COASTLINES

New York Sea Grant | Volume 23 Number 3 | 1993

The Marine Biotechnology Investment Act of 1993 Would Boost New York Sea Grant and Industry Efforts

By Trent Schneider and Julie Zeidner

The oceans of the world represent a vast source of foods, minerals and natural products. But meeting the demands of a growing population will require a greater investment in a coordinated national marine biotechnology program that makes better use of ocean resources. A federal initiative that focuses on the biotechnological potential of the ocean and Great Lakes will help scientists and industry understand and treat human illness, enhance the quality and quantity of seafood, restore and protect marine ecosystems, develop new types of industrial materials, and expand our knowledge of the ocean's biological and geochemical processes. In concert with commercial development, marine biotechnology research could also lead to new industries and jobs.

While federal support to date has made

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FINS Wilderness Area, view towards Smith Point West Visitor Center. *Photo by Ian Stupakoff.*

Aquatic Resources of the Fire Island National Seashore Characterized

By Cornelia Schlenk

What important aquatic animals and plants can be found in the Great South Bay near the Fire Island National Seashore (FINS) on Long Island's south shore? What trends can be seen in the economically important shellfish and finfish populations of the area? What conditions influence local water column productivity? What are the potential effects of new inlets? What information is needed to better understand and manage these resources or this area? These and many other questions are addressed in a new Sea Grant report entitled *The Estuarine Resources of the Fire Island National Seashore and Vicinity.*

The Report is a product of a cooperative effort between the New York Sea Grant (NYSG) and the National Park Service (NPS) to assess the status of aquatic vegetation, salt marshes, submerged shoals and flats, the water column, and the intertidal back barrier beach on the bay side of the FINS, to evaluate factors affecting these resources, and to identify critical management information needs for the area. The NPS will use the report to help in its development of habitat monitoring and research programs to ensure proper management of

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FINS

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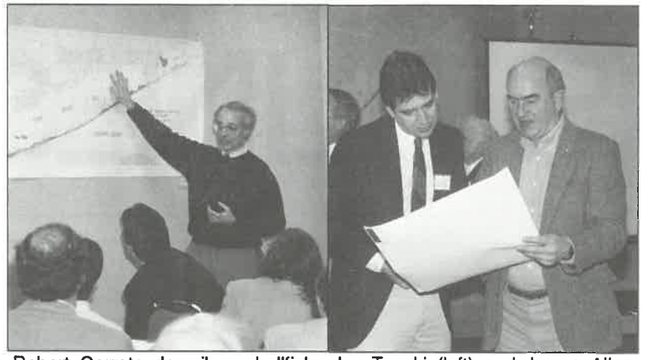
the FINS, as part of its larger program that also includes other northeastern federal parks with estuarine environments.



Robert Cerrato describes shellfish resources to FINS workshop participants.

Jay Tanski (left) and James Allen (National Park Service) discuss potential impacts of inlet formation.

A four-person Sea Grant team (Director Anne McElroy, Assistant Director Cornelia Schlenk, Extension Specialist Jay Tanski, and SUNY Marine Sciences Research Center Professor Henry Bokuniewicz) enlisted additional local scientists to gather and synthesize available information regarding water column productivity, aquatic vegetation, shellfish and benthic invertebrates, and finfishes. Expertise on these subjects was provided by Marine Sciences Research Center faculty members Elizabeth Cosper, Valrie Gerard, Robert Cerrato, and David Conover, respectively.

Input and feedback on the information contained in the report and important resource issues that should be addressed were solicited from scientists as well as from federal, state and local managers and planners. Sea Grant organized a workshop that brought together more than 30 individuals familiar with the area to review and discuss the report in its draft stages. Participants included representatives from the National Park Service, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the N.Y. State Departments of State and Environmental Conservation, the Suffolk County Departments of Planning and Health Services, the Towns of Islip and Brookhaven, Brookhaven National Laboratory, SUNY, Hofstra and Adelphi Universities, and Southampton College, among others.

In addition to providing an overview of what is known about FINS and its environs in Great South Bay, the report also provides suggestions and a framework for improving our understanding of this magnificent area. For a copy of the 60-page (plus appendices) report, please contact New York Sea Grant, 115 Nassau Hall, SUNY at Stony Brook, Stony Brook, NY 11794-5001.

NYSG Welcomes Three New Staff Members

The New York Sea Grant Institute has recently welcomed aboard three new staff members: Helen Domske, Great Lakes Extension Specialist at the State University of New York at Buffalo; Robert Linck, Water Quality and Sustainable Growth Specialist at Sea Grant's new Kingston office; and Julie Zeidner, Sea Grant's Communicator.

In a new position funded by the New York State Legislature, Domske will develop a variety of programs intended to heighten public awareness of problems in the Great Lakes and ongoing efforts to improve Great Lakes ecosystems. The program will provide information on Sea Grant-supported and other research to educators, policy makers and the general public. Domske will produce Great Lakes publications, educational materials, and organize meetings and conferences.

"I look forward to the challenge of combining the resources and research expertise of the Great Lakes Program at SUNY Buffalo and New York Sea Grant, and sharing these valuable assets with the community of Western New York," Domske said. In her new position, Domske also serves as associate director of the University of Buffalo's Great Lakes Program.

Domske previously served as a curator of education at the Aquarium of Niagara Falls where she guided overall educational programming, and produced 15 audio-visual programs. She also has served as an instructor in environmental science and in aquaculture at the SUNY College at Buffalo and Niagara County Community College.

Robert Linck has assumed a position at a Sea Grant office in Kingston that will focus on water quality, sustainable growth and other critical issues in the Hudson River estuary.

"Despite past abuses, the Hudson is still one of the most beautiful rivers in the world," said Linck, whose concern for rivers can be attributed to early experiences paddling on the Hudson River and lakes of the Adirondacks, where his family ran a wilderness canoe-tripping camp for 25 years. "Our focus will be bringing the research community and the best scientific information to the Hudson to help people make sound decisions about the future of the river."

Linck has focused his career on water resources management, having worked as the conservation director of the Adirondack Mountain Club, a research associate and fellow at the Institute of Environmental Studies at the University of Wisconsin-Madison, chairman of Friends of the Lower Wisconsin River and regional director of the Connecticut River Watershed Council.

Julie Zeidner is the New York Sea Grant Institute's new communicator.

She will serve as editor of *Coastlines* and other Sea Grant publications, as well as develop media projects related to the research and education efforts of the Institute.

Zeidner previously served as communications director for the Santa Monica Mountains Conservancy, an agency of the State of California charged with the protection of more than 750,000 acres in the Los Angeles area. She also worked as a general assignment reporter for *The Los Angeles Daily News*, covering environmental issues such as solid waste and parkland aquisition. Zeidner's work includes several years as a reporter and editor in Washington, D.C.

Helping Native Americans Better Manage Their Lands Subject of New Sea Grant Initiative

By Julie Zeidner

Coastal reservations, like other rural communities in New York, are confronted by environmental concerns ranging from toxic dumping, sewage disposal, tank leakage and agricultural runoff, and the ensuing contamination of ground and surface waters. Faced with high unemployment and poverty, tribal leaders are considering the benefits of alternative land and water management practices and natural resources education efforts that could enhance the environment while providing more jobs.

Helping Native Americans better manage and protect their lands and waters is the subject of a new outreach initiative launched by New York Sea Grant with the support of Cornell University's College of Agriculture and Life Sciences. The focus is on working with the Seneca at Cattauragus, the Tuscarora at Lewiston, the Mohawk at Akwesasne/St. Regis, and, on Long Island, the Poospatuck at Mastic and the Shinnecock at Southampton.

These five reservations each face a variety of environmental threats. Health studies have shown PCB contamination in the breastmilk of Akwesasne women. Rivers — which Native Americans traditionally fished on — are polluted. The Mohawks and Senecas are concerned about gasoline tank leakage tainting their groundwater supply. On some reservations, residents have outgrown their sewage treatment capacity, and their properties are subject to illegal dumping by non-residents. In addition, coastal erosion is eating away at the boundaries of the Shinnecock's land.

The effort to enhance the natural resources of the reservations, and bring together New York's diverse tribal communities to reach mutual environmental solutions is being spearheaded by Dave Greene, Sea Grant's extension specialist based in East Aurora. Since the project was launched six months ago, Greene has been traveling to meetings with tribal leadership throughout the state. His goal is to open the lines of communication between the various tribal groups, and provide technical information on issues like water resources management and environmental education.

"There is an opportunity on these reservations to enhance the environment and raise the nations' consciousness about the need to restore, conserve and develop their land," said Michael Voiland, program leader of the Sea Grant Extension Program at Cornell University. "Dave Greene has shown an impressive ability to work with this audience, and to gain their respect and their trust."

Ties between New York Sea Grant and the Native American community began in 1981 when Sea Grant supported the Shinnecocks in their effort to develop a shellfish hatchery project on their reservation. Since that time, Greene has successfully interacted with the Seneca Nation of Indians (SNI) on watershed management projects and youth education activities.

Another important link to the Seneca Nation was made more recently by Greene. With the aid of the Western Consortium of Native American Studies, an organization devoted to enhancing the educational experience of Native American students in the State University of New York system, Greene hired and placed Tracey Jay "T.J." Pierce with the Seneca Nation's newly launched environmental protection project as a summer intern.

Pierce, a student at the State University of New York's College of Environmental Sciences and Forestry, has now been hired on full time by the Senecas to conduct an environmental assessment and workplan for the reservation's waterline project. Of primary importance is Cattaraugus Creek, a major watershed in western New York, subjected to acid rain and other environmental insults. Sea Grant offers help on this issue and others, Pierce said.

In an effort to forge ties with other Indian communities and build an environmental consortium, Greene arranged a meeting of T.J. and former SNI Environmental Office Head Merwin Pierce with Mohawk environmental leaders at Akwesasne this summer. True to tradition, ceremonial corn, tobacco and other gifts were brought to initiate the cooperative effort and sharing of information.

Other contacts were made between tribal leadership and Sea Grant this summer when Sea Grant Marine District Extension Coordinator Bob Kent and Greene visited the Shinnecock reservation on Long Island. The tribal council asked for assistance with a natural resource inventory of their 800-acre reservation, potential environmental youth education programs, and methods to reduce coastal erosion.

Sea Grant introduced Shinnecock Keith Philips to Cornell University's "Aerial Perspectives Program," a National Science Foundation project that uses aerial photography and remotely-sensed data to interest and educate high school-aged students in the natural sciences.

"Dealings between the U.S. government and Native Americans have been filled with betrayal, misunderstanding and deceit," Greene said. "To establish trust in the community you must prove you deserve trust."

Philips hopes to enlist the help of students on the reservation to assist him with using aerial data for their resource inventory.

The potential also exists for marine education programming with the Mohawks at Akwesasne/St. Regis and the Tuscarora at Lewiston. Greene met with tribal representatives from reservation schools to discuss natural resource educational programs Sea Grant could offer in the future.

These are important first steps in helping promote reservation economies, protect the environment, stimulate educational and career opportunities, and forge ties among the diverse Native American groups. At a statewide conference to be sponsored by the State University of New York's

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Biotechnology

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the United States a global leader in biotechnology, Japan and several European countries have made it a national priority to assume this leadership role by the year 2000. The Marine Biotechnology Investment Act of 1993, pending congressional approval, could help the U.S. expand its economic and industrial strength by providing a coordinated national program of research, development and private sector partnership.

Introduced by Rep. Gerry E. Studds (D-MA), The Marine Biotechnology Investment Act of 1993 (H.R. 1916) passed the House of Representatives in July. Seeking to establish a marine biotechnology program within the National Sea Grant College Program, the Senate followed suit this October when Sen. Ernest F. Hollings (D-SC) introduced its expanded version of the bill (S. 1517). He was joined by Senators Ted Stevens (R-AK), John Kerry (D-MA) and Claiborne Pell (D-RI). (Senate passage of S.1517 was still pending as *Coastlines* went to press.)

"The initiative represents the first major step in the revitalization of the National Sea Grant College Program," said Lee Stevens, executive director of the National Sea Grant Association. "In pursuing this initiative in marine biotechnology, we are focusing on a 21st century technology, which benefits from Sea Grant's tightly integrated efforts of research, outreach and industry connections. This investment will help the U.S. maintain its international competitiveness in an emerging growth field."

The Senate bill authorizes up to $20 million for the National Sea Grant College Program for marine biotechnology efforts for each of the fiscal years 1994-1995 and 1995-1996, (in addition to the $3.5 million federal appropriation to Sea Grant for its marine biotechnology efforts in 1994.) This amount could increase to as much as $25 million for fiscal years thereafter. In addition, other National Oceanic and Atmospheric Administration programs would be allocated up to $12 million for similar efforts in each of the next four fiscal years.

The U.S. stands to reap tremendous rewards from the passage of the Marine Biotechnology Investment Act of 1993. New York, which already supports a well-established and rapidly growing biotechnology industry, would also benefit from the passage of the legislation. More than 120 biotechnology firms operate in the state, including such industry leaders as Bristol-Myers Squibb, Pfizer and Sterling Laboratories.

The New York Sea Grant Institute has funded a diverse number of marine biotechnology projects since the early 1980s. Its studies on molecular genetics, immunology and pathology, pharmaceutical development, seafood safety, biofouling, environmental remediation and aquaculture are being used by industry to address the needs of New York and the nation.

Cornell University and the State University of New York (SUNY), New York Sea Grant's parent institutions, each host biotechnology centers that seek to stimulate economic development and transfer of basic research discoveries to the marketplace.

The Cornell Center for Advanced Technology (CCAT) in Biotechnology is a $33- million facility that has already spawned seven new companies since it was founded in 1989. Among the companies is Biolistics, producer of the "gene gun"—a system that introduces DNA

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BIOTECHNOLOGY PROJECTS FUNDED BY SEA GRANT

The New York Sea Grant Institute has supported a wide range of biotechnology projects over the past several years. A small sampling of the spectrum of biotech research supported by the Institute is listed below.

Biofouling

Nonpolluting Control of Biosurface Fouling studied the biophysics of attachment of zebra mussel larvae to different substrates. Researchers determined the attachment mechanisms and adhesive proteins used by the nuisance creatures. One aspect of a three-part research program, also supported by Niagara Mohawk Power Corp. and the Office of Naval Research, will be used to engineer nonpolluting surface coatings that discourage larvae settlement, potentially saving municipal, residential and industrial water users millions of dollars in fouling removal costs.

Marine Natural Products

Structural and Synthetic Studies of Marine Natural Products identified biologically active compounds from marine organisms, and determined how to sythetically produce them. Many of these compounds are being studied and developed by pharmaceutical companies for possible use as anti-tumor and anti-inflammatory agents. (For more information, see *Coastlines* Vol. 23 No. 1, 1993.)

Immunology and Pathology

Fluoroquinolone Treatment of Bacterial Diseases of Salmonids tested the efficacy of a new family of antibiotics in preventing bacterial infections in fish. Drug uptake, retention and elimination rates were determined. The researchers have applied to the Federal Drug Administration for approval of one of the most promising compounds for use in fish culture operations, where significant reductions in fish mortalities would increase the efficiency and profitability of such operations.

Seafood and Human Health

The N-3 polyunsaturated Fatty Acids of Marine Lipids: Determination of Biochemical Effects, Optimum Dietary Intake and Oxidative Stability studied the effects of dietary Omega-3 polyunsaturated fatty acids on tissue fatty acid composition. Modification of fatty acid composition has shown some health benefits including reduced incidence of heart disease. This research found that marine sources (fish oils) were 2.5 to 5 times more effective in altering fatty acid composition than those derived from vegetable oils.

Biotechnology

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into cells — which brought $2 million in royalties to Cornell University when it was later sold to Dupont.

More than 50 percent of the innovative research projects funded by The Center for Biotechnology at SUNY at Stony Brook result in invention disclosures, patents, licenses, new companies and other significant economic developments, said Diane Fabel, the center's assistant director. The biotech center also helped procure funds for a $6-million high technology business incubator center located at Stony Brook.

"As part of the effort to develop a coordinated national marine biotechnology program, New York Sea Grant hopes to work with university biotech centers to expand the number of New York investigators involved in marine biotechnology and help facilitate the transfer of research results to industry," said Dr. Anne McElroy, director of the New York Sea Grant Institute.

BIOTECHNOLOGY PROJECTS INCLUDED IN THE 1994–1995 RESEARCH PACKAGE

The following biotechnology projects will receive funding in 1994–1995. Their inclusion in New York Sea Grant's federal proposal demonstrates the Institute's commitment to supporting biotechnology research as a means of solving some of the state's and nation's environmental and health issues.

Aquaculture Technology

Reduction of Hatchery Discharge Pollution via Mechanical Removal and Dietary Manipulation Affecting Fecal Solids Characteristics would attempt to alter the fecal characteristics of cultured fish making the wastes easier to filter out of the discharge stream of hatcheries. Changes in diet are proposed to make the waste pellets sink faster and clump together longer to facilitate removal. The goal is to lessen the impact of such aquaculture operations on the nearby aquatic environment, while improving the efficiency of the culture process.

Genetics

DNA Analysis of Atlantic and Gulf Sturgeon Populations and Mixed Assemblages would define the stock structure of the Atlantic sturgeon in the Atlantic ocean and Gulf of Mexico. Information at the genetic level can help researchers identify individual stocks and determine how many different unit stocks are represented in the species distribution. This information could aid in the management and restoration of this valuable species.

Marine Natural Products

Marine Natural Products: Novel Biochemical Probes and Potential Pharmaceutical Agents would continue to explore promising new compounds derived from marine sources. Molecular examination of marine natural products can be an excellent first step in finding new drugs to treat a variety of diseases. The interest and participation of the pharmaceuticals industry in the development of marine natural products will help in the development of this field.

Seafood Safety

Electrochemical Approaches for the Analysis of PSP Toxins would develop a new analytical procedure for monitoring Paralytic Shellfish Poisoning (PSP) toxins in shellfish. These toxins cause a major economic problem for the shellfish industry because they pose a potential hazard to shellfish consumers. The new detection method would provide more information about the toxins in shellfish, and would potentially avoid the use of live animals to test for PSPs.

Native American Initiative

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Native American Consortium and New York Sea Grant's Extension Program, the Native American leaders will be invited to discuss their mutual environmental resource problems and needs. The conference is scheduled for January 1994 in the Syracuse area.

Historically, the tribal councils have been reluctant to work with outside environmental agencies that try to impose their views and programs on them. "In working with the Native American audience, one must keep in mind that their culture, government and customs are different," Voiland said. "These nations have generally kept very little written documentation about themselves, and beliefs diverge even within and between tribes."

There is also struggle between progressive and traditional groups over how to deal with environmental and economic problems in their communities, Greene said.

"What is different about dealing with this audience is gaining their confidence," Greene said. "They must have the sense that you are not trying to do a pre-set program for them, but that you are meeting their needs, as they express them. The strategy seems to be they talk about their problems, and they expect you to follow through on being able to help them."

"Dealings between the U.S. government and Native Americans have been filled with betrayal, misunderstanding and deceit," Greene said. "To establish trust in the community you must prove you deserve trust. Often a member of the community is useful in meeting others within it. You establish a relationship and the web spreads." Greene's approach has been met with approval.

"The way we interact with Dave Greene is more than one could hope for," said T.J. Pierce, of Oneida descent. "He has the contacts and information we need. Our objective is a policy of self determination, and Dave understands this to be the goal of the Seneca Nation."

Within the National Sea Grant network, there are other successful Native American initiatives that have been well received. In the eastern Upper Penninsula of Michigan, Sea Grant Extension Agent Ron Kinnunen was able to serve as a liaison between the Bay Mills tribe and the State Department of Natural Resources over the best way to deal with the construction of a breakwall.

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Native American Initiative

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Minnesota Sea Grant sponsors an American Indians in Marine Science (AIMS) program, that provides a full scholarship and stipend for undergraduates at the University of Minnesota-Duluth. The Mississippi-Alabama Sea Grant Program has a minority education effort that focuses on the Porch Creek Band. In Alaska, Sea Grant staffer Dolly Garza, of Native American decent, teaches marine safety issues on reservations.

"For tribal groups, as well as the rest of the U.S., resource management issues are going to be paramount," said Shirley Fiske, program director for social science, marine policy and education at the National Sea Grant College Program office. "Tribes are just getting to the point of realizing they have a stake in this. Sea Grant has the infrastructure through extension to offer tribes environmental education opportunities, and I'm encouraged by the start that's been made in this direction."

Support for the Native American-extension education initiative in New York will be advanced by a program advisory committee including Ron LaFrance, (a Mohawk and former director of Cornell's American Indian Program), Dr. Steven Penningroth of Cornell University's Department of Natural Resources, and longtime Sea Grant advisor and Niagara Country Fisheries Development Board chair Walter "Skip" Hartman, who is a Seneca.

"We want input from those who understand the issues on the reservations, and who understand the Native American audience," said Greene, who hopes to add additional members to the committee. "If the program is to remain relevant, ideas and feedback are a must."

NEW YORK SEA GRANT RESEARCH PROJECT UPDATES

Accounting for Missing Bluefish

Young bluefish appear to recruit to estuaries of the Mid-Atlantic Bight as two groups or cohorts, leading to the prevailing view that bluefish spawn in two distinct seasons. An alternate view is that the apparent bimodal pattern in recruitment of bluefish results from significant loss of May and June-spawned bluefish from the continental shelf rather than an absence of spawning during that period, according to Dr. Robert Cowen, a larval ecologist at the Marine Sciences Research Center at the State University of New York at Stony Brook. The investigator has developed a model based on the flow characteristics of the Southern- and Mid-Atlantic Bights which suggests bluefish larvae spawned in May and June at and just north of Cape Hatteras may be carried by current flow out of the Mid-Atlantic Bight, resulting in their complete absence as recruits to Northeast estuaries during that interval.

Fouling Up Zebra Mussel Biofouling

Zebra mussels can establish colonies on just about any surface they come into contact with. In an effort to understand how zebra mussels do this, Dr. Robert Baier and Anne Meyer of the Department of Biomaterials at the State University of New York at Buffalo, are examining the biophysics of attachment and settling of zebra mussel larvae. What he found is evidence that the larvae prepare potential attachment surfaces with an acellular phagocytosis mechanism that cleanses a site, then deposit a "conditioning film" which enables them to successfully colonize it. Collaboration with researchers at the University of Delaware enabled Baier to determine the molecular configurations of the adhesive proteins used by the mussels. This information can be used to engineer surfaces and surface coatings that will retard the settling and attachment of these nuisance creatures.

Winter Storms Stir up Trouble in Lake Ontario

Lake bottom sediments in certain areas of Lake Ontario contain elevated levels of toxic contaminants, which left undisturbed over time, may become buried deep enough to isolate them from the system. However, a research team led by Roger Flood from the Marine Sciences Research Center at the State University of New York at Stony Brook is finding that winter storms and other meteorological events can resuspend these contaminants, renewing their threat to the ecosystem. Using sediment traps, current meters and sophisticated sonar equipment, the research team found that the amount of resuspended sediment increased approximately tenfold over a six-day period as a series of winter storms swept over Lake Ontario last winter. Understanding these weather-related processes will enable water quality and resource managers to better predict contaminant transport and fate in similar ecosystems.

Announcing availability of new funding for marine biotechnology. Call New York Sea Grant for more information.

For more information about these or other New York Sea Grant research projects, contact Trent Schneider at New York Sea Grant Institute, 115 Nassau Hall, SUNY at Stony Brook, Stony Brook, NY 11794-5001 (516)632-9123.

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Journal Reprints

Development of cell cultures derived from lake trout liver and kidney in a hormone-supplemented, serum-reduced medium. L.-L. Cheng, P.R. Bowser, and J.M. Spitsbergen. 1993. *Journal of Aquatic Animal Health*. 5:119–126. Free.

Dietary n-3 fatty acids alter murine peritoneal macrophage cytotoxicity. J.M. Black and J.E. Kinsella. 1993. *Annals of Nutrition and Metabolism*. 37:110–120. Free.

Impact of the zebra mussel, a bivalve invader. M.L. Ludyanskiy, D. McDonald and D. MacNeill. 1993. *BioScience*. 43(8):533–544. Free.

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Scattering of water waves by vertical cylinders. S. Kakuno and P.L.-F. Liu. 1993. *Journal of Waterway, Port, Coastal, and Ocean Engineering*. 119(3):302–322. Free.

Fact Sheets and Directories

Educational Materials Catalog. An annotated bibliography of a selection of Sea Grant's print publications and audiovisual materials. 48 pp. Rev. September 1993. Free.

New York Sea Grant Marine District Directory. Lists extension staff serving Long Island and the Hudson River. Rev. September 1993. 2 pp. Free.

Guide to the identification of larval and postlarval stages of zebra mussels *Dreissena spp.* and the dark false mussel, *Mytilopsis leucophaeata*. D.B. Conn, R.A. Lutz, Y.-P. Hu. and V.S. Kennedy. October 1993. 22 pp. Includes text, comparative photos and illustrations. $2.00.

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

Call (315) 341–3042 for further information.

Fact Sheets and Directories

Biology and Potential Impacts of the Rudd in the Great Lakes. D. MacNeill. Illustrated fact sheet. October 1993. 4 pp. $.50.

Boating and Water Safety: A Great Lakes Sea Grant Network resource list. Includes a list of print and and video publications, prices and where to order. Compiled by New York Sea Grant Communications. 3 pp. Free.

Control of Zebra Mussels in Residential Water Systems. C. O'Neill. Illustrated fact sheet. July 1993. 10 pp. One copy free.

An Interpretive Planning Guide for Communities Along Scenic Byways. D. Kuehn. Threering notebook, work sheets, illustrations and photos. October 1993. 90 pp. $10.00.

New York Sea Grant Great Lakes Directory. Lists extension and communication staff serving the Great Lakes area. Rev. October 1993. 2 pp. Free.

Our Lake Ontario Sand Dunes: An overview. Information on the eastern Lake Ontario sand dunes. D. White. Illustrations. Fact sheet. October 1993. 2 pp. $.50.

Our Lake Ontario Sand Dunes: An overview of their flora. S. Bonanno and D. White. Illustrations. Fact sheet. October 1993. 4 pp. $.50.

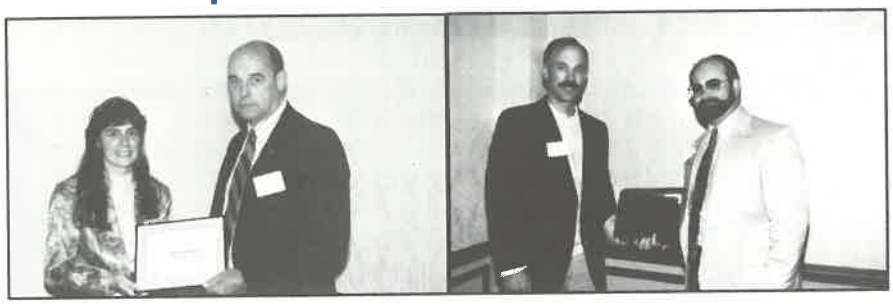
Our Lake Ontario Sand Dunes: An overview of their fauna. S. Bonanno and D. White. Illustrations. Fact sheet. October 1993. 4 pp. $.50.

Our Lake Ontario Sand Dunes: Minimizing impacts of your visit. S. Bonanno and D. White. Illustrations. Fact sheet. October 1993. 4 pp. $.50.

Public Information Inventory for Lake Ontario. J. Pultz. A compilation of available educational information pertaining to Lake Ontario environmental topics. September 1993. 42 pp. $2.00.

Zero Discharge and Virtual Elimination in the Great Lakes: A collection of viewpoints from prominent Great Lakes specialists. 1993. 49 pp. $2.50.

Two NYSG Specialists Receive Achievement Awards



Left: Diane Kuehn receives award from Allen Miller, Chair of the Great Lakes Prgram Leaders. **Right:** David MacNeill receives award from Jeff Gunderson, chair of the SEAGSA. *Photos by Pat Peterson.*

New York Sea Grant Extension Specialists Diane Kuehn and David MacNeill were honored for their professional achievements at the Great Lakes Sea Grant Network Conference in Lorain, Ohio this October.

Kuehn received the Great Lakes Sea Grant Network Outstanding Program Award for her tourism interpretative programming. Kuehn's work involved communicating resource information to visitors in an entertaining and educational fashion. Interpretative programming, which increases visitors' awareness about a resource or attraction, boosts the region's economy by enhancing the chances that tourists may want to stay longer. Kuehn, whose office is at the State University of New York (SUNY) College at Oswego, develops and conducts workshops and conferences, writes publications and participates in regional planning committees to foster an understanding of coastal recreation and tourism. This October, she organized the first northeast interpretation and tourism conference in Syracuse, New York. *An Interpretative Planning Manual for Communities Along Scenic Byways*, a 90-page guide authored by Kuehn for members of the tourism industry was distributed to the 120 participants at the conference. (See page 8 for ordering information.)

David MacNeill received the Great Lakes Sea Grant Agents' and Specialists' Award for outstanding programming related to Lake Ontario forage base issues.

MacNeill, housed at the State University of New York (SUNY) College at Brockport, has conducted educational programs on sportfishery issues, fishery biology, management and conservation, and aquaculture for the past six years. When problems with the forage base in Lake Ontario were observed in 1992, he was involved with a multi-national panel who assessed the issue. (For more information see *Coastlines* Vol. 22, No. 4.) MacNeill also served as a technical advisor to the New York State Department of Environmental Conservation's lakewide task force. He writes articles for the newsletter *Charterlines*, organizes and conducts workshops to educate both community decision-makers and the public on the lake-wide forage base problem.

At the New York State Cornell Cooperative Extension Professional Conference in Niagara Falls in October, Kuehn was also presented a superior performance award from Epsilon Sigma Phi for her work in interpretation. Epsilon Sigma Phi is a national honorary extension fraternity that recognizes individuals or programs for outstanding achievements.

New York Sea Grant

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