

Stewards Lead the Way



Whether along the Great Lakes, an ocean beach, a city park, or a tranquil stream leading into a mighty river, New Yorkers are participating as never before in stewardship programs.

What exactly is stewardship? According to a February 2003 report of the US Environmental Protection Agency's Environmental Financial Advisory Board, "Stewardship calls upon everyone in society to assume responsibility for protecting the integrity of natural resources and ecosystems, and in doing so, to safeguard the interests of future generations."

Protecting our marine and Great Lakes ecosystems for the future is very much in the mission of New York Sea Grant in both the research and outreach programs. "Stewardship is the responsibility we have as citizens of this earth to protect, preserve and

gain knowledge about invaluable natural resources such as the oceans and the Great Lakes," says NYSG coastal educator **Helen Domske**. "Stewardship involves empowering local residents and visitors with the ability and desire to protect and take care of a natural area," says **Diane Kuehn**, NYSG Coastal Tourism Specialist and an instructor at SUNY College of Environmental Science and Forestry. She speaks specifically of the case of eastern Lake Ontario's dune area, where this empowerment came from a grass roots organization called the Dune Coalition.

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From the Director

The stewardship theme of this issue of *Coastlines* is particularly appropriate for New York Sea Grant, but perhaps for more reasons than you think. Each person defines *Environmental Stewardship* a little differently as you will note by the differences in statements on pages 1 and 3. However, each definition includes some aspect of protection, either of ecosystems in general or of natural areas. Each definition also carries the concept of our responsibility as citizens for preserving or taking care of natural resources for future generations.

Perhaps your first thought about the strong link between NYSG and stewardship was education, helping develop citizen responsibility. You would be right. Teaching teachers or involving citizen stakeholders in coastal resource decision-making is one of the tenets of NYSG—one of the “legs” of the three-legged stool that Robert Kent referred to in the last issue of *Coastlines*. There are ample examples in this issue of education by and of stewards and teachers in NYSG's programs: for Lake Ontario and its dunes area; for the Hudson River, Great Lakes and

Marine district boaters and marinas; for cross-sound ferry passengers; for aquatic nuisance species assessment and control; and for support of habitat restoration by urban citizen groups in New York Harbor.

That “In an urban setting, the concept of stewardship is somewhat different” (page 3) is key to another NYSG-stewardship connection. Implicit in each stewardship definition is the concept of *use* as well as protection. Virtually all of the examples cited above involve proactive efforts that soften the impacts of the use of environmental habitats or other coastal resources. Boaters are not expected to give up boating, but to understand how their activities can impact submerged aquatic vegetation and voluntarily avoid doing so. Marina operators are not expected to close facilities, but are instructed how to fuel boats or dredge to maintain navigation. Dune stewards help visitors avoid activities that impact the dunes, but they also put up fences to maintain the dunes and construct new trails so eco-tourists can better see them. In each case, citizens are given information to make choices to use coastal resources more gently.

This emphasis on use and protection of coastal resources makes the stewardship focus an even more applicable characteristic of NYSG. Providing information to support sustainable use now and in the future aptly summarizes NYSG's mission.



Stony Brook University researcher Duane Waliser explains how weather and water observations are made by instruments aboard the *P.T. Barnum* ferry.
Photo by John Griffin/SBU Media Services

Sound Science



Stewards Lead the Way

Continued from page 1

Diane Kuehn and **Dave White**, NYSG Great Lakes extension coordinator helped to facilitate the progress of this organization. Today, **Molly Thompson** (pictured on cover with "Dune Stewards") leads a dedicated group of students in the protection of this fragile ecosystem. These stewards spent the summer showing people how to enjoy this resource while making minimal impacts to the environment.

In another part of the state, NYSG's **Laura Bartovics** is the outreach coordinator for the New York/New Jersey Harbor Estuary Program. "In an urban setting, the concept of stewardship is very similar, and New York City residents take action every day in a variety of ways, large and small, to protect and restore the natural resources of one of the most visible places on earth—New York Harbor." One of Bartovics's missions is to support small groups in their efforts to engage the public and

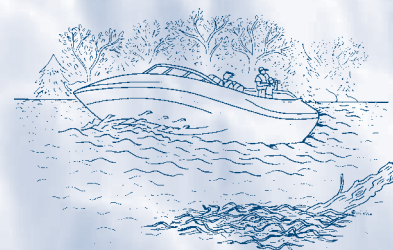
connect them with the estuary that surrounds the densely populated city.

Stewardship also has a "trickle down" effect. The majestic Hudson River starts in the Adirondack Mountains and flows south all the way to New York Harbor. Its estuary is one of NY's greatest natural resources. And along the way, dozens of small tributaries add to its might. The State's Hudson River Estuary Action Plan has recently made a priority the "enhanced protection over the tributary streams of the estuary watershed."

In a recent NYSG-project, **Nordica Holochuck** and her partners have developed and distributed a tributary stewardship guide specifically tailored to meet the needs of the Hudson Valley watershed. The guide details best management practices such as pollution prevention and stream bank stabilization for Hudson River tributary stewardship. It emphasizes to would-be stewards the protection and conservation of fish habitat and explains the linkages between streams, estuarine ecology, and aquatic habitats.

Many Hudson Valley watershed groups are currently developing or conducting stream stewardship education programs. This helpful booklet is for them and other non-governmental education organizations, municipalities, and private landowners throughout the Hudson River Valley.

— **Barbara A. Branca**



Attention Boaters!

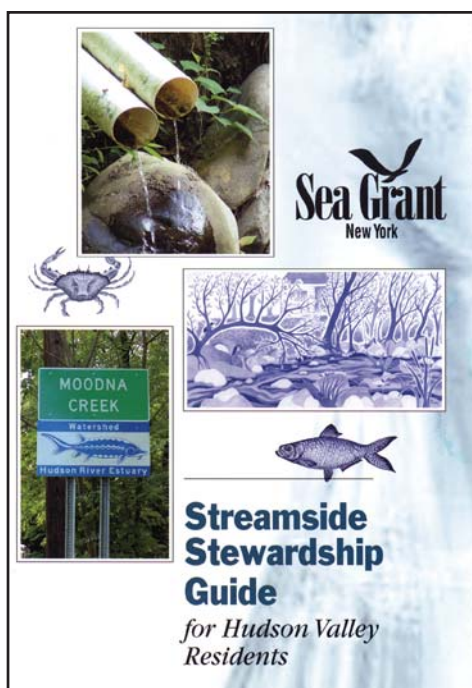
Keep your eye out for a NYSG-sponsored survey on recreational boating that will be mailed in January. Please be sure to respond.

Your answers are important to us.

“ *Stewardship involves empowering local residents and visitors with the ability to protect and take care of a natural area.* ”

— **Diane Kuehn**

NYSG Coastal Tourism Specialist & Instructor at SUNY College of Environmental Science and Forestry





"Guarding"

NYSG offered teachers and students a rare learning opportunity in late July aboard EPA's R/V Lake Guardian

//
I know the teachers and students aboard the Lake Guardian have learned a great deal and they will enthusiastically share their hands-on environmental experiences in all their interactions.
//
— Helen Domske
Coastal Education Specialist

Helen Domske (right), NYSG's Great Lakes coastal educator, talks about her experiences on the week-long tour with Meghan Rubado from the *Syracuse Post Standard*.

Photos by Paul C. Focazio

"There's a push toward teaching hands-on science right in the *local* environment and I think the Great Lakes is a resource to tap into because students can really relate to it."

Michael Lauria, a biology teacher at Sweetholm High School near Buffalo, used his experiences this past summer aboard EPA's R/V *Lake Guardian* to help earn his master's degree from the University at Buffalo.

In late July, Lauria joined other middle and high school teachers, graduate students, and nature center educators for a rare learning opportunity on Lakes Ontario and Erie aboard the 180-foot research vessel. The week-long educational tour began in Buffalo Harbor on Lake Erie, went through the Welland Canal, and stopped at Fort Niagara before cruising Lake Ontario. Participants docked in Clayton, explored the Thousand Islands region, and then went back to Oswego before heading back to Buffalo.

The training program was led by NYSG's Coastal Education Specialist **Helen Domske** and **William Edwards**, an assistant professor of biology at Niagara University. It was made possible by a

partnership among Sea Grant and the US Environmental Protection Agency (EPA), Niagara University, the Niagara Environmental Leadership Institute, and the Great Lakes Program at the University at Buffalo. Instruction on fish and fisheries was provided by **Mike Weimer** of the US Fish and Wildlife Service.

"The *Lake Guardian* course was a rewarding experience for me, both professionally and personally," says Domske. "The EPA was pleased with our successful journey, we received glowing evaluations, and Sea Grant received press coverage in several ports along the lakes."

Valued at \$70,000, the excursion garnered write-ups in the *Watertown Daily Times*, *Palladium Times*, and *Syracuse Post Standard*, as well as news segments by local television and NPR radio stations.



The "Multiplier Effect"

"This collaboration illustrates how strongly the EPA believes, as does Sea Grant, in teaching teachers about the Great Lakes environment," says Domske. "New York Sea Grant believes in the 'teach the teacher' approach and this course was an innovative way to get teachers to infuse Great Lakes materials into their science curriculum."

The Lake

Domske hopes that this enthusiasm among teachers about Great Lakes issues will trickle down to their students. "If you teach something to an individual stakeholder with an interest in the environment, he or she might share that information with two or three friends or family members. If you teach something to a teacher, though, that multiplier effect can be in the hundreds or thousands. We really worry about the next generation—that there will be a shortage of scientists and people who really care about the lakes. Teachers are that link between today's knowledge and research and the future."

Domske, who has more than 20 years experience as an aquatic science educator, offers teacher training every summer. Four years ago, she had an opportunity to teach aboard the *Lake Guardian* on Lake Erie. "The chance to again work on a top-notch research vessel and share those opportunities with students and teachers was wonderful," she says. "To experience the size, power and beauty of Lake Ontario from aboard this ship was overwhelming."

Lakeside Learning

The *Lake Guardian* gave seven school teachers and seven undergraduate students the chance to seine, scientifically age fish, and collect



Molly Thompson (far left), NYSG's dune and habitat educator, points out some of the physical features of the fragile dunes along Lake Ontario's eastern shoreline.



Along the way on this 400-mile aquatic exploration, students took water samples and generated a week-long snapshot of data for Lakes Erie and Ontario. These data, which include figures on dissolved oxygen levels and water temperature, are on file with the EPA.

plankton, lake bottom and water samples. Students and educators also learned about exotic species—the impacts zebra mussels, spiny water fleas, sea lamprey, purple loosestrife, and other invaders are having on the lakes. Once released into the lakes via the ballast water of ships, invasive species enter an environment where they have no natural enemies. It is because of this worldwide exchange of ballast water that species tend to spread, thrive, and pose potential problems (see article page 7).

In the Niagara Falls area, students met with residents to hear about issues affecting that part of Lake Ontario. Along the St. Lawrence River, discussions turned to local issues including expanding the Seaway, controlling the double-crested cormorant, restoring numbers of native common terns, and monitoring water levels.

In Oswego, the group traveled to the Black Pond Wildlife Management Area along Lake Ontario's eastern shoreline for a guided tour on dune ecology by NYSG educator **Molly Thompson** and her summer 2003 dune stewards. "Here is where you'll find the largest and most extensive freshwater sand dune formations in New York State," Thompson explains.

Some of the students and teachers on the educational tour (including Michael Lauria, in red shirt at lower left) take a break from learning to smile for some scenic snapshots.



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"These dunes are nearly as high as those in Cape Cod, where the tallest ones in the entire northeast exist. Dunes develop over the years thanks to plant growth cycles that make it possible for trees to root themselves."

Teachers and students later traveled to the nearby Salmon River Fish Hatchery, where they saw first-hand how the NYS Department of Environmental Conservation raises trout and salmon to stock Lake Ontario.

The take-home message in all of this? "We're trying to help people who do outreach to better understand the Great Lakes ecosystem so they can spread the word," says Edwards. Last year, while teaching at Ohio State University, Edwards led a class on a similar one-week trip on Lake Erie. He says this year's focus was on Lake Ontario because "it doesn't get the public awareness that the other lakes get." Domske adds, "Being that Lake Ontario provides so much of the New York shoreline, we felt it was important for New York teachers to know more about it."

Surveying with Summer Stewards



Five college students from SUNY-CESF and SUNY College at Oswego spent this past summer educating visitors about the value of the beaches, dunes, and wetlands at several public areas along an

18-mile stretch of Lake Ontario's eastern shoreline. "For the third year now, the dune stewards have played an integral role in informing beach-goers on how they can help protect the shoreline dunes," says

Molly Thompson, NYSG's dune and habitat educator. "Their patrolling of the beach and interaction with its visitors has been important in minimizing activities that cause negative impacts on the area."

On a given day, **Willow Eyres** picked up trash or offered a nature walk at the Deer Creek Wildlife Preserve, while **Charlie Hawkins** cut vegetation to open trails at Southwick Beach. **Jeffrey Nassimos** and **Evan Proulx** (pictured l-r) added and repaired string and snow fencing at locales such as the Black Pond Wildlife Management Preserve. "This fencing will allow for blowing sand to accumulate on the dune while discouraging foot traffic," says Thompson, who supervised the students. The students also distributed brochures to help bolster stewardship and posted signs to illustrate how the actions of visitors and residents affect the ecosystem.

Rachel Habig, a PhD candidate at CESF, worked through the season with NYSG's Coastal

Tourism Specialist **Diane Kuehn** to compile data on visitor use since 1985. With the exception of the last three years, data was not collected in a consistent manner. So, Kuehn and Habig are now analyzing data to identify population trends for each of the public areas. They are also pinpointing sections of high use and environmental impacts, such as the loss of beach grass, a plant that inhibits dune erosion. "Input from Rachel and Molly has made it possible to develop a data collection protocol to be used in the future to collect more reliable data," says Kuehn. "This information will help dune managers determine if beach visitors understand how their activities impact the area."

Proulx, a recent SUNY Oswego graduate who majored in public justice and minored in biology and forensic science, has aspirations of becoming an Environmental Conservation officer. The skills he's learned as a Lake Ontario dune steward for two years support this goal. "The steward program has helped me develop leadership and people skills that an enforcement officer can use," says Evan. "I've learned a lot about how fragile our ecosystems are and how to communicate that to the public." Nassimos, an CESF student with ambitions towards consulting, adds, "I now realize the key role public outreach plays in the environmental policy and management discipline."



All photos and both articles by
Paul C. Focazio

Spreading Exotics Through Ballast Water

In the game of ecological roulette, it takes only one species to alter an ecosystem. And in the case of the Great Lakes Basin, 150 years of shipping has made it home to nearly as many invaders. The critical issue: ballast water. For stability, cargo ships overseas fill their ballast tanks with water from the shores of northern Europe, the Mediterranean, the Middle East, and Asia. This water is then unloaded into ports in America and other parts of the world. But, along with the cars, television sets, sofa beds, wine, and other products of global trade, are invaders from distant ecosystems also coming to America?

Last May, University at Buffalo Professor **Robert Baier** completed a NYSG-funded study on invasive species introductions by these ships. "The arrival of zebra mussels in the Great Lakes in the late 80s has forced long-overdue attention to the issue of transport of exotics from distant locations into our inland seas," says Baier.

Assisted by **Anne Meyer**, a UB Research Associate Professor, and former Sea Grant scholar **Robert Forsberg**, Baier developed and installed two kinds of samplers in the ballast water of several ships arriving in the U.S. from trans-Atlantic shipping. Both of these samplers collect biofilms on ballast water tank walls. A **biofilm** is a layer of organic slime made of microscopic larvae, bacteria, and other assorted bioinvasive organisms.

Ballast Organic Biofilm, or "BOB," units captured and analyzed ballast water on voyages without on-board research teams. These samplers don't need a power source, so they were suspended in the ballast tanks and easily retrieved to collect data. The Portable Biofouling Units, or "PBUs," require more hands-on monitoring, but their setup made it easier to search for microorganisms as ballast water left the sampler.

Most of the organisms in the ballast water detected by these samplers are barely visible: larval plankton and crustaceans such as barnacles and tiny crabs. Crossing overseas in ballast tanks have been zebra mussels from the Black Sea, shore crabs from

What is the ballast water of ships leaving behind? Two samplers were used to find out. The small, sturdy BOB unit (in yellow) is easy to assemble and install on-board and retrieves data efficiently. The PBU (in white) has proven most useful for tests of bulk ballast water retrieved from ships in port and returned to the lab for analysis. Photos courtesy of Robert Forsberg



Japan, mitten crabs from China, dinoflagellates from Africa, and *Cholera* bacteria from anywhere around the globe. "Following introduction, the probability of an exotic successfully establishing a self-sustaining population is uncertain," says **Chuck O'Neill**, NYSG ANS specialist.

Stemming this invasion may hinge on regulating where and when ballast water is discharged. Biofilms, considered the 'dental plaque of the ocean,' are not being removed by current mandates of routine mid-ocean ballast water exchanges. When ships empty their ballast, many microscopic species can become airborne and inhaled by workers nearby or tourists downwind, possibly spreading disease to new locations. Other microbes stay behind encased in resistant sacs that keep them protected until re-suspended when the ballast tanks are refilled.



Researcher Bob Baier studies the impact ballast water carried on-board ships may have in the spread of invasive species. "We're concerned because ballast water and its residuals in ship tanks can seed new populations of microbes into harbors."

Having observed biofilms first-hand, Baier recommends inspecting ships entering the Great Lakes via the St. Lawrence Seaway system, even those in a declared 'No Ballast on Board' condition. "Inspecting these ships and sampling their ballast tank bottoms and interior structures will help us better understand bioinvasion pathways and create international policies for controlling aquatic nuisance species," says Baier.

Baier points to measures that can be taken to reduce the further spread of exotic species, like coating ballast water tanks with a non-toxic, non-polluting coating such as those used in cookware. "With this research, we've reached our goal of clarifying and emphasizing the role biofilms play in the transport of exotics in the ballast held by cargo vessels." Baier intends for information gathered in this study to be used by shipping and resource managers to help limit the spread of invasive microorganisms and protect the health of dock and ship personnel.

— **Paul C. Focazio**



How much ballast water can one ship carry? A single iron ore ship can hold 32 million gallons; one oil tanker, 74 million gallons. Tanker photos courtesy of Michael W. Fincham, Maryland Sea Grant

Life above and below the Hudson: A kayaker glides atop the tranquil river while below the surface, native water celery provides life-giving oxygen and habitat to fish and waterfowl.



Boating on the Hudson

Whether you're rowing, kayaking, sailing or motoring, the Hudson River has it all. Part of **Nordica Holochuck's** mission is to increase awareness about what boaters can do to protect the Hudson's unique ecology. What is the best way to deliver stewardship educational materials to boaters along the river? Over the last two boating seasons, Holochuck has been working extensively with regional commercial and recreational boating groups to find out.

Ten locations—marinas, marine stores and municipal docks—throughout the tidal estuary portion of the Hudson River Valley were selected to host pilot information stations on topics of interest to the

recreational boating public such as boating best management practices, safety, and ecotourism. At the end of each boating season, host stations were surveyed regarding public response. A similar survey was sent to commodores of all Hudson boat and yacht club associations. With nearly 40 percent responding, these survey results are helping NYSG develop outreach materials specific to the Hudson Estuary.

Holochuck, NYSG's Hudson Estuary Specialist, has long been delivering a message to boaters about submerged aquatic vegetation (SAV). Based on research by Cornell University, the Hudson River National Estuarine Research Reserve and the Institute for Ecosystem Studies, Holochuck's brochure *What Boaters Should Know About Hudson River Underwater Plant Beds* has been distributed to thousands of Hudson River boaters over the last two boating seasons. In 2003, thanks to the same two-year grant funded by the NYSDEC Hudson River Estuary Program, Boating Community Stewardship of Hudson River Submerged Aquatic Vegetation Restoration, Holochuck developed a colorful SAV poster to further increase awareness about submerged aquatic vegetation. The poster (shown left) is now displayed in Hudson River boat and yacht clubs, marine stores and shops.

Help Protect Hudson River Plant Beds!

While boating on the Hudson River during the summer months, you'll see dense beds of underwater plants in the shallows. Called submerged aquatic vegetation (SAV), these beds are located throughout the river, most abundantly between Kingston and Catskill. SAV provides life-giving oxygen to the water and important habitat and feeding areas for fish and waterfowl.

Common Hudson River SAV

You Can Help!

- Boats and personal watercraft can easily damage underwater habitat. Damage may last many years.
- Slow down and take on your prop. Avoid motoring through or anchoring in the plant beds.
- Test fellow boaters where these SAV beds are and how valuable they are to fish and wildlife.

For more information contact:
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80 Westbrook Lane
Kingston, NY 12401
(845) 340-3983

Sea Grant
New York

Watch

Says **Dottie Knott**, a founding member and former officer of the Hudson Valley Marine Trades Association currently affiliated with *Boating World* magazine, “Nordica Holochuck brings key information to the recreational boaters of the Hudson Valley—and they are happy to get it. When she takes her ‘sojourns’ along the river, she gives boaters brochures and posters about submerged aquatic vegetation—‘the underwater weeds’ as we call them. People are becoming educated about these underwater plants and in the long run, this is helping to protect the SAV.”

What is next for Hudson River SAV project team now that public awareness and interest about SAV is on the rise? Over the summer of 2003, **Dr. Stuart Findlay** of the Institute for Ecosystem Studies ran a trial to test the feasibility of using volunteers to monitor the river’s SAV beds. Holochuck says, “It is exciting to be a part of a team of people willing to try innovative techniques that include welcoming the participation of an enthusiastic group of kayakers, local stewards who will play a key role, formally or informally, in maintaining the health of the river’s SAV. Sea Grant extension will continue to support citizen monitoring of SAV as the project team deems necessary.”

NYSG’s efforts are part of the much larger Hudson River Submerged Aquatic Vegetation Project, under the auspices of the Cornell Institute for Resource Information Systems. The Hudson River Submerged Aquatic Education Project was recently awarded the 2002 Team Effort/Innovative Program Award presented by the New York State Association of Natural Resource Extension Professionals. The award “recognizes interdisciplinary, interagency and/or other teams that have exhibited leadership and excellence in producing unique, cutting edge, risk-taking Extension environmental or natural resources education programs.”

Another educational campaign for Hudson River boaters is to encourage environmentally-safe



With help from NYSG’s Nordica Holochuck and Jay Tanski, “Don’t Fool With Fuel” signs will soon give Hudson boaters fueling tips.

fueling. “Don’t Fool with Fuel” signs were developed with NYSG coastal processes and marine facilities specialist **Jay Tanski**. Knott accompanies Holochuck to many of the Hudson’s marinas where the new signs are being placed at fueling stations to alert boaters to some simple methods. “The design of the new signs is working well,” says Knott. “The signs are unobtrusive, yet very readable. This campaign is being met with much enthusiasm, at both public marinas and private yacht clubs.” With large marinas such as the one in Haverstraw with a thousand boat capacity, the signs have the potential of being read by hundreds of people daily. Some of those same marinas also show an informative slide show Tanski developed from his *Best Management Practices for Marinas Guide* for controlling stormwater runoff.

The signs represent just part of fuel spill prevention education kits provided to all Hudson River marinas with fuel docks. In the spring of 2004, participating docks will distribute educational flyers to boaters and samples of bilge socks and nozzle pads. The 18-inch bilge socks are made of absorbent material that can soak up oil, bilge and other discharge before it can get in the river. With Holochuck’s help and enthusiasm, these outreach campaigns to educate boaters are helping to restore and maintain the Hudson River’s unique habitat and heritage.

— **Barbara A. Branca**

DON'T FOOL WITH FUEL HELP KEEP THE HUDSON RIVER CLEAN

Gas, diesel and oil are extremely toxic to aquatic plants and animals! Fish and shellfish are sensitive to very low concentrations of petroleum products in our waters. Concentrations equivalent to 1 drop of gas in 17 gallons of water can harm aquatic life. Little spills and drips add up fast.

Remember, the person fueling the boat is responsible for all spills and associated penalties. Please obey safety rules and follow these tips:

- ✓ Fuel with care. Hold the gas nozzle handle and stay with your boat during the entire refueling operations!
- ✓ Use an absorbent “doughnut” or collar on the nozzle to prevent “splash-back” and catch drips.
- ✓ Use absorbent pads to catch drips when transferring nozzle to and from boat. Be prepared to catch any overflow from vents with absorbent pads or “no-spill” containers that fit over the vent opening.
- ✓ Fuel expands as it warms up. Do not fill tanks to more than 90% of tank capacity.
- ✓ Install an air/fuel separator or vent whistle in your tank vent line to prevent spills.
- ✓ Fill portable tanks on land and use a drip pan and absorbent material to catch drips and splashes.

If a spill occurs:

- ✓ Stop the source immediately.
- ✓ Report the spill to marina personnel. By law spills must be reported to New York State (1 (800) 457-7362) and the Coast Guard (1 (800) OILS-911).
- ✓ Use absorbent pads and materials to clean up small spills.
Do not use detergents, soaps or dispersing agents.

Thank you for helping to keep our waters clean.



All photos courtesy of Nordica Holochuck

Helping Hudson River Marina Owners



Cornwall Yacht Club, one of many private yacht clubs and public marinas that dot the Hudson.

The Hudson River is a dynamic environment. Sand, silt, debris and other particles are carried and dumped by the river's tides and currents. Marina owners along the river are often faced with a decision—whether or not to dredge the river bottom to deepen mooring areas and channels. But dredging is a highly regulated activity. Marina owners must apply for permits to do so. They must also comply with testing procedures to ensure that the materials dredged up will be disposed of in an environmentally safe manner.

A way to help marina owners make informed decisions about dredging may come through the Hudson Valley Marine Sediment Contamination Data Project, part of the Hudson River Action Plan that is known as the Hudson River Mariners Project. Part of this project includes a report produced with input from the NYSDEC's Division of Water and written by **Dr. Richard Bopp** and graduate student **Michael Wood**, both of Rensselaer Polytechnic Institute. NYSG's **Nordica Holochuck** started a dialogue with marina owners and introduced the project to Hudson boating community leaders at organization meetings over the winter of 2001-2002. The writing team took a hard look at data regarding contaminants in dredge materials from up and down the Hudson. "Marina owners are very interested in having this kind of information," says Holochuck.

Project manager **Larry Wilson**, a biologist with the NYSDEC Division of Fish, Wildlife and

Marine Resources agrees. "The Hudson River Mariners project was done to find the known levels of contaminants along the river. They range from 'background' to 'hazardous' and are usually somewhere in between. By making the known levels of contaminants available to marina owners, they can anticipate some of the problems they might have with new dredging," says Wilson. The outreach aspect of this report is to explain the process of dredging to marina owners and walk them through the permitting process. It also aims to provide testing requirements, the costs entailed, and what different test results mean to the marina owner.

"Nordica Holochuck is doing an excellent job of informing the public," says Wilson. "She is a great resource for the marina community." Wilson anticipates partnering with NYSG's Holochuck on other Hudson River projects such as public education about floatable debris.

The report identifies what contaminants are likely to be found in areas of the Hudson, and which ones won't be. For example, if it is known that cadmium is not found in an area of the river, then it's possible to reduce testing for cadmium on that site. If dredge material tested is safe, then the marinas can dispose of the dredge spoils in a cost-saving way, like using it to build parking lots. But if dredge material tests high for certain contaminants, marinas have to dispose of it in a more costly manner in confined disposal facilities. Says Holochuck, "Ultimately this report's impact will be to save time and effort on the part of marina owners and reduce the expense of unnecessary testing."

— **Barbara A. Branca**



This pristine Hudson tributary is likely free of contaminants, but still adds sediment as it joins the river. A new report shows marina owners exactly which parts of the Hudson River have tested high for which contaminants. Photos courtesy of Nordica Holochuck

“Grinches” of the Hudson:



**They stole the habitat,
native clams, and the
oxygen too!**

When exotic species invade native ecosystems they can bring about big changes. They can alter the habitat, displace native species, and make radical changes in the food web and the way nutrients cycle in that habitat. For the Hudson River, two species—the zebra mussel and European water chestnut—clearly have had significant impacts. The invading zebra mussel (*Dreissena polymorpha*) has clogged intake pipes, fouled equipment, killed off native clams, and had other negative impacts. European water chestnut (*Trapa natans*) covers extensive areas of Hudson River embayments. This exotic plant with its large floating leaves has displaced native species and choked open water areas. Its hard, nut-like fruit possesses sharp spines—a hazard to bathers.

Recent studies have identified another impact of these alien invaders, one that had not been widely recognized. These invaders reduce the **dissolved oxygen** levels (DO) in the water. For most life on Earth, oxygen is a critical element for survival; fortunately for terrestrial life, oxygen is abundant in the atmosphere. However, in the aquatic environment, oxygen is less abundant because it is not very soluble in water. Due to this much lower abundance, oxygen can and often does become very scarce in water, a condition known as **hypoxia**. In extreme situations, DO levels can reach zero. Some of the ways dissolved oxygen gets back into the water are through diffusion from the atmosphere, a process aided by wind **(A)** and

from photosynthesis from submerged aquatic plants and algae (see diagram below).

Through their extensive research and monitoring, scientists at the Institute of Ecosystem Studies discovered a decline in average DO in the freshwater tidal Hudson River. In a NYSG-funded study, researchers **Dr. Jonathan Cole** and **Dr. Nina Caraco** systematically measured dissolved oxygen content in portions of the river from Poughkeepsie to Troy. Synthesizing their data with existing and historical data on freshwater flow and regional wind speed, they created a model of the DO dynamics in the river.

What they found was that the respiration of a growing population of the river’s zebra mussels **(B)** caused DO declines. Another finding showed that water chestnut beds **(C)** also have low to zero DO levels, especially during ebbing tides. Water chestnut depletes DO because its leaves cover the water’s surface, cutting it off from atmospheric oxygen; the plant’s photosynthesis releases oxygen back to the air instead of the water. Contrast this to the native water celery **(D)**

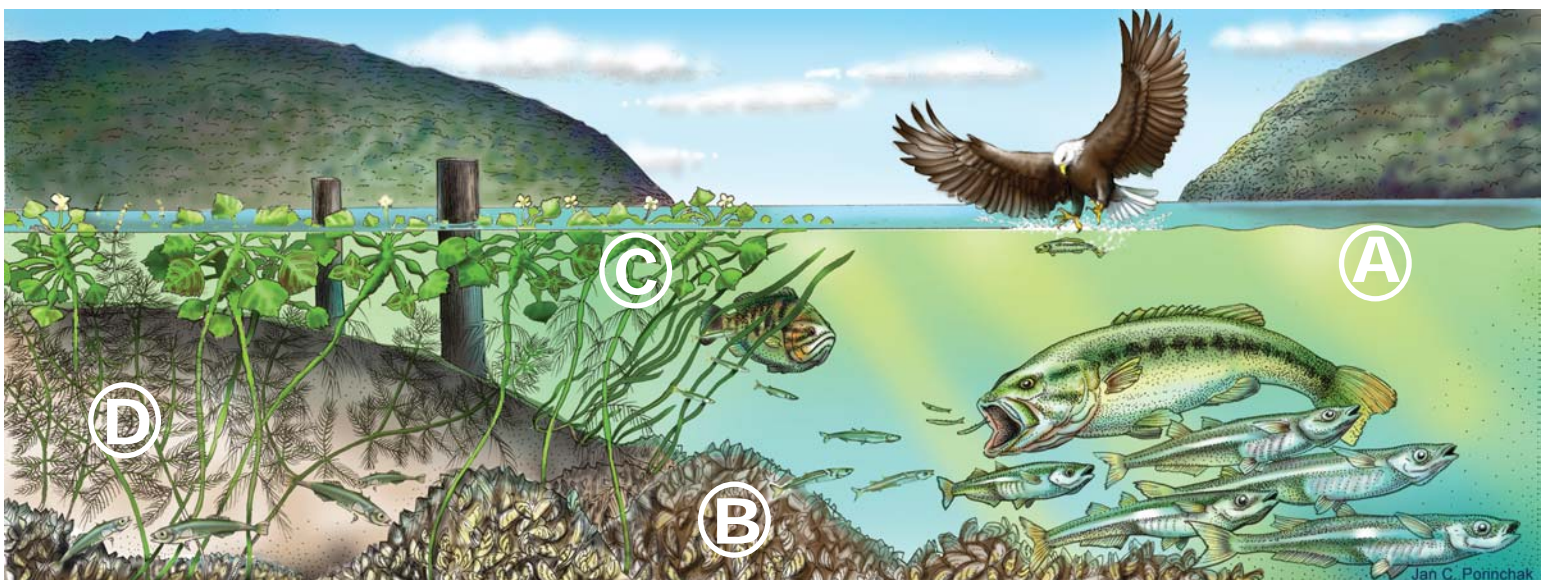


Above: Floating *Trapa* beds choke open water areas of the Hudson. Photo by Nina Caraco. Left: The rather “Seussian” spines of the plants are also called “devil’s horns.” Photo by Paul C. Focazio

(*Vallisneria americana*) whose leaves are submerged and release oxygen from photosynthesis directly into the water.

The researchers’ model allows them to predict DO levels in beds of water chestnut, water celery, and in the main channel of the river. (Below, A and D increase DO; B and C decrease it.) Their research and modeling have shown that changes in the food web caused by exotic species can cause DO declines. This is a little-considered factor compared to other sources of DO declines such as organic pollution. With the presence of zebra mussels and water chestnut beds, the Hudson River can handle less organic loading than it otherwise might. There needs to be consideration of the compounding effects of exotic species’ respiration, and the nutrient and organic loading that create hypoxic conditions which is harmful to much of the river’s aquatic life. The Caraco-Cole model may be useful for environmental managers who plan strategies for maintaining adequate dissolved oxygen levels in the river.

— Lane Smith



National Estuaries Day



WWW. ESTUARIES. GOV

For the two weeks surrounding September 27, 2003, eighteen organizations throughout the NY-NJ Harbor Estuary region hosted festivals, boat tours, catch-and-release fishing clinics and other educational events celebrating National Estuaries Day. And although most of the events drew participation from their own local areas, all had the common goal of raising public awareness and appreciation for an important shared resource – the Harbor Estuary.

The idea of a harbor-wide celebration—and the funding to make it happen—was set in motion by the NY-NJ Harbor Estuary Program (HEP). As the HEP Outreach Coordinator, NYSG's **Laura Bartovics** played a key role bringing it all together. In addition to overseeing the HEP Mini-grant Program that provided funds for the events, Bartovics convened a meeting of the host organizations to find out what kinds of outreach materials they thought would be most effective in connecting people to the estuary.

Banners, posters, species lists, and tote bags were some of the most popular ideas, all of which were produced by the time the first events were held on Saturday, September 20! Initial reports from the host organizations show that the events were highly successful and attracted diverse audiences. All are looking forward to joining the 2004 Harbor-wide Celebration of National Estuaries Day.

—**Laura Bartovics**



Families enjoy catch-and-release fishing at a National Estuaries Day event hosted by the Battery Park City Parks Conservancy. Photo by Laura Bartovics

Partnering to Promote Clean Boating

This summer, boaters in upstate New York were given some of the tools of stewardship when New York Sea Grant, marina operators, a products manufacturer, and two industry organizations united to distribute information and products to promote clean boating at the Syracuse Boat Show on Lake Ontario, Oneida and Skaneateles Lakes, and the Niagara River.

"More than 2,700 bags with an oil absorbent bilge sock, fuel nozzle bib, New York State Boating Guide, a list of pumpout stations and other useful information (see photo) were distributed as part of a pilot project to promote practices to keep

New York's waters clean," says **David White**, NYSG's Great Lakes Extension Program Coordinator and national chair

of the Marine Environmental Education Foundation.

"Every bilge sock that saves oil from going overboard is a plus for the environment," says **Wayne Carroll**, Brewerton Boat Yard owner. Adds Skaneateles Sailboat Shop co-owner **John Jablonski** "This program is a positive way to help boaters have a more pleasurable and safe day."

On Sodus Bay, 100 Lake Ontario boaters discovered bags with local event fliers "courtesy of New York Sea Grant and Arney's Marina."

"We're teaching consumers that keeping a clean boating environment (can be) easy and inexpensive," says **Geoff Smith** of Smith Boys Marina, North Tonawanda. The Boating Industries Association of Central New York and the Western New York Marine Trade Association co-sponsored the project. Anchor Environmental Solutions of Troy, Ohio, provided the bibs and bilge socks.

—**Kara Lynn Dunn**



Photo by Lane Smith

Board the Barnum

How do water and weather conditions change from minute to minute on Long Island Sound? That information can be vital for scientists, anglers, weather forecasters and travelers between Long Island and Connecticut. Now, starting with a September 2003 inaugural demonstration of a first-of-its kind observation system known as **Sound Science**, ferry passengers and educators as well as researchers anywhere in the world can receive both instant and continuous information about the health of Long Island Sound, one of the region's most important estuaries.



New York Sea Grant Director Jack Mattice thanks the project partners aboard the *PT Barnum* during the demonstration cruise. The kiosk on the passenger deck (pictured) displays real-time conditions in Long Island Sound. Photo by John Griffin/SBU Media Services

In an innovative approach to coastal research funded by New York Sea Grant, researchers **Duane Waliser** and **Robert Wilson** at Stony Brook University's Marine Sciences Research Center and their team have installed cutting-edge oceanographic and atmospheric monitoring equipment aboard the *P.T. Barnum* ferry. Through a unique partnership between one of the world's leading oceanographic institutes and the Bridgeport & Port Jefferson Steamboat Company, scientists can now visualize and record the "heartbeat" of Long Island Sound. Instruments automatically transmit data to a Web site operated by the Marine Sciences Research Center, www.stonybrook.edu/soundscience.

And the winner is.....

Peter Martin, a middle school science teacher from Oceanside High School on Long Island, correctly identified the species in both the Great Lakes and the Long Island Bays challenge in our Summer *Coastlines* issue. It's no surprise. This energetic teacher is at home in the outdoors. He's a triathlete, an avid birder and scuba diver who in his spare time goes kayaking! So

kudos to our winner of original artwork by illustrator **Jan Porinchak**.

And thanks, too, for others who participated in the contest and have told *Coastlines* about their interest in having posters of the Great Lakes and Long Island Bay food webs. We will announce when these become available.

Look at page 14 for the answer keys.

Both articles by Barbara A. Branca



Photo by Susan Hamill

On September 29, one hundred invited guests—elected officials, community leaders, scientists, educators, students and the media—boarded the *Barnum* and saw first-hand some of the monitoring devices and viewed the computer screen that displays their measurements at a kiosk on the passenger deck. The demonstration sunset cruise came on the heels of National Estuaries Day, a day to teach awareness of the nation's estuaries that has been designated by the National Oceanic and Atmospheric Administration. The National Weather Service (which is part of NOAA, as is Sea Grant) as well as Stony Brook University contributed much to the project.

Normally, water temperature, salinity, oxygen and currents are learned about from research vessels that are costly to run and can cover only a limited portion of a water body. Limited, too, are meteorological measurements made by stationary instruments in one location. The ferry's mobile nature provides the research team with both weather and water data from across the Sound in real-time. From it, researchers are getting a clearer picture of the impact the atmosphere has on **hypoxia**, a condition of low dissolved oxygen that is stressful to lobsters as well as a wide range of the Sound's aquatic organisms. The *Sound Science* observation system has potential uses for researchers worldwide as well as meteorologists and educators whose mission it is to keep the public informed.

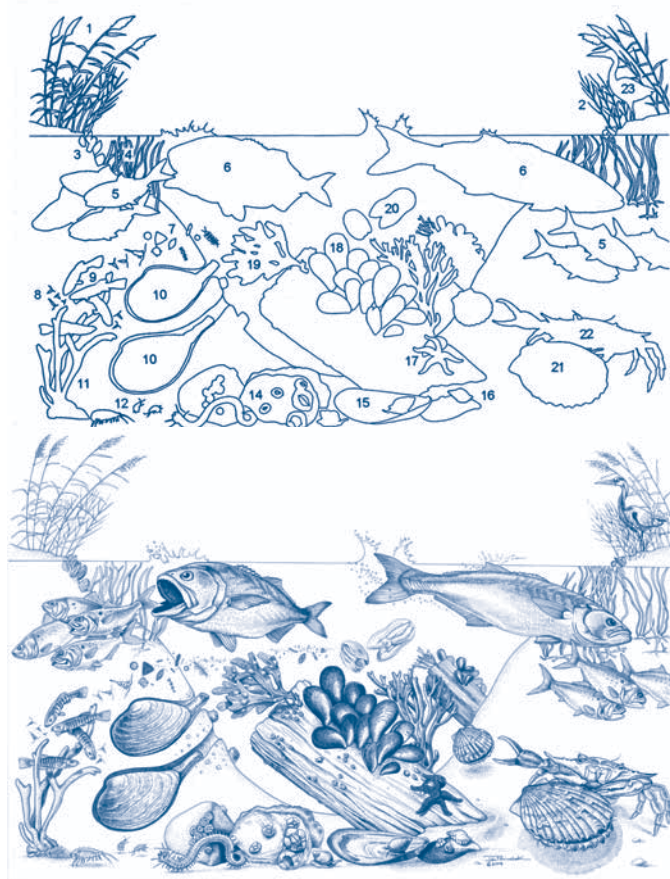
Above: Marine Sciences Research Center researcher **Robert Wilson** explains some *Sound Science* to guests aboard the ferry. Photo by John Griffin/SBU Media Services



CURRENTS

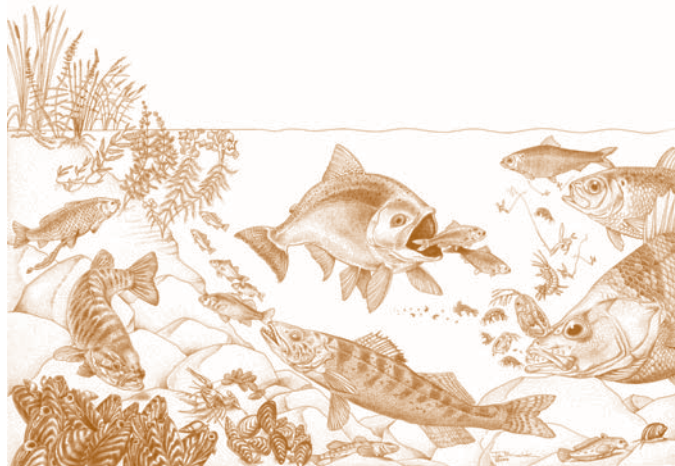
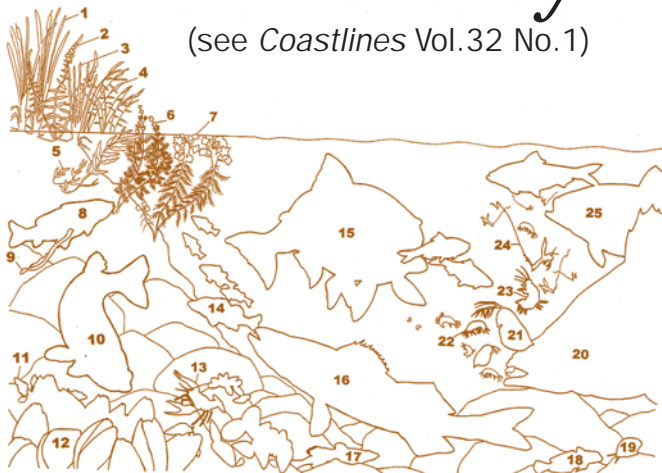
Key for Long Island Bays Challenge, pp. 14-15

1. Common reed (*Phragmites australis*)
2. Smooth cordgrass (*Spartina alterniflora*)
3. Ribbed mussel (*Geukensia demissa*)
4. Eelgrass (*Vallisneria americana*)
5. Atlantic menhaden (*Brevoortia tyrannus*)
6. Bluefish (*Pomatomus saltatrix*)
7. Diatoms
8. Copepods
9. Striped killifish (*Fundulus majalis*)
10. Soft-shelled clam (*Mya arenaria*)
11. Green fleece (*Codium fragile*)
12. Noble sand amphipod (*Psammonyx nobilis*) and Scud (*Gammarus oceanicus*)
13. Clam worm (*Nereis virens*)
14. Eastern oyster, shell (*Crassostrea virginica*) with Northern rock barnacle (*Balanus balanoides*)
15. Mud dogwhelk (*Ilyanassa obsoleta*)
16. Atlantic oyster drill (*Urosalpinx cinerea*)
17. Forbes' common sea star (*Asterias forbesi*)
18. Blue mussel (*Mytilus edulis*)
19. Rockweed/bladder wrack (*Fucus vesiculosus*)
20. Leidy's comb jelly (*Mnemiopsis leidyi*)
21. Atlantic bay scallop (*Argopecten irradians*)
22. Blue crab (*Callinectes sapidus*)
23. Great blue heron (*Ardea herodias*)



Answer Keys

(see *Coastlines* Vol.32 No.1)



Key for Great Lakes Challenge, pp. 6-7

1. Cattail (*Typha angustifolia*)*
2. Purple loosestrife (*Lythrum salicaria*)*
3. Jointed spikerush (*Eleocharis equisetoides*)
4. Common reed (*Phragmites australis*)
5. Curly-leaf pondweed (*Potamogeton crispus*)*
6. Eurasian watermilfoil (*Myriophyllum spicatum*)*
7. Water chestnut (*Trapa natans*)*
8. Common carp (*Cyprinus carpio*)*
9. Sea lamprey (*Petromyzon marinus*)*
10. Smallmouth bass (*Micropterus dolomieu*)
11. New Zealand mud snail (*Potamopyrgus antipodarum*)*
12. Zebra mussel (*Dreissena polymorpha*)*
13. Rusty crayfish (*Orconectes rusticus*)*
14. White perch (*Morone americana*)*
15. Chinook salmon (*Oncorhynchus tshawytscha*)*
16. Walleye (*Sander vitreum*)
17. Deep water sculpin (*Myoxocephalus thompsoni*)
18. Round goby (*Neogobius melanostomus*)*
19. Banded mystery snail (*Viviparus georgianus*)*
20. Yellow perch (*Perca flavescens*)
21. Daphnia (*Daphnia* sp.)
22. *Gammarus fasciatus* (amphipod)*
23. *Echinogammarus ischnus* (invasive amphipod)*
24. Fishhook water flea (*Cercopagis pengoi*)*
25. Alewife (*Alosa pseudoharengus*)*

* Species *nonindigenous* to the Great Lakes, many of which are considered invasive or a nuisance



Free up some time this fall and log-on to nyseagrant.org to find out:

- Our suggested strategies for reeling in more anglers in New York State
- How a new grant from Governor Pataki will benefit our Hudson River efforts
- Why we find Lake Ontario fisheries so important—their history, leadership training and public participation
- If brown tide bloomed in LI's bays this past summer—BTRI Report #8 in our series is released
- If gas additive contaminants are making their way up the Great Lakes food chain
- NY NEMO program's water quality recommendations for Nissequogue River and other locations



Photo by Paul C. Focazio

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121 Discovery Hall/Stony Brook University/
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Journal Reprints

Application of *in situ* target-strength estimations in lakes:

Examples from rainbow-smelt surveys in Lakes Erie and Champlain. L.G. Rudstam, S.L. Parker, D.W. Einhouse, L.D. Witzel, D.M. Warner, J.L. Stritzel, D.L. Parrish and P.J. Sullivan. 2003. *ICES Journal of Marine Science* 60:500-507. *Free*

***Cercopagis pengoi* as a new prey item for alewife (*Alosa pseudoharengus*) and rainbow smelt (*Osmerus mordax*) in Lake Ontario.** T.M. Bushnoe, D.M. Warner, L. G. Rudstam and E.L. Mills. 2003. *Journal Great Lakes Research* 29(2):205-212. *Free*

Mortality and growth of juvenile hard clams *Mercenaria mercenaria* during brown tide. D. I. Greenfield and D. J. Lonsdale. 2002. *Marine Biology* 141:1045-1050. *Free*

Novel sterols of the toxic dinoflagellate *Karenia brevis* (Dinophyceae): A defensive function for unusual marine sterols? J.-L. Giner, J.A. Faraldos and G.L. Boyer. 2003. *Journal of Phycology* 39:315-319. *Free*

Oxidation of thallium by freshwater plankton communities. B.S. Twining, M.R. Twiss and N.S. Fisher. 2003. *Environmental Science Technology* 37(12):2720-2726. *Free*

Trend analysis reveals a recent reduction in mirex concentrations in Coho (*Oncorhynchus kisutch*) and Chinook (*O. tshawytscha*) salmon from Lake Ontario. J.C. Makarewicz, E. Damaske, T.W. Lewis and M. Merner. 2003. *Environmental Science Technology* 37:1521-1527. *Free*

Sea Grant Publications

Streamside Stewardship Guide for Hudson Valley Residents. Nordica Holochuck. 2003.

Invasive Species of Lakes Erie and Ontario. H. Domske and C.R. O'Neill, Jr. 2003. \$2.00

This eight-page fact sheet targets the economic and ecological impacts of non-native *invasive* plants and animals in the Great Lakes. Nine species are identified and illustrated such as the purple loosestrife, pictured here along the eastern Lake Ontario shoreline. Included is a list of eight other species known to be in or coming to Lakes Erie and Ontario, along with insight into ways of reducing the spread of these and future invasive species. Web sites with more on invasive aquatic species are: www.aquaticinvaders.org, www.sgnis.org and nas.er.usgs.gov

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Seafood

Porgy

Porgy, scup—it is the same fish for us in New York. Whatever you choose to call it does not mean it is any less of a fish. This fish packs a big punch for its small size, and makes for excellent fishing for new anglers. Many seasoned anglers look forward to resuming their fishing trips with the first porgy run. The best time to catch porgies in New York bays is June, when bigger fish come up to shallow inshore areas. Porgies move to deeper waters for winter, but good catches can still be seen in early fall before the first chill. The last two years has seen a significant increase in the porgy population, making it an even more important recreational fishery.

But if you're not catching your own, porgies are available in fish markets for most months of the year. According to the NY Seafood Council, a skinless 3-ounce portion of porgy has only 120 calories, contains 21 grams of protein, 3 grams of fat and 45 mg of sodium. It is also a source of omega-3 fatty acids and contains no saturated fats or cholesterol.

Antoinette Clemetson
NYSG Fisheries Specialist

Baked Porgy with Basil

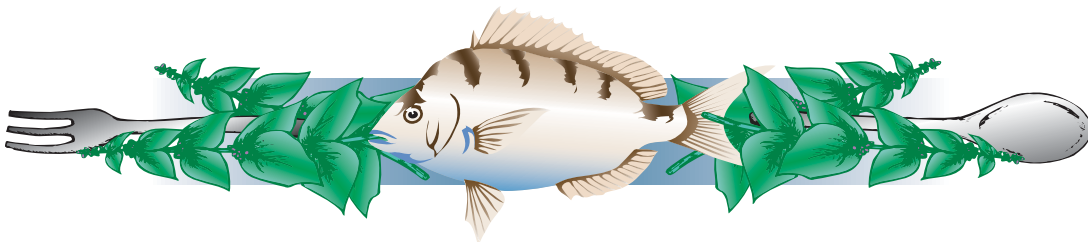
Ingredients

4 porgies (scup), whole, scaled, finned, gilled & cleaned, (3/4 pound each)
3 tbsp. butter, margarine or olive oil
3 tbsp. shallots or green onions, minced
1 tsp. salt
1 cup white wine, dry
3 tbsp. basil (20 leaves) fresh, chopped (or 1 tbsp. dried basil)

Recipe courtesy of Tony DiLernia, Kingsborough Community College, Brooklyn, NY.

Method

Preheat oven to 375°F. Use a cooking spray or coat the bottom of a baking pan with vegetable oil. Spread shallots or green onions in the baking pan. With a sharp knife make several slits along the sides of each porgy. Place fish on the bed of onions and sprinkle with salt and chopped basil. Set aside for approximately 5 minutes to mix flavors. Pour wine over the fish and dot the fish with the butter or margarine (or drizzle with olive oil). Cover with foil and bake for 10-15 minutes until the fish flesh turns opaque and begins to flake. *Serves 4. Preparation time 10-15 minutes.*



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