

Photo courtesy of George Proios



Breaking Through

Nothing is more constant than change itself...

And nowhere can this be demonstrated more graphically than along Long Island's barrier beaches where the dynamic interactions between shifting sands and crashing 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 Long Island's south shore estuaries (LISSE), potentially changing the delicate balance of the estuaries' ecosystems. In recent decades, each of these estuarine ecosystems has already undergone change due to increased community development along Long Island's populated south shore coupled with changes

in business and municipal practices that may have led to a decline in commercial shellfish populations.

Looking long-term at the effects that future breaches along barrier beaches might have on these estuarine ecosystems, New York Sea Grant has funded four novel research projects. Each has a different approach and thus provides a different piece of the puzzle.

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From the Director

Not since the 1969 **Stratton Commission Report** has there been a stronger focus on Great Lakes, coastal and ocean issues than in the last 15 months. The documentation of the sad state of the world's oceans in the Stratton report led President Nixon to create the **National Oceanographic and Atmospheric Administration** in 1970. Besides taking over as the home agency for the National Sea Grant College Program (NSGCP), NOAA initiated the largest effort in history to understand, protect and utilize coastal resources.

The unprecedented recent coastal resource orientation involved four major activities.

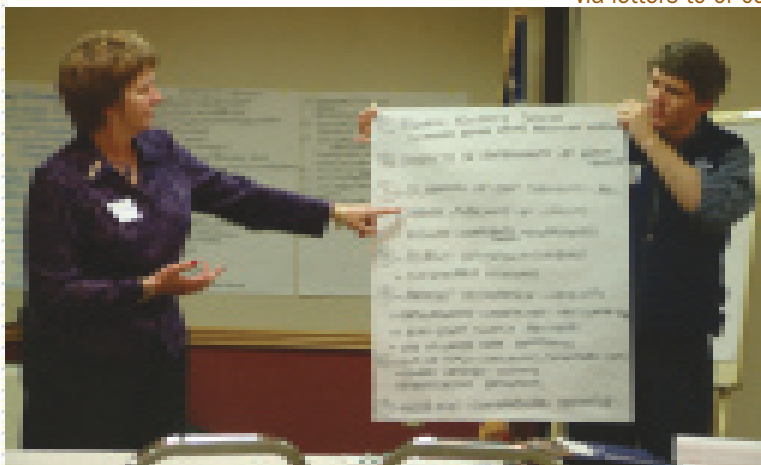
- First, the **PEW Commission** (NY's Governor George Pataki was a member) report concluded that the world's oceans are still in crisis and proposed a multitude of activities related to six major policy objectives aimed at reclaiming ecological sustainability of the oceans.
- Second, a Senate bill was introduced to establish an interagency cooperative **Integrated Ocean Observing System** to provide the baseline monitoring information needed to support wise Great Lakes and ocean policy.
- Third, bills were introduced in both the US House and Senate to appropriate billions of dollars to help restore the Great Lakes;

President George W. Bush subsequently created the **Great Lakes Interagency Task Force** to coordinate all federal "environmental restoration and management activities in the Great Lakes Basin."

- Finally, the draft **Commission on Ocean Policy** (COP) report was distributed for comment to the coastal states' Governors. Already, this report has resulted in the Administration's proposed NOAA Organic Act of 2004 to help NOAA deal with the Commission's recommendations.

All of this activity suggests that larger budgets for ocean studies in general and Sea Grant in particular may be in the offing. In fact, New York Sea Grant has contributed to or is involved in responding to each of the activities. Two examples are summarized in this issue (see pages 6 and 12). And the NSGCP in general is referred to rather liberally in the COP document. However, there is increasing competition for federal funds in a time of uncertain budget projections. Thus, it is likely to take substantial public pressure to ensure that the re-organization and increased funding of Great Lakes, coastal and ocean studies described in the COP report will be realized.

I hope that you will consider supporting the COP's recommendations for strong programs of outreach, education and research, as well as strong roles for NSGCP and in particular NYSG via letters to or contacts with your Congressional representatives.



NYSG's Helen Domske and Dave White review a list of priority topics compiled by stakeholders attending the Great Lakes Restoration workshop. See story on page 12.
Photo by Barbara A. Branca

Funding Breakthrough Research

In February 2004, The National Oceanic and Atmospheric Administration (NOAA) awarded more than \$2.4 million to support programs and research conducted by New York Sea Grant. The award funds many new research projects and numerous educational and communications projects, as well as an extension program that serves the state's coastal communities from New York's two Great Lakes to the Hudson Valley, the greater New York metropolitan area and Long Island.

"This NOAA grant provides funding for New York Sea Grant to support and enhance multi-project initiatives targeting the origin of botulism in Lake Erie fish and the potential impacts of coastal change on New York's communities and beaches," said retired Navy Vice Adm. **Conrad C. Lautenbacher**, Undersecretary of Commerce for oceans and atmosphere and NOAA administrator.

Undersecretary Lautenbacher also highlighted two "special focus areas" that NYSG has targeted for this two-year award. One special focus area, finding the origin of botulism, helps to promote the sustainable use of economically important Great Lakes fisheries. NYSG will sponsor two research projects that trace the origin of type E botulism in Lake Erie fish. For an in-depth look at these seminal projects, read the article on page 12 about the recent Botulism Workshop. In the marine district, NYSG researchers will examine another special focus area—the impacts of potential barrier island breaches to Long Island's estuaries. The article on page 4 will elaborate on this suite of four research projects.

The remaining newly-funded projects affect other important issues from New York's fresh and salt water coasts. Since the 1970s, one of the thrusts of NYSG research has been in the fisheries biology and management of New York's waters. With an ecosystem approach, NYSG researchers improve the understanding of the food webs and the biology of valuable fishery species.

New projects in the Great Lakes District:

Mysis in Crisis: Food Web Disruption and the Decline of *Mysis relicta* in Lake Ontario

Researchers will seek 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 **Lars Rudstam** (Cornell) and **Ora Johannsson** (Fisheries and Oceans, Canada) 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

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 themselves. The Cornell research team of **Clifford Kraft** and **Tadgh Begley** 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

In this project, researchers **Neil Ringler** of SUNY College of Environmental Science and Forestry (ESF) and **Lars Rudstam** of Cornell seek 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.

Low P and High F: Testing for Unexpected Synergistic Effects of Phosphorus Abatement and Bivalve Filtration

The research team of **Kim Schulz** and **Karin Limburg** of SUNY ESF will try to determine the effects and interactions of phosphorus abatement and zebra mussel 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.

Breaking Through

Through documentation of geological history, mathematical modeling, and biological field work and assessment, a whole picture will emerge to show how barrier breaches alter the ecology of these related estuaries. Long Island's south shore estuaries (see map on opposite page) make up a series of contiguous barrier island estuaries that have been subject to severe storm events that cause ephemeral or permanent barrier island breaches. Such inlets can substantially alter the ecology of these estuaries by increasing bay flushing and salinities. It seems clear that LISSE have experienced a phase shift in recent decades. These ecosystems once enjoyed balanced and robust biological production both in the pelagic region (water column) with a variety of phytoplankton and in the benthic region (bottom) dominated by eel grass and hard clams. But now these regions are dominated by pelagic algae such as brown tide which is having a deleterious effect on commercially significant clams and scallop as well as submerged aquatic vegetation (SAV) such as eelgrass.

Using the Past to Plan for the Future

One way of assessing what has changed in Long Island's estuaries is going to the geological record. At present, almost nothing is known about the sub-bottom resources of Great South Bay (GSB) or their history through Colonial times. The research team of **Steven Goodbred**, **Robert Cerrato**, and **Kirk Cochran** of Stony Brook University's Marine Sciences Research Center (MSRC) will be the first to determine GSB's sub-bottom structure and use it to infer its geological history in their project *The History of Great South Bay: Its Geological Evolution, Benthic Faunal Records, and Past Environmental Change*. 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.

These surveys of Great South Bay will have an immediate application of providing Long Island towns with valuable dredge spoils management information. Findings from this research project will also provide details about the structure and variability of the natural and more recently perturbed GSB ecosystem, thus 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.

Using the Power of Physical and Mathematical Models

Barrier island breaches in Long Island's south shore estuaries are a continuing possibility, potentially threatening the water quality and biological resources within the system. MSRC's **Bob Wilson**, **Charlie Flagg**, and **Henry Bokuniewicz** in their project *The Impact of Barrier Island Breaches on the Circulation and Water Properties of Great South Bay* will be applying a 3-D numerical model to investigate the impact that barrier island breaches might have on the ecology of Long Island's south shore estuaries. The model will be sensitive to changes in circulation, salinity, temperature, stratification, nutrient supply, productivity, bed-form and submerged aquatic vegetation.

Modeling represents a potentially very useful tool for gaining a unified picture of how the various components of the system interact and are affected by alterations in the system. This research team will apply a 3-D numerical model, using salinity as a keystone parameter, to evaluate the changes in residence time, 3-D temperature and salinity distributions, tidal and residual circulation, tidal and sub-tidal sea-level variability, and bottom stress with the system. The calibrated model will be used to investigate the response to current US Army Corps of Engineers breach scenarios for Fire Island.

In another newly-funded project, *Physical*,

**Background image of Great South Bay.
Photo by Barbara A. Branca**

Long Island's south shore estuaries are the focus of four newly-funded NYSG research projects.



Sedimentary, and Hydrologic Impacts of Barrier Island Breach Events on Long Island Estuaries, researchers will look at the physical characteristics of the water in LISSE and their effects on living things both in the water column and on bay bottoms. 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. The Southampton College research team of **Joseph Warren** and **Robert Turner** 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.

Establishing Gradients for the Biological Communities

During a breach event, less saline bay water is exchanged for saltier ocean water. To ascertain how ocean exchange influences phytoplankton, SAV, and shellfish populations in LISSE, another research team will concurrently conduct field experiments to assess predation on the growth of SAVs and hard clams across ocean-to-estuary gradients. **Christopher Gobler** and **Bradley Peterson** of Southampton College, Long Island University will conduct *Influence of Ocean Exchange on Nutrients, Plankton Assemblages, Submerged Aquatic Vegetation and Shellfish within Long Island's South Shore Estuaries*.

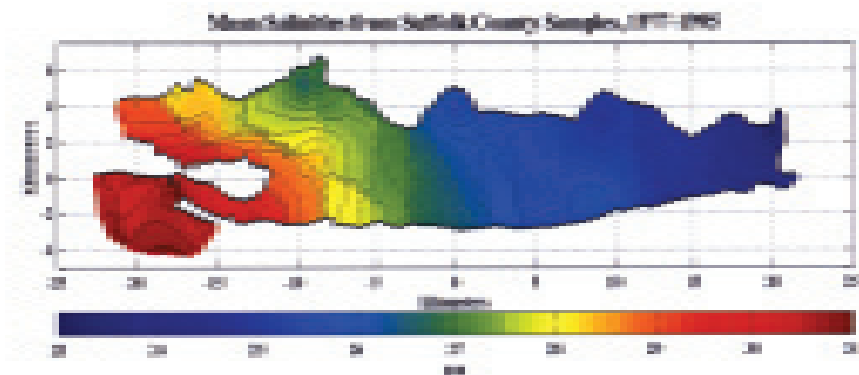
Establishing gradients in nutrient concentrations, phytoplankton abundance, diversity

and productivity, SAV densities and shellfish densities along estuary-to-ocean transects within LISSE is of critical importance for future managerial decisions aimed at understanding the impacts of breaches on the estuaries and restoring their once-productive shellfisheries.

Because of the significance of these four projects, this summer's Research Experience for Undergraduates (REU) program at Stony Brook's MSRC will focus on Great South Bay. A small group of students from around the country will be mentored by many of the breach project investigators during a unique summer session. New York Sea Grant will be sponsoring a student from Northwestern University, **Sarah Holsinger**, who will work with MSRC's **Roger Flood**. This successful summer program initiated by the National Science Foundation and led by MSRC's **Josephine Aller** is now in its sixth year.

The integration of these four projects will provide a greater understanding of estuarine ecosystems and will provide results of interest to planners, managers, citizen groups and the businesses of Long Island's south shore communities as they look long term at land use, development and the commercial and recreational exploitation of marine resources.

— **Patrick Dooley and
Barbara A. Branca**



Maps like this one that indicate the salinity of Great South Bay will be used to create a 3-D numerical model to show the impact of breaches on the estuarine ecosystem.

Courtesy of the Suffolk County Department of Health Services

NYSG a Sounding Board for Governor on Ocean Report

In late April 2004, the preliminary *Report of the U.S. Commission on Ocean Policy: Governors' Draft*, a result of two and a half years of effort, was submitted to coastal states' governors for their comments prior to being completed. **Dr. Jack Mattice**, NYSG Director was asked to submit his comments for inclusion in **Governor George Pataki's** response.

The US Commission on Ocean Policy was charged with "carrying out the first comprehensive review of marine-related issues and laws in more than 30 years to assist the nation in creating a truly effective and farsighted ocean policy." This was to involve organizing US ocean science and regulation to legally and administratively "make decisions, set priorities, resolve conflicts and articulate clear and consistent policies that respond to the wealth of problems and opportunities ocean users face." The Commission also was to provide a common vision and set of objectives. Finally, the Commission was asked to "suggest ways to reduce duplication, improve efficiency, enhance cooperation and modify the structure of federal agencies involved in managing the oceans and coasts."

Says Mattice, "The report is comprehensive and articulates a new vision for ocean and Great Lakes coastal policy and management that is integrative and ambitious. It documents the huge contributions of ocean and coastal resources to the US economy, then indicates that these contributions are degraded and increasingly at risk because of the lack of consistent and insightful policy."

Past efforts to establish ocean and Great Lakes coastal policy are used to launch the Commission's visions of "Imagining a Brighter Future," choosing a set of "Sound Guiding Principles" and using a set of operational concepts to translate those principles into policy.

The report is divided into numerous chapters dealing with different ocean and coastal technical issues including among others sustainable fisheries, education, marine biomedical research, oceans and human health, and a national strategy

for increasing scientific knowledge. For each, the Commission outlines a national framework, mentions organizations in the lead, and identifies what is known and unknown. The report concludes with 35 pages of recommendations.

The Commission suggests that a chair of the National Ocean Council (NOC) become an assistant to the President and lead an effort to establish a Department of Natural Resources, probably at the presidential cabinet level. A regional approach to watershed and coastal management, fisheries and other issues is also proposed—a method that the Sea Grant program has pursued nationally. Sea Grant is mentioned by name several times in the document.

The report considers the Great Lakes as the "Fourth Coast" because of its unique fisheries and watershed issues. The document also touches on international policy participation, funding, intra-organizational coordination and timelines.

Mattice was able to point out in his assessment of the document that seafood safety and fish and shellfish disease issues are largely ignored as is the extent of current response to the topic of nonpoint source education for municipal officials. In his comments to the Governor, Mattice was aided by several NYSG specialists who sponsor programs to address the state's needs on these broad issues—programs that have a proven track record with New York's municipalities, coastal businesses and other stakeholders.

In summary, says Mattice, "The Commission on Ocean Policy has done a tremendous job and prepared a comprehensive document that presents a new paradigm for ocean and Great Lakes coastal policy and management. The organizational structures that they have proposed, for both the short and long-term, show great promise for achieving a sustainable future for coastal resources. This bodes well for the future of aquatic environments and their dependent human populations."

— **Barbara A. Branca and
Jack Mattice**

Are Marshes Losing Ground?

Imagine going back to a favorite childhood spot and it wasn't there. If you choose to visit a coastal salt marsh, it could happen.

"The natural laboratories of Long Island's many estuaries support numerous salt marsh and coastal wetland habitats which are under threat from both natural and human-induced changes," says **Steven Goodbred**, a marine geologist at Marine Sciences Research Center at Stony Brook University. Ongoing work funded by New York Sea Grant is looking at several different salt-marsh sites around Long Island. One major goal of this study is to reconstruct the history of a marsh's response to environmental change—change caused by sea-level rise, shifting land use, and the natural forces that continually reshape the coast. Every wetland has its own distinctive tides, wave energy, and rates at which sediment accumulates or is washed away. And each wetland has its own sensitivity to the possible threats of future environmental change.



Alex Kolker holds a large sediment corer taken from a salt marsh.

Marshes that dot New York City's Jamaica Bay, a complex ecological system that also happens to be a gateway to one of the world's most densely populated cities. Recent observations reveal that some of these marshes seem to be disappearing. On some of these marshes, grasses waving in the wind and abundant wildlife looking for food have been replaced by barren, eroded landscape. The marshes are in the middle of an active bay where waves constantly wash away sediment and re-deposit it. Does marsh loss over the last 30 years have anything to do with changes in sedimentation rates?

Investigating this possible linkage, Sea Grant Scholar **Alex**



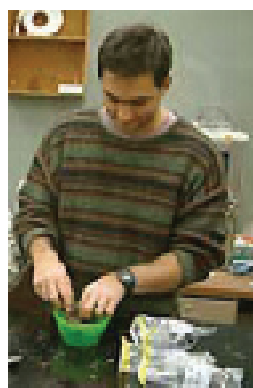
Sea Grant Scholar Alex Kolker observes a salt marsh.

Kolker, working under Steve Goodbred and MSRC's **Kirk Cochran**, recently presented his findings at a March symposium, *Jamaica Bay's Disappearing Marshes*, which was sponsored by the National Park Service and Gateway National Recreational area with help from NYSG and the NY Aquarium. Kolker and his fellow graduate students took core samples from three different salt marshes in Jamaica Bay and compared them to sediment cores from salt marshes elsewhere on Long Island. By using radioactive lead tracers, they determined the rates at which sediment accumulates.

What the team found was that sedimentation rates over the past century averaged 0.52 cm/yr for a core from Big Egg Marsh, 0.44cm/yr from East High Marsh and 0.28 cm/yr from JoCo Marsh. These sedimentation rates are comparable to fairly stable wetland systems elsewhere on Long Island. Analysis suggests that sedimentation rates in Big Egg Marsh have increased over the past three decades. Yet, Big Egg appears to be losing ground and has been the site of experimental techniques to restore the marsh.

The results suggest that marsh loss in Jamaica Bay, and across Long Island, is controlled by complex dynamics which may not be directly linked to the accumulation of sediment at all. Other factors that the researchers are looking at are changes in storm frequency, sea level change and anthropogenic disturbance to the adjacent estuaries and uplands. Examining these other factors further may help to characterize each wetland and its potential response to future environmental change. Determining marsh sensitivities to multiple stressors is expected to aid Jamaica Bay restoration efforts and mitigate marsh losses in other Long Island wetlands.

— **Barbara A. Branca**



Graduate student Chris Clapp examines material from a core sample. Photos courtesy of Alex Kolker and Steven Goodbred.

A student from Lorraine Academy, Buffalo Public Schools checks the dissolved oxygen levels of water samples taken from the Buffalo River. Students attending the two-day NYSG co-sponsored Great Lakes Student Summit in May also recorded the river water's pH and temperature.

All photos by Paul C. Focazio



Powering the Future

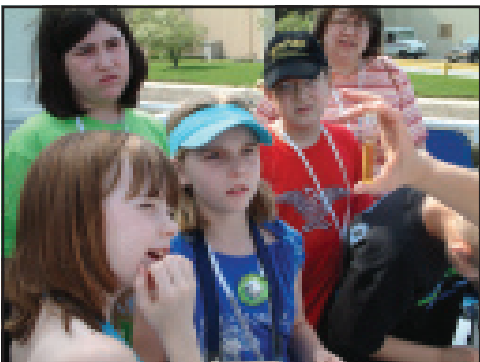
"The great thing about dealing with students is that they're so open minded," said NYSG's **Helen Domske** to a WBFO 88.7 Buffalo Public Radio reporter during this past May's opening day of the fifth Great Lakes Student Summit. "They don't point fingers, don't want to hear whose fault it is, as adults do. They really want to hear what's going on in the Great Lakes and also what they can do to correct things or not create the same mistakes."

For two days, teachers and nearly 130 fifth through tenth graders from schools around the lower Great Lakes descended upon Buffalo to show, as this year Summit's slogan states, Great Lakes youth are the "Energy That Powers the Future." They gave presentations, put up displays, and attended workshops on aquatic invaders, energy

conservation, water quality, and other environmental topics.

During one afternoon discussion, students and teachers learned about 41 locations in and around the Great Lakes and its bays and rivers that the International Joint Commission has determined need special attention. "When we talk about problems in the Great Lakes," explained Domske, "we often focus on Areas of Concern." Six of these AOCs are in New York State, three of which are in its western region – the Niagara and Buffalo Rivers and Eighteen Mile Creek.

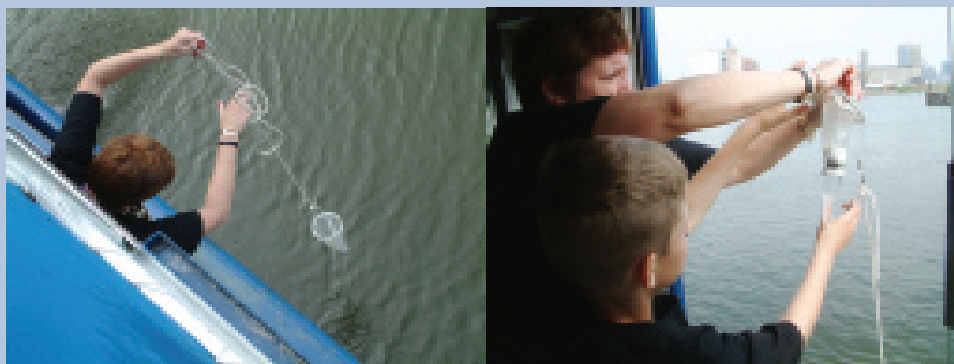
Eager students and teachers experienced some AOC-related issues firsthand during an educational cruise aboard the *Niagara Clipper* along the Buffalo River and Lake Erie. They saw hydro-electric power being harnessed at Niagara Falls and explored the Aquarium of Niagara to hunt



Students aboard the Niagara Clipper also tested for

If you look really close ...

you just might catch a glimpse of the plankton NYSG's Coastal Education Specialist Helen Domske discovered while collecting Buffalo River water aboard the *Clipper*. She shows off her find to a student from the Lorraine Academy, Buffalo Public Schools.



for answers to a competitive scavenger hunt. Last stop on an all-day excursion around the Great Lakes Basin ecosystem was the Niagara Power Project Visitors Center. There, a dozen students were selected to read the group's "Statement of Stewardship" (see sidebar).

Park School sixth grader **Lucas Baumgait** told WBFO Radio that stewardship is what it's really all about. "You need to make a promise to the Great Lakes, saying you're really going to help. Some people are coming here because they have to. But when you make a statement of stewardship it means you really care about the Great Lakes."



Attending the Summit were 130 students and their teachers from both sides of the border – ten upstate New York schools and one each from Pennsylvania and Canada.

And, with take home messages like this from perspective educators and environmental stewards of tomorrow, the overall response from teachers at the Summit comes as no surprise. "What a phenomenal program," said Fredonia Middle School's **Jennifer Neri**. "We are so excited to go back to our community and talk up environmental awareness and the Great Lakes."

Teachers left the two-day Summit with resource materials and posters that will hopefully evoke responses similar to one made by Dunkirk Middle School student **Bianca Moore Sayles**, who said: "I will teach my classmates that we should be part of the solution, not the problem."

— **Paul C. Focazio**

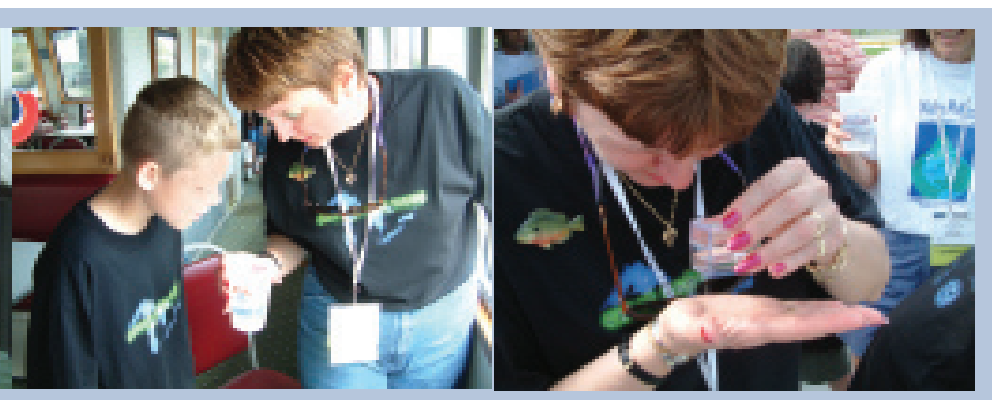
Statement of Stewardship

The Students of May 2004's Summit generated about a dozen statements on Great Lakes protection and preservation.

Promising to promote alternative energies such as solar, wind and hydropower, students resolved to reduce their electricity consumption by 20% by the next Summit. They also intend to use less fossil fuels by riding bikes and walking short distances, conserve water at home and school and restore and protect natural habitats in their local environments.

As environmental stewards, they plan to reduce litter, participate in beach sweeps, tree plantings, clean-ups and other volunteer efforts. Educating others about environmental issues and concerns such as invasive species and toxics also made the list. Students pledge to remind themselves and their schools to follow the 4 R's (Rethink, Reduce, Reuse, Recycle) and purchase environmentally friendly products. They will also encourage school officials and governmental representatives to support legislative efforts for Great Lakes protection, maintenance and restoration.

A US Fish and Wildlife technician uses equipment to shock smallmouth bass, emerald shiner, rock bass, brown bullhead and other fish species, then scoops them up in nets. Fish were placed in a cooler aboard a boat alongside the Clipper, identified for students and later released back into the Buffalo River.



Read the students' statements in full at:
www.greatlakesed.org/2004glss.html

Botulism Update



Lake Erie near Erie, Pennsylvania in Spring 2004, where fewer botulism die-offs of fish and waterfowl have been reported.

There is good news and bad news regarding botulism die-offs in the lower Great Lakes. The good news is that there were fewer die-offs of fish and waterfowl in the summer and fall of 2003 in Lake Erie. The bad news is that there has been an increase of die-offs in Lake Ontario. This leaves scientists wondering if Lake Ontario will see the same ecological impacts of botulism that has been witnessed in Lake Erie over the past five years.

Botulism is a disease caused by exposure to the toxin produced by the bacterium

Clostridium botulinum. Botulism has been recognized as a major cause of mortality in migratory birds since the 1900s. Although type C has caused the die-off of thousands of waterfowl (especially ducks) across the western United States, type E has been somewhat restricted to fish-eating birds in the Great Lakes. Type E toxin has also been known to affect fish and the toxin is suspected in recent fish die-offs in the lower Great Lakes.

In order to bring researchers, agency staff members and concerned stakeholders together to exchange data and ideas, New York Sea Grant again joined forces with Pennsylvania and Ohio Sea Grant to hold a binational workshop on the botulism issue. The fourth annual workshop on botulism was held on Thursday, March 25, 2004, at the Stull Nature Center in Erie, Pennsylvania.

Approximately 40 participants gathered to hear reports from New York, Ohio, Pennsylvania, and Ontario. The reports from the various state and provincial agencies provided information on the fish and waterfowl die-offs from 2003.

Ken Roblee of the New York Department of Environmental Conservation reported that waterfowl die-offs decreased from over 17,000 in 2002 to approximately 3000 in 2003. Roblee, a wildlife biologist, also reported that 22 dead lake sturgeon were collected along the Niagara County shoreline of Lake Ontario, a significant mortality for these threatened fish. These mortalities concern biologists because the Niagara River is an established spawning area

NYSG's Helen Domske and Pennsylvania Sea Grant's Eric Obert coordinated this year's botulism workshop.
All photos by Lane Smith



for lake sturgeon and these slow-reproducing fish could be impacted by the loss of reproductive-age fish.

Following the reports on bird and fish die-offs, participants heard from researchers representing Cornell University, Penn State University, Wadsworth Center – New York State Department of Health and the University of Guelph – Health Canada. The research at Cornell and the Wadsworth Center are efforts that were funded through New York Sea Grant.

The NYSG funded research at Cornell is being carried out by **Dr. Paul Bowser** and **Dr. Rod Getchell**. Through this work, the Cornell team has developed a faster, safer and more affordable way to detect botulism using a molecular assay to screen samples. Their new research will also focus on testing sediments, quagga mussels and other invertebrates in the future (see sidebar). This will help to evaluate the hypothesis that botulism is being moved from the sediments up into the food chain by filter-feeding quagga mussels.

As a true binational effort, participants heard from researchers in Ontario. **Dr. Rich Moccia**, **Dr. Ian Barker** and graduate student, **Adam Yule**, from the University at Guelph, presented their findings on interspecies toxicity of Type E botulism in fish. This research demonstrated that fish such as round gobies, walleye, yellow perch and rainbow trout show different sensitivities to the botulism toxin. Not only was there a difference in mortality for different species of fish, some species like the round goby seemed to show pigment changes and others like trout showed marked behavioral changes. These changes in behaviors, such as erratic swimming or “breaching” (where the fish swims head-first upwards in water), may actually help to “lure” bird predators to the affected fish. This may increase the likelihood for fish-eating birds to prey on fish that contain the toxin, resulting in illness or death for birds like loons and mergansers.

Results of the workshop evaluation indicated that 98% of the participants will share the information and data from this workshop with others. Participants have shared information from previous workshops with colleagues, students, administrators, general public, media, sportfishing groups and the Commissioners from the International Joint Commission. **Helen Domske**, Senior Extension Specialist for NYSG,

has herself made several presentations on the botulism outbreaks to angling and environmental groups, such as the Audubon Society.

When asked if they plan to take some action as a result of the information learned at this year’s workshop, nearly all of the participants indicated that they would. These actions ranged from initiating research projects, working on bird or fish surveys, making observations, collecting samples, and writing articles, to making oral and written briefings for agency colleagues.

Conference organizers were pleased by the positive responses concerning interest in the continuation of annual workshops. Participants overwhelmingly indicated that there is a need to keep the flow of information and data ongoing. Along those lines, proceedings are being developed from the workshop and that information will be placed on the NYSG web page.

— **Helen Domske**



Rod Getchell of Cornell University and Katherine Alben of the University at Albany at the botulism workshop. Each has begun newly-funded NYSG botulism research projects (see sidebar).

NY Sea Grant's Commitment to Botulism Research

Two new projects that began this spring further NYSG's involvement in Great Lakes botulism research. Cornell University researchers **Paul Bowser** and **Rod Getchell** are looking at food web relationships involved with the spread of botulinum toxin. Field observations suggest that quagga mussels and maybe other benthic organisms may become infected by the presence of vegetative cells of type E *Clostridium botulinum* bacteria in the sediment immediately beneath or within the mussel beds. Fish species that feed on infected mussels—round gobies and drum—then contribute to the movement of type E toxin up the food chain to fish-eating birds. Bowser and Getchell plan to document the role of organisms at different trophic levels in the movement of the toxin through the food chain.

University at Albany's **Katherine Alben** and **SUNY Fredonia's Alicia Perez-Fuentetaja** are working on another aspect of the food chain transfer of botulism toxin. They seek to determine the dietary pathways leading to type E botulism in fish and birds using the presence of algal carotenoids in tissues of food organisms as tracers. The use of carotenoids would provide an abundant, easy-to-work with tracer that could provide information on the trophic pathways that the botulism toxin follows in the food chain. Results from both projects will provide information on an important dimension relating to the botulism die-offs of birds and fish in the Great Lakes

— **Lane Smith**

Legislative aide Chris Knospe (pictured right) expresses Congressman Thomas Reynolds' support for Great Lakes restoration efforts to NYSG Director Jack Mattice.

Photos by Barbara A. Branca



Stakeholders Set Great Lakes Priorities

Earlier this year, priorities were identified to protect the Great Lakes, which make up one-fifth of the world's fresh surface water. In response, NYSG teamed up with the Great Lakes Commission (GLC) in late April for a public forum to solicit feedback from a variety of user groups. "In addition to offering presentations on the current state of Lakes Erie and Ontario," says NYSG's **Chuck O'Neill**, "we helped provide a forum for New York's Great Lakes resource users and managers to register their input on what they, as stakeholders, believe the restoration priorities to be."

The priorities, drafted by the Governors of the eight states containing the Great Lakes, target issues such as shoreline and economic development, fisheries and invasive species, water quality, pollution prevention and ensuring the sustainable use of resources. "Our intent with this workshop was to help identify the most important topics to focus and spend money on," says NYSG Director **Jack Mattice**. Following similar public discussions this past winter in Ohio and Pennsylvania, the aim was to "make certain New York got its druthers considered," says Mattice. "We wanted to make sure that the wants and needs of the lower Great Lakes are well represented in the legislation."

Through public forums such as this one, the GLC and Sea Grant are providing scientific and technical guidance for the generation of a final version of these legislative, appropriations and policy priorities. "We're addressing the complexities of restoration to reinforce the idea that it is not a black and white issue," says

GLC President **Mike Donahue**. "We're not out to show that the concept of restoration is new. It just hasn't been coordinated and packaged in a basin-wide initiative like this before."

In the coming months, proceedings will distill feedback to be shared with Great Lakes leadership and stakeholders. The document will be used to illustrate that, as Mattice describes, "High quality Great Lakes are high on every Basin resident's agenda. But the goals and schedules of restoration need the input from *all* stakeholders to make sure that the Lakes become all they can be for all of us." Adds O'Neill, "This input will help develop a shared vision and the principles, goals, objectives and strategic actions needed to achieve that vision."

— **Paul C. Focazio**

"The road to Great Lakes restoration begins with a well-informed stakeholder constituency," says NYSG's Chuck O'Neill, at podium.



Earthstock 2004

EARTHSTOCK is a Stony Brook University cross-campus community effort to promote environmental awareness during the celebration of Earth Day each year. Displays, workshops, lectures and interactive educational events provided by over 70 vendors and sponsors brought the theme home to scores of people at the Charles B. Wang Center this April 2004.

New York Sea Grant-funded research being done by researchers **Duane Waliser, Robert Wilson** and their team at Stony Brook University's MSRC, in partnership with the Bridgeport & Port Jefferson Steamboat Company, was a featured display. Instruments mounted in the hull of the *PT Barnum* ferry, in conjunction with a moored data profiler, provide unique scientific insight into the conditions above and below the surface of Long Island Sound. A kiosk mounted on the passenger deck continuously displays this data for travelers to view during their Sound crossing. Photos capturing the progress of the installation of this state-of-the-art sensing system and the inaugural demonstration aboard the *PT Barnum* brought the project to life on Earth Day at the Wang Center.



NYSG's Susan M. Hamill at the Sound Science display.
Photo by George Carroll, MSRC, Stony Brook University

As a thought provoking addition to this display, visitors that day were asked to answer the question, "**How deep is the deepest part of the Long Island Sound along the ferry route?**" Our congratulations go out to *Grand Prize* winner **Dave Fersh**, of Huntington Station, whose entry was closest to the answer of **138 feet!** He wins a round trip ferry ride with passengers, plus 4 free tickets to *Six Flags New England*. Second and third place winners were also awarded prizes generously donated by **Fred Hall**, VP and General Manager of the Bridgeport & Port Jefferson Steamboat Company.

— **Susan M. Hamill**

Funding Breakthrough Research

New projects in the Marine District:

Coastal Early Warning for Emergency Response and Protection Against Flooding in Metropolitan New York

The research team of MSRC's **Malcolm Bowman** and **Bob Wilson** 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.



Alistair Dove at the Marine Pathology Lab at Stony Brook where he'll be working on QPX, a parasite that affects hard clams.
Photo by Bob Strovink

Continued from Page 3 **Isolation of the Pathogen from New York Clams and Genetic Variability in the Host-Parasite System of QPX Disease in *Mercenaria mercenaria***

Little is known about the protistan parasite QPX and its effect on 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 occurrence of the disease. Molecular genetic tools and infection transmission experiments will be employed by the team of **Alistair Dove** and **Bassem Allam** at Stony Brook University's Marine Pathology Lab to address the genetic variability in the QPX disease system.

— **Barbara A. Branca,**
Patrick Dooley and Lane Smith

CURRENT EVENTS

Annual Report

New York Sea Grant

State, Federal, and Other* Funds Allocated in Calendar Year 2003
for use in 2003 and beyond

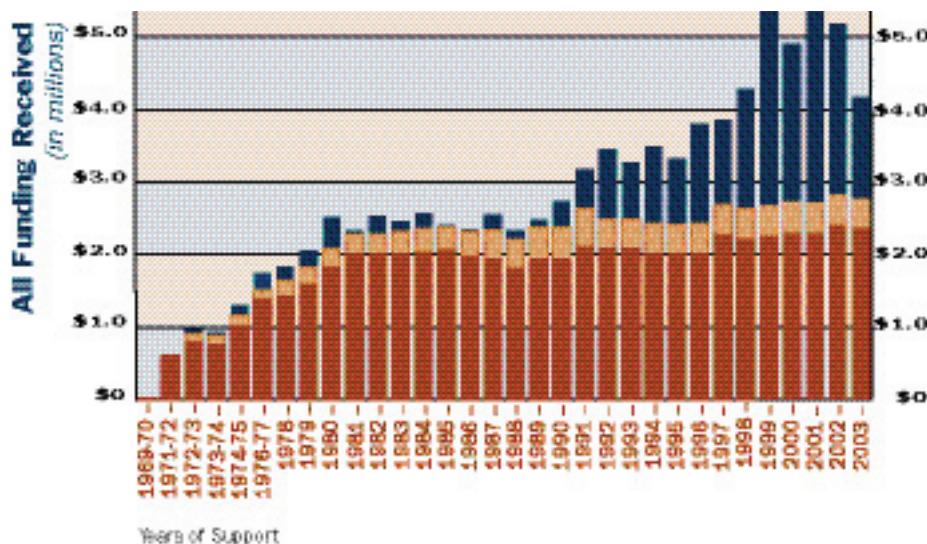
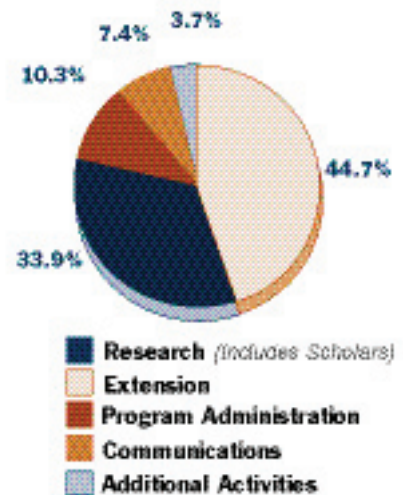
Program Administration	
From NSGO (federal) and New York State (federal and/or member funds)	\$424,054
From NSGO initiatives and national investments	\$0
From other sponsors	\$27,326
Total Program Administration	\$451,420
Communications	
From NSGO (federal) and New York State (federal and/or member funds)	\$296,244
From NSGO initiatives and national investments	\$6,986
From other sponsors	\$19,311
Total Communications	\$322,541
Extension (includes one Sea Grant Scholar)	
From NSGO (federal) and New York State (federal and/or member funds)	\$901,911
From NSGO initiatives and national investments	\$243,675
From other sponsors	\$814,527
Total Extension	\$1,960,113
Research and Scholars	
From NSGO (federal) and New York State (federal and/or member funds)	\$1,086,792
From NSGO initiatives and national investments	\$401,166
From other sponsors	\$0
Percent of above research funds allocated to Scholars	18.50%
Total Research and Scholars	\$1,487,958
Additional Activities	
From NSGO (federal) and New York State (federal and/or member funds)	\$22,451
— Fellowships	\$44,322
— Other conferences/workshops/special projects	\$0
From NSGO initiatives and national investments	\$31,667
— Fellowships	\$0
— Other conferences/workshops/special projects	\$38,000
From other sponsors	\$28,455
Total Additional Activities	\$162,895
Total Funds Allocated	\$4,284,927
Unallocated and Pending Committed** Funds Carried into 2004	\$927,482
Additional Non-Federal Cost-Sharing or In-Kind Support (not already included as direct support in table above)	\$1,582,710

Other includes funds provided by Cornell, SUNY, local and private sources

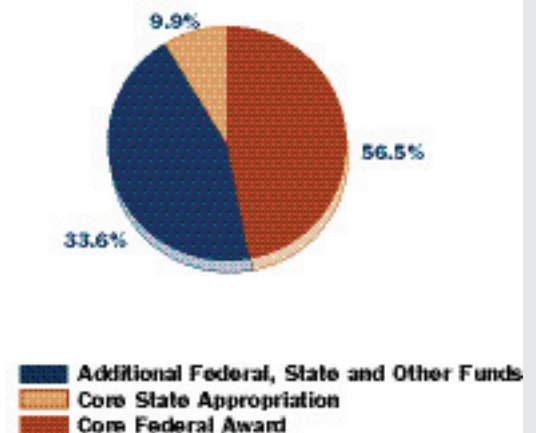
**includes funds committed to continuation of specific projects/activities, and projects slated to begin in 2004

Distribution of Funding Among Program Elements

2003



Funding Sources (2003)



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



**Summer's here
@ nyseagrant.org**

Did you know that rip currents are the cause of many more deaths nationally than hurricanes, lightning and sharks combined? Sea Grant collaborates with NOAA's Weather Service and the U.S. Lifesaving Assn. on www.ripcurrents.noaa.gov, a Web site with helpful tips to swimmers about identifying rip currents and staying safe.

See what Sea Grant is bringing to the shore throughout the nation. Surf over to NOAA National Sea Grant Office's newly-redesigned Web site, _____

www.seagrant.noaa.gov.



Lobster Life Cycle and Habitat. Connecticut and New York Sea Grants, supported by the Long Island Sound Lobster Research Initiative. 11" x 17" color poster. Jan Porinchak, Illustrator. 2004. Free

LastWave

Ordering Publications

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

New York Sea Grant Communications
121 Discovery Hall/Stony Brook University/
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Journal Reprints

Partitioning of dissolved thallium by seston in Lakes Erie and Ontario. M.R. Twiss, B.S. Twining, and N.S. Fisher. 2003. *Can. J. Fish Aquat. Sci.* 60:1369-1375. Free

Trophic transfer of trace metals from protozoa to mesozooplankton. B.S. Twining and N.S. Fisher. 2004. *Limnol. Oceanography* 49(1):28-39. Free

Weighing health benefit and health risk information when consuming sport-caught fish. B.A. Knuth, N.A. Connolly, J. Sheeshka, and J. Patterson. 2003. *Risk Analysis* 23(6):1185-1197. Free

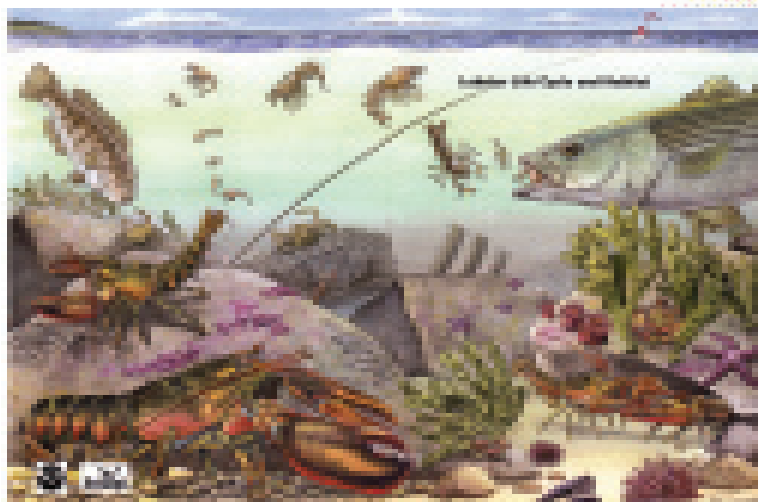
Sea Grant Publications

Rip Currents! Break the Grip of the Rip. Brochure. NOAA's National Weather Service, National Sea Grant College Program, and the United States Lifesaving Association. 2004. Free

Available in English and Spanish at: www.ripcurrents.noaa.gov/graphics.html

QPX Disease in Hard Clams Quahog Parasite Unknown. Brochure. New York Sea Grant. 2003. Free

Great Lakes and Long Island Bays food web posters. Two separate 24" X 36" full-color illustrated posters with identification keys. Individual poster: \$5; one of each: \$8. Posters shipped in mailing tube. CD with both images (pdf) to print out 11" x 17": \$8. CD and both posters: \$15. Call 631.632.9124 for discounts on multiple posters. Make check payable to New York Sea Grant.



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Black Sea Bass

Centropristis striata

In the winter of 1778, colonists fighting the Tories on Cape Cod were short on food. A blizzard blew in a school of sea bass which froze in the lagoon. The colonists chopped the fish out of the ice as needed and survived the siege. Since then, black sea bass has become one of the most popular and valuable fish along the Eastern Seaboard, prized by recreational and commercial fishermen alike. The fish average 1 to 3 pounds, are dark brown to blue-black in color with white stripes on the large dorsal fin.

Black sea bass is the most common sea bass found in the North Atlantic and is sometimes confused with the striped bass and tautog (blackfish). Black sea bass live in rocky areas and are found close to shore from spring through fall, moving offshore or south to warmer waters during the colder months. The fish are available year-round but in New York, locally harvested fish are most abundant during late spring and fall.

Unlike striped bass, sea bass live strictly in saltwater, feeding on crab, shrimp, lobster and mollusks. The flesh is white, firm and delicately flavored because of this diet. Black sea bass can be cooked by most methods and can be used in most recipes that call for cod, striped bass, blackfish, tilefish, or halibut. Black sea bass are popular in NY's Oriental markets and restaurants where they may be served whole, deep-fried or steamed.

— Barbara A. Branca and
NY Seafood Council

Black Sea Bass Stir-fry

Ingredients

1 lb. black sea bass, skin removed and cut into 1 1/2 inch pieces
1 1/2 tbs. canola oil, divided
1 clove garlic, minced
1 shallot, minced
1 cup red pepper, chopped
1 cup celery, sliced
1 cups fresh snow peas, trimmed
1 cup water chestnuts, sliced
1/2 cup fresh orange juice
2 tsp. cornstarch or arrowroot
1 tsp. sesame oil
1 tsp. rice vinegar
1 tsp. reduced sodium soy sauce
chopped scallions for garnish
2 cups hot cooked brown rice

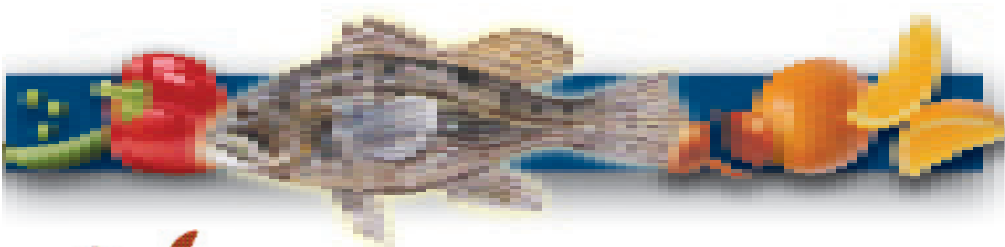
A 3 oz. portion of baked fish has 105 calories; contains 20 gm protein and 0 carbohydrates; 2.2 gm total fat; 0.6 gm saturated fat, 0.7 gm omega-3 fat, and 45 mg cholesterol.

Method

Heat 1 tablespoon canola oil in a wok or heavy skillet over medium high heat. Add fish and stir-fry gently until opaque, about 2-3 minutes. Remove fish from skillet and set aside. Add remaining 1/2 tablespoon canola oil and stir-fry garlic and shallot 1 minute. Add red pepper, celery, snow peas and water chestnuts. Cover pan and steam 2 minutes. Meanwhile, in a measuring cup or small dish, combine orange juice, cornstarch, sesame oil, rice vinegar and soy sauce. Add mixture to pan and cook until sauce thickens, about 1 minute. Add fish back to pan and cook 1 minute. Garnish with chopped scallions. Serve with rice.

Serves 4

*Recipe provided by the American Institute
for Cancer Research*



New York Sea Grant

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Seafood Corner