

COASTLINES



Coastal Awareness:

A Bird's Eye View of Our World

The Oswego River Runs Through It

Long Island Fever

VOLUME 24 NUMBER 1 • A PUBLICATION OF THE NEW YORK SEA GRANT INSTITUTE • SPRING 1994

COASTLINES

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COVER PHOTO:
Port Jefferson, NY by Lori Palmer



Note from the Director:

I am pleased to present the first issue of COASTLINES in its new format. With the arrival of Sea Grant's new communicator last year, COASTLINES Editor Julie Zeidner, we have been working on a redesign of our newsletter that better portrays New York Sea Grant's wide range of research, technology transfer and educational activities throughout the state. We hope this new magazine format will appeal to New York's diverse coastal users.

We hope that readers will find the mix of feature articles on New York Sea Grant projects and activities, short accounts of recent project results and programs in "Currents," general articles in "Coastwatch," new Sea Grant publications, and the recipe of the month in our "Seafood Corner," interesting reading and a valuable resource.

The theme of this issue is Coastal Awareness, and what individuals are doing to help protect our natural resources. By informing the public about the value and potential threats to New York's coastal resources, Sea Grant hopes to help people appreciate, use and protect this incredible resource that we share.

Along with the redesign, we have significantly expanded the COASTLINES mailing list to reach a greater number of New Yorkers interested in coastal issues. We'd like to know what you think of our new look. Please feel free to share your copy with others.



What Each Person Can Do To Make a Difference

Whether it was a summer vacation, a college class or a view from a suburban window, Sea Grant specialists became inspired enough by their experiences to pursue environmental stewardship. By painting storm drain stencils or demonstrating how lawn products contaminate coastal waters, among other educational activities, they are trying to make people aware of how their behavior can upset the environment. Breaking old habits is hard to do. When these stewards observe people changing their behavior as a result of Sea Grant efforts, they know they are succeeding.

Kimberly Zimmer totes a model of a plastic village with houses, factories, roads and schools around Long Island with her to demonstrate how pollution works. In a room full of foreign exchange students at Marymount College, she sprinkled multi-colored packets of Kool-Aid on the model. She imitated the effect of rain with a squirt bottle, wetting the sugary powder until it turned to liquid. The Kool-Aid, a substitute for earth and contaminants, slipped down the streets into drains and streams to the estuary.

■ "At first the students seemed bored, but when I showed them this demonstration they got really excited," said Zimmer, a New York Sea Grant program aide. "What they saw wasn't a problem particular to the U.S. It was a concept they could take with them."

■ In Upstate New York, Sea Grant Extension Specialist Jennifer Pultz is trying to make a similar impact on residents of the Great Lakes. With spray paint and stencils, she kneels down next to storm drains to inscribe a permanent message "Don't Dump, Drains to Lake." The storm-drain stenciling program, which Pultz promoted as "Gutter Talk" on the back of 750,000 milk cartons upstate, is helping educate the public about nonpoint source pollution. To help with the physical labor and educational campaign, Pultz has mobilized volunteer groups, such as the Boy Scouts, garden clubs, and local public works departments. In a single afternoon, 750 storm drains were stenciled in Watertown near Lake Ontario with Watertown's Mayor Jeffrey Graham present to kick off the event by stenciling the first drain himself.

■ "Over 240 million gallons of used motor oil are illegally disposed of each year, much of it down storm drains," said Pultz, citing an American Petroleum Institute study. "Many people do not realize that these materials end up in our ground and surface waters, and could harm our drinking water and the environment."

■ Storm drain stencils, also distributed by Zimmer to groups around the Long Island Sound, are also making a similar impact. Since Sea Grant initiated the project in 1992, more than 1,981 stencils have been used by 178 community groups, local municipalities and schools, in 29 counties in the marine and Great Lakes regions, and New York City.

■ During the past decade, intense public concern has focused on preserving Long Island Sound and the Great Lakes because water quality and the health of marine life have been jeopardized by contaminants. Sea Grant extension staff like Zimmer and Pultz provide the public with the most up-to-date information about the condition of coastal resources, and help explain why activities within the watershed contribute to pollution.

■ When the U.S. Environmental Protection Agency (EPA) designated Long Island Sound as an estuary of national importance in 1985, the Long Island Sound Study was initiated to determine the environmental problems facing the Sound. The goal of the study was to develop a management plan that would preserve the Sound's ecosystem while considering the pressures placed on the estuary by surrounding communities.

■ Zimmer, under EPA contract, was responsible for the New York public education component of the study. New York and Connecticut Sea Grant staff also assisted with the Long Island Sound Study by holding public meetings to discuss the draft report throughout the region during March of 1993. "Residents wanted to make sure the Sound was clean to use and the beaches stayed open," said Zimmer, commenting on the public comments received on the Long Island Study Draft Management Plan released earlier this year. "Fishermen wanted to ensure the health of shellfish, and environmental groups wanted to see the content of the management plan for the Sound improved."

■ The major focus of Zimmer's work now is raising awareness about the Long Island Sound Study. Equipped with a display board and brochures, Zimmer can be found before groups like the League of Women Voters and other civic organizations, at schools or environmental events on any given day of the week. Her goal is to help people discover their watershed address. "We all live in a watershed," Zimmer said. "Most people do not know what happens to rain water that falls in their neighborhood, in what body of water it ends up, or what pollutants it is carrying with it. People need to realize that what they do has an affect on their environment."



"If the Hamptons are 'the place,' why do people leave their trash everywhere?"

"I want people to experience what I did growing up - clean beaches that you can swim at, and get clams and mussels from," said Zimmer, remembering her summers spent camping out on Fire Island. Despite the ticks covering her family's tent one year ("we didn't know we were not supposed to be that close to the grass,") and a storm that split the barrier beach in two forcing her to evacuate during another beach season, Zimmer's interest in the outdoors only grew stronger.

• She studied environmental biology at Southampton College in Long Island, organized a recycling effort for her dorm, and worked on the town's Southampton Water Revitalization Plan, before joining New York Sea Grant.

■ Public involvement has also centered on trying to cap excessive commercial fishing, human sewage, industrial waste, agricultural runoff and other chemical input to the Great Lakes. While the agricultural community has been blamed for increasing soil erosion and contaminating groundwater, lakes and streams with fertilizers and pesticides, the cumulative impacts of individual homeowners are also a significant source of nonpoint source pollution. From Sea Grant's office in East Aurora near Lake Erie, Pultz develops educational programs that make gardeners aware of how improper handling and use of fertilizers, fungicides, pesticides, and copious amounts of water can harm water resources.

■ Sea Grant's *Great Lakes: Great Gardening* program helps Pultz educate homeowners about more efficient gardening techniques. To get her message across, she attends nationally-sponsored home and garden shows held in the Great Lakes with fact sheets and display information on birds and beneficial insects. A similar *Sound Gardening* kit is being used by Zimmer to reach residents of Long Island.

■ Changing people's perception about what constitutes an attractive garden is Pultz's main goal. "I like to challenge the manicured chemical-lawn square shrubbery mentality," said Pultz, advocating the less rigid native plant approach. "When did the dandelion become the enemy?" Native vegetation not only saves water, but is more inviting to birds like robins, cedar waxwing, and ruby-throated hummingbird. Shrubs buffer houses from winter winds, provide shade in the summer, and shelter wildlife. Native plants also attract insects like ladybugs, who eat plant-eating critters like aphids.

■ Composting is another practical gardening technique that Pultz recommends. Compost can be used as a soil conditioner for flower and vegetable gardens, and houseplants. The key to making an effective compost is to use diverse ingredients: a third of green things like grass, a third of brown things like leaves or wood, and a third of kitchen scraps.

■ "The common misperception is that composts will smell and attract rodents," Pultz said. "Diversity is the key. And the best thing is that all this stuff isn't going to the landfill where it doesn't do plants a bit of good."

When did the dandelion become enemy?"

Sea Grant Specialist Jennifer Pultz grew up in the scenic Finger Lakes region of New York, but it wasn't until she took a conservation biology class in college that she began to fully respect the environment she lived in.

- "This course made me aware of how sensitive the balance of nature really is," Pultz said. "I was raised in suburbia where they flattened out entire areas and used chemicals on their lawn. People tamed the environment around them to make it look very uniform. Nature was either ignored or abused badly. Being outdoors was something taken for granted."

- To pursue her interest in conservation, Pultz attended the State University of New York's College of Environmental Science and Forestry where she received a master's degree in wildlife management and education. She has been conducting New York Sea Grant public outreach programs for almost two years now.



Two L.I. High School Students Measure Pollution in Long Island Sound and Win National Science Honor

Two high school seniors concerned about pollution in Long Island Sound were named as semifinalists in the prestigious Westinghouse Science Talent Search this January.

Sheila May Gulati, 17, of Ward Melville High School in East Setauket, wrote a paper on wet atmospheric deposition of nutrients to Long Island Sound. Her mentor was Bruce Brownawell, an assistant professor at the State University of New York's Marine Science Research Center. Brownawell has received funding from New York Sea Grant to analyze atmospheric deposition of organic contaminants and nutrients to an urban nearshore environment. Their findings could have implications on management decisions concerning upgrading New York City's sewage treatment plants.

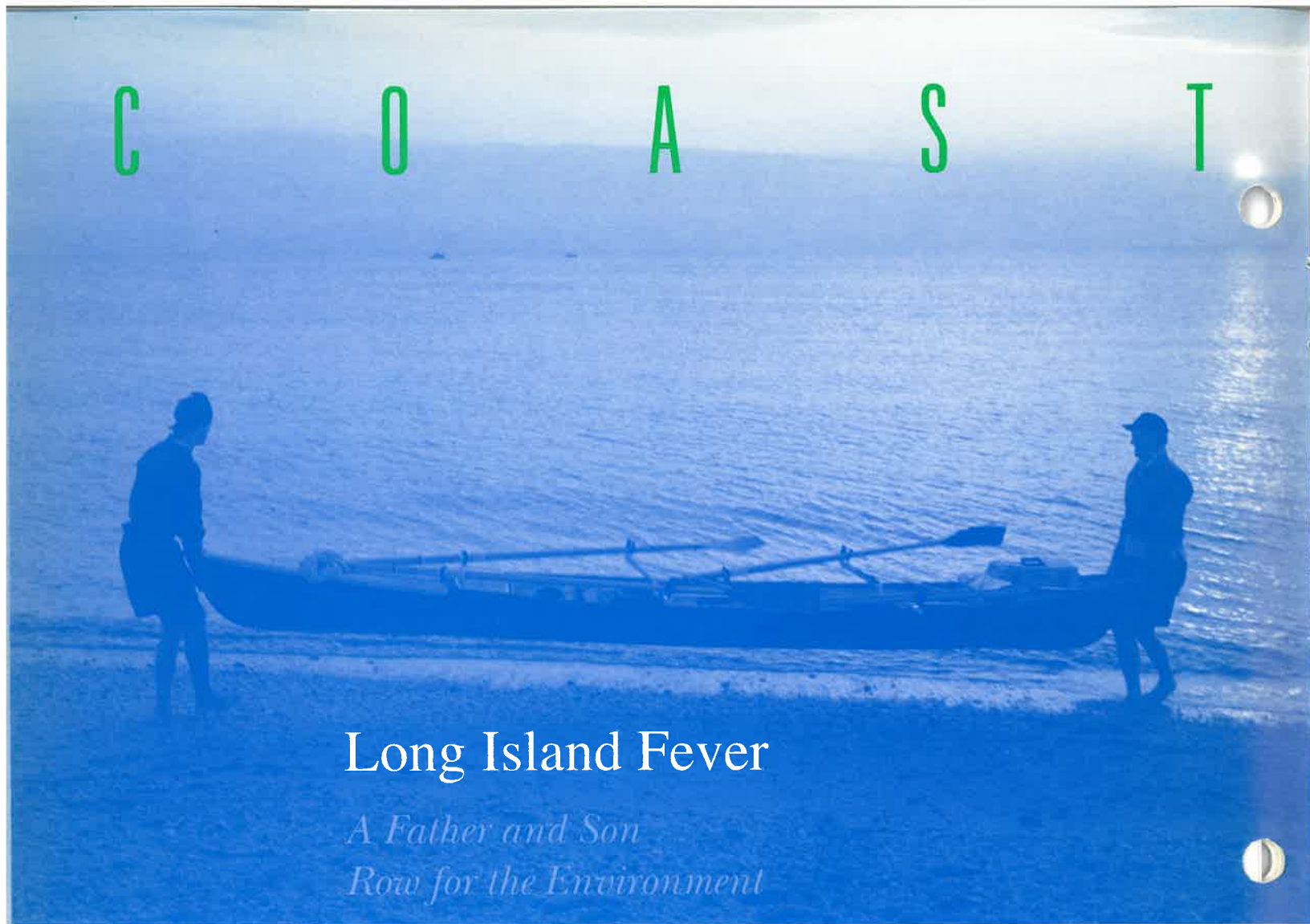
During a six month period, Gulati studied the deposition of chloride, nitrate, phosphate, sulfate and ammonium analytes in the near urban environments of Western and Eastern Long Island Sound. She found that the amount of atmospheric deposition of nutrients greatly varies for each rain event. According to her calculations, wet atmospheric deposition could be overrated as a source of nutrient input to Long Island Sound.

Rena Hope Barnett, 18, of Herricks High School in New Hyde Park, wrote a paper on the effects of stormwater runoff on Long Island Sound wetlands for the Westinghouse competition. Assisted by New York Sea Grant Project Assistant Trent Schneider in selection of sites, she then studied wetland plants, animals and water samples received at Udall's Cove in Great Neck Estates, a marsh not greatly affected by runoff, and at Glen Cove, a marsh exposed to large quantities of nonpoint source pollution. Her data indicated that stormwater runoff has a positive effect on salt marsh flora, and very little negative effect on animal life. Her study supports the importance of wetlands as a barrier to help minimize the effects of nonpoint source runoff on the Sound.

Barnett, who serves as co-president of Student Action for the Environment (SAFE), also worked with New York Sea Grant Program Aide Kimberly Zimmer and 20 Herrick High students on a storm drain stenciling project in her community.



Sheila May Gulati measures atmospheric deposition of nutrients to Long Island Sound.



Long Island Fever

*A Father and Son
Row for the Environment*

The Linzee's at Mattituck Inlet.

George Linzee and his son, Jeremy, are gearing up to row 175 miles around Long Island for the second consecutive year to raise awareness for the environment. Last August, they embarked in an 18-foot scull from the Stony Brook Yacht Club and docked at the same port after 10 days on the water. Cheered on by fishermen, baymen, beachgoers and other onlookers, they rowed clockwise around the island an average of 17 miles a day stopping in various ports where they camped on the beach or stayed overnight with friends. Because it was a personal journey for the father and son, the Linzees' didn't publicize their effort much during the first year. They also weren't sure if the row was physically possible.

• Now RAISE, or Row Around the Island to Support the Environment, is slated to become an annual educational event, like Earth Day, that will draw attention to the coastline and promote future rowathons. "We need to create an island identity and draw attention back to the waterfront," said George

Linzee, a marine and earth science teacher at the Stony Brook School. "We are facing an environmental crisis and could lose Long Island Sound within a given number of years. Our row is about bringing people together to undertake proper environmental stewardship of the region."

• Having grown up in the harbor town of Port Jefferson, George Linzee spent his summers on Long Island waters, swimming, diving and rowing. He studied naval science and rowed crew at Tabor Academy and went on to Harvard University where he also joined the rowing team. He is the current holder of a 50-ton Coast Guard license.

• The Linzees' have teamed up with members of various state and university environmental departments to turn RAISE into an event that will motivate people to care enough about the coast to help protect it. This summer, the Linzees' will again use their rowing scull, but plan to invite other participants to join in for sections of the trip in life boats

from the Merchant Marine Academy at King's Point. When the team rows into various ports this summer, plans are underway to organize activities and festivals by environmental experts for the public.

• The long range goal is to develop a summer program that would take high school students from every town and burrough in the region and involve them in a four-week program that would train them to be environmental stewards as they travel around the coast. Funds raised this summer will be used to build the rowing craft used for future RAISE events.

• "There is an Islander's hockey team, so why not rowing teams?" Linzee said. "Most of us don't think about the water except when we go over the bridges to and from New York and hassle with paying a toll. Rowing is a symbolic effort to make millions of people aware of the beautiful island we live on and the link between our everyday activities on land and the quality of our water resources.

• Jeremy Linzee was inspired to row around Long Island after he heard Dennis Bader speak at a New York State Educator's conference last year. He decided to make RAISE a class project at the Stony Brook School. With the help of his marine science teacher, George Linzee, they began to make plans for the undertaking.

• Robert Kent, the marine district coordinator for New York Sea Grant, helped launch the Linzee's project. He felt a row around Long Island would be an inspirational vehicle to spread the word about his Water Quality Stewardship Program, which is designed to make people aware of how their activities can potentially contribute to water pollution. People who adopt at least ten environmentally sound practices receive a certificate from New York Sea Grant and the National Oceanic and Atmospheric Administration.

• RAISE was a personal journey for the Linzees'. It was the summer before Jeremy Linzee headed off for college at Harvard, and the row drew them closer together. The father and son now plan to share their

experience with as many people as possible. George Linzee has a slide show of the row, which he presents to his students and other groups.

• A steering committee has been formed to plan this year's RAISE including representatives from New York Sea Grant, SUNY's Marine Sciences Research Center, the New York State Department of Environmental Conservation, the U.S. Merchant Marine Academy, among other organizations.

• "RAISE is designed to increase involvement in the environmental stewardship of Long Island," Linzee said. "One day we hope to reach out to other people living on islands worldwide and have similar journeys that help renew their spirits."

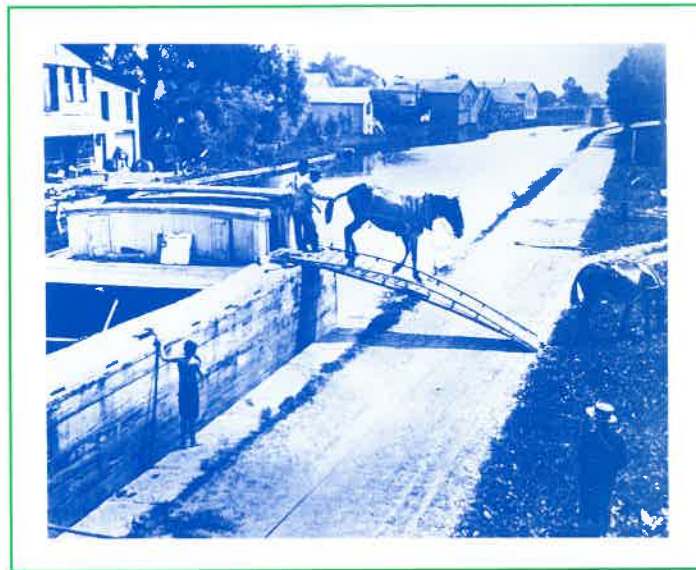


The Linzee's in
Shinnecock Canal.

The Oswego River Runs Through It

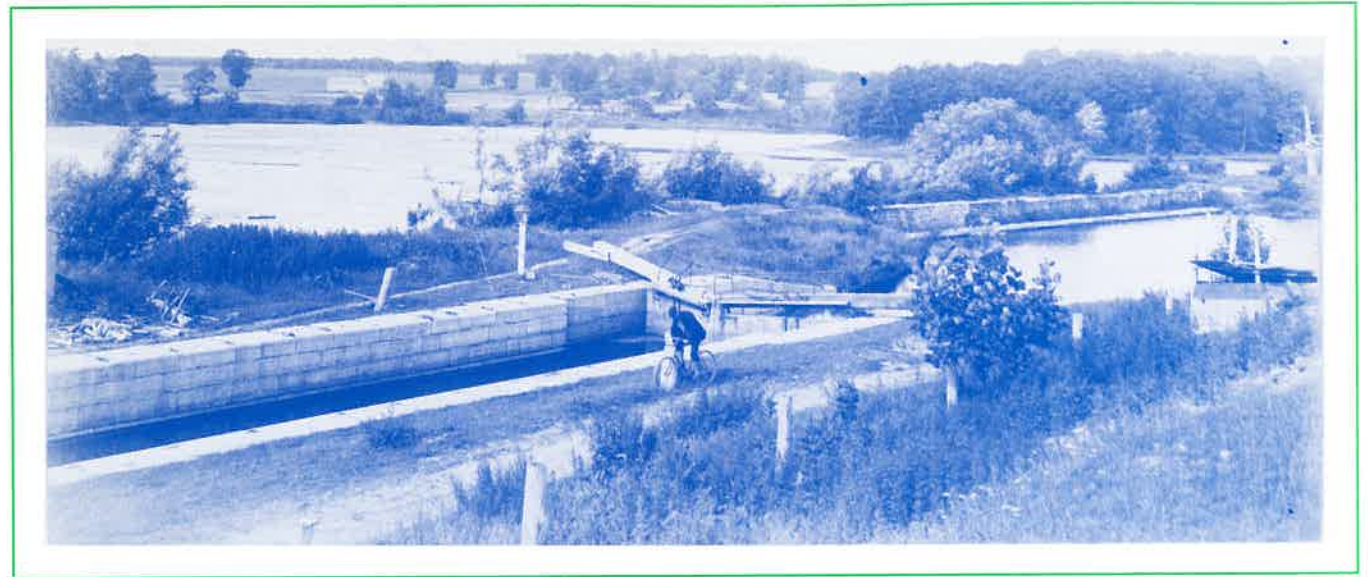
Sometimes a story about a place makes people pause to think about what they had previously taken for granted. This was the case with the Oswego River, a 24-mile scenic route that weaves its way past rural banks of maple, green ash and sumac connecting the Erie Canal south of Phoenix, N.Y. to Lake Ontario in the City of Oswego.

At Three Rivers Point, where the Seneca and Oneida rivers meet, the Oswego River begins. Every mile of the route unfolds clues about the cultures who vied for the river from the Iroquois and Onondaga Indians who once lived along its shores to the British and French colonists who fought for the territory. Construction of the old Oswego Canal began in 1827 along side the river, creating a vital transportation link for salt, timber and coal merchants from the East coast to the Midwest. As use of the canal for transportation of goods declined in the late 1800s, its use for recreation increased. In 1917, the new Oswego Canal opened with hopes that use of the canal would be revived. Unlike the old canal running parallel to the Oswego River, the new canal was an integrated part of the river.



Today, eight hydropower plants along the rural river provide enough electricity for about 40,000 residences. Thousands of people cruise the Oswego or rest on its banks for pleasure, many fishing for walleye, small mouth bass and chinook salmon. Birdwatchers observe kingfisher and great blue heron in the wetland and marshes dotting the area.

Promotion of the Oswego River came into focus only recently. The three communities along the river, the Village of Phoenix, and the Cities of Fulton and Oswego, had no existing plan for increasing visitors' awareness about this natural resource. In 1991, the first tourism development plan for the Oswego-Eastern Shore Communities by Seaway Trail, Inc. was developed to



help reverse this trend. The New York State Legislature also approved legislation to promote the development of the state's canal system in an effort to enhance its recreational use. The legislation enabled the Thruway Authority to collect tolls from canal users in order to fund canal repairs and future recreational development.

Traveling through New York, Sea Grant Specialist Diane Kuehn noticed the lack of information available to visitors about the history, scenery and culture of the region. The Oswego River was a perfect example of a natural resource whose value had not been adequately recognized.

Used by Native Americans, traders, colonists, industrialists and tourists for more than a century, the route had gradually been neglected. Locks on the new Oswego Canal built in 1917 had fallen into disrepair, its banks eroded by waves from speeding boaters, and its water polluted by industrial waste. The number of recreational boaters using the river was also in decline. A lack of general tourist information about the Oswego seemed to accentuate the fact that its importance was being dismissed. Kuehn thought an interpretive boater's guide for the Oswego that both connected and promoted these communities should be developed. She contacted the Oswego County Department of Promotion and Tourism with her idea. Within several days, they reached an agreement to develop the guide.

"We wanted to increase resident awareness about this resource so they could be proud of the river," Kuehn said. "We also wanted to let visitors know about this tremendous resource."

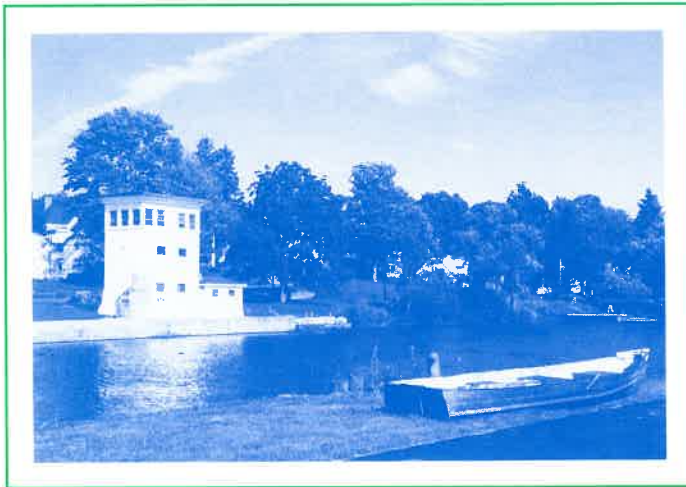
In her 1991 Sea Grant fact sheet "Developing An Interpretive Guide For Your Community," Kuehn outlined how communities could expand visitors' and resident awareness, understanding, and appreciation for an area using interpretive publications.

Development of an Oswego River guide would be a test of Kuehn's written recommendations. She spent six months gathering information from people at more than 60 agencies located near the Oswego River including historians, hydropower plant and industry officials. The 40-page guide, written by independent writer Kathleen Cook, would contain facts about the history of the river and the communities along it, architecture and ship building, boating safety tips, visitor information, an explanation about hydropower, and a sportfishing quiz.

The release of "Oswego River Canalling: a boater's guide to the history, facilities, and resources of the Oswego River and Harbor" was coordinated with a tour of the river by the "Urger," a tug boat owned by the New York State Department of Transportation. School groups toured the Urger at stops in the communities along the river. At the Urger's final stop in Oswego, Oswego Mayor Terrence Hammill formally presented a copy of the guide to the public.

In 1992, 10,000 copies of "Oswego River Canalling" were distributed to various community and state agencies, industries, and legislative offices. It was so popular that an additional 15,000 copies were printed seven months later.

"HOW to attract visitors..."



The river's popularity improved with the publication of the guide. Information about the resource made it more accessible, attracted visitors and gave them a reason for staying in the area longer. The interest shown by boaters throughout the northeast region indicates that the effort to raise awareness about the Oswego River will probably have an impact of over \$100,000 in visitor expenditures in the next several years, Kuehn said. The favorable public response prompted the Oswego County Department of Promotion and Tourism to begin plans for an interpretative guide to the Salmon River Corridor, which will be produced in 1995.

"Increased interest in the canal united all three communities and drew tourists from throughout the region," she said. "Because the guide was used in school districts, students also learned more about the river. They had a new respect for resources that their parents probably didn't even know about. Most people take for granted what's in their own backyard."

When Diane Kuehn was in 7th grade she already knew that she wanted to pursue natural resource management as a career. While visiting her aunt in Iowa that year, she expressed her reluctance about pursuing forestry because it was a predominantly male profession. Her aunt told Kuehn not to let that stop her.

■ *"I became very determined after that," said Kuehn, who went on to receive a bachelor's degree in Forestry and Forest Biology and later a master's degree in environmental education from the State University of New York's College of Environmental Science and Forestry. While working towards her second degree, she was employed at a U.S. Forest Service research station unit in Syracuse, N.Y.*

■ *For the past four years, Kuehn has been working for New York Sea Grant developing interpretive tourism programs for communities. Interpretive guides, signs and centers orient, entertain and inform visitors, Kuehn said.*

■ *She recommends that signs be created that make visitors feel they are helping a community solve their environmental concerns. "Signs in particular can be very effective at educating both residents and visitors about local environmental problems and getting them to change their negative behavior patterns," Kuehn said. "Many communities have asked me for suggestions about how to get people to stop feeding local duck populations or how to get people to stop littering. Usually it's just a matter of explaining to people why their actions are harming the environment and what they can do to help, instead of ordering them not to do something."*

■ *Working with 13 state and regional agencies last year, she brought together 120 tourism professionals, interpreters, and recreational planners for a two day conference to discuss what interpretation is and how to plan for it in their communities. She is now focusing her efforts on a pilot study showing how to develop an interpretive signage program, using the Southwick Beach State Park dune area on the eastern shore of Lake Ontario as a study area. The program, to be launched this summer, will follow the outline described in her fact sheet, "Developing Interpretive Signs For Your Visitors."*

Break in "Brown Tide" Studies

BY TRENT R. SCHNEIDER

Blooms of the brown tide alga, *Aureococcus anophagefferens*, have plagued Long Island's east end bays for almost a decade. In addition to helping wipe out scallop populations in the Peconic Bay system and impacting the quality and size of clams taken from Great South Bay, high concentrations of the algae in the water column block sunlight to underwater vegetation, killing eelgrass and other plants. The loss of important habitat such as eelgrass beds harms marine life dependent on them for survival, particularly the commercially important bay scallop.

Since the first devastating brown tide hit Long Island bays' in the mid-eighties, researchers have been scrambling to figure out what causes these blooms. Dr. Elizabeth Cospser, of the Marine Sciences Research Center at the State University of New York at Stony Brook, has been involved in brown tide research funded by the New York Sea Grant Institute since 1986. Cospser's initial work focused on understanding the physiology of the organism, and preliminary attempts to discover its origin. She was also successful at culturing this microscopic plant under laboratory conditions to study it further.

Subsequent studies under Cospser's direction investigated how other members of the plankton community interact with brown tide (see *Coastlines*, Vol. 23 No.2, 1993 for an article about this research). In her current New York Sea Grant project, Cospser is attempting to determine the environmental factors and key chemicals and nutrients that enhance brown tide blooms.

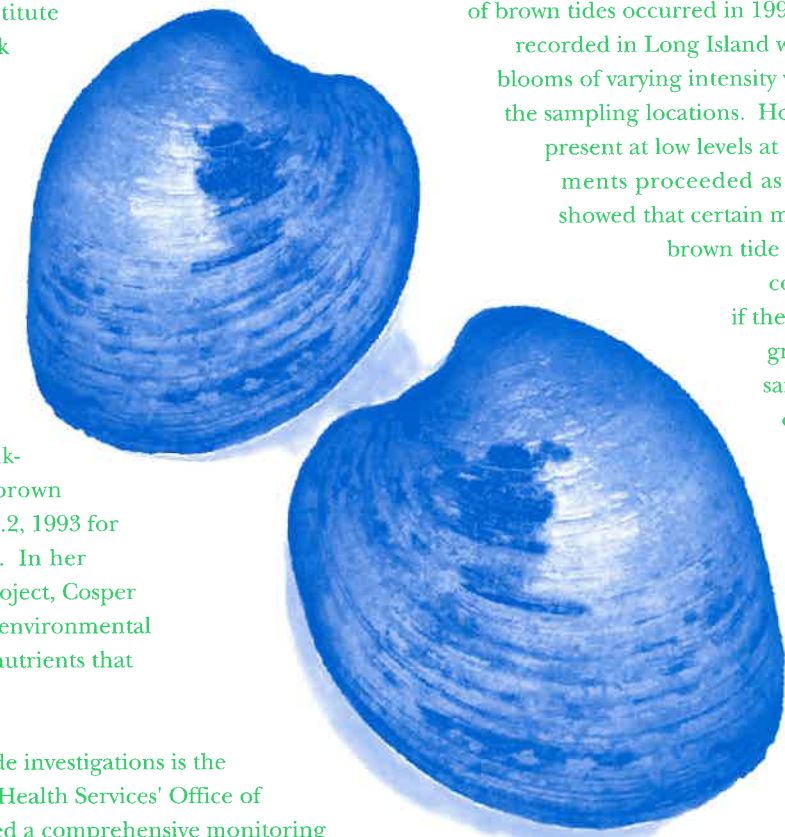
Another key player in brown tide investigations is the Suffolk County Department of Health Services' Office of Ecology, which has implemented a comprehensive monitoring program to characterize the extent of bloom activity in the county's waterways. Dr. Robert Nuzzi, a scientist with the county, has played an important role in the county's brown tide and water quality programs, including coordinating research

efforts for the Federal Peconics Estuary Program. The role of metals as triggers for the brown tide is of great interest, said Nuzzi, who hopes Cospser's research could provide clues that might help county resource managers predict and even prevent these blooms in the future.

As a first step towards determining what environmental factors might enhance brown tide activity, Cospser relied on information provided by the county to select sampling locations where brown tide blooms had occurred in previous years. She hoped this would increase her chances of finding blooms to measure during the field season. Sites included West Neck Bay in Shelter Island, Noyak Bay near Sag Harbor, and Quantuck Bay between Moriches and Shinnecock Bays on the South Shore.

An interesting twist demonstrating the unpredictable nature of brown tides occurred in 1993, when no blooms were recorded in Long Island waters. In previous years, blooms of varying intensity were recorded at each of the sampling locations. However, the algae was still present at low levels at the test sites, and experiments proceeded as planned. Prior studies showed that certain micronutrients stimulated brown tide growth under laboratory conditions. To determine if these nutrients also sparked growth in the natural field samples, experiments were conducted with the help of Sea Grant Scholar Chris Gobler, a graduate student at the Marine Sciences Research Center.

Their preliminary results showed a clear stimulation of brown tide growth over the general plankton community with the addition of iron and certain chelators to natural bay water samples. Since no field measurements of bloom conditions were possible in 1993, due to the lack of bloom activity in



the bays, researchers examined field data collected in previous years for evidence of a relationship between iron and brown tide blooms. In support of their findings, the data analysis showed that changes in dissolved levels of iron in water samples taken from the bays appeared to correlate with the brown tide blooms found during the summer of 1992.

Cosper speculates that increasing water usage in the bays' watersheds might be linked to the blooms. Deep ground water, isolated from the bays by its depth underground, is rich in iron compared to shallow ground water which naturally feeds into the bays via streams and springs. When the deeper water is pumped up for residential, agricultural, and other uses, and gains access to shallow aquifers and the bays through runoff, infiltration, septic systems, and sewage plants, iron levels in bay water can increase, which may create conditions favorable to the formation of brown tide blooms.

Additional studies to further document these findings, including repetition of the micronutrient experiments and analysis of water quality data from other bloom years, will be conducted in 1994. Gobler will be concentrating on determining what portion of the observed iron concentrations in Long Island's eastern bays is available for uptake by the brown tide algae, using new techniques developed by researchers at the University of Maine (see sidebar about red tide research on this page.) The researchers will also be on the lookout for any brown tide activity during 1994, and will attempt to directly sample bloom conditions.

While it is still too early to implicate iron as the key nutrient in brown tide blooms, Cosper's studies over the next year should further clarify the role of iron in brown tide blooms and help determine the direction of future research efforts. Ultimately, determining the environmental conditions which enhance these blooms will be important in predicting bloom events, managing bay resources, and guiding management decisions concerning land use, waste management and water quality.

The role of iron in the formation of algae blooms was the subject of previous research supported by the New York and Maine Sea Grant Programs.

Iron uptake mechanisms in toxic "Red Tide" dinoflagellate algae in the St. Lawrence Estuary and the Gulf of Maine was studied by Dr. Gregory Boyer of the State University of New York College of Environmental Science and Forestry. Other studies had shown that certain bacteria and blue-green algae produce organic molecules known as siderophores in the presence of iron, which help make the iron nutritionally available to these organisms. Boyer's research team was unable to detect siderophore production in the growth of red tide algae, despite using four different detection methods. Unsatisfied with these results, Boyer made several technical modifications to one of the methods, testing them on species known to produce siderophores, to improve its sensitivity to siderophore production. Still no activity was found in the red tide algae, leading Boyer to conclude that it does not utilize siderophores to obtain the iron necessary for bloom formation.

Researchers from the University of Maine also evaluated iron as a triggering factor for red tide blooms in a study supported by Maine Sea Grant. Since much of the total iron found in seawater occurs in colloidal or particulate phases, which cannot be readily assimilated by phytoplankton, measuring total iron in water samples is a poor indicator of what is available for their use. Mark Wells, a graduate student involved in the Maine study, developed a novel technique for determining the chemical lability, or ease of dissolution of colloidal iron in seawater. To directly measure the bioavailable fraction of iron in the seawater, Wells employed a complexing agent, oxine, which binds available iron like the natural agents found in algae. Field data analyzed with this method showed that the reactive fraction of iron in seawater can vary considerably over short time scales, indicating that the chemical nature of iron, and its biological availability to phytoplankton, is a dynamic feature in natural systems.

This research implies that a significant proportion of the particulate iron in water samples could be a ready source of available iron, and that changing environmental factors such as atmospheric deposition of dust, resuspension of iron-rich sediments, and photolysis (breaking down of colloidal iron by sunlight) might govern the availability of iron to phytoplankton. Despite this enhanced understanding of iron-seawater chemistry, the Maine research team was unable to directly correlate red tide outbreaks with changes in total iron in coastal waters.

New York Sea Grant Publications

Please send requests for the following publications, including checks payable to:

New York Sea Grant Institute
115 Nassau Hall
SUNY at Stony Brook
Stony Brook, NY
11794-5001
or call 516.632.9124

Aquatic Plants - Another World

H. David Greene
Michael W. Duttweiler
Terrestrial plants are obvious members of our communities. Although less obvious, aquatic plants, which live in and around water, are just as important as land plants. The activities in this book provide high school students with an introduction to the aquatic plants that they can see without a microscope. Students will learn about the relationships between plants, fish and people. A glossary explains unfamiliar terms. Appendixes show how to make and use a plant press for preserving aquatic specimens, and record sample collection notes in the field. 12 pages. \$3.50.

Long Island Coastal Conference 16-17 June 1993 Scenario Planning & The Future of Long Island's Coastline and Near-Coastal Environments

J.R. Schubel
James Larocca
In June 1993, a group of nearly 200 environmentalists, business people, concerned homeowners, coastal scientists, managers, and engineers

used scenario planning to explore a range of plausible futures for Long Island's coastline and near-coastal environments. The goals were to reach consensus on qualities that Long Islanders want for their coast in 2020, and to identify strategies that have the greatest chance of producing a coast with those qualities across a range of natural conditions. Conference participants told vastly different stories of the region from a bleak picture of Long Island minus 100 feet on all shores to a harmonious image of people working with nature in partnership. 136 pages. (Also available from SUNY's Marine Sciences Research Center) \$10.00.

A Manual for Nonlethal Surgical Procedures to Obtain Tissue Samples for Use in Fish Health Inspections

G.A. Wooster, H.-M. Hsu and P.R. Bowser
Researchers at Cornell University's Department of Avian and Aquatic Animal Medicine, within the College of Veterinary Medicine, developed this manual to instruct fish health personnel on the procedures for liver and kidney biopsies in live salmonid broodfish. The tissues collected will be suitable for fish disease diagnostic or fish health inspection purposes; however, both procedures are outlined in detail. The intent of the surgery is to detect vertically transmissible diseases or pathogens that can be passed into eggs or fingerlings that might be shipped from one point to another, without sacrificing the sampled fish. 27 pages. Free.

Development of a Directory of Boater Pumpout Facilities and an Assessment of Pumpout Operations and Use in New York and Connecticut Marine Waters

Jay Tanski
This report describes a boater edu-

cation project focusing on reducing potential sanitary discharges from recreational vessels and presents an assessment and characterization of pumpout station operations and use based on surveys of marine facility operators and boaters in New York and Connecticut. Included are quantitative data and information on pumpout use, factors affecting use, pumpout costs, boater demand and disposal options. This information is particularly useful for coastal planners, managers, and regulators involved with boat waste issues as well as for marine facility operators. 37 pages (plus appendices). \$2.00.

Other newsletters available from Sea Grant:

- Charterlines
- Coastal Educators News
- Commercial Passenger Fishing Vessel News
- *Dreissena polymorpha* Information Review
- Marine Facilities Notes
- Marine Network News
- New York Great Lakes Water Level Update
- Perspectives: Great Lakes Program

Journal Reprints

Detachment of Bouyant Surface Jets Discharged on Slope.
Joseph F. Atkinson. 1993. Journal of Hydraulic Engineering. 119:878-894. Free.

Seasonal Contrasts in the Diel Vertical Distribution, Feeding Behavior, and Grazing Impact of the Copepod *Temora longicornis* in Long Island Sound.
Hans G. Dam and William T. Peterson. 1993. Journal of Marine Research. 51:562-594. Free.

Predation by Age-0 Bluefish on Age-0 Anadromous Fishes in the Hudson River Estuary.
Francis Juanes, Rick E. Marks, Kim A. McKown, and David O. Conover. 1993. American Fisheries Society. 122:348-356. Free.

Uptake and Retention of Mirex by Fish Maintained on Formulated and Natural Diets in Lake Ontario Waters.
Joseph C. Makarewicz, Joseph K. Buttner and Theodore W. Lewis. 1993. The Progressive Fish Culturist. 55:163-168. Free.

Beyond Hydrography: Can Physical Processes Explain Larval Fish Assemblages Within the Middle Atlantic Bight?
Robert K. Cowen, Jonathan Hare and Michael P. Fahay. 1993. Bulletin of Marine Sciences. 53:567-587. Free.

Ecological Energetics of Rainbow Smelt in the Laurentian Great Lakes: An Interlake Comparison.
Brian F. Lantry and Donald J. Stewart. 1993. The American Fisheries Society. 122:95-976. Free.

Effect of Different Dietary Triglycerides on Liver Fatty Acids and Prostaglandin Synthesis by Mouse Peritoneal Cells.
Belur Lokesh, Jerome LiCari and John Kinsella. 1992. Journal of Parenteral and Enteral Nutrition. 16:316-321. Free.

Please send requests for the following publications, including checks payable to Cornell University to:

New York Sea Grant Communications
Swetman Hall
SUNY College at Oswego
Oswego, NY
13126-3599
or call 315.341.3042 for further information.

The Biology, History and Management of the Lake Sturgeon in the Lower Great Lakes.
David MacNeill and W. Dieter Busch. 1994. Includes illustrations, maps and tables. \$.50

Our Lake Ontario Sand Dunes: A Resource Notebook.
1993. Includes fact sheets, brochures and activity worksheets relating to the sand dune ecosystem along the eastern shore of Lake Ontario. \$10.00.

A Bird's-Eye View of How Our World Is Changing

AERIAL MAPS FOSTER SENSE OF PLACE AND DUTY

The first satellite images of earth taken from space in the early 1970s seemed to crystallize the environmental movement. For the first time, our planet was viewed as a fragile entity, a tiny ball protected by a thin atmospheric veneer.

- "When you look at earth from outer space you see what a thin little layer of protection the atmosphere really is, and then there's nothing," said Robert Kent, of New York Sea Grant. "If we destroy that, that's it. We don't survive."
- These aerial images have broadened our understanding of earth and our sense of place and responsibility. Since the first balloon ride in Paris in 1783, and then with more elaborate inventions like planes, skyscrapers and satellites, we have sought a bird's-eye view of the world. "The first thing everyone asks when they look at satellite images are questions like 'where's my house, where's my state,' Then they gain an appreciation for the bigger picture," Kent said.
- A new program called Explorations from an Aerial Perspective will help students form this connection to their environment. The program, funded by the National Science Foundation in cooperation with Cornell University, Cornell Cooperative Extension and the New York Sea Grant Institute, makes use of low-altitude aerial photographs and maps so that young people and adults can experience their communities from the air.
- By investigating how their neighborhoods have changed over time with development, students will learn how land-use practices affect their quality of life. Aerial photos, which date from the 1930s up to present day, allow them to compare what life was like without suburban sprawl, shopping malls and massive development. Recognizing how their activities affect water quality and other natural resources, students are then invited to become environmental stewards in their community.
- Kent, Sea Grant's marine district coordinator, helped launch the new program a year ago. He was among five Long Island educators who took part in a week-long training session at the Cornell Laboratory for Environmental

Applications of Remote Sensing (CLEARS). The educators included Richard Hilary of Southold Public Schools, George Linzee of the Stony Brook School, Mary Watros of Nassau County Board of Cooperative Educational Services, and Keith Philips of the Shinnecock Nation.

- During the training, the educators analyzed aerial photographs and maps of sites they had chosen. The photos are one form of remote sensing, which simply means to observe from a distance, and includes such technologies as satellite imagery and radar. Aerial photos, which are more affordable and accessible than other types of remote sensing, will allow students to focus on their local communities and the changes that have occurred there during the past sixty years.
- The aerial perspectives program will be used in a variety of settings including schools, 4-H clubs, nature centers, science museums, recreation centers and citizens' meetings in the near future. Philips is concerned that young people on the Shinnecock Reservation are disconnected from their heritage. With aerial photos, the students will take an inventory of natural resources on the reservation, and track such problems as agricultural decline and shoreline erosion that have occurred over time.
- Pollution problems in Stony Brook and Port Jefferson Harbor will be the focus of George Linzee's efforts. Using photos of the harbor and their school district, he will talk to students about how their behavior affects water quality. Linzee hopes students will become environmental stewards of these two bodies of water and get the general public interested in their project.
- In Kent's Sea Grant office in Riverhead, he examines an aerial photograph of a 40-acre wetland property on Hog's Neck, which juts into Peconic Bay. He uses a stereoscope, a pair of eyeglasses on 6-inch stilts that create a three-dimensional affect when he looks down at two photos of Hog's Neck taken at slightly different angles.
- The property, targeted for a housing development and marina in the early 1970s, had already been dredged when angry residents put enough pressure on public officials to stop the project. The county purchased Hog's Neck, and built a



marine sciences community college on the property.

- Kent's students, from the Suffolk County Marine Environmental Learning Center in Southold, will do a lot of "ground sensing" of Hog's Neck before they look at aerial photos. "I want to get them out in canoes, to walk it, to drive it, to get a better feel for the area," Kent said. "Hopefully a sense of connection to Hog's Neck will develop, and these kids will come up with a stewardship plan to protect the area from future problems."
- Another goal of the Aerial Perspectives Program is to engage students in science education by using an untraditional approach. "When they talk about science education now, the move is not to follow the cookbook recipe and have students replicate what somebody else did, this is boring," Kent said. "Just as a real scientist sets up some kind of experiment without knowing what the answer is going to be, kids should be able to devise their own set of questions and make their own discoveries."

"I grew up in a potato field, and never knew how pretty it was."

Robert Kent, New York Sea Grant's Marine District Coordinator, grew up in the suburbs of New York City on the former site of an old potato field. Driving through upstate New York when he was 20-years old he noticed a beautiful field with white flowers in it.

"I asked my friend what that was, and he said why it's a potato field," Kent said. "Gee, I grew up on what was an old potato field, and I never knew what it looked like."

Kent uses this story as an example of how a person can make a pivotal connection with their environment after having been uninformed about it previously. A historic photograph can help people learn about changes in land use over time. His own interest in the outdoors was actually sparked by his parents, who took him to parks, a cottage on the lake, and to a forest preserve owned by relatives upstate. Kent said his father grew up on the lower East side of Manhattan where there was no open space, but after watching birds out his window, he checked out a book from the library on the subject. He has been an avid birdwatcher ever since.

Living without the natural world is a lonely existence, Kent said. "A lot of kids grow up without spark. Today most people live in the suburbs and are not outdoor oriented. Kids go to shopping malls and play computer games. We need to get people to make connections between their daily life and what's out there. I'm not going to change the world, but each person can have an impact, and that's what I try to do. The aerial perspectives program may add spark to a person's life that is currently missing."

C U R R E N T S

Breach Increases Bay Tide Ranges

The pounding surf of a strong Nor'Easter at Westhampton Beach barrier island last winter opened a 2,600-foot breach in Moriches Bay that was eventually closed by the US Army Corps of Engineers. The breach destroyed or isolated hundreds of beachfront homes, and cost \$8 million dollars to fill. Researcher Daniel Conley of the Marine Sciences Research Center (SUNY at Stony Brook), with assistance from New York Sea Grant Extension Specialist Jay Tanski, set up equipment to quantify the increased water exchange between the ocean and the back bay caused by the new inlet. Preliminary data from the study indicate that tidal ranges in Moriches Bay increased approximately 35 percent compared to tidal measurements taken before the breach in 1987.



Breach at Westhampton.

The Changing Face of the Lower Great Lakes Ecosystem

Scientists, policy-makers, resource managers, environmentalists and local anglers came together in February for a day-long seminar on The Changing Face of the Lower Great Lakes Ecosystem. More than 90 concerned stakeholders attended.

- The Great Lakes Program at the University at Buffalo, New York Sea Grant Program, and SUNY College at Buffalo's Great Lakes Center sponsored the seminar about the ecological status of the Great Lakes. Speakers included representatives from the NYS Department of Environmental Conservation, US Fish and Wildlife Service, US Environmental Protection Agency, and Buffalo State College.
- Dr. Paul Bertram, of the EPA's Great Lakes Office in Chicago, provided an overview of the efforts that have resulted in reduction of the nutrient loading in Lakes Erie and Ontario. Dr. Joseph DePinto, the director of UB's Great Lakes Program, discussed how toxic contaminants in the lakes accumulate and magnify as they move up the food chain. He pointed out that "parts per billion in water samples become parts per million in fish flesh." Although many toxics are found at reduced levels compared to the past, DePinto stressed the need for continued scientific research.

Native Americans Seek Environmental Coalition

Native Americans from western New York state gathered in Syracuse this January to begin discussions on how to improve the environment on their reservations. Members of the Oneida, Seneca, Mohawk and Tuscarora Nations are concerned about toxic dumping, sewage disposal, tank leakage and agricultural runoff, and the ensuing contamination of ground and surface waters.

- The conference was sponsored by the State University of New York (SUNY), Cornell University and the Native American Western Consortium. New York Sea Grant Extension Specialist Dave Greene, who also helped organize the event, is spearheading an effort to help Native Americans better manage and protect their lands, and work towards mutual environmental solutions. For more information contact Dave Greene at 716.652.5453.

New Seafood Safety Program Launched

The Food and Drug Administration announced new proposed regulations in January to establish procedures for safe processing and importing seafood products.

- The proposed regulations will mandate a HACCP-based system recognized as state-of-the-art for food safety control. It requires seafood processors to identify potential hazards in their operation, and develop a system to monitor and control them. Working with industry and government regulatory officials to formalize a Seafood HACCP Alliance, the National Sea Grant College Program has developed a new initiative related to Seafood HACCP training. The initiative's objective is to increase the safety and quality of seafood produced, imported, processed and consumed in the United States through a national education and training program.
- New York Sea Grant Seafood Specialist Ken Gall has been working with the seafood industry to help them understand and begin to adopt this new system. At least 45 individuals from seafood businesses in New York have completed a HACCP training course, and the National Marine Fisheries Service certification exam. Gall is continuing to work with smoke fish processors in the New York City area to develop and implement a HACCP plan for their operations. For more information, contact Ken Gall at 516.632.8730.

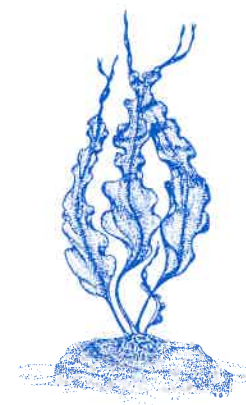
Great Lakes Environmental Forum

A panel discussion on Great Lakes issues was presented for State Assembly and Senate members in Albany on Feb. 8. The environmental forum was sponsored by Senator Owen Johnson, Assemblyman Richard Brodsky, the New York Sea Grant Institute, and the New York Great Lakes Research Consortium.

- Dr. Anne McElroy, director of the New York Sea Grant Institute, spoke about the impact of zebra mussels and other introduced species in the Great Lakes. Stephen Brandt, director of the Center for Environmental Education and Research, discussed the ecology and economics of the Lake Ontario and Lake Erie fisheries. Joseph DePinto of the Great Lakes Program, Richard Smardon and Jack Manno of the Great Lakes Research Consortium, talked about the impact of toxic chemicals in the Great Lakes, natural resource management and environmental conservation.

Seaweed Stress Management

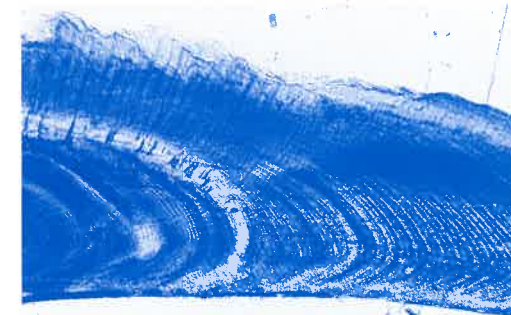
Seaweed aquaculturists, like farmers, depend on favorable growing conditions to produce the best crops. Researcher Valrie Gerard of the Marine Sciences Research Center (SUNY at Stony Brook) investigated how environmental stresses would impact the growth of commercially important seaweed species. She subjected microscopic early life stages of kelp (*Laminaria saccharina*) to stress conditions such as low light levels, high water temperatures, and low nitrogen concentrations for two weeks. The kelp was then exposed to optimal conditions to see if the earlier effects of stress still caused growth or mortality conditions. The plants seemed to show rapid growth, recovering quickly from unfavorable conditions.



Student Research Highlighted

More than 150 faculty and students from New York and Ontario attended an annual conference in January held by the Great Lakes Research Consortium, in cooperation with the New York Sea Grant Institute. Forty-nine students presented papers and posters, and six were selected to receive \$100 Don Rennie Memorial outstanding student presentation awards funded by Sea Grant.

- The following students were given awards: Betsy Donald, University of Toronto; Gregory Lampman, SUNY Brockport; Mary Anne Augustyn, University of Waterloo; Mary E. Merner, SUNY Brockport; Michael Kadlec, SUNY School of Public Health, Massena, NY; Adrian Spidle, Cornell University.



A clam shell viewed under microscope shows lines indicating slower growth in winter (left) and rapid growth in spring (right).

Do Clam Growth Lines Tell Tales?

As clams grow, their shells enlarge by layers, forming a pattern called microgrowth lines. Researcher Robert Cerrato of the Marine Sciences Research Center (SUNY at Stony Brook) is studying these lines to see what they reveal about the early stages of a clam's life. The pattern of line deposition was set by the clam's own biological clock and could not be changed by experimental alteration of day length. This study challenges a previous hypothesis that at the very early life history stage line deposition is governed by length of daylight.

Back to the Future

Marine natural products research involves the study of biologically active compounds derived from marine organisms. Some of these compounds prove to be promising pharmaceuticals and are developed into new medicines. Cornell University natural products chemist Dr. Jon Clardy recently found himself returning to the roots of his profession to develop futuristic cancer-fighting compounds.

- The modern era of marine natural products research began in the early '70s when several independent groups of researchers examined biologically active compounds from marine algae and invertebrates. The first compounds studied were a class of highly halogenated metabolites derived from red algae, and later, more complex, natural products.
- When a novel screening effort by the National Cancer Institute (NCI) recently highlighted a pentahalogenated monoterpene as a high priority material, Clardy renewed his interest in these halogenated compounds. The NCI screen used 60 different human tumor cell lines to assess the relative activity of potential anti-tumor compounds. The pentahalogenated monoterpene was the most selective compound discovered to date in this assay method.
- In continuing studies funded by New York Sea Grant, Clardy is continuing to study these halogenated metabolites. For more information about Clardy's work, see "New Molecules Yield New Medicines," in COASTLINES, Volume 23 No. 1, 1993.

SEAFOOD CORNER

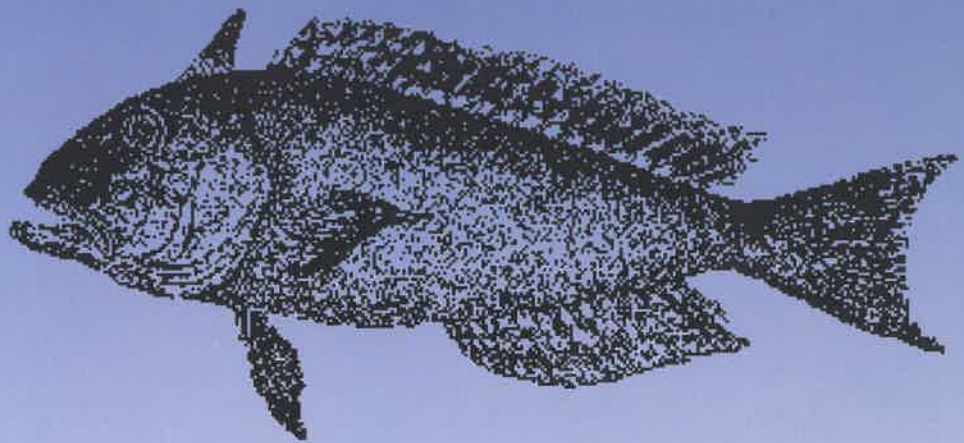
TILEFISH PARMESAN

Tilefish, which has a mild flavor and firm texture excellent for grilling, broiling or using in chowders, stews and salads, is New York Seafood Council's Fish of the Month. It is also high in protein and low in fat making it a good local alternative for a healthy diet.

• Tilefish, called the "clowns of the sea" because of their bright blue, green and yellow coloration, are an important deep sea fish harvested by New York fishermen.

Living at depth of 300 feet or more near the Continental Shelf 60 miles off Long Island's eastern shore, tilefish feed on a variety of shellfish including crabs and squid.

• In 1992, more than 2.1 million pounds of tilefish with a dock-side value of \$3.7 million were landed in New York waters. Tilefish are primarily landed at Long Island's largest port, Montauk, where at least four full-time tilefish vessels and several part-time boats are located.



A simple and quick meal that can be great tasting and easy to prepare. (Courtesy of Susan Farnham, wife and co-owner of the tilefish vessel "Kimberly.")

3 or 4 lb tilefish (2 fillets)
1/2 cup white wine
1 lemon
1/3 cup bread crumbs
1/3 cup parmesan cheese
2 to 3 pats butter or margarine

Place fish in broiling pan. Add wine. Sprinkle breadcrumbs and parmesan cheese over fish and top with pats of margarine. Broil for 15 minutes. Serve with lemon slices.

Nutritional Information (for 3 ounces cooked tilefish only*):
Calories: 125;
Protein: 20.8 grams;
Total Fat: 4 grams;
Saturated Fat: 0.7 grams;
Omega-3s: 0.8 grams;
Sodium: 50 milligrams.
*Source: USDA Handbook No. 8-15, Composition of Foods: Finfish and Shellfish Products, 1987



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