on the interaction between QPX and hard clams. For this study the research team performed lab-controlled experiments to investigate the effect of temperature, salinity and dissolved oxygen on hard clam immunity, QPX disease development and resulting mortalities using both naturally- and experimentally-infected clams.

RESULTS -
Results from the project demonstrated that both salinity and temperature affect defense parameters and disease progression in M. mercenaria. Higher temperatures had the most impact with experimental temperature of 21 C significantly enhanced clam defense response to QPX infection and helped reduce disease development while the maximal temperature tested (27 C) completely aborted the infection process. These results provide important information regarding QPX disease and its potential remediation. These results led to further funding in the form of a new NYSG project currently in its second year. This project is building on the previous study to further clarify the role of temperature and the best methods use to take advantage of this finding.

RECAP: Sea Grant research team finds that high temperatures reduces disease development of QPX in hard clams. Back to Goals

6649 - Preventing and Containing VHS in Aquaculture Operations

RELEVANCE
VHS, viral hemorrhagic septicemia, threatens the sustainability of global fisheries and aquaculture. The viral pathogen (VHSV) is considered to be one of the more serious fish pathogens known and has the potential to devastate hatchery operations. Prior to 2007, little information concerning the containment of the virus and disease was available.

RESPONSE
Since 2007 New York Sea Grant (NYSG) has been taking steps to educate fish health and culture professionals about VHS in an effort to protect wild fish stocks and maintain the viability of aquaculture in the Northeast. With NY Sea Grant funding, renowned fish disease experts Dr. Paul Bowser and Dr. James Casey of the Aquatic Animal Health Program at the Cornell University College of Veterinary Medicine developed and refined a molecular technique used to diagnose the disease. These researchers also generated valuable research essential to prevent and/or contain the disease and pathogen. During 2008-2010, NYSG partnered with the Cornell researchers and Rhode Island, Pennsylvania and Lake Champlain Sea Grant programs to organize regional workshops to disseminate the results of this research to diverse stakeholder groups. Hatchery managers of the Vermont Fish and Wildlife Department were among the first to use the information to evaluate their current practices and maintain their walleye stocking program.

RESULTS
The National Sea Grant Office recognized the success of this research and outreach partnership and presented its first-ever Research to Application Award to Dr. Bowser and NYSG Fisheries Specialist David B. MacNeill in October, 2010. As of January 2011, VHSV has not been found in any fish culture facility in the eastern U.S.

RECAP: New York Sea Grant quickly identified and addressed the threat of viral hemorrhagic septicemia to global fisheries and aquaculture by supporting cutting edge research and delivering newly generated information to diverse constituencies in partnership with researchers. Back to Goals

6646 - I FISH NY: Sharing Fishing Facts & Fun in NYC and on Long Island

RELEVANCE
Despite unprecedented threats to the world's ocean and water resources and being literally surrounded by water, many New York residents do not realize the quality fishing and thriving aquatic ecosystems

they have right in their own front yard.

RESPONSE
To address this problem, I FISH NY in New York City and Long Island a joint program of the New York State Department of Environmental Conservation and New York Sea Grant offers public event and school programs to connect New Yorkers to their water resources through angling. Despite a late state budget, no funding for nearly six months, and reduced staff hours, I FISH NY conducted a nearly full complement of angling outreach programs in 2010.

RESULTS
In 2010, I FISH NY in New York City continued outreach into the city's more remote and neglected corners. This effort culminated in a highly successful public event, conducted in partnership with local civic organizations in Baisley Pond Park, South Jamaica, Queens. Plans are already underway to repeat next year, and schools from non-English speaking neighborhoods in Flushing, Queens, and economically-challenged sections of the Bronx are lined up for the 2011 in-school program. I FISH NY NYC also made a more concerted effort to work with the media to publicize fishing events, and that effort that paid off not only in Baisley Pond but at the Little Red Lighthouse Festival at Fort Washington Park where a record number of people enjoyed an afternoon of angling and education in September.

In 2010, I FISH NY continued to offer well-attended public and non-public fishing clinics across Long Island in partnership with public agencies and municipalities. A public clinic held in partnership with the Town of Brookhaven at Lake Ronkonkoma provided 74 beginner anglers with a fun introduction to fishing. Through collaboration with the New York State Office of Parks, Recreation and Historic Preservation, I FISH NY offered three public fishing events at Long Island state parks in 2010, reaching a total of 2,750 people. I FISH NY continued to partner with summer camps to provide an enjoyable and safe fishing experience for children. In 2010, I FISH NY saw a total of 827 students at local summer camps, including Girl Scouts of America at Camp Edey and the Western Suffolk BOCES Marine Studies Enrichment Program.

RECAP: Despite greatly reduced 2010 budgets and staffing, the successful I FISH NY program provided economically-challenged sections of New York City with educational fishing events and continued to serve thousands from Long Island communities who participated in fishing clinics, park events and summer programs. Back to Goals

6561 - Development and Application of a Quantitative PCR Technique to Establish QPX Dynamics in Clams and in the Environment

RELEVANCE
The protistan pathogen of the hard clam Mercenaria mercenaria known as Quahog Parasite Unknown (QPX) has caused significant mortality of hard clam stocks in many locations along the east coast of the United States and Maritime Provinces of Canada since the 1960s, including an economically devastating outbreak in Raritan Bay NY during the summer of 2002. In an effort to protect wild hard clams in Peconic Bay, the Raritan Bay Shellfish Transplant program (which had accounted for almost half of New York's hard clam production) was discontinued in 2002. The transplant program was partially reinstated in June 2005, and its management has since required ongoing intensive monitoring of QPX.

RESPONSE
In an effort to improve the efficiency of this QPX monitoring, New York Sea Grant funded researchers Drs. Bassem Allam and Jackie Collier at Stony Brook University to develop a new cutting edge quantitative polymerase chain reaction (QPCR) assay to detect QPX in clam tissues.

RESULTS
The assay techniques developed by the Stony Brook team is faster and more sensitive than the current standard histological method to detect QPX in clam tissue samples. The assay was field-tested and validated and is currently used to monitor QPX in state clamming areas. The NY State Department of Environmental Conservation (NYSDEC) Shellfish Management Unit has incorporated this new assay into its ongoing monitoring of clam beds for QPX. Because this assay is a new method and is still undergoing ongoing testing and refinement, the NYSDEC continues its QPX monitoring using both the QPCR assay and the standard histological methods. The experience of the NYSDEC is being used to help with official adoption of the QPCR assay as a standard method for testing for QPX. In the long run the QPCR assay will save time and money for agencies because this assay method is much faster and cheaper than standard histological methods. The assay also has a positive impact on scientific research. Because of savings in terms of time and money, tests for QPX can be made in significantly more clams, and provides quantitative information on the intensity of QPX infection in those clams. It allows researchers to investigate questions regarding the factors involved with the development of QPX disease in both the lab and the field that were previously difficult to do.

RECAP: New York Sea Grant researchers have developed a fast, accurate, and less expensive way to test for the QPX pathogen which has the potential to cause significant mortalities in one of New York's most important commercial shellfish species, the hard clam. Back to Goals

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Program Performance Measures (2010 - 2013)

Program Performance Measure	Program Plan Target (2010-2013)	Reported	Program Comments
Number of anglers who will be educated about safe techniques to handle fish that minimize the risk of pathogen transmittal to humans.	500	650	2012 - Target was met in 2010 and the program has since ended. 2013 - Target was met in a previous year. However, during 2013 postcards featuring different marine animal diseases were designed and were disseminated in the Spring of 2014.
Number of food processing, distribution or warehouse firms will participate in Internet-based training programs on current Good Manufacturing Practices managed by New York Sea Grant that will enable them to more effectively manage the conditions and practices in their facilities that could affect the safety of their products.	200	607	2013 - These individuals completed the internet training course on Good Manufacturing Practices.
Number of Great Lakes fisheries stakeholders that will be educated on the observed and potential effects of ecosystem changes on fish populations, the challenges posed to sustainable fisheries by these changes, the capacity of fisheries managers to manage sustainable fisheries in the face of these changes, and the relative efficacies of different management options for sustainable fisheries.	200	1,232	2012 - Two extension professionals conducted 7 programs reaching 377 stakeholders. 2013 - One professional made presentations at three Buffalo area events.
Number of individuals from the seafood industry and State and Federal regulatory agencies who will have completed HACCP training conducted by New York Sea Grant enabling members of the industry to develop, evaluate or modify the HACCP based food safety systems that each firm must develop and implement to ensure the safety of their seafood products.	1,000	4,742	2013 - Number of individuals who completed the internet training course.
Number of members of the recreational angling community, commercial fishers, aquaculturalists, and hatchery operators that will be educated about diseases and pathogens that immediately or potentially threaten coastal fisheries and aquaculture operations, how pathogens can be spread, how to better recognize particular abnormalities in fish, how to report these observations to fisheries managers and what procedures to follow to send potentially diseased fish to diagnostic experts.	600	2,350	2012 - Publications on fish diseases were planned in 2012 for distribution in 2013. 2013 - 2 Extension professionals provided educational opportunities at the Niagara Outdoor and Fishing Expo and the J& J Sportfishing Forum (Long Island).
Number of models, methods, or scientific results that have been	2	46	2012 - Anticipated: From research projects R/SHH-17 (Updated seafood

developed by NYSG research and extension to improve safe, high quality, and profitable seafood products, including those from aquaculture.			mercury database) R/FBM-34 (Develop methods to cure hard clams of QPX by exposing them to a relatively easy-to-implement heat shock treatment). Projects are currently underway. 2013 - From research projects R/SHH-17 (Updated seafood mercury database) R/FBM-34 (Develop methods to cure hard clams of QPX by exposing them to a relatively easy-to-implement heat shock treatment). Projects are currently underway.
Number of models, methods, or scientific results that have been developed by NYSG research and extension to improve the sustainability of New Yorkâ€™s economically important coastal fisheries.	5	17	2012 - These include trawl technology developed and utilized in Lake Ontario and being prepared for the Upper Lakes as well as a project developing future scenarios for planners to use when discussing potential impacts on the Lake Ontario fishery. Actual: Research project R/XG-21 scientific results suggest that summer flounder consist of more than one coastwide genetic stock. Research project R/FBF-21-Y2 scientific results that show that alewife growth is strongly influenced by essential fatty acids and that alewife health can be quickly assessed using a simple measure (% dry body weight). Research project R/XG-19-Y2 scientific results that identify candidate biomarkers of hard clam resistance to QPX that can be used for quick screening of resistant clam stocks. 2013 - Extension professional partnered with researchers at SUNY Buffalo State in order to develop a model predicting the potential range of expansion of select Eurasian aquatic invasive species. In addition, a second trawl workshop was held in order to demonstrate improved ways of using the technology in the Great Lakes.
Number of recreational anglers that will be educated about proper fish identification guidelines, catch-and-release methods and could use these tools to reduce non-target fishing mortality of recreational fish stocks and thus help conserve fish populations in accordance to angling regulations.	200	7,823	2012 - Full color brochures on salmon and trout identification were produced in 2012. Three extension professionals distributed a total of 2350 of these guides in 2012. Evidence mentioned in the impact statement suggests that there may be a connection between distribution of the brochures and fewer tickets for illegal catches during the fishing season. 2013 - These numbers are from a barotrauma workshop (26) and the distribution of Marine Recreational Information Program, "Count your Catch" brochures (3000).
Number of youth that will be taught the technical and stewardship aspects of fishing from Sea Grant.	24,300	11,948	2010 - The target will likely not be achieved given the end of the grant which funded this work and the delay of over a year in issuing a new RFP 2012 - Two events were held in the Buffalo area attracting a total of 350 youths. 2013 - These youth were reached at an Expo. This performance measure originally came from the "I Fish NY"

			program which has not been funded since 2011.

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Program Objectives (2010 - 2013)

Program Objective	Achieved (yes/no)	Program Comments
New York Sea Grant has changed their objectives to performance measures to more closely align with their tracking methods. The National Sea Grant College Program Director has approved this change.	No	