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Patricia MacNeill

One of the pleasures of my job is that I get to spend time visiting and thinking about the coastal resources in New York State. This has been a lifelong activity. Much of my youth seems to have been spent on, in or around the water. Fishing for anything that would bite in one of Lake Ontario's many tributaries, boating on the Hudson, crabbing on Long Island and walleye fishing on Oneida Lake all provided pleasurable, and at times exciting recreation. These days, I lean more toward hiking along beaches, wetlands and tidal creeks watching people and wildlife.

If you've shared any of these experiences, you know that we in New York are blessed with a huge diversity of coastal resources. This diversity stems from the different aquatic habitats that we find when we travel from Montauk Point to Buffalo. For New York Sea Grant, this diversity is important. Our authorizing legislation, the National Sea Grant College and Program Act of 1966, defined coastal as inshore marine environments as well as all of the Great Lakes. Accordingly, New York is responsible for coastal resources in both the ocean and the Great Lakes. But besides pristine coastal areas, New York's coasts also support heavy industrial and community development, adding to the diversity of decision-making about coastal resources.

Although New York Sea Grant must help develop and protect some of the most diverse systems in the network, we also have the advantage of an equally diverse pool of high quality talent to help. Internationally recognized research and extension faculty from a wealth of excellent universities, as well as our own management, extension, education and communications staff, help achieve our goals successfully and cost-effectively. New York Sea Grant has been "Bringing Science to the Shore" since 1971.

Our strategy is to bring objective, pragmatic scientific information to all coastal decision-makers and citizens to help them make wise coastal resource decisions.

This Program Guide documents the two-year Implementation Plan for 2004-2005. It is organized around the issues, goals and objectives in NYSG's 2000-2005 Strategic Plan listed in the early pages of this book. The primary research, outreach and education activities underway are presented



Barbara A. Branca

against the backdrop of these goals in the second section with an emphasis on the target of the work. The final section of the guide lists NYSG outreach and management staff, currently-funded researchers, and the other collaborators with parallel interests in developing and protecting coastal resources who assist New York Sea Grant in achieving its goals.

I hope that this Program Guide will help you better understand how New York Sea Grant is contributing to wise ecological and economical decisions about New York's coastal resources.

Jack Wallace



Bob Strouk

New York Sea Grant is the only program that is fully bi-coastal in the National Sea Grant network. About 85 percent of New York's population lives within a short distance of the State's 3400 miles of Great Lakes, estuarine and marine coastline. Prominent New York State coastal water bodies include the Hudson, St. Lawrence and Niagara Rivers, Lakes Ontario, Erie and Champlain, Long Island Sound and inland bays, New York Harbor and the Atlantic Ocean.



Courtesy of Nordica Holochuck

With so much of the State's economy and population located near the State's coastline, there is a strong need for New Yorkers to carefully manage the interplay of people and environment in those areas. As a university-based program committed to objectivity and science rather than advocacy, New York Sea Grant (NYSG) assists all levels of government and private entities in "Bringing Science to the Shore."

New York Sea Grant has carefully developed its Vision, Mission and Value statements. NYSG has also set its course and goals in a Strategic Plan for 2000-2005. The Plan outlines specific ways in which NYSG's research and outreach will be applied to help provide science to inform coastal resource decision-makers.



Barbara A. Bianca

VISION

To be a leader in formulating and funding scientific research and in disseminating science-based information for coastal decision-making and education, as well as a key collaborative force for wise management, economic development and conservation of New York's and the Nation's coastal assets.

To achieve this vision, New York Sea Grant will continue to:

- Focus efforts on New York State's most critical coastal resource issues
- Conduct a competitive, high quality research program to objectively fill information gaps
- Disseminate the latest science-based information to all parties for resource decisions
- Increase its role as a liaison among coastal decision-makers
- Support a responsive, knowledgeable staff
- Educate the public and the next generation of coastal scientists

VALUES

- First quality scientific research to provide information for wise coastal resource decisions
- Activities to extend unbiased science and technology to New York's coastal users
- Input from stakeholders to maximize program applicability and usefulness

STRUCTURE

NYSG has conducted a multi-faceted program of research, outreach, and education for New York's coastal resources for over thirty years. NYSG is funded by the National Sea Grant College Program (part of NOAA and the U.S. Department of Commerce) and New York State. Within New York, NYSG is a joint program of Cornell University and the State University of New York. A Board of Governors establishes NYSG policy and oversees its operations and budget. NYSG uses stakeholder advisory groups to obtain input and feedback on programmatic value and priorities. The program's main administrative offices are at Stony Brook University; extension administration is located at the Cornell University campus in Ithaca. Research proposals are solicited from campuses throughout NYS and beyond. The proposals are rigorously reviewed to select high quality research that addresses the region's most pressing coastal issues and opportunities. Extension professionals are all specialists in one or more technical fields related to coastal resources and are located near their audiences at offices across the state. They work with these stakeholders to provide science-based information about coastal matters. Thus, the organizational structure and operations of NYSG are designed to enhance its effectiveness.



Core financial resources for NYSG include the annual federal allocation from the National Sea Grant Office (NSGO) and an annual state allocation from New York State through the State University of New York (SUNY). NYSG also receives and administers a substantial portion of its annual funding from other resources, including special state legislative appropriations, research and extension project funds resulting from NSGO National Strategic Investments, funds awarded directly to the Extension Program at Cornell University for specific outreach projects (such as the Long Island Sound Study and the National Aquatic Nuisance Species Clearinghouse), and funds awarded for specific large-scale research activities (such as the Brown Tide Research Initiative, the Hard Clam Research Initiative, and the Long Island Sound Lobster Research Initiative). These resources are provided by a variety of federal, state, and private sponsors. Figure 1 shows the funding history of NYSG since its inception.

NYSG's total program funding has significantly increased over the past decade. An average of \$2.4 million in funding was administered by NYSG in the 1980's, increasing to an average of \$3.7 million during the 1990's, and since 2000, the average has increased to \$5.2 million. The primary increase in NYSG funding is derived from sources other than core funding. Though there are variations in the levels of funding in any given year, in general, the core federal support for the program from the NSGO has increased only 11% since 1990, compared to an increase of 333% in funds from other than core resources. Over the same period, NYSG's financial support from its core state allocation has seen an overall average decrease in level since 1990, averaging approximately \$420,000 per year.

Figure 1 depicts funding in each of these categories based on when they were received by NYSG, however, they are often allocated and distributed to the five program

elements (research & education, extension, administration, communications, and additional activities) over the course of several years. For example, all funds for the Long Island Sound Lobster Research Initiative were received in 2001, but are distributed

and used over a four-year period 2001 through 2004. Figure 2 shows the average allocation of funds (as they are distributed to individual activities) among the program elements over a five-year period:

AVERAGE ALLOCATION OF FUNDS BY PROGRAM ELEMENT 1999-2003

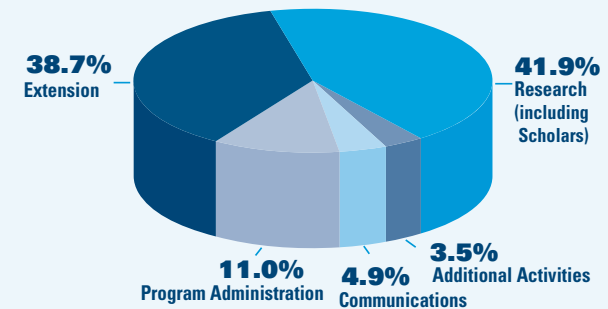


Figure 2

NEW YORK SEA GRANT *Strategic Plan*

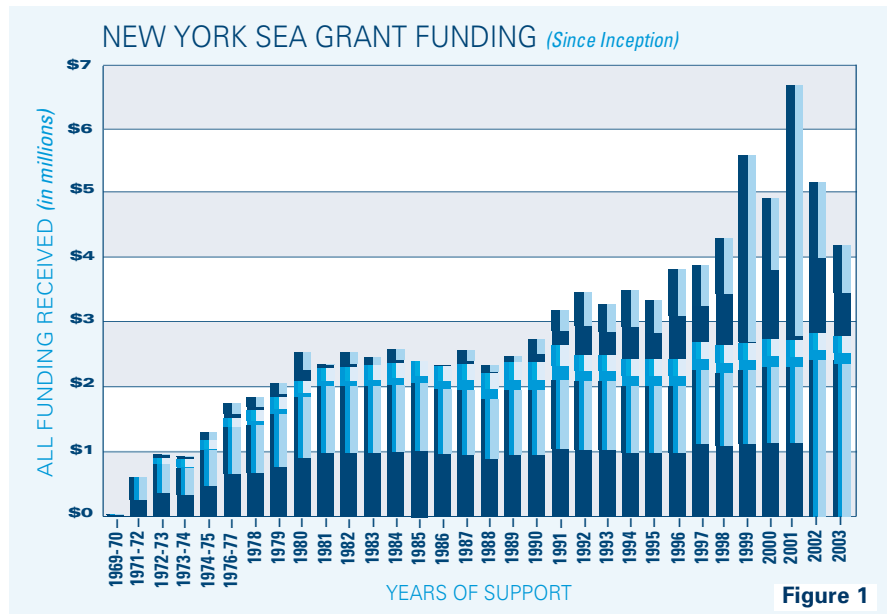


Figure 1



Courtesy of NY Dept. of State

STRATEGIC PLAN TECHNICAL FOCUS

This detailed Strategic Plan forms the basis of the two-year Implementation Plans that are submitted to the National Sea Grant College Program biennially. NYSG supports research, outreach, and education efforts to contribute to a variety of issues, goals and objectives. The goals and objectives listed here are used for NYSG research and outreach planning and to describe to New York's coastal decision-makers the major foci of its integrated program. These same objectives and other components in the two-year Implementation plans provide the metrics for measuring the extent of New York Sea Grant's success.

ECONOMIC LEADERSHIP ISSUES

GOAL 1: Increase the Viability of Coastal-Dependent Businesses

- Search for economically viable niches for aquaculture in New York State
- Help water-dependent businesses improve their response to public policies and regulations
- Design and evaluate approaches to enhance coastal tourism and eco-tourism
- Identify and assess techniques or strategies to predict/mitigate



Barbara Branca

environmental impacts of coastal businesses and activities

- Provide balanced seafood product information to consumers.

GOAL 2: Facilitate Sustainable Use of Economically Important Coastal Fisheries

- Develop methods to assess the impact of ecosystem and policy changes on fishery sustainability

- Examine the effects of fishing activities on fisheries
- Identify factors involved in disease, physiology and behavior in fish and shellfish
- Increase understanding of socio-economic responses of communities to fishery changes
- Improve fish population and ecosystem process models

COASTAL ECOSYSTEM HEALTH AND PUBLIC SAFETY ISSUES

GOAL 3: Improve the Quality and Safety of Seafood Products

- Coordinate efforts to optimize seafood safety control programs
- Develop innovative educational programs for seafood safety
- Develop new ways to identify seafood safety risks and methods to increase quality and safety

GOAL 4: Prepare for and Respond to Coastal Hazards and Processes

- Demonstrate new technologies to assess impacts of coastal hazards
- Develop techniques to predict, prevent or mitigate coastal hazards
- Assist coastal stakeholders with water level and erosion problems
- Develop models to predict effects of sedimentation and dredging in harbors and waterways

GOAL 5: Assess and Enhance Coastal Water Quality

- Design and deliver non-point source pollution best management practices

- Develop models to predict point and non-point contaminant impacts
- Design innovative outreach programs to support lakewide management plans
- Develop techniques to evaluate water quality impacts of alternate resource uses
- Develop techniques to evaluate costs and effectiveness of water quality improvement strategies

GOAL 6: Protect or Enhance Coastal Habitats

- Develop techniques for habitat assessment
- Develop and conduct educational programs on the value and methods for habitat improvement
- Develop techniques for managing critical coastal habitat, e.g., wetlands and essential fish habitat

GOAL 7: Control the Spread and Mitigate the Impact of Non-Indigenous (NIS) and Aquatic Nuisance Species (ANS) in New York's Coastal Waters

- Develop techniques for and educate society about introduction, control and mitigation of ANS
- Examine the causes and dynamics of harmful algal blooms to develop mitigation strategies
- Determine how selected human activities can affect distribution and impacts of ANS



Susan Hamill

EDUCATION AND HUMAN RESOURCES ISSUES

GOAL 8: Enable New Yorkers to Participate as Partners in Coastal Issues

- Help educators apply new technologies to employ Sea Grant information in K-12 classes
- Develop future professionals by supporting graduate and undergraduate scholars
- Develop innovative communications strategies and methods to foster an educated citizenry
- Help legislators understand resource management and its uncertainties

GOAL 9: Develop New Partnerships

- Initiate an urban outreach effort in New York City
- Provide information to help New York's Native Peoples manage their aquatic resources
- Respond to emerging coastal resource needs



Sea Grant's university-based research is of high quality and chosen to take an unbiased look at priority questions. It has the scientific rigor of work funded by the National Science Foundation with the additional requirement of real-world stakeholder review. New York Sea Grant's research is expected to "make a difference" by providing useful results to the public, businesses, and managers. Given the variety of marine, aquatic, and coastal topics covered by our grants to top-notch physical oceanographers, food scientists, benthic ecologists, aquatic



Gregg Rivara

toxicologists, fisheries modelers, geochemists, and others, NYSG serves as an important resource for New Yorkers with many different interests and information needs. NYSG research also sets benchmarks within the scientific community, advancing the state of knowledge in many fields.

With more than \$1 million of core funds per year dedicated to it, research is the single largest component of NYSG's state and federal base budget.

Competition for grant funds is high, and the selection of projects for NYSG's portfolio is a science in itself. It includes programmatic screening of preproposals submitted in response to a priority-driven Call for Proposals, peer review and Technical Review Panel evaluation of full proposals, and input from stakeholders. Final selection depends on technical soundness and anticipated usefulness of the results. Even if a proposal addresses a crucially important topic, if the science or methods are questionable or subpar, New York Sea Grant will not fund it. The rigor of our technical review process is highly praised and provides the foundation for NYSG's scientific credibility.

New York has tremendous research talent in its many universities and research-capable institutions. NYSG's Calls are sent to more than 300 individuals in nearly 100 institutions, usually attracting about four times as many applications as can be funded. New faculty names are continually being added to our mailing list and roster of funded investigators. Occasionally we must look beyond New York's borders to find expertise for certain topics, but funding NY faculty helps to reinforce and build their interests in addressing the state's coastal problems and opportunities.

The cost/benefit ratio and the non-federal match requirement of Sea Grant research make it a very wise investment. A typical core research project will run about \$80K per year for two years and include the hands-on training of at least one graduate student. More than twenty such efforts can be underway at any one time. Counting research funded under other initiatives in addition to NYSG's core

program, that number usually climbs close to fifty. Research accountability is key, being evaluated regularly via required progress reporting. Presentations at scientific conferences and peer-reviewed publications validate the work's technical quality and academic interest in the results. But, that's just the first step.

Just as important to Sea Grant is practical use of the proven, new information. This takes the research a vital step beyond the mandate of other funding organizations. And, that's where the extension program staff comes in. With skills in technology transfer and outreach, extension specialists know who the concerned stakeholders are and can convey the results to them in ways most effective for application conducting business and making decisions. It is truly a unique, effective, and highly-appreciated model.

The Sea Grant extension specialists form advisory committees from the regions they serve. Once issues are identified, a wide variety of techniques are used to tackle them. Extension specialists may work with individuals, collaborate with others to organize workshops, or consult with experts to get needed information from other available sources. This may also involve suggesting new research topics and the research process starts anew.

New York Sea Grant Extension has one of the largest and most respected extension programs in the Sea Grant network. Eighteen extension professionals are located in nine different offices in the downstate marine and upstate Great Lakes regions of New York. These specialists have expertise chosen to meet specific responsibilities assigned to them

and take on statewide, regional, and in some cases national responsibilities.

This program guide provides a brief synopsis of the current research and outreach efforts that New York Sea Grant has underway. The projects are organized according to New York Sea Grant's strategic goals and objectives as stated on the previous pages. Research, extension and communications projects receive much of their funding from the National Sea Grant College Program and the State of New York. Noted, too, are some of the specific



Paul C. Focazio

funding partners on many individual extension projects. The number of partnerships established by the whole program is great; a list of many participating partners is found at the end of this book.

With its partners, New York Sea Grant is finely-tuned to develop and deliver the science that New Yorkers need to wisely utilize, conserve, develop, and enjoy our coastal resources.

GOAL 1.**Increase The Viability Of Coastal-Dependent Businesses****ENVIRONMENTAL PROTECTION AGENCY
Smart Growth Extension Partnership
(Mattice)**

2/01/2004-1/31/2005 I/PIU-10

In coastal communities across the nation, there is a growing concern that current development patterns, dominated by what some call "sprawl," are contributing to water quality and environmental degradation. Spurring the efforts in "smart growth" are demographic shifts, a growing environmental ethic, increased fiscal concerns, and more nuanced views of growth. Though supportive of growth, communities are increasingly seeking solutions to balance growth with community and environmental values. Often community decision-makers lack the resources and training necessary to address these issues resulting in a new demand and a new opportunity for smart growth extension programming.

**Assessment of Recreational Boating Expenditures and their Economic Impacts
(Brown/ Connelly/Kay/Tanski)**

7/1/2003-6/30/2004 R/CHD-5

Recreational boating is one of America's leading pastimes and is an important economic generator nationwide. New York is one of the nation's major boating states, with 528,114 registered boats in 2002. This represents an increase of 20.5% over the past ten years. Recreational boating is important in virtually all areas of New York, especially the marine waters, Hudson River, Great Lakes, St. Lawrence River, the Finger Lakes, and Lake Champlain. This study will produce a comprehensive assessment of boater expenditures and accompanying economic impact, valuable

to decision makers and others to be able to place the value of this sector in context with others.

**Sea Grant Extension Program
(Baker/Kent/White)**

2/1/2002-1/31/2006 A/EEP-20

The **New York Sea Grant Extension Program** uses its core funding to develop and disseminate problem-solving educational programs and activities in each of NYSG's issue areas: economic leadership, coastal ecosystem health and public safety, and education and community well-being.

Throughout this guide, extension activities funded under this omnibus (core) award will be described first, followed by additional activities funded by NYSG's partners.

New York Sea Grant assists water-dependent businesses statewide in improving their management, operation, marketing, and responses to regulations to enhance business efficiency, effectiveness, cost competitiveness, and profitability. Several **NYSG extension specialists** (Gall/ Clemetsen/ MacNeill) work closely with industries that have a vast impact on the state's economy: NY State's seafood industry (\$7.8 billion), commercial fishing industry (\$150 million) and sport fishing industries (\$3.6 billion). Other NYSG specialists (Holochuck/ Tanski/ White) work with federal, state, and local officials, marine industry leaders, and community groups to increase their understanding of the impact that recreational boating and boating facilities have on regional and state economies. New York's recreational and tourism business communities also need tools to design and evaluate approaches that enhance tourism while promoting environmentally sustainable, economically-stable tourism markets. NYSG extension specialists (Holochuck/White/Thompson) are working

with tourist promotion agencies, coastal business owners, the diving community and resource managers to use sound public policy for managing and protecting coastal resources.

**NEW YORK SEAFOOD COUNCIL
Joint New York Sea Grant/New York Seafood Council Project (Gall)**

2004-2005

NYSG extension (Gall) provides New York seafood businesses with technical information on specific seafood products, markets, processes, and regulations that helps them enhance profitability or create new economic opportunities by utilizing alternative resources, developing new markets or products, or managing overhead costs. NYSG also provides potential seafood consumers with objective information about seafood products, nutrition, safety issues, and proper handling, storage and preparation techniques with a goal of positively impacting their attitudes about seafood.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYS DEC)**New York State Clean Vessel Act Education/Information Program (White)**

2004-2005

Part of a statewide effort, NYSG extension (White) is developing an education/information program targeted at marina operators, boaters, government officials, and community leaders. Through Sea Grant presentations, workshops, web programs, and signage, these stakeholders are being instructed in ways they can improve the quality of NY's coastal waters, especially through the use of environmentally safe pumpout facilities.



Jay Tanski

GOAL 2.**Facilitate Sustainable Use of Economically Important Coastal Fisheries****FINFISH**

Since the 1970s, Sea Grant research has been advancing the science of fisheries biology and management in New York's waters. NYSG researchers improve the understanding of both marine coastal and Great Lakes food webs and the biology of valuable fishery species.

Mysis in Crisis: Food Web Disruption and the Decline of *Mysis relicta* in Lake Ontario (Rudstam/ Johannsson)

2/01/2004-1/31/2006 R/CE-23

This research seeks to understand how ecosystem changes in Lake Ontario have impacted distribution, mortality and growth of *Mysis relicta*, an invertebrate essential to the diet of Lake Ontario trout and salmon. Investigators are seeking a better understanding of the consequences of ecosystem changes in Lake Ontario, as well as an increase in their understanding of the spatial and temporal dimensions of predator-prey interactions and the role of

mysids in Great Lakes food webs.

Evaluating the Effects of Environment and Stressors on Thiaminase Expression in Alewife (Kraft/ Begley)

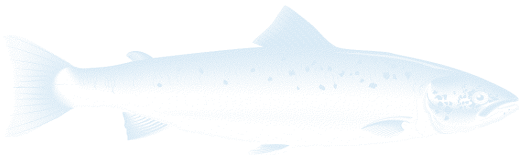
2/01/2004-1/31/2006 R/FBF-15

A primary challenge in managing Great Lakes fisheries is the prevalence of early life stage mortality in salmonids. Over the past three decades, a thiamine-deficiency-related reproductive failure (early mortality syndrome, or EMS) has been observed that affects alewife predators such as lake trout and Atlantic salmon, but not alewife. This research team will use replicated pond manipulations to investigate environmental stressors responsible for the expression of thiaminase in alewife, the key food web vector affecting the development of EMS in valuable Great Lakes fishes. A cheaper and less complicated assay procedure for detecting the presence of thiaminase in fish tissues will also be developed for use by fishery managers in the Great Lakes and marine districts.

Estimating Natural Recruitment of Chinook Salmon in the Salmon River, New York (Ringle/ Rudstam)

2/01/2004-1/31/2006 R/FBF-16

This project seeks to improve estimates of salmon adult stock and smolt recruitment, identify critical habitat, examine hydrologic factors that influence smolt migration, and provide better estimates of the number of salmon smolts entering Lake Ontario from the Salmon River. This will provide fisheries managers with critical information for stocking programs.



Through fishing clinics, fact sheets, and informative web sites, **extension specialists** (Clemetson/Holochuck/Kuehn/MacNeill) use core funding to educate New York anglers. These educational tools help anglers identify not only their catch, but also those techniques and gear improvements that help restore fisheries health and reduce by-catch. During Sea Grant sponsored workshops, the angling public and the resource management community become more familiar with the latest developments in fisheries science. The first four projects listed below are funded by the **NSGO Fisheries Extension Enhancement** program.

A Technical Review of the Lake Ontario Forage Fish Assessment Program (MacNeill)

9/1/2003-8/31/2004 A/O-6

To address ongoing public concerns about the integrity of the joint USGS/NYSDEC Lake Ontario forage base assessment program, NY Sea Grant organized a technical review of the assessment program involving 4 international experts on fish assessment to critique the program. Program strengths and improvements were identified by the expert panel. As a result, the program incorporated some of the improvements and more money was allocated to support the effort. A summary report from the workshop is being prepared.

Fisheries Extension Enhancement: Great Lakes Fisheries Leadership Institute (Baker/White)

6/1/2002-9/30/04 A/EEP-25

NYSG extension staff and partners are selecting and training a cadre of 60 emerging Great Lakes fishery leaders, providing them the leadership skills necessary to make them more effective advisors on Great Lakes fishery issues. This project,

both at the state and regional level, uses a common curriculum and draws on partner agency experts to serve as instructors. The initial cohort will provide the foundation for a long-term, sustained fisheries extension effort, as through a teach-the-teacher model, participants raise the level of constituent understanding, involvement and action in their home organizations and local communities.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYS DEC) **Lake Ontario in an Era of Ecosystem Change: Future Changes, Fisheries Management Challenges, and Outreach Needs** (MacNeill)

2003-2004

There is a strong need for the development of new (or enhanced use of existing) tools to evaluate the effects of recent ecosystem changes on current and future sport and commercial finfish and shellfish fisheries and to identify harvesting and management policy responses to overcome barriers to sustainability. NYSG will work to provide fisheries managers with information on new innovations in predictive modeling and statistics that will better enable fisheries managers deal with uncertainty and decision analysis. This should help agencies develop more proactive management strategies despite facing a multitude of possible future states of Lake Ontario's fisheries from ecosystem changes.

LOBSTER

Six research projects have concluded as part of the total effort (19 projects) to determine the causes of the 1999-2000 lobster mortalities in Long Island Sound being coordinated with the ASMFC-appointed Long Island Sound Steering Committee. The NYSGE outreach effort

is the only remaining activity under the initial \$1.4 million federal.

Bacterial Assemblages Involved in the Development and Progression of Shell Disease in the American Lobster, *Homarus americanus* (Chistoserdov/Smolowitz)

6/1/2001 - 5/31/2004 R/FBM-25

This project is studying the bacteria involved with the development of shell disease in lobsters. The causes of shell disease are



Patrick Sullivan

not clear and a specific infectious agent has not been identified. This project will use molecular techniques as well as classic culture techniques to characterize the bacteria associated with shell disease.

LONG ISLAND SOUND LOBSTER RESEARCH INITIATIVE **Community Outreach, Education, and Extension Programming** (Clemetson)

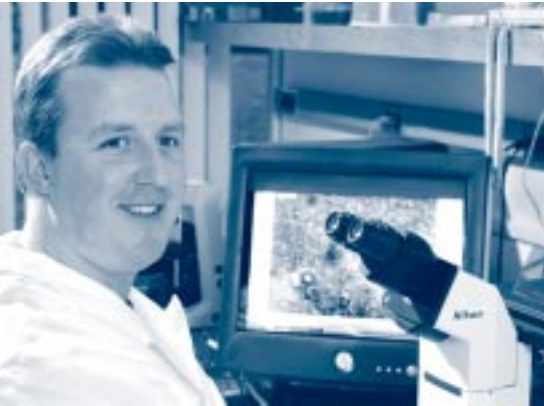
2004 A/EEP-17

LONG ISLAND SOUND LOBSTER RESEARCH INITIATIVE **Community Outreach, Education, and Extension Programming** (Branca/Focazio)

2004 C/CPC-16

New York Sea Grant continues to serve as the state liaison between the ASMFC-appointed Lobster Steering Committee, industry, and the general public, as part of

ongoing efforts in response to the massive die-off of lobsters in Long Island Sound. The research program was supported by the publication of a newsletter, fact sheets, and continued update of web-based information. New York Sea Grant



Bob Stovink

will host the final meeting in the series of public symposia, when final conclusions from the research program will be presented about the most likely events that led to the massive lobster die-off in 1999-2000.

HARD CLAM

Following completion of the three research projects supported under the Hard Clam Research Initiative's first phase, the Initiative is beginning a second phase with additional funding from NOAA's National Marine Fisheries Service. Based on the findings of the first projects and input from the Hard Clam Initiative Advisory Committee, a new request for proposals was developed and released. Technical and programmatic review identified two studies for funding.

This multi-year effort, (plus the first-listed project funded with core NYSG

monies) is providing science-based information to agencies and organizations currently directing considerable attention toward restoring the hard clam populations in NY's south shore estuaries.

Analysis of Field Plantings of Young Cultured Hard Clams, *Mercenaria mercenaria* (Linne), in Long Island, NY (Rivara/Cerrato/Barnes/Aldred)

2/1/2002 - 8/31/2004 R/ATD-10

This project will help scientists and managers evaluate aspects of young hard clam stocking into various Long Island waters. This research team is evaluating stock recovery trade-offs between growth, survivorship and the effects on productivity to determine whether more small-sized seed planted earlier in the year can be as effective as less, larger seed planted later.

The Effects of Brown Tide and Plankton Quality on Hard Clam Larval Growth and Survivorship (Padilla/Gobler)

7/1/2004-6/30/2005 R/FBM-28

The impact of brown tide on hard clam larvae is unknown, but may be an important factor in the potential for recovery of hard clam populations. This project will test whether larval growth, development, and survivorship are inhibited by different strains and concentrations of brown tide and other microalgae. If the larvae are very sensitive, then clam population recovery and restoration efforts will be impeded by continued occurrence of this harmful algal bloom.

A Modeling Study of the Growth, Survival and Recruitment of Hard Clam (*Mercenaria mercenaria*) Larval and Post-Settlement Populations (Hofmann/Bricelj/Buckner/Klink/Kraeuter/Powell)

8/15/2004-8/14/2005 R/FBM-29

This project will build on a hard clam population model developed with previous

NYSG funding, adding a larval component and examining changes in predation pressure. The results of simulation runs will provide information about the most important factors affecting hard clam recruitment and predictions about the feasibility of broodstock sanctuaries and other enhancement efforts.

Isolation of the Pathogen from New York Clams and Genetic Variability in the Host-Parasite System of QPX Disease in *Mercenaria mercenaria* (Allam/Dove)

2/01/2004-1/31/2006 R/BBF-17

Little is known about the protistan parasite QPX's etiology in the commercially important hard clam *Mercenaria mercenaria*. Research thus far suggests that genetic variability in the host and/or in the QPX pathogen could be responsible for differences in susceptibility toward the infection and in the presentation of the disease. Molecular genetic tools and infection transmission experiments will be employed to address the genetic variability in the QPX disease system.

BOTULISM

Since 2001, avian botulism has become a major issue in eastern Lake Erie along the coastal region of New York, Pennsylvania and Ontario, Canada. New York Sea Grant extension took leadership in getting state and federal agencies together with researchers to develop a research and outreach agenda.

Prevalence of Botulism in the Food Chain of the Lower Great Lakes (Bowser/Getchell)

2/01/2004-1/31/2006 R/CTP-31

This project seeks to determine the role of organisms at different trophic levels in the movement of botulism from the sediments through invertebrates to higher vertebrates

such as fish. Determining the prevalence of *C. botulinum* in the food items consumed by the fish provides wildlife pathologists information about the sources and pathways of botulism in the environment.

Algal Pigments as Biomarkers Linking Fish and Benthic Organisms with Type E Botulism (Alben/Perez-Fuentetaja)

3/01/2004-2/28/2006 R/CTP-32

This project seeks to determine the dietary pathways leading to Type E Botulism in fish and birds in Lake Erie, using the presence of algal carotenoids in tissues of food organisms. With this information, scientists will better understand and evaluate the food-web origins and transfer of Type E botulism (*Clostridium botulinum*) toxin from benthic organisms to fish.

Prevalence of Botulism in Fish in the Lower Great Lakes (Bowser/Getchell)

1/1/2002-9/30/2004 R/SHH-12

This team will investigate the role that fish play in mortalities of waterfowl on Lake Erie from the causative agent of botulism, *C. botulinum*. This project fills a critical research gap and will provide government agencies with information essential for managing natural resources and protecting human health.

SUNY Research Foundation, University at Buffalo Great Lakes Program Botulism Outbreaks and the Lake Erie Fishery (Domske)

2004-2005

With the emergence of botulism as a threat to the bird and fish populations of the Great Lakes, NYSG has responded with workshops, proceedings, websites, research meetings, and public presentations designed to provide information and linkages among researchers, managers and the public.

GOAL 3.**Improve the Quality and Safety of New York State's Commercial and Sport Caught Seafood Products**

Sea Grant plays a leadership role in helping both the seafood industry and consumers understand food safety issues related to seafood and develop strategies to effectively manage potential risks. One such hazard is *Listeria monocytogenes*, one of the most difficult microbial pathogens to control in foods not cooked before consumption. The National Seafood HACCP Alliance's distance learning training program continues to play an important part in developing or improving existing controls for these and other hazards in the seafood industry.

USDA/CSREES

Development and Implementation of Science-based Environmental Testing and Control Strategies for *Listeria monocytogenes* in Food Processing Plants*(Wiedmann/Gall)*

9/15/2004-9/14/2006

The project is based on the hypothesis that there is a quantifiable relationship between the presence of *L. monocytogenes* at specific sites in the food processing environment that can be used to predict the likelihood that food contact surfaces or finished products will be contaminated. A mathematical model to define this relationship will be used to develop, implement and evaluate environmental testing procedures. Workshops and training programs will be conducted in the final year of the project to extend project results to processors of ready-to-eat food products. Project collaborators include a half dozen ready-to-eat processing plants and food safety professionals from several universities and associations.

USDA/CSREES

An Internet Based Distance Education Program for Seafood HACCP Training*(Gall)*

9/30/1999-9/2001

NYSG has taken leadership for delivering seafood HACCP training for the seafood industry and federal and state regulators in New York and the nation. Working with the national Seafood HACCP Alliance, NYSG *(Gall)* developed and implemented an innovative 12-module Hazard Analysis Critical Control Point training program that is available on the Internet. From October 2001 to April 2004 over 1,000 individuals from 48 U.S. states and 19 foreign countries had enrolled in the Internet course. Approximately three fourths of the Internet course students are from the seafood industry and about 20% from federal or state regulatory agencies that conduct food safety inspections in seafood processing operations. For more information about this course or to register go to <http://seafoodhaccp.cornell.edu>

Fisheries Extension Enhancement Training and Education in Support of Effective Controls for Scombroid (Histamine) Poisoning*(Gall)*

9/1/2002-8/31/2004 A/EPP-26

NYSG *(Gall)* is part of a national team educating commercial fisheries and charter boat operators about histamine poisoning, a common cause of illness that results from consuming improperly stored species of fish like tuna, mackerel, mahi-mahi and bluefish. Sea Grant is facilitating workshops and conferences and producing publications to help operators implement effective controls to prevent histamine formation in susceptible species. Funding for NYSG's activities in this national initiative is through the NSGO Fisheries Extension Enhancement Program.

GOAL 4.**Prepare for and Respond to Coastal Hazards and Processes**

Along Long Island's barrier beaches, ocean waves constantly reshape the thin strands of beach and periodically form new inlets. When new inlets form, salty water from the ocean enters the calmer, shallow waters of LI's south shore estuaries, potentially changing the delicate balance of the estuaries' ecosystems. Looking long-term at the effects that future breaches along barrier beaches might have on estuarine ecosystems, NYSG has funded four novel research projects, each taking a different approach.

Numerical Modeling of Flow and Scour at the Vicinity of a Coastal Structure*(Liu/Alsaffar)*

4/1/2003-3/30/2005 R/CCP-9

This research is developing a numerical model that can be used by engineers to estimate the potential scour near a coastal structure caused by flowing water. Work from this research will improve understanding of the sediment transport process in the coastal environment. Funding is through the Sea Grant Technology Program.

Physical, Sedimentary, and Hydrologic Impacts of Barrier Island Breach Events on Long Island Estuaries*(Warren/Turner)*

2/1/2004-7/31/2005 R/CCP-10

The formation of breaches in a barrier island separating estuaries from ocean water can cause substantial changes in the water quality, volume of water exchanged, sediment composition and bottom type, and the biological resources of the estuarine environment. In conjunction with another NYSG funded project, this research team will collect baseline data to characterize Long Island south

shore bays' hydrography, bathymetry, and sediment characteristics and their effects on pelagic and benthic communities. Resource managers, agency personnel, scientists and modelers will be able to use this information to aid in decision making regarding breach events.

The Impact of Barrier Island Breaches on the Circulation and Water Properties of Great South Bay*(Wilson/Flagg)*

1/02/2004-1/31/2006 R/CCP-11

Applying a 3-D numerical model, this project will investigate the impact that barrier island breaches might have on the ecology of Long



Courtesy of Martin Weidmann

Island's south shore estuaries as a result of changes in circulation, salinity, temperature, stratification, nutrient supply, productivity, bed-form and submerged aquatic vegetation.

Hydrologic Feasibility of Storm Surge Barriers to Protect the Metropolitan New York-New Jersey Region*(Bowman/Flood)*

2/1/2002-8/31/2004 R/EPH-1

This team is studying the feasibility of placing storm surge barriers at The Narrows, the eastern mouth of the East River, and potentially the mouth of the Arthur Kill to protect low lying areas of New York City and adja-

cent New Jersey from storm surge flooding. The researchers will use maps, models of flooding and hydrology, and several data sources to determine the possible effectiveness of the barriers in these areas. Co-funded by the DEP of the City of New York.

Coastal Early Warning for Emergency Response and Protection Against Flooding in Metropolitan New York (Bowman/Wilson)

2/01/2004-1/31/2006 R/EPH-2

Results from this research will produce an integrated state of the art meteorological/storm surge prediction model for early warning of coastal flooding. Another expected result is to provide significantly improved techniques for forecasting the location, timing and severity of coastal flooding from severe storms.



George Fracos

Along with their partners, specialists in NY's marine district (Tanski) and in the Great Lakes (O'Neill) create, produce, and disseminate vital information about coastal erosion using state-of-the-art technologies of Geological Information Systems (GIS) and CD-Rom. Such informative publications as storm preparedness guides, lake level updates and web-based dissemination of coastal

monitoring program data showing the potential impact of sea level rise help community, state and national leaders make more informed decisions about coastal zone management issues.

NOAA COASTAL SERVICES CENTER Development of a Website for Dissemination of Coastal Data (Tanski)

3/1/2004-2/28/2005
With a grant from NOAA's Coastal Services Center, NYSG will coordinate federal and state partners in a project to develop a web-based geographic information system to disseminate information and data on coastal erosion hazards to federal, state and local government officials and the public.

NYS Department of State Coastal Monitoring, Data Distribution and Awareness Program (Tanski)

2002-2003
Under a MOU with the NYS Department of State, NYSG is working with the Division of Coastal Resources and Waterfront Revitalization to develop, evaluate, and disseminate information on the conditions of the state's ocean shoreline to a variety of audiences.

U.S. ENVIRONMENTAL PROTECTION AGENCY Assessment and Review of Potential Sea Level Rise Response Scenarios in New York (Tanski)

2/01/2004-7/31/2004 A/EEP-29
Using GIS technologies and information provided by local officials, NYSG is developing planning maps that depict the potential response to flooding and erosion problems associated with an accelerated rate of sea level rise. This information will be used to develop better estimates of the potential impact of sea level at the national level and help communities understand how this phenomenon may affect them.

GOAL 5.

Assess And Enhance Coastal Water Quality

A Ferry-Based Observing System for Long Island Sound: Application to Physical Influences on Hypoxia (Waliser/Wilson)

11/3/2001-9/30/2004 R/CE-19

This project's novel use of public transportation ferries to collect real time physical data for input to water quality models will greatly enhance scientific understanding of Long Island Sound in order to predict future conditions of stratification and hypoxia relative to regional weather and other variables. A companion project funded by CT Sea Grant is focused on the eastern end of Long Island Sound.

Low P and High F: Testing for Unexpected Synergistic Effects of Phosphorus Abatement and Bivalve Filtration (Schulz/Limburg)

2/01/2004-1/31/2006 R/CE-24

This project seeks to determine the effects and interactions of phosphorus abatement and dreissenid filtration on benthic and pelagic primary and secondary production and community composition in the Great Lakes. Understanding of how the factors of lowered phosphorus and increased filtration interact to effect production in the benthic and pelagic habitats of the Great Lakes will enhance ability to develop effective management strategies.

Identification of E. coli Sources for Effective Mitigation of Nonpoint Source Pollution (Hasbrouck/Hagedorn)

2/1/2002-5/31/2004 R/CTP-29

This project is developing a crucial bacterial source-tracking tool by modifying novel molecular methodologies that could possibly identify coliform pollution sources with

animal species or groups. Bacterial libraries will be established and validated to aid in best management practice development.

Disposition and Metabolism of Polybrominated Diphenyl Ethers in Fish (Sikka/Kumar)

2/1/2002-12/31/2004 R/SHH-14

Filling a critical data gap, this research team will examine the uptake, tissue distribution, excretion and metabolism of PBDEs in a model fish species. This vital information will advance the state of knowledge on PBDEs in fish and allow the prediction of these chemi-



Greg Boyer

cals and their metabolite body burdens under environmental exposure conditions.

Preparation and Calibration of a Rapid Assay for the Cyanobacterial Toxin Anatoxin-a (Boyer/LaLonde)

2/1/2002-9/30/2004 R/XO-2

A new and novel tool is being developed that can be used to rapidly screen for the presence of anatoxin-a in water and tissue samples. This tool, along with the corresponding ELISA assay, could provide two key components for a tier-based monitoring system for the detection of Paralytic Shellfish Poisoning toxins.

Endocrine Disruption in Jamaica Bay: Are Winter Flounder Being Affected? (McElroy/Schreibman)

2/1/2002-1/31/2005 R/CTP-28

Resource managers will have a demonstration of whether endocrine disruption-chemicals need to be examined carefully with respect to assessment of potential effects of effluents such as those from municipal sewage treatment facilities.

Coastal Communities Development Program 2004-2005 (Kent/White/Thompson)

The Coastal Communities Program is designed to help local land use decision makers understand the link between land use and coastal water quality. In the Marine District an educational CD-ROM is being developed for use with local planning and zoning board members. This builds on the work completed in the first two years of the project. In the Great Lakes Region educational materials are being developed for use in counties bordering Lake Ontario, building on work done in the St. Lawrence River watershed in the first two years of the project.

U.S. ENVIRONMENTAL PROTECTION AGENCY/NY DEC New York Sea Grant NEMO Program (Keenan)

NYSG extension specialists work with their partners to design nonpoint source water quality education programs that assist exist-

ing federal, state, and municipal water quality coordinating committees and water body management programs, lake associations, local governments, and estuary programs in protecting and enhancing the quality of New York's coastal waters. These specialists help plan and coordinate implementation of non-point source educational efforts (including EPA Storm Water Phase II and sediment and erosion control) by integrating work sponsored by the NEMO program (Keenan), Long Island Sound Study (Zimmer), and Hudson River groups (Holochuck). Through Sea Grant workshops, presentations and publications, local officials in multiple Long Island watersheds, the Hudson River Valley and around the Great Lakes are being informed about nonpoint source issues and can incorporate this knowledge into programs that will reduce pollution into their harbors and bays. New York Sea Grant staff (Domske) also provides leadership to the Lake Erie Bi-national Forum and the Buffalo River Remedial Action Plan to provide outreach and educational assistance to keep teachers and the general public aware of progress in the Areas of Concern and the Lakewide Management Plans (LaMPPs).

SUNY RESEARCH FOUNDATION, CEF; MERHAB Tier-based Monitoring for Toxic Cyanobacteria in the Lower Great Lakes (O'Neill)

9/1/2002-8/31/2003

NYSG staff (O'Neill) is helping plan annual training workshops on the identification of cyanobacteria bloom toxins that have been found in NY's lakes. In a stakeholder advisory capacity, Sea Grant is preparing workshop proceedings, fact sheets, and recommendations to health officials regarding their response to potential toxic blooms. Funding is through NOAA's Monitoring and Event Response for Harmful Algal Blooms (MERHAB) project.

GOAL 6.

Protect Or Enhance Coastal Habitats

Response of Long Island's Coastal Wetlands to Environmental Change (Goodbred/Cochran)

(Goodbred/Cochran)

2/1/2002-7/31/2004 R/CCP-8

This project is reconstructing high-resolution histories of three Long Island marsh systems by examining accretion rates, sediment character, geochemistry, and paleohydrology. Results from this work will aid in successful management of Long Island's wetland resources.

The History of Great South Bay: Its Geological Evolution, Benthic Faunal Records, and Past Environmental Change (Goodbred/Cerrato)

(Goodbred/Cerrato)

11/01/2003-1/31/2006 R/CE-22

At present, almost nothing is known about the sub-bottom resources of Great South Bay (GSB) or their history through Colonial times. This research team will be the first to determine GSB's sub-bottom structure and geological development. This information will be useful for understanding the system's evolution and possible future response to environmental changes such as sea-level rise and barrier breaches and their management. Sub-bottom surveys will also delineate the thickness, distribution and nature of mineral deposits providing towns with valuable dredge spoils management information. This work will also provide constraints on the structure and variability of the natural and more recently perturbed GSB ecosystem helping shellfish managers to set realistic standards and expectations for shellfish restoration efforts. The Long Island South Shore Estuary Reserve's Comprehensive Management Plan gave a high priority to this information for public and government stewardship.

Influence of Ocean Exchange on Nutrients, Plankton Assemblages, Submerged Aquatic Vegetation and Shellfish within Long Island's South Shore Estuaries (Gobler/Peterson)

2/01/2004-1/31/2006 R/CMB-30

Barrier breaches (temporary or permanent) can substantially alter the ecology of Long Island's south shore estuaries by increasing bay flushing and salinities. Although these regions once enjoyed balanced and robust pelagic and benthic (eel grass, hard clams) production, they currently are dominated by pelagic production of picoplankton which are having a deleterious effect on resource bivalves and submerged aquatic vegetation (SAV). To ascertain how ocean exchange influences phytoplankton, SAV, and shellfish populations in LISSE, this research team combines observational and experimental approaches to address this issue.

Development of a New Approach for Benthic Habitat Identification and Mapping (Cerrato)

11/1/2002-10/31/2004 R/CO-6

Methods of mapping underwater habitat still utilize a decades-old approach. This study will help develop a new tool for benthic habitat identification by incorporating faunal and geophysical data into an integrated approach that differentiates among benthic habitats. This new and exciting tool will benefit the design and power of scientific research, monitoring projects, and environmental impact studies that are vitally important to resource managers.



Media Services

Working with partners throughout New York's Marine and Great Lakes districts, NYSG extension specialists (Holochuck/Kent/Thompson) are developing public education programs targeted toward the realization of coastal habitat awareness, improvement, and restoration of specific sites. For example, along Lake Ontario's eastern basin, a successful summer intern program aimed at educating the public and protecting the shore's fragile dune ecosystem will continue. On Long Island's south shore,

the Allan Overton Memorial Coastal Habitat and Restoration Endowment funds a Sea Grant Extension coordinated coastal restoration project for youth.

U.S. ENVIRONMENTAL PROTECTION AGENCY
Assessing the Effects of Habitat Protection Efforts on the Eastern Lake Ontario Dune and Wetland Area Management Strategies (Thompson)

2001-2003

NYS DEC
Shoreline Stewardship Practices for Private Landowners (Thompson)

2001-2004

Allan Overton Memorial Coastal Habitat and Restoration Endowment (Kent)

DEC HUDSON RIVER ESTUARY PROGRAM
Hudson Estuary Interpretive Signs for Marina Project (Holochuck)

2004-2005

There is a need for more interpretive information to be located at the most common points of access for thousands of Hudson anglers and recreational boaters. This project will produce a series of interpretive signs to be posted at Hudson River Marinas and yacht clubs that highlight the ecological, biological, physical and cultural aspects of the estuary.

Barbara A. Branca

GOAL 7.

Control the Spread and Mitigate the Impact of Non-Indigenous Species (NIS) and Aquatic Nuisance Species (ANS) in New York's Coastal Waters

AQUATIC INVASIVE SPECIES

Scores of aquatic invasive species compete with NY's native species for food and habitat, creating negative impacts to the state's ecosystems. In NY's Great Lakes district, zebra and quagga mussels cost tens of millions of dollars in impacts on industrial water users, power plants, drinking water treatment facilities, and fisheries. Other aquatic invasive species, such as round gobies, are poised to cause significant negative changes to Great Lakes fishery resources. *Cercopagis*, "the fishhook water flea," is a late '90's invader native to the Caspian and Aral Seas. NYSG has funded research and outreach projects regarding what *Cercopagis* eats, how it behaves and reproduces, and its potential impacts on the Lake Ontario food web. In the state's marine district, a brown tide research initiative spearheaded by NYSG and funded through NOAA's Coastal Ocean Program followed a brown tide summit in the mid-1990s. With a steering committee providing insight, research focused on the ecology of the brown tide algae, its culture in the laboratory and triggers for its bloom. Final syntheses of research findings for both the research community and the public are being developed in 2004.

Aquatic Nuisance Species: Metapopulation Dynamics and Control of the Zebra Mussel in Freshwater and Estuarine Systems: The Effects of

Hydrodynamics, Larval Supply, and Embayments (Padilla)

1/1/2002-8/31/2004 R/CE-18

Extending current work to evaluate the applicability of a zebra mussel control strategy based on the manipulation of larval dispersal, this research will help identify the relationships among population structure, regulation and physical conditions.

Benthification of Great Lakes Ecosystems: A Synergism Between Nutrient Reduction and *Driessena*? (Mills/Mayer/Fitzgerald)

2/1/2002-9/30/2004 R/CE-20

Fisheries managers will gain long-term planning tools in the form of habitat models to interpret and predict the response of fish populations and other communities to the environmental benthification changes in the Great Lakes caused by zebra mussels and nutrient abatement.

Aquatic Nuisance Species: Ecology and Control of the Invasive Plant *Hydrocharis morsus-ranae* in Eastern Lake Ontario and St. Lawrence River Wetlands (Leopold)

6/1/2003-5/31/2005 R/CE-21

The exotic floating-leaved plant, Eurasian frogs-bit, considered one of the top five invasive species in Canada, is expanding its range into the United States. This project will assess the impact of native herbivores as potential biocontrol agents as well as the effects of water levels on growth and spread of this plant. A goal of the research is to enable scientists and wetland managers to implement effective control and preventative protocols against this invasive plant while its spread is still limited.



Aquatic Nuisance Species: Effects of Invasive Invertebrate Predators on the Food Webs of the Great Lakes (Schulz)

3/1/2002-2/29/2004 R/CMB-27

It is likely that the invasions of *Bythotrephes* and *Cercopagis*, two exotic zooplankton species, have affected Great Lakes food webs since both have roles as prey and predator relative to other species near the bottom of the food chain. Several



Courtesy of Joe Malaniewicz

tools including stable isotope analysis will be used to get a better picture of trophic interactions and energy flow, and to identify whether these species are beneficial or detrimental to juvenile fish. *This project is funded through the NSI on ANS.*

Aquatic Nuisance Species: Applied Research Project for the Development of a Cercopagis Interdiction/Prevention Protocol (Baker/MacNeill)

10/1/2001-5/30/2004 R/CMB-28

This project is testing a variety of physical means (temperature, agitation, desiccation), chemical agents (oxidizing compounds, saline compounds) and combinations thereof on the resting egg stage of the exotic zooplankton species *Cercopagis pengoi*. The project developed user friendly guidelines to interdict or reduce the spread of *Cercopagis* into new lakes. The goal is to develop an interdiction or prevention protocol to prevent the spread of this exotic species into new lakes. *This project is funded through the NSI on ANS.*

NATIONAL SEA GRANT COLLEGE PROGRAM Maintain and Enhance the National Aquatic Nuisance Species Clearinghouse (O'Neill)

2004-2005

First established in 1990, The National Aquatic Nuisance Species Clearinghouse at SUNY Brockport with over 7,000 publications in its technical collection is perhaps the most extensive library of its kind in the world. The Clearinghouse and its staff (O'Neill/ Oleson/ MacNeill) keeps industry, government, environmental associations, academia and the media informed about zebra mussels and other marine and freshwater aquatic nuisance, nonindigenous, and invasive species of North America. A searchable electronic database of its Technical Library Bibliography is accessible through the Clearinghouse's web site. The Clearinghouse is also the publisher of the quarterly research digest, *Aquatic Invaders*.

UNIVERSITY OF MINNESOTA ANS-HACCP Training Initiative: To Prevent the Spread of Biological Pollution (Domske)

10/1/2003- 9/3/2005

Great Lakes Sea Grant Network program designed to create training materials and conduct workshops for agency staff, hatchery personnel and other professionals to utilize a hazard identification and risk management approach called Aquatic Nuisance Species-Hazard Analysis and Critical Control Point (ANS-HACCP). The environmental outcome of this effort will be less movement of ANS, fish pathogens and parasites to uninfested waters of the Great Lakes.

SEA GRANT AQUATIC NUISANCE SPECIES OUTREACH PROGRAM Water Chestnut Educational Materials Development (O'Neill/Malchoff)

6/1/2003 -5/31/2005 A/EEP-27

By identifying all laws and regulations that apply to the spread, control and management of water chestnut in NY and the Northeast, this project seeks to educate property owners, recreational boaters, elected and appointed officials, environment interest groups, the media and others about the introduction, spread, impacts, management, and control of the water chestnut. A Northeast water chestnut web site will provide easy access to new and existing water chestnut outreach education materials.

SEA GRANT AQUATIC NUISANCE SPECIES OUTREACH PROGRAM Economic Impact of Zebra Mussels in North American Waters, 1989-2002 (O'Neill/Knuth/Brown)

6/1/2003-5/31/2005 A/EEP-28

This project seeks to quantify the annual and cumulative economic impact of zebra and quagga mussels on surface water-

dependent public and private drinking water treatment and electric power generation facilities throughout the mussels' North American range from 1989 through 2002. This is an updating of a similar study compiled in 1995 by New York Sea Grant Extension and the National Aquatic



Courtesy of Chuck O'Neill

Nuisance Species Clearinghouse. The survey will be followed by programs and materials to educate all interested audiences on such economic impacts and to assist policy and decision-makers in making better decisions regarding zebra mussel prevention and control activities and public policy initiatives based upon known economic impacts.

Brown Tide Outreach (Dooley)

A/0-4

Since 1997, the Brown Tide outreach effort (Dooley) has been characterized by four public symposia and series of seven reports. A fifth symposium and an eighth and final report will summarize and synthesize the conclusions of the brown tide research projects. With assistance from NYSG communications, reports, articles, interviews as well as research results are posted to the NYSG web site.

GOAL 8.**Develop the Capacity of New Yorkers to Participate as Partners in Coastal Issues****Communications***(Branca/Focazio)*

2/1/2002 - 1/31/2006 C/PC-7

Communications is an integral part of New York Sea Grant, using strategies such as publications, the Internet, and the

Sea Grant-funded marine and Great Lakes research is an essential mission for our communications team. The public's understanding and appreciation of our coastal assets is necessary to sustain, develop and safely utilize them.

Sea Grant publications, like **Coastlines**, which is published three times a year, help raise interest in the value of our nation's coastal resources and enterprises. They also illustrate the need for sound science in the formulation of environmental policy decisions by business, government, and educators.

How NYSG's research, extension, and education programs promote better understanding, conservation, and use of New York's coastal resources is also demonstrated through NYSG's web site, **www.nyseagrant.org** where visitors learn more about critical issue areas, download numerous publications, and read up on the latest outreach activities and research findings.

All media releases and electronic news articles will continue to be archived in the "In the News" portion of NYSG's web site. Communications writes and distributes these media releases to members of the press on a regular basis describing activities related to fisheries, seafood safety, coastal businesses and resources, aquatic invaders, water quality, and coastal habitat restoration.

Communications also maintains web sites on NYSG's special research initiatives: the hard clam declines off Long Island's south shore, lobster die-offs in Long Island Sound, bird and fish deaths in Lakes Ontario and Erie linked to the bacterial disease botulism, and the prevalence of brown tide in the Island's bays

Sea Grant Scholars*(Schlenk/Massucci/Dooley)*

2/1/2002-1/31/2006 E/PS-3

New York Sea Grant continues to give high priority to the support of graduate students, recognizing their importance to the conduct of university research in marine or related sciences. Our support helps optimize the students' educational experiences and provides an introduction to the philosophy of the Sea Grant program. Student theses often impart very useful results and information that may not appear in the published literature. We also recognize that these students constitute one of Sea Grant's most important products. Many of NYSG's former scholars (approximately 350) have gone on to highly successful careers in government, industry, and academia. It is anticipated that the currently-supported scholars working on this biennium's research projects will find relevant roles as decision-makers, managers, administrators, business-people, researchers, extension specialists, and teachers who are critical to the future of our marine and Great Lakes resources.

KNAUSS MARINE POLICY FELLOWSHIP PROGRAM

Established in 1979, this program is designed to provide a unique educational experience to students who have an interest in ocean, coastal and Great Lakes resources and in the national policy decisions affecting those resources. Named in honor of one of Sea Grant's founders, former NOAA Administrator, John A. Knauss, this NOAA-sponsored program is committed to advancing marine-related educational and career goals of participating students and to

increasing partnerships between universities and government. It matches highly qualified graduate students with "hosts" in the legislative branch, executive branch, or appropriate associations/institutions located in the Washington, D.C. area, for a one year paid fellowship.

Dean John A. Knauss Marine Policy Fellowship for Brian Weitz *(Mattice)*

2/1/2004-1/31/2005 E/I-35

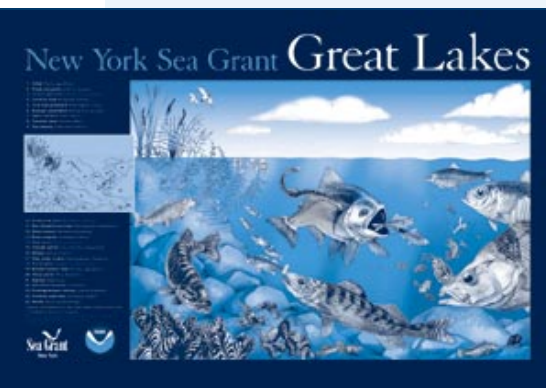
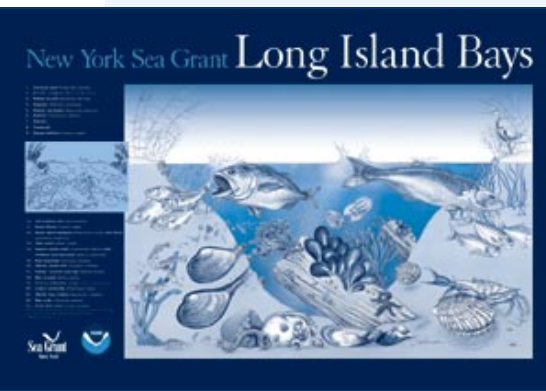
Dean John A. Knauss Marine Policy Fellowship for Michael Snyder *(Mattice)*

2/1/2004-1/31/2005 E/I-36

Brian Weitz received a BA in environmental biology from Columbia University and an MPA in environmental policy from Columbia University's School of International and Public Affairs. Mike Snyder, received a Masters of Public Administration degree (MPA) from the Maxwell School of Syracuse University and an MS in Ecology from the SUNY College of Environmental Science and Forestry. Both Knauss Fellows have been placed on the Senate Committee on Commerce, Science & Transportation, on the Subcommittee on Oceans, Fisheries and Coast Guard.

NATIONAL MARINE FISHERIES SERVICE/SEA GRANT FELLOWSHIP

This fellowship is designed for highly qualified PhD-level graduate students interested in careers in (1) population dynamics of living marine resources and development and implementation of quantitative methods for assessing their status, and (2) economics of conservation and management of living



media to reach out to stakeholders and the general public in order to foster an educated citizenry. Increasing awareness about the value of coastal resources and

marine resources. Each year, approximately two fellowships are awarded in each discipline, with an overall maximum of 12 fellows at any time. Support is given for up to three years for population dynamics fellowships and up to two years for marine resource economics fellowships. Fellows work closely with mentors from NMFS Science



Paul C. Focazio

Centers or Laboratories and work as summer intern at NMFS facility on thesis research or related problem.

NMFS - Sea Grant Graduate Fellowship in Population Dynamics: Defining and Modeling Linkages between Ecosystem Properties and the Abundance and Distribution of Fish Populations
(Sullivan/Gabriel)

6/1/2003-5/31/2006 E/MP-15

Katherine Mills, a Cornell doctoral student working under Patrick Sullivan of the Department of Natural Resources will work with Wendy Gabriel at the Northeast Fisheries Science Center developing GIS techniques to enable future analysis of species-environment relationships.

NMFS - Sea Grant Fellowship in Population Dynamics: Spatial Modeling of

Sea Turtle Distribution and Movement in the Western North Atlantic

(Sullivan/Epperly/Morreale)

6/1/2004-5/31/2007 E/MP-17

Graduate student Beth Gardner, working under Cornell's Patrick Sullivan, will advance the field of movement modeling, provide quantified information about sea turtle distributions, and allow for more sophisticated management strategies. Work will take place at the Southeast Fisheries Science center under Stephen Morreale and Sheryan Epperly.

RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU) FELLOWSHIP

This program at Stony Brook University's Marine Sciences Research Center has summer fellowships for eight academically talented and motivated undergraduates available through funding by the NSF and NYSG, to actively participate in research on estuarine and oceanographic/atmospheric processes. The 8-week program provides 'hands-on' experience in the field with small boats and sampling gear, and in the laboratory with basic analytical instruments and techniques.

REU in Estuarine Processes: Studies of the Great South Bay: Learning from the Past to Manage the Future (Aller)

4/1/2004-3/31/2005 E/MP-18

Students will be teamed with a faculty mentor and carry out individual research projects as well as participate in a coordinated group research effort to examine the history of the Great South Bay, a shallow and important coastal lagoon on the South Shore of Long Island. The physical

dynamics, geological evolution, benthic faunal records, and past environmental change of this environment will be considered as part of a larger project to explain possible impacts of perturbations caused by natural phenomena or human activities. The goal is to demonstrate the importance of teamwork in gathering and sharing data, and will illustrate the usefulness of scientific research for understanding real-world problems. NYSG will sponsor Northwestern University undergrad, Sarah Holsinger, who will work with MSRC's Roger Flood.

Increasing the scientific knowledge and literacy of educators helps develop environmentally aware students, some of whom will become tomorrow's coastal scientists and managers. New York Sea Grant staff works with marine district and Great Lakes educators to integrate Sea Grant resources into K-12 classrooms. Such resources include national and regional Sea Grant curriculum materials, such as *water on the web* and *ESCAPE from Exotics web sites* and effective, hands-on teacher training sessions.

NSF THROUGH MINNESOTA SEA GRANT
Water on the Web (Holochuck)
2002-2004

ILLINOIS/INDIANA SEA GRANT
SGNIS - Kid's Page (Domske)
2004

NYSG helped develop and test a website designed for teachers and students to increase awareness of exotic aquatic species and their ecosystem impacts.

In addition to working with educators in formal settings such as schools, Sea Grant specialists work with non-formal educators in nature centers, aquariums, and with youth groups such as 4-H and scouts providing them with materials and tools to incorporate marine science into their programs. The goal is to interest youth in coastal zone issues, and to promote environmental stewardship of New York's marine coast, estuaries and lakeshores.

NYSG extension specialists (Bartovics/Zimmer) coordinate outreach efforts for two National Estuary Programs. Activities include publishing quarterly newsletters for stakeholders, administering small grant programs, and sponsoring



Barbara A. Bianca

National Estuaries Day celebrations.

HUDSON RIVER FOUNDATION

New York Harbor Estuary Program Public Outreach (*Bartovics*)

2003-2005

U.S. ENVIRONMENTAL PROTECTION AGENCY

Coordinating the Public Outreach Program Year Four for the New York-New Jersey Harbor Estuary Program (*Bartovics*)

2002-2004

U.S. ENVIRONMENTAL PROTECTION AGENCY

Long Island Sound Study Public Outreach (*Zimmer*)

2004-2005

THE NATURE CONSERVANCY

Eastern Lake Ontario Dune Steward Internship Coordination (*Thompson*)

2004

THE NATURE CONSERVANCY – CENTRAL/WESTERN NY CHAPTER

Development of a Natural Resources Assessment of the Salmon River Watershed (*Thompson*)

2004-2006

NY Sea Grant staff (Thompson) will work with a student to design and produce a website for the Salmon River Watershed Natural Resources Assessment project. This public website will include a general introduction to the project; a list of project participants and their contact information; press releases; ongoing project updates; available data; publications from the project; and maps of the study area.

GOAL 9.

Develop New Partnerships

U.S. ENVIRONMENTAL PROTECTION AGENCY

Peconic Estuary Program (*Miller*)

2004-2005

Following the successful partnership with the New York/New Jersey Harbor Estuary Program, NYSG has now partnered with the Peconic Estuary Program in the creation of a new position. The key duties of the Technical Outreach Specialist for the Peconic Estuary Program include developing a newsletter and website for the program, administering a mini-grants program, and doing technical writings to educate the public.

NYS COLLEGE OF AGRICULTURE AND LIFE SCIENCES AT CORNELL UNIVERSITY

Native American Natural Resources Development Extension Program (*Greene*)

2004-2005

New York State is home to more than 6,500 Native Americans, some interspersed within the larger population, and others living on numerous sovereign territories. In an attempt to increase the diversity of audiences reached and because much of this audience lives on or near the water, Sea Grant developed a program with Cornell University's American Indian Program. The goal is to reach this audience with targeted information to help them better manage their resources and to become more involved in coastal zone management.



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Connecticut Department of Environmental
Protection

Dept. of Environmental Protection of New
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Environment Canada

Environmental Protection Agency

Erie County Environmental Education
Institute

Federal Emergency Management Agency

Fisheries and Oceans Canada

Food and Drug Administration

Genessee Valley Land Trust

Great Lakes Fishery Commission

Hudson River National Estuarine Research
Reserve

Illinois-Indiana Sea Grant

Legislative Commission on L.I. Water
Resources

Nassau County

National Marine Fisheries Service

National Oceanic and Atmospheric
Administration; (NOAA)

Coastal Service Center

National Park Service

National Sea Grant College Program

National Science Foundation

National Water Research Institute, Canada

National Weather Service

Natural Resource Conservation Service

The Nature Conservancy

New York City Department of Health,
Environment Microbiology Lab

New York City Mayor's Office of
Emergency Management

New York Office of General Services

New York State Department of Agriculture
and Markets

New York State Department of Economic
Development

New York State Department of Education

New York State Department of
Environmental Conservation

New York State Department of Health

New York State Department of State

New York State Emergency Management
Office

New York State Environmental Facilities
Corp.

New York State Museum

New York State Office of Parks, Recreation,
and Historic Preservation

Oneida Nation of Indians – New York

Ontario Ministry of Natural Resources

Oswego County Soil & Water
Conservation District

Seneca Nation of Indians

St. Regis Mohawk Tribe

Suffolk County Department of Health,
Office of Ecology

Suffolk County Department of Health
Services

Suffolk County Soil & Water Conservation
District

Town of Babylon

Town of Brookhaven

Town of East Hampton Shellfish Hatchery

Town of Hempstead

Town of Huntington

Town of Islip

Town of Manhasset

Town of Smithtown

Town of Southampton

Town of Southold

Ulster County

U.S. Army Corps of Engineers

U.S. Department of Agriculture
Cooperative State Research, Education &
Extension Service

U.S. Department of Health and Human
Services

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

U.S. Food and Drug Administration

U.S. Geological Survey

Westchester County Planning Department

Cornell University	State University of New York College at Oswego
CUNY Brooklyn College	State University of New York College of Environmental Science and Forestry
Great Lakes Research Consortium	Stony Brook University
Nassau County BOCES	Suffolk County BOCES
Niagara County Community College	Syracuse University
Niagara/Orleans BOCES	University at Buffalo
North Carolina State University	University of Connecticut
Oregon State University	University of Delaware
Pennsylvania State University	University of Georgia
Rutgers University	University of Maryland
Southampton College of Long Island University	University of Miami
State University of New York at Fredonia	University of Minnesota
State University of New York at Plattsburgh	University of Rhode Island
State University of New York College at Buffalo	University of Toledo
State University of New York College at Brockport	University of Vermont
	Virginia Institute of Marine Science
	Virginia Polytechnic University

INDUSTRIAL (AND NOT-FOR-PROFIT) *Participants*

Babylon Town Sport Fishing Education Center	Industrial Economics, Inc.
Bechtel Power Company	Lake Kinneret Limnological Lab, Israel
Bridgeport & Port Jefferson Steamboat Co.	Marine Biological Laboratory
Brookhaven Science Associates	Marine Environmental Education Foundation
Center for Great Lakes Environmental Education	National Fisheries Institute
Cornell Cooperative Extension of Suffolk County	National Food Processors Association
Cross Sound Ferry Services	National NEMO Network
Ducks Unlimited	New York Seafood Council
The Eppley Foundation	Oswego Maritime Foundation
Frank M. Flower & Sons Inc.	Peconic Estuary Program
Health Research, Inc.	Port Jefferson Steamboat Company
Hudson River Estuary Program	Research Foundation of SUNY
Hudson River Foundation	Save the River
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