



Valuing our Resources

Water — a most precious resource. That's the real pot of gold at the end of the rainbow. New York's water resources span the cataracts of Niagara Falls to the calm embayments of Long Island Sound. Often maintaining our water resources means protecting coastal habitats.

Protecting habitats may involve actions like keeping pollution from reaching these precious waterways (See "CoastWatch," pgs. 8-9). **Restoring** habitats involves repairing ecological damage that's already been done to the coastal resources.

Restoration efforts underway in New York State's marine and freshwater ecosystems



are made possible in part by specifically designated Environmental Bond Act monies. Related NYSG efforts help protect submerged aquatic vegetation, tidal wetlands, beaches and dunes, estuarine embayments, riverine habitat and migratory corridors and coastal grasslands such as dune habitats. "Historic losses of these habitats have impacted once-productive fisheries and robbed the coastal ecosystem of many of its natural functions," says NYSG Marine District Extension Program Coordinator **Bob Kent**.

Continued on page 10

Maintaining Coastal Fisheries *page 4*

Fisheries Research *page 6*
by Lane Smith

CoastWatch:
Clarifying Water Quality *page 8*
by Paul C. Focazio

**Coastal Habitat Restoration/
Water Quality** *page 10*

Currents
Training Tomorrow's Scientists
by Barbara A. Branca *page 12*
Annual Report
by Stefanie Massucci *pages 14*



COASTAL LINES

Director
Jack Mattice
Associate Director
Dale Baker
Assistant Director
Cornelia Schlenk
COASTLINES
Vol. 30, No. 3, Late Fall 2001

Editor/Writer
Barbara A. Branca
bbranca@notes.cc.sunysb.edu

Contributing Writer
Paul C. Focazio
pfocazio@notes.cc.sunysb.edu
Lane Smith
lsmith@notes.cc.sunysb.edu

Design
L.C. Graphics
Layout
Sharon O'Donovan
Production Assistants
Sharon O'Donovan
Susan Hamill

Coastlines is a publication of the New York Sea Grant Institute, a cooperative program of the State University of New York and Cornell University, engaged in research, education and outreach concerning our marine and Great Lakes resources. Copyright © 2001 New York Sea Grant, all rights reserved. No part of this issue may be reproduced by mechanical, photographic or electronic process or otherwise copied for public or private use without the written permission of the publisher.

New York Sea Grant Institute
121 Discovery Hall, Stony Brook University
Stony Brook, NY 11794-5001
(631) 632-6905

New York Sea Grant Extension Offices:
Administration Office
340 Roberts Hall
Cornell University
Ithaca, NY 14853-5905
(607) 255-2832

Great Lakes District Office
New York Sea Grant
SUNY College at Oswego
Oswego, NY 13126-3599
(315) 312-3042

Marine District Office
New York Sea Grant
Cornell University Research and
Extension Center
3059 Sound Avenue
Riverhead, NY 11901-1098
(631) 727-3910

This issue of *Coastlines* ends both our 30th Anniversary year and the presentation of the **Coordinated Issue Areas** that we highlighted to the review team that evaluated our program for the National Sea Grant College Program (NSGCP). It's particularly appropriate that restoring **coastal habitat** and **water quality** is paired with **maintaining coastal fisheries** given the recent focus on use of essential fish habitat to manage or restore fisheries. Fishing is a real contributor to New York State's economy. Commercial fishing sales almost equal the value of the state's fourth largest agricultural crop – apples. In fact, the commercial and recreational fishing and seafood industries have a combined total impact of \$11.5 billion on New York State's economy. The stories running from pages 4-7 highlight how NYSG's role in helping state resource agencies manage these important fisheries depends not only on integration of the research, extension, education and communication programs, but on social as well as ecological and fisheries science.

Water quality and habitat are frequently interrelated as shown by the articles on pages 8-11. NYSG is involved in these issues on Long Island, and in New York Harbor, the Hudson River and the Great Lakes. Our activities are leveraged by working with organizations at the national (USEPA, NOAA, Nature Conservancy), state (NYS Department of Environmental Conservation), and local community (NYC Soil and Water Conservation District, municipalities of Hempstead and Manhasset) levels. Again, all NYSG programs play important roles.

This issue's **Currents** reviews some of NYSG's efforts to educate the next generation of scientists. These efforts, too, are leveraged; by the individual universities where the NYSG graduate student scholars conduct research, by the federal funding agencies that view our participation in undergraduate research programs as a partial reason for providing funding; and by the federal administrative and legislative offices where the Knauss Fellows work for a year.

New York Sea Grant's budgetary incomes and outflows for calendar year 2000 on page 14 show how NYSG researchers and staff have done a great job of competing for outside funds from NSGCP, NOAA and other federal and state sources over the last few years when the federal and state base budgets have remained flat. The full budget impact of NYSG is almost one-half again as large as indicated in the graph because all of the NSGCP funds require a 50 percent match.

This has been a rewarding anniversary year. The retrospective of Coordinated Issue Areas has given us the platform to highlight the integration and contributions of NYSG to coastal resource issues in New York and the nation. We look forward to an even more productive and successful second 30 years and hope that you will join us in the quest to "Bring Science to the Shore."

Have a great holiday and the best of New Years.




Some of the New York Sea Grant staff in attendance at our annual networking meeting, held in October 2001 at the Winter Clove Inn, Round Top, NY.
Photo by Lenore Witcomb

Learn more about NYSG's Coordinated Issue Areas online:
www.seagrant.sunysb.edu/NYSG@30

*In this the third Coastlines in our 30th anniversary series, we focus on two of New York Sea Grant's seminal issue areas: **Maintaining Coastal Fisheries and Coastal Habitat Restoration/ Water Quality.***

Our two previous Coastlines issues brought to light our historic research and extension efforts in the areas of Seafood Technology, Aquatic Nuisance Species, Fostering Coastal Businesses, and some of our New Initiatives including research on brown tide, hard clams and lobsters.

The lives of New Yorkers are inextricably linked to the state's water and fisheries resources, from Niagara Falls to the tip of Long Island, from our mighty rivers to New York Harbor and our Great Lakes. Yet as we end this year in somber recognition of all New York's incredible resources, let us understand what we value above all else — our human resources.

— Barbara A. Branca



Sunrise, New York Harbor, pre-September 11, 2001

Photo by Don Riepe

The Genessee River leading out to Lake Ontario, Rochester, post-September 11, 2001

Photo by Barbara A. Branca



Sunset, Orient Point Lighthouse, Long Island

Photo by Barbara A. Branca

Maintaining Coastal Fisheries

Each year, New York's seafood, commercial fishing and sport fishing industries generate a total of \$11.5 billion worth of economic activity statewide. The figure is part of a report released this past spring by New York Sea Grant (NYSG) under the guidance of seafood specialist Ken Gall, who compiled the 100-page read along with an advisory committee of representatives from industry and government.

NYSG provided funding to economists at TechLaw, Inc. of Bethesda, MD who formulated the report's estimates of economic activity for these New York industries. "Prior to this study, no one had assessed the economic contribution of all three of these sectors to the state's economy," says NYSG Director **Jack Mattice**.

Promoting NY's Saltwater Sport Fishing

Last year marked the 50th anniversary since the signing of the Sport Fish Restoration Act, a major U.S. landmark in natural resources restoration and conservation. Several fishing organizations joined efforts to promote the sport and encouraged people to "step outside and enjoy fishing" as part of the year-long celebration. New York Sea Grant took steps to participate in this national initiative at the local level through its extension program, a partnership with Cornell University.

Marine Fisheries Specialist **Antoinette Clemetson**, along with NYSG's Office of Communications, completed an online "Fishery Resource Center" to provide marine-related fishing information. "Our goal was to enhance the initial fishing experience of beginners and less experienced anglers in order to generate an interest in the sport that will eventually develop into a long-term commitment," says Clemetson.

Continued on Page 5

In addition to analyzing the economic impacts of these industries, NYSG maintains coastal fisheries throughout the state. In New York's Great Lakes region, which includes Lakes Ontario and Erie, their tributaries, and the St. Lawrence and Niagara Rivers, the bulk of NYSG's fisheries-related upstate extension and research activities has been targeted on Lake Ontario. This smaller, but more economically important lake has been a focal point because it accounts for most of the state's Great Lakes shoreline. Related programming downstate in fisheries biology, management, conservation, restoration and aquaculture focuses primarily on Long Island's marine waters (*see sidebar*).

Efforts in both regions target a variety of primary audiences - anglers, bait and tackle dealers, organized fishing groups, charter and party boat operators, business owners, coastal communities, and elected officials.



In New York's marine district, these endeavors are documented in the regularly published *Sport Fishing Industry News*. And for 25 years, the Sea Grant quarterly publication *New York's Great Lakes Angler* has summarized the latest upstate technical fisheries information in an understandable format.

Currently, anglers from all over the world come to fish for trophy sized trout and salmon, smallmouth bass and panfish in the economically viable waters of Lake Ontario and its numerous tributaries and streams. But early in the 1990s, there was escalating concern for

the future sustainability of the fisheries among researchers, fisheries managers and fishery stakeholder groups. Some potential causes included possible food web unsteadiness, non-indigenous species impacts, heavy stocking pressure, nutrient reduction, fish predation by cormorants (*see Spring/Summer 1999 issue*), and the overall complexity of managing large ecosystems.

In addressing these issues, New York Sea Grant has been and continues to be a credible and objective information source between fisheries resource users and the research and management communities. NYSG played a role in the development and expansion of the Lake Ontario fishery by educating anglers on various techniques in locating, catching and identifying target sport species and practicing catch and release and by fostering growth of charter boat organizations and county fishery advisory groups. These efforts have created a sense of empowerment within the sport fishing industry.

Working closely with researchers at Cornell and SUNY College of Environmental Science and Forestry (CESF) in Syracuse, NYSG continues to address New York's Great Lakes invasive species issues and monitor impacts of the lakes' sport fisheries on the region and its coastal businesses. In the last decade, research studies have focused on angler effort and expenditures, angler markets, New York's Great Lakes charter boat industry, the effects of fish contaminant issues on fishing activity, and angler satisfaction (*see research on cited pages 5-7, and 15*). In addition, NYSG monitors changes in fishing license sales and motorboat registration data. Fact sheets and service letters are produced for all applied research results and distributed throughout the region to coastal businesses, chambers of commerce, tourism promotion agencies, and fisheries managers.

Throughout the 1990s, New York Sea Grant has prominently and consistently provided timely and comprehensible information to sport fishing stakeholder groups. "The successes of this program are directly attributable to extension and research working in unison," says NYSG Fisheries Specialist **Dave MacNeill**. "Our activities over the years have integrated extension outreach with sponsored research to successfully break down information barriers and have fostered closer working relationships between resource managers and public stakeholders."

For example, MacNeill, who is currently on temporary leave to complete his doctorate, commissioned renowned artist Peter Thompson to render full-color

artwork that accurately identifies all Lake Ontario watershed trout and salmon for educational posters and brochures. Currently available fish drawings — either generalized blackline drawings or inaccurate, low-resolution color — cause misidentification. Mac Neill says this new anatomically accurate and detailed set will help anglers better target species.

On the research side, NYSG developed a two-year \$600,000 “special focus” fisheries research project in early 2000 to better understand the complex dynamics of the Lake Ontario ecosystem and its fisheries. Headed by Cornell researcher **Patrick Sullivan**, this study is improving the understanding of factors affecting early survival and management of salmon in Lake Ontario (see **Summer 2000 issue**). This enhanced knowledge of the Great Lakes food web has aided the NYSDEC in its management of Great Lakes fisheries. One finding so far is that stocking levels of salmon was too great to be supported by the forage fish population, advancing the State’s ability to manage for a sustainable salmon population.

A number of NYSG-funded angler surveys were done in the last decade, three administered under Cornell’s **Tommy Brown**, **Barbara Knuth** and **Nancy Connelly** and two by CESF’s **Chad Dawson**. Overall, the surveys inquired licensed Lake Ontario anglers and charter operators on fishing efforts, satisfaction (theirs and customers), and fish consumption. Studies also helped to better identify anglers in New York’s varying geographic regions and suggested where to direct future fishery-related marketing and administrative efforts by analyzing market segmentation factors such as angler preferences, fishing experience, geographic origin, motivations, and product-related interests.

How have invasive species in the Great Lakes impacted New York’s fisheries? In addition to overseeing several fish ecology studies in the 1990s, CESF’s **Donald Stewart** assessed the impact of the zebra mussel on lake dynamics in Oneida Lake. Although results showed the zebra mussels helped to increase water clarity through filtration and declines in algae were found, primary productivity in the lake’s lower trophic level did not decline significantly and no decline in the lake’s total phosphorus was observed.

Also on Oneida Lake, Cornell’s **Ed Mills** found that while smaller yellow perch tend to feed mainly on zooplankton, larger ones prefer small crustaceans, which he found increased in abundance in the presence of zebra mussels. Another of Mills’ studies, which wrapped up in Fall 2000, examined changes in the Lake Erie ecosystem due to decreased nutrient loading and invasions of exotic species in an attempt to better predict fish production for improved fishery management.

On the pathology (disease)-related end of the fisheries spectrum, Cornell’s **Paul Bowser** led a study on the Cayuga Syndrome, a lethal deficiency of thiamine (vitamin B₁) affecting larval landlocked Atlantic salmon in several of New York’s Finger Lakes. The syndrome has been linked to a maternal diet of non-native alewife that has high concentrations of thiaminase, the enzyme responsible for B₁’s breakdown. Results have shown that earlier treatment at the egg hardening stage might provide a greater likelihood of avoiding long-term effects of the deficiency.

Also at Cornell, Paul Bowser and **James Casey** continue a study through early next year on the little-known swim bladder sarcoma virus - a possible skin lesion-causing disease recently identified in the U.S. affecting Atlantic salmon. “Our intent is to determine if monitoring for presence of the disease must take into account the time of year during which fish are tested,” says Bowser.

Fisheries management and population dynamics issues continue to be addressed in both New York’s Great Lakes and marine waters. At Cornell, **Lars Rudstam**’s examination of Lake Ontario mysid population dynamics helped refine acoustic techniques to estimate abundances of aquatic organisms. Results also determined that mysids are the dominant plankton eaters in offshore deep-water habitats, while fish are dominant in shallow nearshore habitats, and that mysids compete with larval salmonids for zooplankton, one of the basic foods for larger aquatic animals.

Stony Brook University’s (SBU) **Dave Conover** wrapped up two related projects in 2000, the first focusing on bluefish recruitment dynamics and the second on the role of marine reserves in fisheries management. Findings in the latter study addressed when reserves would work best, social issues surrounding their implementation, and their role within broader management schemes. And why study bluefish? As Conover explains, “Abundance of the species in any one segment of the coast in a given year may be a poor reflection of recruitment to another region in that same year, or for the coast as a whole.” Research showed a strong relation between April and May winds and the abundance of spring-spawned bluefish, possibly indicating that wind-driven surface flow aids the transport of larvae or juveniles across the shelf-slope region.

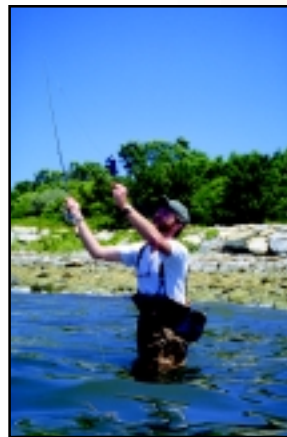
Continued from Page 4

During production of the online Center, a great deal of input was received from several stakeholder groups, including experienced anglers and bait and tackle suppliers, who Clemetson says deserve many thanks for generously offering their time and expertise on the project. The end result: a Web site featuring information on the biology, life history, distribution, management and regulation for species that are targeted by the region’s avid sport fishers—bluefish, porgy/scup, striped bass, summer and winter flounder, blackfish/tautog, and weakfish. Angling tips, rigging, knot tying, hook selection, angling etiquette and releasing techniques provide users hints for improving their fishing skills.

Says Clemetson of the Center’s electronic format, “This medium not only affords us the advantage of providing regular content updates, but also has the potential to reach a wider audience than by other more convention methods. We welcome comments and suggestions to assist us in improving the contents.” Downloads of *Sport Fishing Industry News* are also available.

NYSG’s Fishery Resource Center:
<www.seagrant.sunysb.edu/Fishery>

Photo courtesy of David Hutchins



**Article and sidebar
compiled by
Paul C. Focazio**



Enhancing Trout Fishing

**Diver holding a lake trout caught on its spawning grounds.
Photo by J. Ellen Marsden**

Coastlines asked project assistant Lane Smith to focus on two NYSG fisheries research projects that have had long-term impact for nearly a decade.

The lake trout (*Salvelinus namaycush*) was once the top-level predator throughout most of the Great Lakes and was an important species for the sport and commercial fishery. By 1960, populations of lake trout had collapsed due to predation by the sea lamprey (*Petromyzon marinus*), overfishing, and habitat loss. Beginning in the early 1970s efforts were underway to restore lake trout populations. These efforts involved a lamprey control program, stocking, and fishing regulation changes. The goal was to re-establish a self-sustaining population of lake trout that would produce a surplus for harvest.

Although stocking has maintained adult populations in Lake Ontario since 1973, no natural recruitment of lake trout was detected until 1994. The first evidence of natural reproduction by stocked fish was found in 1986, when wild fry were captured, but no yearling fish were detected until 1994. Since 1994 naturally produced lake trout older than fry (one year and up) have been detected in assessment programs by the state (i.e., natural recruitment was occurring). This was due to a change in stocking practice that focused on a particular strain of lake trout. Prior to 1991 the Lake Ontario stocking program released several genetic lake trout strains into Lake Ontario (the original Lake Ontario native strain is extinct). The idea was that one or more of the strains might be best suited to conditions in the lake. Through natural selection, the best suited strain or strains would survive and recruit into the fishery. The question was which strain or strains survived the best and reproduced the most? By answering that question, the stocking program could use the best strain or strains for rehabilitating the lake trout population.

Perkins, D.L., Fitzsimons, J.D., Marsden, J.E., Krueger, C.C., and May, B. 1995. Differences in reproduction among hatchery strains of lake trout at eight spawning areas in Lake Ontario: genetic evidence from mixed-stock analysis. *Journal of Great Lakes Research* 21: 364-374.

Marsden, J.E., Krueger, C.C., and Grewe, P.M. 1993. Genetic comparison of naturally spawned and artificially propagated Lake Ontario lake trout fry: evaluation of a stocking strategy for species rehabilitation. *North American Journal of Fisheries Management* 13: 304-317.

In a NYSG-funded study, researchers **Dr. Charles C. Krueger, Dr. Bernie May** and **J. Ellen Marsden** of Cornell University examined the parental strain of lake trout eggs and fry collected in Lake Ontario in 1990. To see if different strains spawn at different times, they compared differences in strain composition of early and late spawned lake trout eggs. The team also compared the strain composition of naturally spawned eggs collected in the fall and wild caught fry collected in the spring to see if certain strains survive winter better (spawning occurs in the fall and fry hatch out in the spring). Lastly, the scientists compared the strain composition of wild caught eggs and fry with Lake Ontario hatchery strains of lake trout. This would reveal which of the hatchery strains are most successful in the wild.

Genetic comparisons showed that the Seneca strain was the most successful overall. Both eggs and fry collected in Lake Ontario were dominated by the Seneca strain. The scientists also found that while the hatchery fish released into the lake were comprised of several strains, wild caught fry were dominated by the Seneca strain. The team concluded that the Seneca strain produced the most eggs and fry in Lake Ontario.

These results had clear management implications for the rehabilitation of lake trout in Lake Ontario. After learning that wild caught fry were dominated by the Seneca strain, New York State DEC weighted their stocking towards the Seneca strain. Out of 0.5 million lake trout stocked annually, 67% are Seneca strain, up from 20% before the project. Assessment programs by the state now detect small numbers of yearling trout in the lake. It appears that natural recruitment of lake trout into the next generation is now occurring at a small scale in Lake Ontario. The goal of achieving a self-reproducing population of lake trout in Lake Ontario is closer due to this research. The future looks hopeful for this once dominant native of the Lake Ontario ecosystem.



Diver collecting lake trout eggs. Photo by J. Ellen Marsden

Knowing When to Eat Your Catch

According to NYSG's recent study, sportfishing reels \$3.6 billion into the economy of New York State. However, in some locations, anglers who consume the fish they catch can be exposed to chemical contaminants. Several management strategies like closing fisheries, banning take of certain species or issuing fish consumption health advisories have been used to try to help reduce public health risk.

Issuing advisories presumes that anglers are aware of them, understand them, and know the consequences of their decisions to comply or not comply with them. But often information is lacking about the effectiveness of fish health advisories. To know whether an advisory is effective, information is needed about which groups of anglers know of the health advisories and what proportion understand them. But compliance is the real key.

To address this problem, New York Sea Grant researcher **Dr. Barbara A. Knuth** conducted a mail survey in January 1992 of New York licensed anglers. The survey was developed to be similar to a statewide angler survey conducted in 1988 so that comparisons could be made between the two surveys. Anglers were asked about their catch and consumption of fish, their fish preparation and cooking methods, awareness of the health advisory, changes they made due to the advisory, their sources of information about the advisory and other information they would like to have made available.

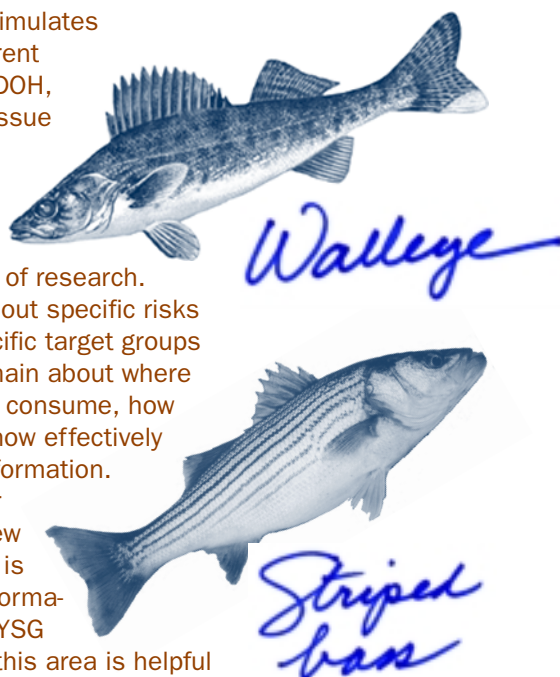
Knuth's study showed that awareness of the health advisory by licensed New York anglers was high (85%). This was an increase from the previous statewide survey (80%). However certain groups of anglers were less aware or unaware of the health advisories. These groups included people with low income, as well as women and minorities.

State health officials used this information to develop ways to target these groups with information about the health advisory. One important effort involved a cooperative project between the New York State Department of Environmental Conservation (NYSDEC) and the New York State Depart-

ment of Health (NYSDOH) that was funded by the Environmental Protection Agency (EPA) in 1999. The project hired and trained "health rangers" who worked in New York Harbor and the Hudson River to get the word out about the health advisories. The rangers posted public fishing sites, developed a brochure for anglers, spoke to community groups, and developed public service announcements (PSA) for local radio and television broadcast both in English and Spanish. As a result, the NYSDOH received many calls for information from the Spanish-speaking public. This project exemplifies how New York Sea Grant-funded research stimulates cooperation among different agencies (NYSDEC, NYSDOH, and EPA) to address an issue of public concern.

There is a continuing role for New York Sea Grant to play in this area of research. Information is needed about specific risks of consumption and specific target groups of people. Questions remain about where they fish, how much they consume, how best to reach them and how effectively they are targeted with information. This is especially true for the lower Hudson and New York City where licensing is not required and thus information is lacking. Further NYSG funding of research into this area is helpful for agencies such as NYSDOH to do their work.

Is sport fishing for walleye or striped bass one of your passions? Keep on top of the latest advisories about eating sport fish caught in New York waters from Lake Erie to Montauk. Just log onto our Seafood pages <www.seagrantsunysb.edu/seafoodtechnology> and scroll to "Sites of Interest." Click on "NYS Health Advisories."



— Articles by Lane Smith, Project Assistant

Connelly, N.A., B.A. Knuth, and C.A. Bisogni. 1992. Effects of the health advisory and advisory changes on fishing habits and fish consumption in New York sport fisheries. Human Dimensions Research Unit, Department of Natural Resources, Cornell University. Series No. 92-9: 120 pp.

Connelly, N.A., and D. Kuehn. 1994. Lake Ontario fishing and fish consumption. New York Sea Grant Fact Sheet: November.

Knuth, B.A. 1990. Risk communication: A new dimension in sport-fisheries management. North American Journal of Fisheries Management 10: 374-381.

Knuth, B.A., and N.A. Connelly. 1992. Is New York's health advisory on fish consumption making a difference? Coastlines 22(4): 4-5.

According to New York Sea Grant publications, **nonpoint source pollution**, or contaminated runoff, affects just about everyone living in a watershed. Examples of runoff that may come from local land-use decisions include:

- Soil erosion from construction sites
- Fertilizer and pesticide runoff from improper lawn and landscape care
- Bacteria and viruses from the improper disposal of pet waste
- Materials washing off roads and other paved surfaces

Photo of a Manhasset Bay locale
by Rafael Bellber



“

Reaching the millions of people living in New York's marine district with information about nonpoint source pollution and motivating them to change their behaviors is a daunting task. In some cases, we know the sources and input levels and need to focus on educating the public to recognize the problems or participate in their solutions.”

—Bob Kent, NYSG's Marine District Extension Program Coordinator

Over the past ten years, New York Sea Grant's extension program has educated a variety of audiences on ways to control nonpoint source pollution (NPS), which occurs when rainfall, snowmelt, or irrigation flows over land or through the ground, picks up pollutants, and delivers them into rivers, lakes, coastal waters or ground water. Through fact sheets and posters, workshops and announcements

in newspapers, radio and television, NYSG gets the word out on improving water quality to community groups, businesses, educators, and local government officials.

In addition to addressing water quality and sustainable coastal development issues in three National Estuary Programs (NY/NJ Harbor Estuary, Long Island Sound, and Peconic Estuary), NYSG also supports related research and education efforts in the Hudson Estuary and through Long Island's South Shore Estuary Program. In May 2000, NYSG received a NYS Department of Environmental Conservation (NYSDEC) grant to begin a Nonpoint Education for Municipal Officials (NEMO) program on Long Island. Now a national network of approximately 20 programs, NEMO began in 1991 as a pilot project of Connecticut Sea Grant and the University of Connecticut Cooperative Extension that used geographic information systems, remote sensing, and the Internet to educate municipal officials about the correlation between land use and coastal resource degradation.

So why does NEMO primarily target planning and zoning board officials? “These local officials make important land-use decisions every day that determine the social, economic and environmental health of their communities,” says **Eileen Keenan**, NYSG's water quality specialist. “People serving on these boards are volunteers and few have training in marine sciences or water quality issues. Also, reaching planning and zoning board officials is considered a priority need by the

Eileen Keenan (top photo, left), NYSG's water quality specialist, at a September 2001 follow-up workshop on EPA Phase II Stormwater Regulations with North Hempstead Councilwoman **Doreen Banks** at Roslyn's Bryant Library. The locale (bottom photo) was also the setting for two inaugural nonpoint source education workshops held in February 2001. During each workshop, Keenan provided municipal officials with an effective, integrated approach to meeting land-use needs while protecting fisheries, beaches, and coastal habitats.



Photos courtesy of Eileen Keenan and Barbara Branca

Watch

Environmental Protection Agency, DEC, and others involved in water quality issues."

In the wake of the EPA's 2000 Phase II mandate requiring the development of municipal stormwater management plans, New York Sea Grant held two NEMO educational workshops for local decision makers in Long Island's north shore watersheds of Hempstead Harbor and Manhasset Bay. Since then, Keenan has conducted another half-dozen water quality workshops in other Long Island locales, such as Riverhead, to support municipal officials in their evaluation of local policies, proposals and regulations. "It is my hope that the workshops will continue to help Long Island's coastal villages enhance their vitality and aesthetic character while, at the same time, preserving the rich natural resources that are so important to them," she says.

Water quality education is a challenge New York Sea Grant has faced in New York's metropolitan area as well. Last fall, Sea Grant made its move into Manhattan, now one of 10 offices statewide. **Laura Bartovics** was named the outreach specialist for the New York-New Jersey Harbor Estuary Program. The estuary is a large dynamic and interactive ecosystem encompassing the waters of New York Harbor and the tidally influenced portions of all rivers and streams that empty into it.

After obtaining input from NY and NJ community stakeholders during a dozen "Help the Harbor" public meetings held earlier this year, the next step was to host "Making the Vision a Reality," a June 2001 conference on priorities for implementing the NY/NJ Harbor Estuary Program. "Our intent was to use the conference and the series of public meetings leading up to it to ensure that the program's future directions consider the voices of the public and the scientific community," says Bartovics. EPA's **Robert Nyman**, Director of the Harbor Estuary Program (HEP), adds, "Informing the public about the complex problems that the Harbor faces and what can be done to address them is a challenging task. Encouraging public participation is a key element in the restoration of the Harbor and Sea Grant has made this a reality by bringing the expertise they have demonstrated in other programs to the Harbor Estuary Program."

Planned by **Eugenia Flatow** from NYC Soil and Water Conservation District and the Hudson River Foundation's **Dennis Suszkowski**, the "solution-oriented" conference, as Flatow called it, provided a forum for perspectives from the scientific community, environmental and civic sector, and government agencies and a discussion of how to begin

setting targets for the program. The event, as well as the series of meetings leading up to it, was based on "Success and Challenges: Highlights of Program Accomplishments and Challenges for the Future," a report published by HEP's Citizens Advisory Committee and Science and Technical Advisory Committee that was widely distributed among the Program constituents.

"This was the next logical step in what we hope will be a collaborative effort to make the vision of the Program's Comprehensive Conservation and Management Plan a reality for the Harbor Estuary," says Flatow. In 1996, the Harbor Estuary's CCMP was completed and, a year later, it was signed by the Governors of New York and New Jersey as well as EPA's Regional Administrator Jeanne Fox. The CCMP focuses on protecting, restoring, and enhancing habitat and forming public/private relationships in the region and coordinating with other geographic plans to protect and restore the environment. The plan also emphasizes the need to develop management strategies to, among other things, prevent pollution, reduce contaminants at the source, and integrate plans across land, water and air.

New York Governor **George Pataki**'s statement reconfirmed his commitment to the program since taking part in the CCMP's 1997 approval, citing the conference as "a sign of the spirit of cooperation." Pataki commended "the contributions made by the citizens, scientists and representatives of the many public agencies," recognizing that "thanks to those efforts, improvements in water quality and aquatic habitat that enhance the resource in this highly populated and economically important area have taken place."

In a statement read at the conference, then NJ Governor and current EPA head **Christie Todd Whitman** said the Harbor Estuary Program "has made great strides in implementing the plan. I congratulate [the HEP] on the work it has done . . . and encourage its continued efforts. The Harbor is an extraordinary vibrant ecosystem, supporting the many diverse uses demanded by a densely populated metropolitan area."

As a result of the conference, possible future directions include port development and further environmental restoration efforts, a stronger focus on air, water, and hazardous waste programs, a high priority on enhanced interaction between involved organizations and agencies, and a renewed belief that public outreach for HEP will lead to increased support.

—Paul C. Focazio



Outreach coordinator Laura Bartovics (above) welcomes attendees to

"Making the Vision a Reality," a June 2001 conference of the NY/NJ Harbor Estuary Program (HEP) held at the World Trade Center. NY Governor George Pataki, who considers the estuary as both an ecological vital and economically viable resource, cites the restoration of tidal wetlands such as those at Healy Avenue on Jamaica Bay as one of the current successes the HEP should build on.

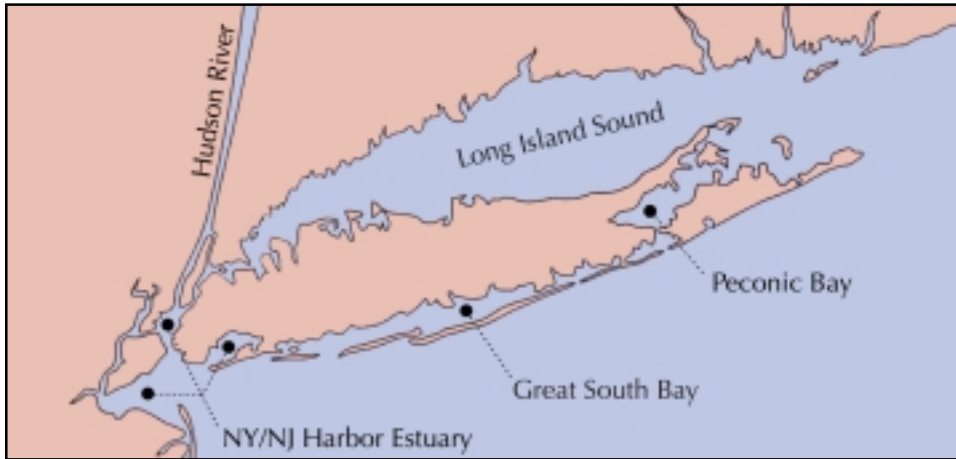
Photos courtesy of Don Riepe (Jamaica Bay) and Barbara Branca

Want more information on land use impacts and non-point source pollution?

Check out NYSG's NEMO site:
www.seagrant.sunysb.edu/nemo

The EPA, the Harbor Estuary Program's Citizens Advisory Committee and Science and Technical Advisory Committee, and the NY/NJ Port Authority made "Making the Vision a Reality" possible. New York Sea Grant, which supports these endeavors through its HEP outreach coordinator, would like to express its condolences to the families and friends of the victims of the tragedy our nation suffered on September 11, 2001, including those lost by the Port Authority.

Coastal Habitat Restoration/ Water Quality



The Long Island Sound Study, for which public outreach is provided through NYSG specialist **Kimberly Zimmer**, has as two of its goals to “Restore the ecological function of degraded and lost habitats,” and to “Restore at least 2,000 acres and 100 river miles of natural habitats over the next 10 years.” New York Sea Grant, along with organizations such as the US Environmental Protection Agency (EPA), US Fish and Wildlife Service, NYS Department of Environmental Conservation, and the NYS Department of State, has pledged to play a leading role in the effort to restore and protect the habitats of Long Island Sound.

In New York’s marine waters, it is difficult to find a habitat that has not been impaired in some way by human activity. Many of the region’s coasts are *estuaries*, – places where fresh and salt water mix (see map). Portions of estuaries may be bays, harbors, sounds, or lagoons — all fertile junctions of sea and stream that are among the most productive areas on earth. Estuary programs for the NY-NJ Harbor Estuary, Long Island Sound, Long Island’s Peconic and South Shore Estuaries, and the Hudson Estuary have placed a priority on balancing the protection and restoration of coastal habitats with economic development. And New York Sea Grant continues to be an active participant in related regional research and educational efforts. For example, NYSG staff served on the Peconic Estuary Program’s habitat restoration working group to gather citizen input and develop a related comprehensive plan.

LISS encourages hands-on citizen participation by providing local groups with small grants program funding. Under this now \$278,000+ NYSG-administered program, over 72 projects have been funded and completed since 1995. “A substantial increase in funding for the past several years has led to a significant increase in the number of people getting involved and the quality of projects planned for Long Island Sound,” says Zimmer.

Recent rounds of LISS small grants projects have included curriculum development and teacher training workshops, production of a series of posters on controlling nonpoint source pollution, a Sound-wide beach clean up, and summer programs for children from low-income families. The program also continues to address issues such as habitat restoration, water quality monitoring, toxins, hypoxia (the depletion of dissolved oxygen), and pathogens.

In the summer of 2001, Sea Grant programs in New York and Connecticut partnered with the EPA to make more than \$400,000 available to support the nearly three-quarters of a million dollars already earmarked for Sound research studies. The grant program, now in its second round, will improve the understanding of Sound pollution problems and related ecosystem impacts of eutrophication, the process by which the water’s enrichment of dissolved nutrients stimulates growth of aquatic plant life and can result in hypoxia.

While boating on the Hudson River during the summer months, have you noticed dense beds of underwater plants in shallow waters? Cornell University researcher Eugenia Barnaba reveals some near Castleton. Why are these plant beds so valuable? Read on.

Photo courtesy of Nordica Holochuck



"Given the importance of Long Island Sound, collecting scientific data which can be used to make future decisions regarding the health and cleanup of the Sound is important," says NYSG Director **Jack Mattice**. "The fact that we can partner to do this is a plus."

Restoring coastal ecosystems, such as those of Long Island Sound and the Hudson River, is a relatively new science, one in which research is needed to guide communities toward their restoration goals. According to the National Research Council, "A new emphasis on resource stewardship and restoration cannot succeed without public understanding and support. Thus, educational programs aimed at raising the level of public knowledge and comprehension of aquatic ecosystem restoration rationales, goals, and methods should receive adequate government funding."

The Hudson River, an estuary below the Troy Dam where fresh water and salt water from the ocean mix, is another rich ecological environment providing food and shelter to diverse plants and animals. A spawning ground for major species of Atlantic coast fish and the flyway for many migratory birds, the Hudson River is also home to dense beds of shallow water plants. Called submerged aquatic vegetation (SAV), these beds are located throughout the river but are mostly abundant in the mid reaches, especially between Catskill and Kingston, the latter of which is the location of NYSG's Hudson Valley Specialist **Nordica Holochuck**.

One related project involving Sea Grant researchers conducted by the Institute for

Ecosystem Studies, Cornell University, and the Hudson River National Estuarine Research Reserve addressed the concern that SAV beds are being lost in many estuaries throughout the northeast, including the Hudson River. These underwater plant beds provide critical habitat for a variety of finfish and shellfish, and feeding habitat for many species of waterfowl. Good information on SAV abundance, distribution, and ecological functions will make improved understanding and managing of the resource possible. More information on this topic is available in NYSG's brochure *What Boaters Should Know About Hudson River Underwater Plant Beds*.

In a separate study, NYSG-funded researchers at Cornell University collaborated with two Sea Grant specialists to analyze public and community leader perceptions of and support for coastal ecosystem restoration. The study demonstrated that community leaders and state agency staff could not accurately predict views of local residents. Findings showed the importance of economic development and access issues to local residents were overestimated, while concerns were more related to contaminants in the environment. Actions local residents felt should be taken included: reducing danger to humans from chemical contaminants in the river, cleaning up contaminated urban waterfront sites called brownfields and monitoring levels of the river's contaminated fish. NYSG extension staff is working with the researchers to develop fact sheets to summarize study findings for distribution to agency staff, environmental groups and the public.

—Paul C. Focazio

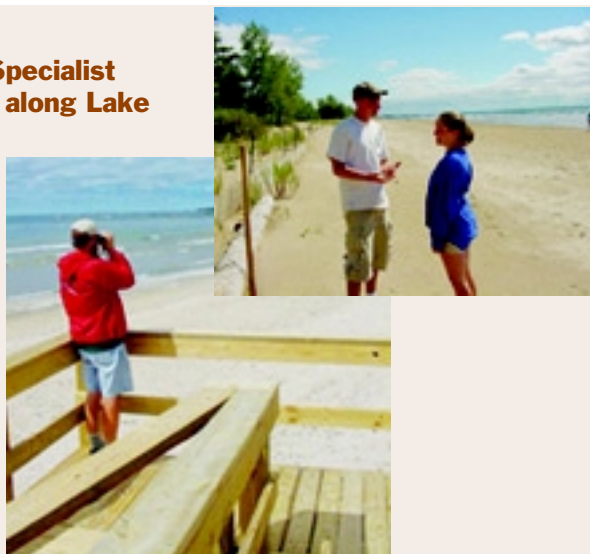
You Can Restore Habitat

Want more information on habitat restoration-friendly grasses for planting? NYSG has made available fact sheets on *Native Grasses*, *Smooth Cord Grass*, and *American Beach Grass*. These types of relatively simple habitat restoration projects were identified for citizen participation thanks to NYSG, Cornell Cooperative Extension's marine program, and the USDA's Natural Resources Conservation Service.



This past summer, NYSG Dune and Habitat Education Specialist Molly Thompson coordinated a dune stewards program along Lake Ontario's eastern shore with the help of The Nature Conservancy and the NYS Department of Conservation. One of four interns working along a 17-mile stretch of shoreline, SUNY at Cobleskill undergrad Barry Mahar, (above right) educates a visitor at the Southwick Beach/Lakeview Wildlife Management Area. SUNY Oswego undergrad Garr Owens stands on a new walkover at Black Pond Wildlife Management area looking for shorebirds. The program's success has allowed for its return next summer under Thompson's supervision.

Photos courtesy of Molly Thompson



Training Tomorrow's Scientists

Educating the next generation of scientists is part of New York Sea Grant's mission. And what could better exemplify such a mission as the support given to both undergraduate and graduate students participating in scholarship and fellowship programs that focus on coastal research and policy.

quickly due to a shortened breeding season. This has had certain tradeoffs in evolution—namely that the fish actually develop poorer swimming abilities and thus are more prone to predation. Whether or not this is trend is actively in effect in Great South Bay estuaries is currently under study by Conover and Arnott.



Matt Ajemian (far right) enlists the help of other Summer REU students at Stony Brook's Marine Sciences Research Center as they use a 100-foot seine net to catch Atlantic silversides in Great South Bay. Photo courtesy of Megan Dantzler

Undergraduate **Matt Ajemian**, sponsored by New York Sea Grant, sampled the waters of Long Island's south shore on some of the summer's good "beach days" along with other student participants in the **Research Experience for Undergraduates (REU)** hosted by Stony Brook University's Marine Sciences Research Center and directed by **Dr. Josephine Aller**. Matt, a junior at Boston College and Long Island native, looked at the feeding behavior of juvenile Atlantic silversides (*Menidia menidia*) during the eight-week program and often enlisted the help of the other REU students in the program. Those eight students (sponsored by the National Science Foundation) studied other aspects of the Great South Bay, ranging from its physical factors (groundwater discharge and salt penetration), its geological history (salinity variations over time), and its living resources (microbial communities, shellfish and finfish).

Matt's project stemmed from a current NSF funded project being done by his mentor, **Dr. David Conover**, who is looking at the predator-prey relationship between the predatory bluefish (*Pomatomus saltatrix*) and young silversides. Conover and **Dr. Steven Arnott** study how latitude of the fish affects the species' ability to escape predation. They have found that in colder climates, fish must develop more

On the rugged coastline of Maine, NYSG has been funding summer research experiences for qualified Cornell undergraduates for the last three years. According to course leader **Dr. Bruce Monger**, senior researcher at Cornell's Center for the Environment, only top students are selected for courses at **The Shoals Marine Laboratory** which is jointly operated by Cornell University and the University of New Hampshire. All the course instructors are NASA Earth Science Enterprise Science Team Members who conduct

active research in their respective fields at prestigious institutions.

In the summer of 1999, **Benjamin Carr** analyzed one year's worth of SeaWiFS ocean color data to study the seasonal phytoplankton dynamics in various North Atlantic regions—the Grand Banks, Georges Bank, the North Sea and the open-ocean North Atlantic. Ben developed a method to establish the precise starting time of the spring bloom and created movie loops to demonstrate the dynamic nature of the spring bloom event in the different regions.



To study feeding behavior in these small, but important fish, the students took nine samples within a 24-hr period. Photo courtesy of Megan Dantzler



NYSG has supported a Cornell undergrad for the last three summers at the Shoals Marine Laboratory.

Phillip Roseman did his summer of 2000 student project on the seasonal changes in chlorophyll concentration in the Great Lakes using SeaWiFS ocean color satellite imagery. He clearly demonstrated significant intra-lake difference in the seasonal pattern of change in chlorophyll concentration. Phil offered a good hypothesis that may have explained these differences in terms of the relative flushing time of each lake system.

And in this past summer of 2001, Cornell undergraduate **Eli Perrone** analyzed satellite imagery of ocean wind speed, sea-surface temperature and chlorophyll concentration derived, respectively, from QuickScat, AVHRR and SeaWiFS sensors. He wanted to gain an understanding of the physical mechanism responsible for localized regions in the North Atlantic that experience unusual early spring phytoplankton blooms that occur before usual thermal stratification. He proposed that unusually low wind speeds might allow phytoplankton to remain high in the water column before it is stratified. Eli and advisor Monger are continuing this research as part of Eli's senior thesis.

A little closer to home at SUNY Brockport, **Betsy Damaske**, a Sea Grant Scholar working with **Dr. Joseph Makarewicz**, a NYSG-funded researcher of longstanding in the area of aquatic nuisance species, won the Best Student Presentation in the Limnology and Ecology section of the **Great Lakes Research Consortium** annual meeting in March 2001 held in Syracuse at SUNY CESF. After graduating with a degree in biology from Nazareth College of Rochester, Betsy first worked as a metals analyst at an environmental laboratory in Rochester. She decided to get a master's degree to become an environmental consultant. Her masters thesis on evaluating trophic interactions and changes in Lake Ontario biota due to the invasive fishhook water flea, *Cercopagis pengoi* is being readied for publication.

Says Sea Grant Scholar Betsy Damaske, "I have thoroughly enjoyed my time spent at SUNY Brockport working in the lab and on the research vessel."

With the title "Roles of Coastal Habitats in the Life Histories of Lake Ontario Fishes," Sea Grant Scholar **Darran L. Crabtree** received a NYSG **Thesis Completion Award** during the fall of 2001. Darran, under advisement from SUNY-CESF's **Dr. Neil Ringler** was featured in the Winter '99 *Coastlines* article "CoastWatch: A Fisheye View on Lake Ontario."

Another successful Sea Grant Scholar who started in research and has spent a year in the policy area is **Katherine Mills**. Her year as a NYSG's sponsored Knauss Fellow soon draws to a close. Since early 2001, Kathy has worked with the US Senate Commerce Committee's Subcommittee on Oceans, Atmosphere, and Fisheries and handled marine habitat issues such as marine protected areas. Sea Grant's Knauss Fellowship program provides practical, "hands-on" policy-making training on marine and Great Lakes resources to graduate students who are hosted by the legislative or executive branches of the federal government in the Washington, DC area. Says Kathy, the experience "links academic training to real-world marine management issues and provides an opportunity to work in collaboration with managers to address them."

This Duke University grad is working on her thesis on fish community structure in tidal wetlands under Cornell's **Dr. Mark Bain**. Kathy's master's research, was done as a Sea Grant Hudson River National Estuaries Research Reserve/ Sea Grant Fellow in 1998.

New York Sea Grant's 2002 Knauss Fellow **Laura Oremland** will work for the National Marine Fisheries Service. She recently completed her MS and was a Sea Grant Scholar under Stony Brook University's **Dr. Dianna Padilla** on a NYSG-funded project to study zebra mussel population dynamics in the Hudson River.

—Barbara A. Branca



CURRENTS

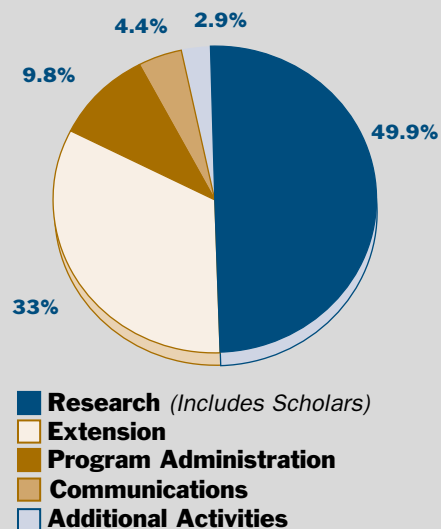
New York Sea Grant Institute Funding 2000

(State, Federal, and Other Funds Allocated in Calendar Year 2000)

Program Administration	\$528,943
Communications	\$234,475
Extension	\$1,774,015
Research and Scholars	
Economic Leadership	\$922,104
Coastal Ecosystem Health and Public Safety	\$650,426
Initiatives and National Investments	
Aquatic Nuisance Species/Ballast Water Investment	\$301,308
Brown Tide Research Initiative (BTRI)	\$478,807
Hard Clam Research Initiative	\$325,119
Percent of Above Research Funds Allocated to Scholars	13.7%
Total Research and Scholars	\$2,677,764
Additional Activities	
Fellowships	\$61,100
Regional Activities	\$25,956
BTRI Administration and Outreach	\$39,340
Hard Clam Research Initiative Administration	\$10,272
South Shore Estuary Reserve Technical Advisory Committee	\$18,816
Other Conferences/Workshops/Special Projects	\$32,390
Total Additional Activities	\$155,484
Total Funds Allocated	\$5,370,681
Unallocated and Pending Committed* Funds Carried Over	\$1,227,484
Additional Non-Federal Cost-Sharing or In-Kind Support (not already included as direct support in table above)	\$1,625,737

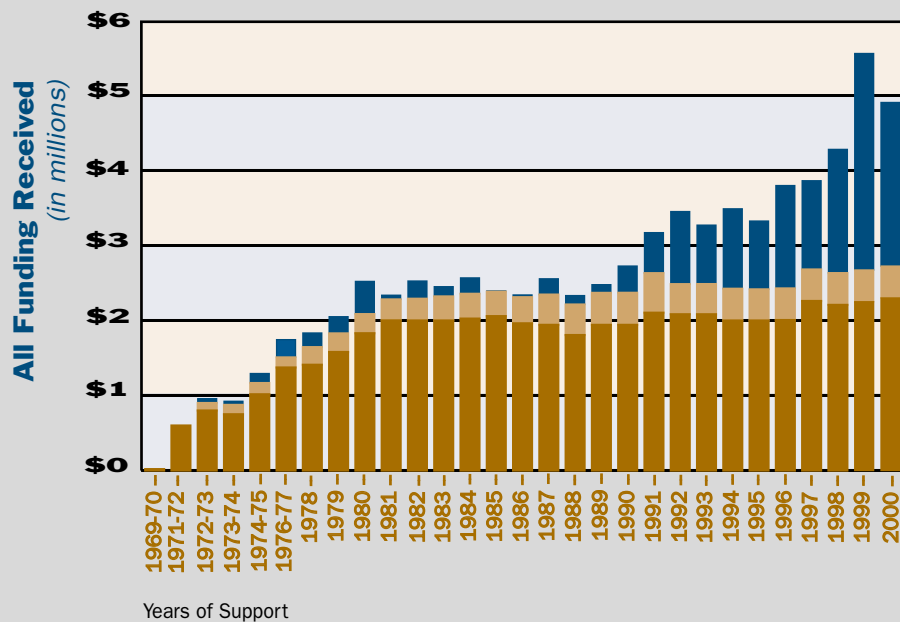
*Includes funds committed to continuation of specific projects/activities, and projects slated to begin in 2001

Distribution of Funding Among Program Elements



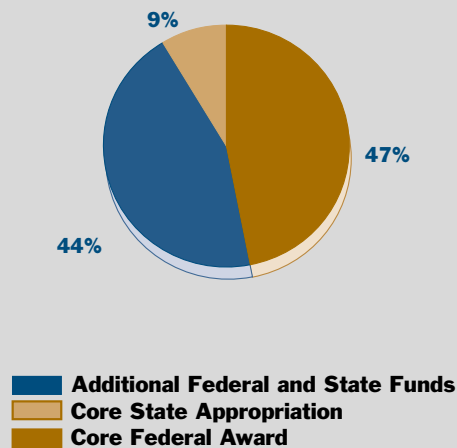
New York Sea Grant Funding

(Since Inception)



Funding Sources

(2000)



Note: "Other" includes additional state, federal, Cornell, SUNY and private funds received by NYSG program.

–Stefanie Massucci
Fiscal Officer

LastWave

Ordering Publications

Please send requests for the following publications along with a self-addressed label and check payable to:

New York Sea Grant Institute
Communications
121 Discovery Hall
Stony Brook University
Stony Brook, NY 11794-5001
(631) 632-9124

Is the cold keeping you away from the water?

Be one of the over 14,500 who warm up with Sea Grant online each month through the winter. Log on to www.nyseagrant.org for the latest on these questions.

- Are brown tide blooms to blame for declines in hard clam populations in Long Island's south shore waters?
- Why did a NY lawmaker call for Sea Grant studies on botulism - a bacteria affecting the Lake Erie ecosystem, especially its fish and birds?
- What caused the winter '99/'00 die-off of Long Island Sound's lobster fishery? NY and CT researchers convened in November 2001 to discuss possibilities.
- Where in upstate New York did we open our 10th office statewide?
- Where are water quality education efforts being targeted in New York's marine waters? Our newly launched NEMO (nonpoint source pollution) Web site has the answers.

New York Sea Grant Publications

Boating in NY is good clean fun Let's keep it that way! Rack Card. New York Sea Grant, NYSDEC, and Sport Fish Restoration. 2001. *Free*

Fish Profile(s): Antoinette Clemetson. 2001. *Free*

- Bluefish • Scup • Striped Bass
- Summer Flounder • Tautog
- Weakfish • Winter Flounder

Fisheries Management Planning

Resources: A Guide to the Agencies & Organizations Involved in the Process: An Annotated Directory. Antoinette Clemetson. 2001. *Free*

30 Species to Watch in 2001. Illustrated bookmark. New York Sea Grant. 2001. Available in sets of 30. \$3.00

Water-Wise Guide for Home Gardeners. Nordica Holochuck. 2001. *Free*

Sport Fishing Industry News Newsletter. Antoinette Clemetson, Editor. Spring/Summer 2001. *Free*

Journal Reprints

Ferguson, P. Lee, Charles R. Iden, Anne E. McElroy and Bruce Brownawell. 2001. Determination of steroid estrogens in wastewater by immunoaffinity extraction coupled with HPLC-Electrospray-MS. *Analytical Chemistry* 73(16):3890-3895. \$1.00

Hoffman, Adam D. and Martin Wiedmann. 2001. Comparative evaluation of culture- and BAX polymerase chain reaction-based detection methods for *Listeria* spp. and *Listeria monocytogenes* in environmental and raw fish samples. *Journal of Food Protection* 64(10):1521-1526. \$1.00

Makarewicz, J., I.A. Grigorovich, E. Mills, and E. Damaske. 2001. Distribution, fecundity, and genetics of *Cercopagis pengoi* (Ostroumov) (Crustacea, cladocera) in Lake Ontario. *Journal of Great Lakes Research* 27(1):19-32. \$1.00

Montlucon, Daniel and Sergio A. Sañudo-Wilhelmy. 2001. Influence of net groundwater discharge on the chemical composition of a coastal environment: Flanders Bay, Long Island, New York. *Environmental Science and Technology* 35(3):480-486. \$1.00

Norton, Dawn M., Janet M. Scarlett, Kelly Horton, David Sue, Joanne Thimothe, Kathryn J. Boor and Martin Weidmann. 2001. Characterization and pathogenic potential of *Listeria monocytogenes* isolates from the smoked fish industry. *Applied and Environmental Microbiology* 67(2):646-653. \$1.00

Parker, S.L., L.G. Rudstam, and E.L. Mills, D.W. Einhouse. 2001. Retention of *Bythotrephes* spines in the stomachs of eastern Lake Erie rainbow smelt. *Transactions of the American Fisheries Society* 130:988-994. \$1.00

New York Sea Grant Board of Governors

Dr. Kraig Adler
Vice Chair of Board of Governors;
Vice Provost for Life Sciences
Cornell University

Mr. R. Wayne Diesel
Vice Chancellor for Business and Industry Relations, SUNY

Dr. D. Merrill Ewert
Director, Cornell Cooperative Extension
Cornell University

Dr. Marvin Geller
Chair of Board of Governors;
Dean and Director, Marine Sciences Research Center
Stony Brook University

Dr. Susan A. Henry
Dean of College of Agriculture and Life Sciences,
Cornell University

Dr. James Lassoie
Chair, Department of Natural Resources
Cornell University

Dr. Walter Lynn
Director, Center for Environment
Cornell University

Dr. Jack Y. Narayan
Dean of Graduate Studies & Research,
SUNY College at Oswego

Dr. H. Lorraine Oak
Associate Dean
SUNY at Buffalo

Mr. Francis Pordum
Derby, NY

Dr. William Tully
Vice President for Academic Affairs
SUNY College of Environmental Science and Forestry

Mr. Michael E. White
Westbury, NY

Ex Officio Members

Mr. Gordon Colvin
Director of Marine Resources
NYS Dept. of Environmental Conservation

Mr. Robert Crowder
Policy Analyst, Division of Policy & Research
NYS Department of Economic Development

Herring

The Atlantic herring is a small Northern Atlantic Ocean fish most abundant in New York during the winter and early spring. For the nutrition conscious consumer, herring is a great choice. It's high in protein, has a moderate amount of fat, is an excellent source of omega-3 fatty acids, and is a reasonable source of B-complex vitamins and trace minerals.

The familiar canned sardines are actually small immature herring, one to two years in age. In the Northeast, the sardine harvesting and canning industries are concentrated in Maine. Other popular and widely consumed herring products in Europe and the U.S. include smoked herring products such as kippers, and a variety of pickled herring products such as roll-mops and herring in sour cream and wine sauces. You're as likely to find herring products at the deli counter as in your local seafood store. The ingenious methods of "curing" herring by salting, smoking or pickling could easily fill an entire book.

Fresh herring are traditionally prepared by frying, broiling, grilling or baking – cooking methods of choice for the fattier, full-flavored fish species. Herring is one fish species found in the cuisine of many northern European countries. In Scotland, herring are rolled in coarse oatmeal and fried. In a Russian dish, herring are mixed with boiled potatoes, apples, and onions and baked in sour cream. The Dutch send a batch of the season's first herring directly to the Queen. In a traditional Dutch recipe, chunks of herring are baked with an egg, potato and yogurt mixture. Try sharing a batch of herring this New Year's in the German tradition, using this recipe.

Courtesy of NY Seafood Council

German New Year's Herring

Ingredients

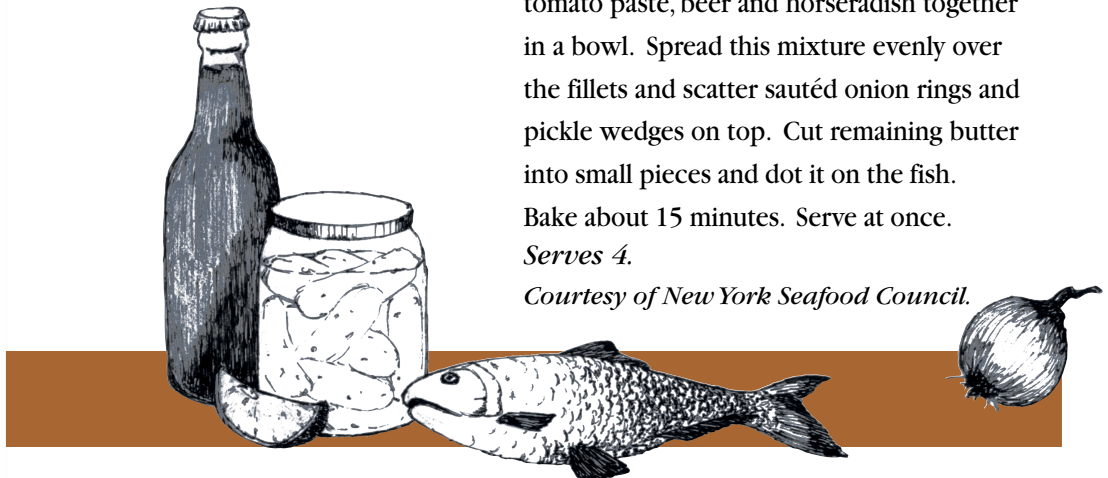
- 2 lbs. herring fillets,
cut into serving pieces
- 2 tbsp. lemon juice
- 2 onions, medium,
sliced and separated into rings
- 3 dill pickles, medium,
cut into thin wedges
- 4 tbsp. butter or margarine
- 3 tbsp. tomato paste
- 1 tsp. horseradish
- 1/2 tsp. salt
- 1 tbsp. beer

Method

Preheat oven to 375°F. Butter a baking dish or casserole large enough to hold the herring fillets in a single layer. On wax paper, spread the fillets out and sprinkle them with lemon juice and salt. Let the fillets marinate for 10 minutes. Melt 2 tablespoons of butter over moderate heat. Sauté onion rings in the butter for about 5 minutes until soft and transparent. Arrange herring fillets in the baking dish. Beat tomato paste, beer and horseradish together in a bowl. Spread this mixture evenly over the fillets and scatter sautéed onion rings and pickle wedges on top. Cut remaining butter into small pieces and dot it on the fish. Bake about 15 minutes. Serve at once.

Serves 4.

Courtesy of New York Seafood Council.



New York Sea Grant
121 Discovery Hall
Stony Brook University
Stony Brook, New York
11794-5001

ADDRESS CORRECTION REQUIRED

NONPROFIT
U.S. POSTAGE PAID
UNIVERSITY AT
STONY BROOK



*New York Sea Grant
provides equal opportunities
in employment and
programming. Coastlines is
printed on recycled paper
and may be made available
in an alternative format.*

*Bringing
Science to
the Shore*

<http://www.nyseagrant.org>