Sea Grant New York

Long Beach aerial photo from
Atlantic Coast of New York Monitoring Program

Monitoring Change

Long Island's coast is a dynamic environment, constantly changing in response to natural processes and human activities. The 125 miles of ocean coast stretching across its densely populated south shore from Coney Island to Montauk is of particular interest due to the high level of development in this area. For example, Long Beach, seen in the aerial photo above, is a barrier island with a year round population of 50,000. "Coastal erosion along the south shore is a significant problem for all levels of government," says NYSG coastal processes and facilities specialist Jay Tanski. "Historical maps and aerial photos show that the patterns of shoreline change are highly variable in this area. Some areas appear to be stable or even gaining sand over the last century while others are eroding at tens of feet per year."

The key to sound coastal management is having a good understanding of how the shoreline is behaving and what is causing these changes. "In addition to natural processes such as storms and sea level rise," Tanski says, "human activities– primarily those associated with stabilizing and dredging the inlets for navigation purposes– have impacted the patterns and rates of erosion in the area."

Continued on page 4

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From the Director

New York Sea Grant staff and managers are in the midst of re-examining and revising our strategic plan with the help of our Board of Governors, Program Advisory Council (stakeholders) and a cadre of senior researchers in the state. This will help clarify why my first thought about this issue of *Coastlines* was as a vehicle to explain an important aspect of our mission. NYSG's mission is to "Identify, support and extend research-based information, which will enable individuals, communities, businesses and other decision makers to better conserve, utilize and rehabilitate their coastal resources."

Note that this statement carefully highlights our goal to contribute to decision-making, but says nothing about making decisions. This difference is critical to NYSG's success. We like to think of ourselves as objective providers of valid and unbiased (scientifically-based) information that allows others to make wise decisions. We are in the business of telling 'what will happen if'… and not in the business of telling whether that result is good or bad for society.

So why is this issue of *Coastlines* a good example of this important aspect of our mission? Look at the lead story. NYSG's extension specialist Jay Tanski worked from the goal of helping local and state governments better respond to erosion and flooding issues along the south shore of Long Island. His efforts range from gathering experts together to identifying the types of information that is needed. These efforts also include acting as a liaison to coordinate federal, state and local activities and incorporating the monitoring results into a user-friendly, interactive Geographic Information System database. This database can be used by decision makers and staff to answer the questions that are critical for their site-specific decisions.

Other articles document: 1) NYSG research results that will support management decisions about impacts of eroded tidal inlets in the barrier beaches along the south shore of Long Island; 2) NYSG research results that will help document changes in living organisms in the bottom muds of the Great Lakes that are related to cargo sweeping and whether new regulations are needed; 3) Liaison activities of Chuck O'Neill, one of our extension specialists in the Great Lakes District, to get stakeholder concerns included in agency decisions about water flows through Lake Ontario; and 4) Results of an educational program that has helped provide the NY Department of State with an experienced agency staff person.

I hope that these articles give you an appreciation of how NYSG contributes to making New York a better place to live.

Photo by Barbara A. Branca

Some of the New York Sea Grant staff in attendance at the program's annual extension meeting, which was held in West Point, NY in November 1999. In addition to discussing NYSG's Strategic Plan, the staff apprised each other of their range of current efforts in NY State's marine and Great Lakes districts as well as the Sea Grant Lake Champlain Project.

In this winter Coastlines, we look to the future.

"Our mission as part of NOAA's National Sea Grant network

is to describe and predict changes in the earth's environment and to conserve and manage wisely the nation's coastal and marine resources."

—NYSG Director Jack Mattice

In the Great Lakes. . .

NYSG-funded researchers are studying one matter raising eyebrows– the impacts that decades of sweeping unwanted debris overboard from commercial ships may have on the lake ecosystem.

Also garnering attention throughout the Great Lakes is a trend where warmer temperatures and less rainfall over the past several years have brought some water levels to their lowest in 30 years. While this occurrence may spell relief for many shoreline property owners along Lakes Ontario and Erie in New York faced with coastal flooding and erosion issues, Chuck O'Neill reports there are concerns as well.

Photo by Barbara A. Branca

Oswego Lighthouse on Lake Ontario. Read about lake levels on page 10.

Photo by Ken Rubino

Low lying coastal areas such as this Bay Shore beach are vulnerable to flooding and erosion problems. See the related map on page 5.

On Long Island. . .

Coastal erosion and flooding are significant issues along its densely populated south shore, as explained by NYSG coastal processes and facilities specialist Jay Tanski in this issue's feature story.

Whether the issue at hand is lower lake or rising sea levels, coastal flooding or erosion, it is the goal of New York Sea Grant's researchers, extension specialists and administrators to empower the program's various users with the tools needed to effectively evaluate potential hazards.

Monitoring

Continued from front cover

In recent years, Long Island's south shore has been impacted by a number of major storms that have resulted in serious flooding and erosion in many communities. Estimates of the value of public and private structures and property in these erosion and flood prone south shore areas alone are upwards of $10 billion.

To help local and state governments better respond to this growing issue, the New York Sea Grant Extension Program worked closely with the Long Island Regional Planning Board (LIRPB) and the New York State Department of State's (NYS DOS) Division of Coastal Resources to develop a coastal hazard management program for the area.

With funding from NYS DOS, Sea Grant brought together some of the country's top coastal scientists and engineers to participate in a series of initial workshops for state and local officials. Starting in 1990, the workshops focused on identifying what was known about the specific erosion problems occurring in the area and the best approaches for dealing with them from a technical perspective.

The resultant reports served as the technical basis for the LIRPB's and the NYS DOS's plan and were incorporated directly into the final report, "Proposed Long Island South Shore Hazard Management Plan." This report provided a framework for guiding future coastal management and policy decisions. From this effort it was clear that state and local officials did not have adequate scientific-based information to make technically-sound decisions regarding erosion management and coastal development. Acting on a recommendation made in the report, the two agencies again asked for Sea Grant's help in developing a program that would fill this information gap.

Working with Henry Bokuniewicz, a researcher at the State University of New York (SUNY) at Stony Brook's Marine Sciences Research Center (MSRC), Tanski developed a model monitoring program based on the experiences of similar programs across the country and input from local officials.

> *"The focus was always on providing practical information for managers."*
> *—Jay Tanski*

This resulting monitoring program, specifically designed to provide managers, planners and their coastal users with information they could use to make better decisions regarding erosion management along the south shore, incorporates six different elements. They include periodic aerial photography of the shoreline, measurements of the condition of the beach twice a year and measurements of the waves causing shoreline changes.

"Although the program provides a wealth of information of interest to scientists and researchers, the focus was always on providing practical information for managers. We didn't want it to become a scientific or theoretical exercise," says Tanski. The program was specifically designed to provide information that would help decision makers and others identify and quantify erosion problems, evaluate the effectiveness and impacts of existing and proposed erosion measures and develop a better understanding of coastal processes and their effect on shoreline behavior.

Photo by Jack Mattice

Along a boardwalk on a south shore beach, NYSG's Jay Tanski (r.) explains the importance of coastal processes planning techniques to Tom Doheny, former Director of Conservation and Waterways for LI's Town of Hempstead (l.), and National Sea Grant Director Ron Baird.

Change

Using the information and materials from Sea Grant's efforts, the NYS DOS Division of Coastal Resources worked with the U.S. Army Corps of Engineers New York District to begin implementing the program. With the support of both federal and state legislators, a $1.4 million annual appropriation to fund the Atlantic Coast of New York Monitoring Program (ACNYMP) was included in the Federal Water Resources Development Act.

The monitoring program, which is administered by the Planning Division of the Corps New York District, is a cooperative effort with overall program guidance and direction provided by a "study team." This group is comprised of representatives from the Corps, the NYS DOS Division of Coastal Resources and New York Sea Grant.

Although lapses in the funding stream have prevented full implementation of the program, a considerable amount of data has been collected from some 348 locations along the shore. In addition to taking measurements of beach volume and elevation, aerial photographs of the entire shoreline have been taken twice a year since 1995. Supplemental funds provided by the State of New York are used by the NYS DOS to address additional data gathering needs. "We want to be sure that we are getting all the data needed by local governments and regulators to facilitate wise management of our coastal resources," says Fred Anders, of the State's Division of Coastal Resources.

"Previous data collection in this field has been limited to specific coastal events or geographic areas," says Tanski. "This program provides a more comprehensive basis for improved decision making by treating the coastal system as a whole, both in space and time, rather than in isolated parts."

Each of the cooperating agencies in the program presently serves as a repository for data products, enhancing dissemination of the information generated by ACNYMP to the widest range of audiences–

Continued on page 6

Mapping Our Future

The coastline inundation map below depicts portions of the Town of Islip, including the Hamlet of Bay Shore and shows how the position of the shoreline and the extent of flooding might change over the next 50 to 100 years in response to potential changes in the rate at which sea level is rising. These mapping efforts are a part of an ongoing project Tanski is working on to use the computer-based tools of a Geographic Information System to provide decision-makers with information about coastal conditions and processes at a scale they can use.

Courtesy of Jay Tanski

Monitoring Change *continued from page 5*

local governments, regulatory agencies, scientists, engineers and other interested parties.

Data from the monitoring program has already been used in an array of applications. Sea Grant has used the sequential sets of aerial photographs and profile data to help government officials better understand changes occurring along this coast and how best to deal with them. The information has been used to address problems ranging from dealing with oceanfront erosion to evaluating habitat for endangered species. In addition, several SUNY researchers such as Daniel Conley *(page 7)* are using the monitoring data in projects looking at coastal processes and shoreline change.

According to Steve Couch, project planner at the Corps of Engineers, "The data collected under the monitoring program have proved extremely valuable in the planning and design of our coastal projects." This information has been used to refine and improve the design and analysis of 11 Corps projects. "With this extensive data set, we are able to better quantify what is happening in this complex environment." This improved understanding has translated to a potential cost savings of some $6 million for two projects alone. The NYS DOS has used the monitoring information to prepare management plans for the south shore estuaries and to evaluate permit applications.

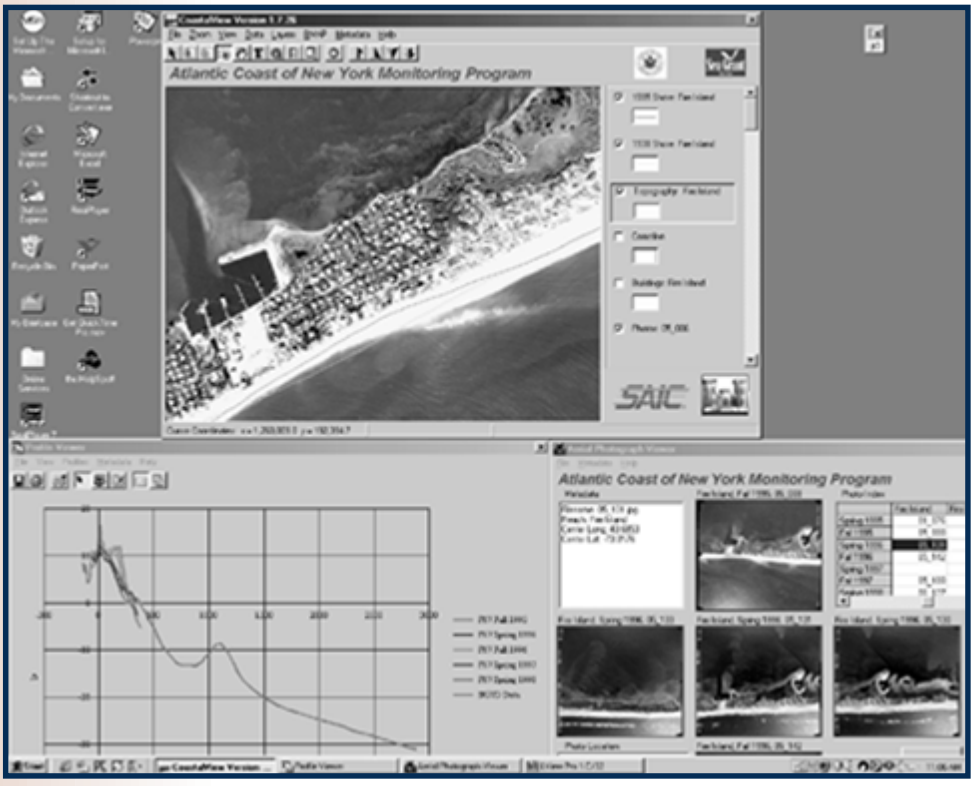
To further improve the accessibility and distribution of this important information, the study team has been developing a comprehensive database utilizing Geographic Information System technology. Based on the results of a user needs analysis conducted by Sea Grant, the database contains information collected as part of ACNYMP as well as existing coastal data from other sources. Included are historical shoreline positions, topographical data, building locations and flood zone designations.

All this information has been digitized and placed on compact disks. For easy viewing and retrieval, a program called *CoastalView* was developed in conjunction with a consulting firm and is included on the CDs. *CoastalView* includes features that allow the user to view the program's aerial photographs, manipulate the profiles, overlay various data sets and perform simple analyses. *(See the desktop image below.)* Currently, a draft of the two-CD-ROM *"CoastalView"* software (its beta version) is being tested by study team members and is expected to be ready for wider distribution shortly.

"What is really exciting about this application is that it brings all this information together in one place and allows the user to tailor it to his or her specific needs," says Tanski. According to Couch, "The CD-ROM application is an excellent tool to make these data accessible and usable by local decision makers and the coastal community."

This could be your desktop...

Information from the monitoring program is being transferred to CD-ROMs with a special viewer allowing the user to access and retrieve a wealth of coastal data on a personal computer.



Tanski says that another goal of the ACNYMP is to eventually have the data and information collected available on the World Wide Web. "Our objective is to put the information in a format that is usable by as diverse an audience as possible. The intent in eventually getting this data posted on the Internet is so people will have ready access to information they need to make informed coastal decisions." Realizing that achieving this one of many objectives mapped out for the project may take time, Tanski says, "Solutions to complex issues don't come quickly."

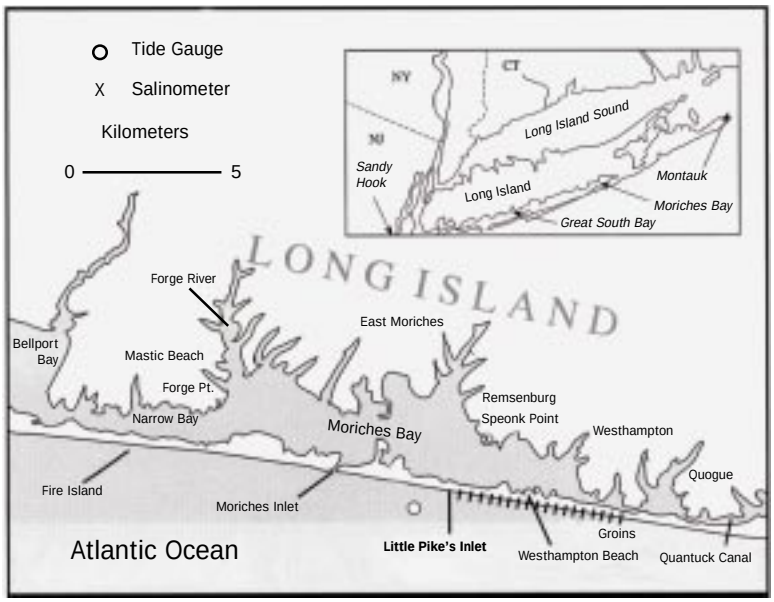
— Paul C. Focazio and Jay Tanski

The Short Life of Little Pike's Inlet

For most of the time since 1931, Westhampton Beach and Fire Island have been bordered by a single shallow, narrow opening, Moriches Inlet. Created by storm breaching, this inlet has provided sole direct passage between the bay and the Atlantic Ocean. In 1992, a second tidal inlet developed between the bay and ocean known as Little Pike's Inlet. Prior to its artificial closure the following year, Little Pike's Inlet provided a unique opportunity for research by NYSG-funded principal investigator Daniel Conley of MSRC.

"The development of a new tidal inlet is a matter of considerable scientific and social interest," Conley says. "Such an event may lead to increased tides and coastal flooding, shoaling and closure of older inlets and changes in the biological makeup of estuarine community structure." According to Conley's findings, the presence of this additional inlet in Moriches Bay resulted in a 30 percent increase in tidal transmission — hence, larger tides— than before. In addition, Little Pike's Inlet led to a local increase in bay salinity in the eastern half of Moriches Bay. However, no salinity change was detected in the western half of the bay, suggesting that, as Conley describes, "the additional mixing with ocean water and its consequential impacts on biological communities was confined to the eastern section of the bay."

Map courtesy of Daniel Conley



Lessons from Little Pike's Inlet

In his NYSG-funded report, researcher Daniel Conley explains how the development of a second tidal inlet in Long Island's Moriches Bay for a 10-month period in 1993-94 affected the tidal transmission between the bay and the Atlantic Ocean. His measurements also illustrate how this altered water flow in turn influenced the salinity in the estuary. (See page 15 for journal reprint information.)

Extending the Research

Great South Bay is also the focus of a NYSG Extension project. Sea Grant has received funding from the National Park Service (NPS) to identify and assess the potential impacts of breaches and new inlets on estuarine resources in the vicinity of Fire Island National Seashore (FINS). Tanski says this effort works in concert with the NPS's research program designed to identify the probable locations and quantify the potential physical changes caused by future breaches along Fire Island. Conley's modeling study, which received additional monies from the NPS following the completion of NYSG funded research, will be used as a basis for a series of workshops Tanski has planned as part of his proposal to the NPS. Also partaking in Tanski's extension effort are co-principal investigators Cornelia Schlenk, New York Sea Grant's Assistant Director, and MSRC's Henry Bokuniewicz.

Says Tanski, "Of particular concern to managers and planners is how these physical changes may in turn impact the biological resources and ecological characteristics of the bay. In order for these decision makers to develop effective, technically-sound management policies, they will require quantitative information on how new inlets might affect finfish, shellfish, submerged and intertidal aquatic vegetation and other living resources in Great South Bay. Therefore, this effort was undertaken to evaluate the ecological impacts of new inlets on this estuarine system."

— Paul C. Focazio

The Coast Guard lowers the *Phantom* ROV into a shipping lane on Lake Ontario. Two ROVs from NOAA's National Undersea Research Center (NURC) were used to collect lakebed sediments for research teams from the Marine Sciences Research Center of SUNY Stony Brook.

Coast "Sweeping" the Lake

For decades, sweeping unwanted debris overboard in international waters has been common practice on commercial ships. Do impacts to the Great Lakes warrant a revision of cargo sweeping regulations?

Historically, the Great Lakes have linked the region's vast resources to the world. Starting with the fur trade in the seventeenth century, ships bearing a rich variety of natural resources made their way from the North American wilderness through the Great Lakes and beyond. By mid-nineteenth century, urbanization and industrialization in the lake watershed was on the rise and commercial ships practiced cargo sweeping—a quick way to clean decks and cargo holds of coal, cement clinker, boiler slag and iron ore.

Today, regulations set up by an international marine pollution treaty and enforced by the Coast Guard generally prohibit the discharge of debris within twelve miles of land. As the Great Lakes are a confined international waterway, ships may not be able to distance themselves properly when discharging. In order to determine if and how cargo sweeping regulations should be changed, a group of researchers aimed to assess the ecological impact of these ship-derived deposits.

A team of investigators and several Sea Grant Scholars from the Marine Sciences Research Center (MSRC) at SUNY Stony Brook made this a truly interdisciplinary project. They tracked the physical changes in the profile of the lake bottom, the chemical changes occuring both in the water column and in the sediments, and the biological impacts of cargo debris on benthic community structure.

During three cruises in 1995 and 1996, the team visited nine sites along well-used shipping lanes in western Lake Ontario. Side-scan sonar deployed from Coast Guard cutters "swept" the lake bottom to identify deposits

Dual-frequency sonar provided by Patricia Manley of Middlebury College (l.) made possible these mosaic images of the lake bottom. The dark areas show the anamolies associated with ship-derived debris.

All photos courtesy of Vincent Breslin

Watch

believed to be the result of cargo sweeping. Because of the high reflectivity of ship-derived debris against a background of fine-grained lakebed sediments, the deposits appeared as acoustic backscatter anomalies or ABAs in the images. Then remotely operated vehicles (ROVs) were used to photograph and sample the lakebed near the ABAs.

Sonar proved to be an effective technique in identifying areas of cargo sweeping debris. With known sedimentation rates, and the approximate age of the ABAs, it suggested to Sea Grant Scholar Vicki Ferrini that debris deposited any time within the past 100 years is probably detectable by this sonar in the muddy deep lake sediments. Thus while dual frequency side scan was useful for detecting ship-derived waste, it could not distinguish between deposits at the surface of the lake bottom from those buried deeper in the sediments. "This conclusion is important because it suggests that only a fraction of the hundreds to thousands of ABAs identified in muddy lake sediments are at or near the sediment surface," says investigator Roger Flood. "Indeed, many of the ABAs may have been created by cargo sweeping events that long predate modern shipping practices."

Once an area that contained debris was identified, it underwent serious scrutiny by each research team. The geology team used box corers and grab samplers to collect sediment. They calculated grain size of the surface sediments and determined the depth of the deposit using X-radiography and magnetic susceptibility. The chemistry team measured metal content in the sediments and biological tissues to determine impacts associated with ship debris. The biology team collected samples of organisms to compare the type and composition of invertebrates inside and outside of the ship-derived waste deposits.

The research team (from l. to r.): Vicki Ferrini, Nicole Maher, Bruce Brownawell, Maura Clyne, Bob Cerrato, Si-Hoon Song and Vincent Breslin. Sea Grant Scholar Ferrini used sonar to locate ship-derived debris with advisor Roger Flood (pictured below). Scholar Maher studied benthic community structure with advisor Cerrato while Scholars Clyne and Song conducted trace metals analysis with advisor Breslin.

Although no changes in the international agreement about the practice of cargo sweeping have been made to date, a firm foundation assessing its physical, chemical and biological impacts on western Lake Ontario has been laid. Current interest in ship-derived debris is evidenced by a September 1999 workshop entitled "The Environmental Implications of Cargo Sweeping in the Great Lakes" held at the Great Lakes Environmental Research Laboratory (GLERL) in Ann Arbor, Michigan. According to GLERL Director Stephen Brandt, this project and other related research will provide much needed information for the US Coast Guard to revisit the issue of cargo sweeping regulations.

Continued on page 14

Quagga mussels were found attached to coal pieces (dark-colored) and limestone (light) that had been swept off cargo ships.

Investigator Roger Flood sorts through sediment brought up by a box corer deployed from the US Coast Guard Cutter *Bramble.* The USCG contributed ship time to the project.

On the Level

Chimney Bluffs, Lake Ontario

Photo by Pat MacNeill

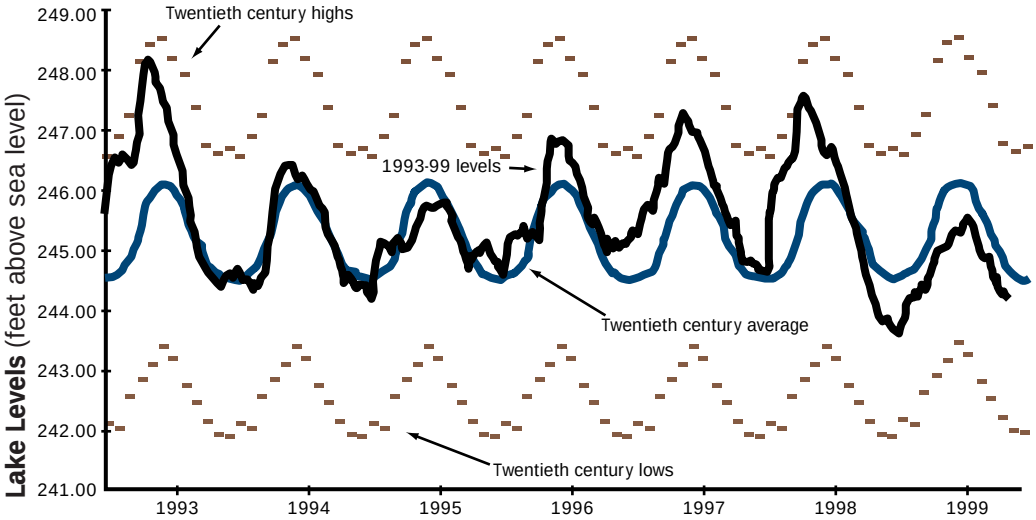
NOAA reports mild winter weather and less rainfall over the past several years are responsible for the lowest water levels in the Great Lakes in 30 years. So what does this mean for Lakes Ontario and Erie?

While lower water levels may come as good news for most property owners along Great Lakes shorelines including Lakes Ontario and Erie in New York who are threatened by intensive flooding and erosion, Sea Grant extension specialist Chuck O'Neill reports that for some shoreline users, low water can also be a problem.

"People who bought shoreline property in mid-1998 when the lakes were so far above their long-term summertime peak level found themselves facing levels as much as four and a half feet lower by New Year's Day 1999," he says. "Marinas and yacht clubs are also feeling the pinch of the lower water levels," O'Neill continues, "Particularly those who deferred maintenance dredging during the years of high water and now find themselves dealing with water levels much lower than those to which their customers have become accustomed. The same problems hold true for marinas with dock systems that were designed and installed based upon high water levels and are now 'high and dry'."

As part of NYSG's goal to continue its leading edge role in ensuring that its user groups receive the very best information regarding Great Lakes water levels, the program's extension sector recently undertook two important measures.

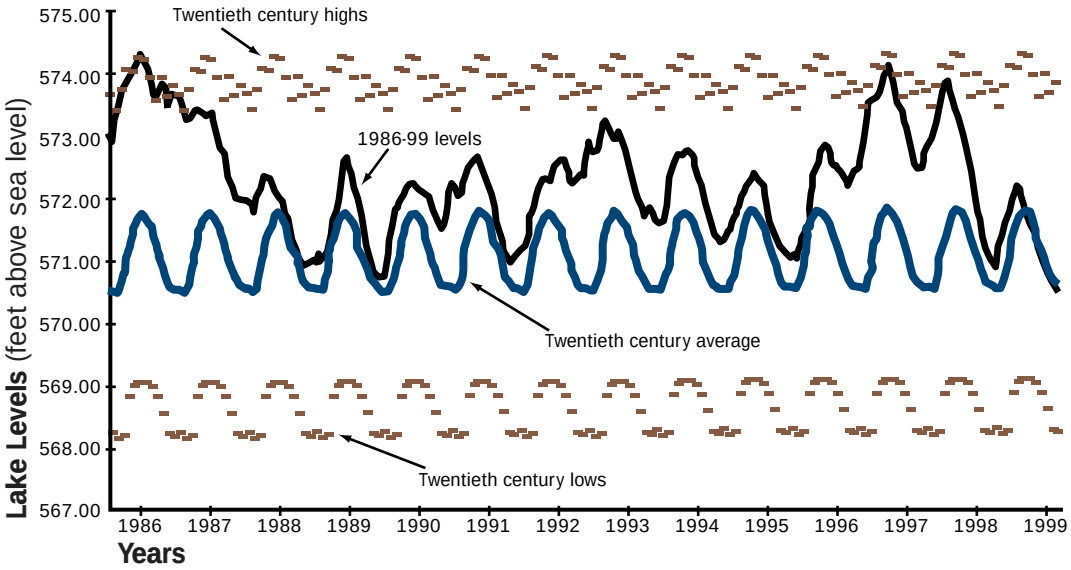
First, Sea Grant's Oswego regional office hosted a meeting to address the issue along with Dr. Ted Hullar, Director of Cornell University's Center for the Environment and newly appointed member of the International Joint Commission's St. Lawrence River Board of Control. At the meeting, O'Neill, Sea Grant's coastal resources specialist, updated Hullar as to what educational materials and programs NYSG has to offer audiences impacted by the IJC Board's decisions. In addition, Sea Grant received



Lake Ontario

was as much as 24 inches above its long-term average for the date in April 1998. On January 1, 1999, Lake Ontario was almost a foot below its long-term average and stayed below average through the end of 1999.

Courtesy of New York Sea Grant Extension



Lake Erie

water levels were substantially above the lake's long-term average all through the 1990s. But the situation changed dramatically in 1998. On January 1, 1998, Erie's water levels were about 24 inches higher than "normal." By January 1, 1999, the dry summer and fall of 1998 had reduced levels to a mere 3 inches above normal. Erie's water levels continued to drop throughout 1999 until the lake was several inches below the twentieth century average by September.

Courtesy of New York Sea Grant Extension

Hullar's input as to where he foresees his responsibilities leading with the Board, which offers advisement on regulation of Lake Ontario water levels by control of flows through the river.

Hullar also heard concerns regarding lake levels from Sea Grant's user groups most directly impacted by the water levels– lakeside residents. In attendance were representatives of the Ontario Dune Coalition (on behalf of land- and homeowners), the Oswego County Soil and Water Conservation District, the Nature Conservancy (which manages some habitat preserve lands within the dune area) and the marine trades industry. Says O'Neill, "Very honest, frank discussions ensued which we hope will pave the way for much closer working relationships between these impacted groups and the Board, with Sea Grant playing an important role."

The second important Sea Grant-related event was the unveiling of the program's newly revised Great Lakes water levels web site. Included on this site are biennial charts for each lake showing the actual recorded water level compared with the twentieth century mean curve and the maximum and minimum recorded curves. Also online are single year charts for each lake that show the twentieth century average curve with the curves for each of the years in which NYSG has compiled data as overlying curves in various colors. Some new features that will be added to the site in the upcoming months include scanned-in copies of some NYSG coastal erosion publications and explanations on how lake levels operate.

—Chuck O'Neill
Coastal Resources Specialist

Navigate the Great Lakes water levels from the NYSG web site homepage, <www.seagrant.sunysb.edu>

Click on "Brockport" on the New York State map. There you'll find a link to Chuck O'Neill's "Great Lakes Coastal Processes and Erosion" web pages.

Lake Erie breakwalls
Photo by Steve Curcio, Pennsylvania Sea Grant

Sea Grant Fellows –

Nancy Niedowski

Coastlines editor Barbara A. Branca interviewed Nancy Niedowski, a former NYSG Coastal Management Fellow who is now working for the Department of State in our capital city, Albany.

Q: You were a Coastal Services Center Coastal Management Fellow supported through New York Sea Grant for two years starting in the fall of 1997. Could you elaborate on the nature of the fellowship and what qualified you to receive it?

A: The CSC fellowship is open to recent graduates of Master's or PhD programs in coastal management related disciplines. For the fellowship, coastal states develop special two-year projects addressing state-level priorities for the coastal zone. Both states and students are competitively selected for the program. The fellowship benefits recent graduates by offering applied training in the field and benefits state agencies by providing the extra manpower needed to accomplish special projects in important issue areas.

The New York State project, sponsored by the Department of State Division of Coastal Resources and administered through New York Sea Grant, focused on coastal habitat issues in several areas. These included updating *Significant Coastal Fish and Wildlife Habitats* in eastern Long Island and developing a guidance document for salt marsh restoration and monitoring projects.

I came to New York State from the Environmental, Coastal and Ocean Science Program at the University of Massachusetts at Boston, from which I received a Master's degree in the policy track. Coursework included coastal and ocean law, environmental economics, policy analysis, physical oceanography, biological oceanography, aquatic chemistry, aquatic toxicology, applied statistics. My master's thesis was on *"The Role of Impact Assessment in the Evaluation of Integrated Coastal Management."*

Photo by Gary Gold

Nancy Niedowski at the state capital.

Q: What were the highlights of your activities during the fellowship's two-year duration?

A: Seeing the great variety of coastal environments in New York State and experiencing the diversity of coastal resource issues has been great. I like getting out and seeing significant habitats and restoration sites, although I get to do that only a fraction of the time. I did some field work with a NY Natural Heritage Program person in Southampton last summer that reminded me of how I really love the salt marsh and how fascinating the natural environment is.

Q: What is your present position and what are your primary responsibilities?

A: I was offered a permanent position in the DOS's Division of Coastal Resources even before the CSC fellowship was officially completed. I've since taken the appropriate Civil Service exam and now hold a Coastal Resource Specialist position in the Division's Habitat Unit. I continue to work on several initiatives started during the fellowship, including participating in our National Estuary Programs (New York/New Jersey Harbor, Long Island Sound and the Peconic Estuary). I co-chair the Habitat Restoration Workgroup for the Peconic Estuary Program. Also, I now participate in

From NY to the Nation's Capital

the Environmental Protection Fund and Bond Act project review and oversight, respond to *Significant Coastal Fish and Wildlife Habitat* information requests, and provide technical assistance to our Consistency Bureau and Local Waterfront Revitalization Plan team on coastal habitat issues.

Q: How did your fellowship prepare you for your current job?

A: Well, as you can see, it prepared me quite well for my current job, which is more or less an expansion on the fellowship work although I had other job leads and interviews both in the NGO sector and in the Federal government. The fellowship is phenomenal preparation for a career in coastal management in terms of the "real world" experience provided: the development of problem-solving skills, use of multi-disciplinary knowledge, and the ability to successfully coordinate your activities with other coastal agencies and stakeholders. It was often extremely challenging–just like all work in this field!

Q: The motto of New York Sea Grant is "Bringing Science to the Shore." Its mission is to provide information vital to the wise use of our coastal resources through research, education and extension. In your experience, how is Sea Grant helping to prepare coastal managers of the future?

A: Sea Grant is involved in the critically important area of bridging gaps between science education, research and coastal management. Integrating scientific information with management is often quite difficult and yet critical for effective protection of natural resources. Sea Grant helps develop research programs that meet the information needs of coastal managers, needs that are very different from standard academic research. Sea Grant also supports and develops educational programs that train future coastal managers. Participation in the Coastal Services Center fellowship is just one example of this.

Hudson Roditi

Sea Grant Scholar Becomes Knauss Fellow

Marine Sciences Research Center doctoral candidate, Hudson Roditi, became a Knauss Fellow as of February 1, 2000. Roditi's assignment is with a program known as the Global Learning and Observations to Benefit the Environment (GLOBE), a worldwide network of students, teachers and scientists working together to study and understand the global environment. Students and teachers from over 7,000 schools in more than 80 countries are working with research scientists to learn more about our planet. As of the springtime, Hudson has relocated to Washington, D.C. to take part in the GLOBE program. Previously, as a Sea Grant Scholar based at SUNY Stony Brook, Roditi worked on the bioaccumulation of metals in zebra mussels under the direction of principal investigator Nicholas Fisher.

Photo courtesy of Hudson Roditi

Hudson Roditi in our nation's capital.

—Barbara A. Branca

Why Lake Ontario?

Western Lake Ontario has a high volume of shipping traffic with active Canadian ports of Hamilton, Toronto and Clarkson. Many ships also pass through Port Weller and the Welland Canal (just west of Niagara Falls) which connects Lake Ontario with Lake Erie and thus the rest of the Great Lakes. Cargo sweeping usually occurs once a ship is underway and well out of port resulting in debris accumulation on the lake bottom of the shipping lanes. In Lake Ontario, ores of iron, aluminum, lead, manganese and zinc are more likely to be swept overboard than coal. With an annual total of over a quarter of a million kilograms of debris in all of the Great Lakes, Lake Ontario accounts for over 40 percent although it is the smallest lake in water volume.

The harbor in Hamilton is a designated Area Of Concern because it fails to meet objectives of the Great Lakes water quality agreement. The International Joint Commission announced in late 1999, that although most of the problems in the western lake have been defined and remediation measures chosen, "questions remain concerning the selection of remedial measures for contaminated sediments." Thus analysis of sediment data compiled during NYSG-funded research projects remains of great value.

"These tiny spheres serve as surrogate's for the fossil-fuel burning history of the lake.
—Vincent Breslin"

"Sweeping" the Lake

continued from page 9

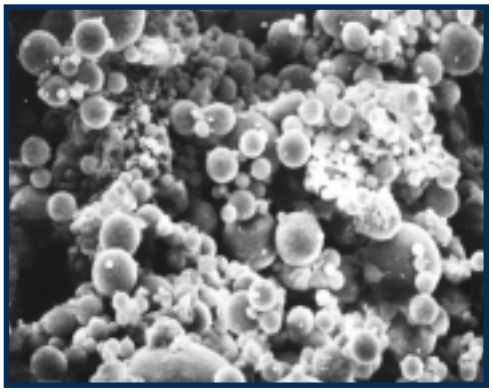
Cerrato, Song and Breslin examine a sediment core. Photo by Vincent Breslin

According to Maher, the biology team identified over 22,000 individual organisms from over a hundred samples. The benthic community was dominated by amphipods, ostracods (crustaceans), oligochaetes (worms), and bivalves (shelled mollusks). "Differences in community structure existed both within and between sites and a significant amount of faunal variation was explained by the ship-derived waste variables," reports Maher, who sought to explain the changes in the living community. Three mechanisms were proposed to explain the change in community structure associated with ship-derived waste: physical disturbance, contaminant effects, and coarsening and de-enrichment. Although results provided support for and did not exclude any of these three mechanisms, the strongest evidence was present for the coarsening and de-enrichment of sediments via ship-derived waste additions. Maher plans to present these findings at the annual Benthic Ecology meeting in Wilmington, NC in March 2000.

Breslin and Song measured the accumulation of metals in the opossum shrimp *Mysis relicta.* By day these common lake dwellers remain in the bottom sediments. At night, they swim up into the lower reaches of the water column to feed on plankton. There, the shrimp may become food for alewife, smelt, sculpin and young lake trout. During this feeding migration, perhaps the shrimp were introducing metals ingested in the sediment into the water column. Breslin and Song estimated the concentrations of metals the shrimp transported to the water column and thus to fish. They found that aluminum, chromium, iron and vanadium were readily excreted and did not accumulate in shrimp tissue. But arsenic, cadmium, copper and zinc did accumulate and the nightly migration caused these contaminants to be introduced into the water column where the shrimp could be consumed by fish.

In a related study, species of the amphipod *Diporeia,* showed bioaccumulation that correlated well to the metal content in sediments most especially for copper and zinc. Perhaps with further investigation, these amphipods may have use as a bioindicator for these two metal contaminants. Breslin and Song presented these results at the International Association for Great Lakes Research conference in 1998.

— Barbara A. Branca



Materials enter the sediment from the atmosphere as well as from ships. Carbon fly ash, as seen with a scanning electron microscope, is generated during incomplete combustion of oil and coal. Sediment cores from the lakebed mirror the use of fossil fuels for over a hundred years and even show the decline in fly ash production with increased use and efficiency of particle collection devices over the last decade.
Photo by Vincent Breslin

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These opossum shrimp were collected with suction samples attached to *Max Rover*, an ROV provided by NURC in Avery Point, CT.

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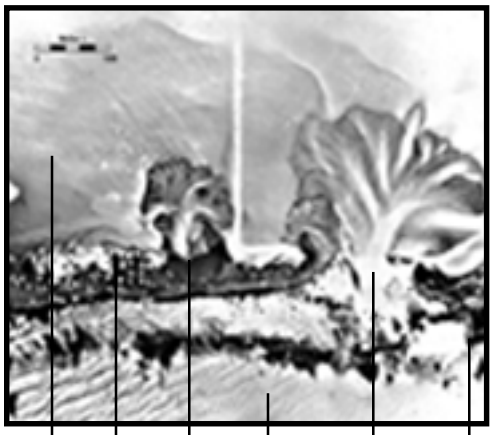
Aerial composite photo of Little Pike's Inlet courtesy of Daniel Conley



Accumulation and transport of sediment metals by the vertically migrating opossum shrimp, *Mysis relicta*. Ki-Hoon Song and Vincent T. Breslin. 1999. *Journal Great Lakes Research.* 25(3):429-442. $1.00

Accumulation of contaminant metals in the amphipod *Diporeia* spp. in western Lake Ontario. Ki-Hoon Song and Vincent T. Breslin. 1999. *Journal Great Lakes Research.* 24(4):949-961. $1.00

Related Theses
Presented at State University of New York at Stony Brook:

Accumulation of trace metals in sediments and benthic macrofauna in western Lake Ontario. Ki-Hoon Song. 1998.

Side-scan sonar imagery and the sedimentary characteristics of ship-derived deposits in western Lake Ontario. Vicki Lynn Ferrini. 1998.

Effects of cargo sweeping deposits on benthic community structure in the shipping lanes of western Lake Ontario. Nicole Patricia Maher. 1999.

Cod

Cod live in offshore ocean waters, are generally harvested by fishermen throughout the Northeast, and can be found in the western side of the Atlantic Ocean from the Arctic Circle to Virginia and Maryland. Locally caught cod is most abundant during the winter and spring with peak landings at New York ports from January to April. Cod is the most familiar type of the lean white fish fillets with a mild flavor and a firm flaky texture that is preferred by most Americans.

Available year-round in the New York marketplace in many different forms, cod is very versatile in the kitchen. It can be cooked by almost any method, and common choices include baking, broiling, frying and microwave cooking. In addition, it is a good choice for hearty seafood stews, soups or chowders. Cod's mild flavor makes it especially suitable for a variety of sauces and condiments from traditional cream and tomato based sauces to simple preparations with herbs or vegetables.

Cod's popularity has carried over to such other lean white-meat fish as pollock, monkfish and halibut. Its appeal is also shared with two of its smaller cousins, red hake and silver hake (whiting), which are abundant in New York from late fall through spring.

—Paul C. Focazio

Seafood Corner

Hearty Fish Stew

Ingredients

2 tbsp. olive oil

2 cloves garlic, chopped

2 tbsp. butter

2 cups coarsely chopped fresh tomatoes

2 tbsp. minced fresh parsley

1 cup tomato puree, unsalted

3 medium onions, sliced

1/2 cup dry white wine

1 tbsp. minced fresh basil or
1 tsp. dried basil

1-1/2 lbs. cod filets, cut into chunks

2 bay leaves

1/2 cup Greek olives, pitted and halved

pinch crushed red pepper (to taste)

black pepper (to taste)

Method

In large skillet, heat olive oil and butter. Sauté parsley, onions, basil, bay leaves and crushed red pepper over medium heat until onions are soft and translucent. Add garlic and sauté a bit longer. Add tomatoes, tomato puree, and wine. Simmer to blend flavors. Add fish chunks and olives. Continue cooking over low heat until fish begins to flake. Season to taste. Serve with French Bread.

Other lean white fish such as hake, whiting, pollock, monkfish or halibut can be substituted for cod.

For information on a variety of seafood-related issues, surf over to the newly-created "Seafood Technology" pages on the NYSG web site, www.seagrant.sunysb.edu. Also included on this seafood site is a link to the World Wide Web address of the New York Seafood Council, for which NYSG's seafood specialist Ken Gall is technical advisor.

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