

COASTLINES

New York Sea Grant

Volume 22 Number 2

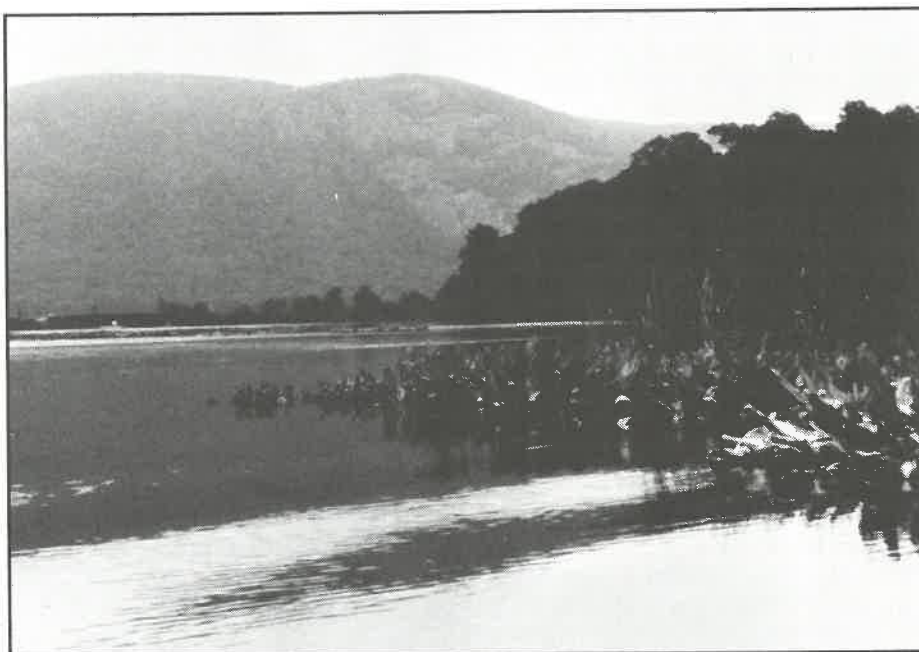
Spring 1992

Coastlines Readers Survey
*Now's Your Chance To Tell Us
How We're Doing*

CADMIUM CONTAMINATION OF HUDSON RIVER FISHERY EXPLORED BY RESEARCH TEAM

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Foundry Cove's deceptive beauty conceals what is probably the most cadmium-polluted site in the world. *Photo courtesy Jeffrey Levinton.*

Some fifty miles north of New York City in Foundry Cove on the Hudson River, a team of New York Sea Grant funded researchers is exploring how the heavy metal cadmium is accumulating in local blue crab stocks. The research should add to our understanding of the ways in which toxic metals are released in the environment, and how they contaminate and affect the plants and animals of an estuary.

Foundry Cove is bordered by a marsh located near Cold Spring, NY, on the east side of the Hudson. Adjacent to the cove is a site that was used by several companies from 1953 to 1979 for nickel-cadmium battery production. Concentrated cadmium and nickel nitrite solutions were used in the manufacturing process, and for a time, cobalt, another toxic

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Cadmium Contamination

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metal, was also used as an additive. The discharged wastes from this manufacturing process initially went through the Cold Spring sewer system into the Hudson, but about 10 percent of the discharge flowed through a bypass system that emptied into Foundry Cove. Other wastewater treatment systems were implemented over the years, but during the period of battery manufacture, contaminated wastewater (effluent) eventually flowed into Foundry Cove or into the Hudson River. This contamination consisted of cadmium in soluble and particulate forms, and totaled an estimated 179 metric tons, according to a 1983 study.

Typically, the cove's sediments have cadmium concentrations of over 1,000 parts per million (ppm) — about 0.1 percent — and in several places the concentrations skyrocket to as high as 250,000 ppm, which means that the sediment contains 25 percent cadmium. "Unlike many other metal-contaminated aquatic sites, Foundry Cove contains only a very few pollutants, namely cadmium, nickel, and some cobalt," says Dr. Jeffrey Levinton, who heads the SUNY at Stony Brook research team. "It is easier for us to isolate and study these metals because there are few of them and because of the absence of organic pollutants."

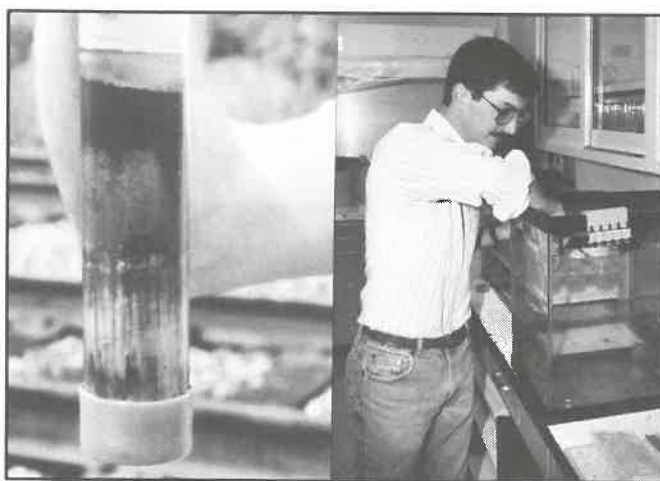
Levinton, who is working with Drs. Nicholas Fisher and Glenn Lopez and Sea Grant Scholars Daniel Martinez and Randy Young, explains one purpose of the study: "We hope to understand something about the crabs' ingestion of cadmium through the food chain and about how crabs take up cadmium directly from the water. We chose Foundry Cove because it is probably the most cadmium-polluted site in the world, and poses a potentially serious human health threat. The cove has in fact been designated as a Superfund cleanup site by New York State."

According to the researchers, cadmium is a known cause of renal (kidney) damage in people. It has a long half-life in humans — it is not rapidly eliminated from the human body — and if food with high cadmium concentrations is consumed over a prolonged period of time, cadmium may be

expected to accumulate in human tissues.

Fishing for blue crab was once a major recreational activity in the tidal Hudson estuary, but the New York State Department of Health has issued regulations limiting consumption of blue crabs from the Hudson River to just six per week. The health department also warns that the crabs' internal organs should not be eaten and that all the cooking liquids are to be discarded.

Levinton notes that the types of animals living in the sediment in Foundry Cove are not markedly different from those in similar locations that have been unaffected by this kind of contamination. The most com-



LEFT: Sediment samples such as this one from Foundry Cove were found to comprise 25 percent cadmium. (Photo by Jeffrey Levinton.) RIGHT: Randy Young tending young blue crabs. (Photo by Avery Klauber.)

mon bottom-dwelling animals are oligochaete worms and chironomid fly larvae (midges). By using an electron microprobe the research team has determined that these Foundry Cove animals contain very high concentrations of cadmium. When sections of the animals' bodies are placed under the microprobe, the internalized cadmium causes them to "light up like a Christmas tree," according to Levinton.

The fly larvae seem to have a natural immunity to cadmium, while the common worm species appear to be genetically resistant to the metal. As such, the animals would seem to be a living example of Charles Darwin's theory — adaptation and survival of the fittest.

Moving up the food chain, the research team has fed blue crabs and grass shrimp a steady diet of cadmium-laden foods in laboratory experiments. Grass shrimp are stud-

ied because they are a possible prey of juvenile blue crabs. "We already know that crabs take up cadmium from the water in dissolved form," says Levinton. "So now we're feeding worms to both crabs and grass shrimp to see whether these animals also get cadmium through their food." According to the team's findings, it appears that both the crabs and the grass shrimp do indeed take up cadmium from their food, and retain high amounts of this heavy metal.

The researchers also studied the rates and patterns in which cadmium is transported into and out of Foundry Cove. To obtain their data, they collected water samples from the middle of the inlet, approximately 3 feet above the bottom. Water current velocities, tide heights, and water temperatures were also recorded during the sampling period. The samples were then brought back to the lab where filters removed suspended particles from the water. The researchers determined the cadmium levels and used the calculations as a basis for an estimate of the total annual flux of cadmium contamination in the Hudson River near this site.

"Our results indicate that although the net flux or movement of cadmium to the river in the dissolved phase is negligible, a large amount of cadmium is transported on suspended particles," Levinton says. "What happens is that the cadmium is adsorbed — chemically attached to the surface of particles such as sand or silt that have been lifted into the water column. Our figures suggest that 500 to 1,000 kilograms of cadmium are transported out of the cove and into the Hudson River each year on suspended particles."

Evidence that Foundry Cove may be in the process of cleansing itself could help to renew the optimism of the people along the Hudson. The researchers are seeing examples of heavy metals becoming buried deeper in the sediment — where they are less likely to affect aquatic plants and animals such as the blue crab. In addition, as cadmium-laden suspended particles flow out of the cove into the Hudson, and then out into the ocean, they are being replaced by "clean" particles from sediment upriver.

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Please take a moment to renew your subscription by sending us your name and address. If we do not receive this information from you by **September 8, 1992**, we will drop you from our mailing list. We would also like to ask you to take a few additional minutes to complete the reader survey form. The price of *Coastlines* remains unchanged—it's free. We welcome your comments and criticisms, and thank you for your interest in New York Sea Grant.

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11. Please check here to receive a coupon for \$ 1.00 off your next publication order of \$ 1.00 or more, good through 12/31/93. (We must receive your request for the coupon by 9/8/92.)

OPEN FORUM We invite your comments on what New York Sea Grant is doing and where it should be going. Please address: Dr. Anne McElroy, New York Sea Grant Institute, Dutchess Hall, SUNY at Stony Brook, Stony Brook NY 11794-5001.

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New York Sea Grant Awarded Over \$2 Million from NOAA for FY 1992-1993

New York Sea Grant Institute, a cooperative program of the State University of New York and Cornell University, has been awarded \$2.083 million from the National Oceanic and Atmospheric Administration (NOAA) for the fiscal year February 1, 1992 through January 31, 1993. Matching funds totaling \$1.272 million will be provided from several universities during this period as well. In addition, a State appropriation of \$417,000 has been received for July 1, 1992 through June 30, 1993.

The Federal award and matching funds will be used for 17 scientific research projects in New York's Great Lakes and marine districts, and for advisory services provided through the New York Sea Grant Extension Program. The 1992 research pro-

gram will involve some 27 academic researchers along with 20 graduate students working as Sea Grant Scholars. The Extension program currently includes the activities of 11 extension specialists and one program assistant located in the state's coastal regions.

New York Sea Grant research proposals undergo a highly competitive selection process that includes rigorous peer review. The studies selected for funding have outstanding scientific merit and fill programmatic needs of the Institute. General research program areas this year include the coastal environment, contaminants and environmental quality, fisheries, and biotechnology.

Advisory services include targeted edu-

cation efforts in such areas as zebra mussel ecology and control; tourism and small business development; sportfishery use and development; coastal erosion and management; the Long Island Sound Study; seafood nutrition, safety, and marketing; recreational facility design and operation; the design and management of marine facilities; and the development of marine education programs for youngsters, among others.

Gearing up for future efforts in bringing science to the shore in New York State, NY Sea Grant will release its next call for research proposals in late fall. To be placed on the mailing list, researchers from academic and not-for-profit institutions can contact New York Sea Grant Institute at (516) 632-6905.

New York Sea Grant Has Role in New LIS Office

New York Sea Grant and Connecticut Sea Grant share responsibility for the public education and outreach component of the six-year Long Island Sound Study (LISS). To facilitate public involvement in the study's final comprehensive conservation and management plan, the U.S. Environmental Protection Agency (EPA) opened a Long Island Sound (LIS) Office in Stony Brook, New York this spring. A Connecticut office opened in Stamford in February.

New York Sea Grant Program Assistant Trent Schneider was selected to staff the New York office. One day a week, he will be joined by the EPA's Mark Tedesco, who directs both LIS offices. Schneider has been working for the past year and a half with New York Sea Grant Extension Specialist Melissa Beristain, who is NY's LISS public participation coordinator, and Chester Arnold of the Connecticut Sea Grant Marine Advisory Program.

The new LIS office will be taking over production of the *LISS Update*. According to Schneider, "This newsletter will keep interested parties up to date on the progress of and issues related to the study and its forthcoming management plan."

The new office is housed in the Marine Sciences Research Center (MSRC) of the State University of New York (SUNY) at Stony Brook. Tedesco, Schneider, and Beristain were on hand for the official opening and ribbon-cutting, along with U.S. Representatives James Scheuer and George Hochbrueckner, N.Y. State Senator Owen

Johnson, Connecticut State Senator Steven Spellman, EPA regional director Constantine Sidamon-Eristoff, New York Sea Grant Director Anne McElroy, SUNY at Stony Brook President John Marburger, and MSRC Director J.R. Schubel, among others.

By increasing the visibility of the Long Island Sound Study, the New York LIS office will play an important role in coordinating efforts to involve the public in addressing the estuary's numerous problems. To contact the office, call (516) 632-7666.



From left: Sen. Owen Johnson, U.S. Rep. James Scheuer, MSRC Director J.R. Schubel, EPA Reg. Dir. Constantine Sidamon-Eristoff, U.S. Rep. George Hochbrueckner, and LIS Office Director Mark Tedesco. Photo by Avery Klauber.

Storm Drain Painting Award



Avery Klauber

Melissa Beristain

Protection Agency (EPA) Region 2 Environmental Quality Award. The project seeks to make the public more aware of the potentially harmful contributions storm drain outflows can make to coastal environments.

The storm drain painting program adapted for New York by New York Sea Grant Long Island Sound Study Public Participation Coordinator Melissa Beristain has been selected as one of this year's winners of the U.S. Environmental

Each year EPA searches for those individuals and groups who have demonstrated an outstanding commitment to protecting and enhancing environmental quality. Nominations for those deserving of these awards are solicited from outside the agency and from EPA personnel.

"Although many of our award recipients do not seek acclaim for their efforts," explains Constantine Sidamon-Eristoff, EPA's regional administrator, "we believe that they deserve special recognition for their tireless pursuit of environmental protection."

The award ceremonies took place this spring in the U.S. Court of International Trade at 1 Federal Plaza in New York City.

Innovative Traps Provide Data on Trout and Salmon in Lake Ontario Tributaries

By Jonathan Kennen

In a recent New York Sea Grant funded project, prototypes of a new smolt trap design were used to study the natural reproduction of Pacific salmon and trout species that have been introduced in eastern Lake Ontario tributaries. These smolt traps target juvenile salmonids—migrating salmon and trout that are generally between 1 and 3 years old—and provide fishery biologists and managers with a method of estimating the number of naturally produced fish entering Lake Ontario.

The principal investigator for this project was Dr. Neil H. Ringler of SUNY College of Environmental Science and Forestry (SUNY CESF) in Syracuse. Ringler has been conducting research on salmonids for over 20 years and was one of the first scientists to discover that introduced coho (*Oncorhynchus kisutch*) and chinook (*O. tshawytscha*) salmon reproduce naturally in the Salmon River system.

Where there had been none before, substantial natural reproduction of Pacific salmonids now occurs in many Lake Ontario tributaries, according to studies by Ringler and his graduate students. Assessing the contribution from naturally spawned fish is essential to effective long-term management of the fishery, because decisions regarding appropriate numbers and species to stock require information on natural populations. The continued stocking of steelhead trout, coho, and chinook salmon, without recognizing the contribution of naturally produced populations, may reduce availability of forage fish and potentially result in reduced weight, poor growth rates, stress, disease, and mortality of adult salmonids.

Although differences between naturally produced and hatchery fish can be reliably determined by fin clips, fin and gill

wear from crowded hatchery conditions, and patterns of scale growth, prior to Ringler's study, naturally produced fish were not sampled due to logistic, time, and monetary constraints.

The smolt traps used in this project were developed as a result of a previous New York Sea Grant funded project conducted by Ringler in 1988. Built by the Center for Innovative Technology Transfer at SUNY College at Oswego under the guidance of Harry Hawkins and Donald Feck, the "auger" trap is quite unusual in appearance, resembling an early space capsule with floats. A large cone-shaped screw with an opening of about 4 feet in diameter is enclosed in hardware cloth and positioned between two pontoons. Unsuspecting fish migrating toward the Lake enter the large opening at the upstream end of the trap and are then guided by rotation of the screw into a screen-covered live well at the downstream end. The upstream end of the screw is attached to a winch that facilitates the movement of the screw in an upward and downward motion. This movement allows the user to adjust the volume of water entering the trap mouth and makes the trap effective at a variety of depths.

Water flow powers the rotation of the

screw. This "hydropower" is harnessed to rotate a belt-powered cleaner at the downstream end of the live well. Without the live-well cleaner, the traps would have to be checked on an hourly rather than daily basis due to the large amount of organic debris that enters the trap mouth. The advantage of this technique over the establishment of weirs (fences or enclosures stretched across the entire width of a stream for the purpose of catching fish) is that costs and personnel efforts are minimized. Also, the traps are portable.

Traps were placed in four eastern Lake Ontario streams in the Tug Hill region: Little Sandy Creek, Skinner Creek, Trout Brook, and Orwell Brook. Biological data were collected on trapped smolts. Since the traps did not extend entirely across the streams, their efficiency had to be ascertained for trapped smolts. Smolts were counted, marked, and released back upstream. The number of fish recaptured was used to estimate trap efficiency. Ringler and his coworkers found that auger trap efficiencies ranged from 1.3% to 18% for chinook, coho, and steelhead smolts.

The number of smolts produced was estimated by dividing the number trapped by these trap efficiencies. The Tug Hill streams produced significant numbers of Pacific salmon smolts. For example, annual estimates of chinook smolts leaving Little Sandy Creek ranged from 1,440 to 63,000. In the other three streams, estimates ranged from 56 to 3,904 smolts.

Natural reproduction in a stream is looked at in terms of yield. Yield is calculated based on the rearing area of the stream, which is the area used by the juveniles to grow. Ringler's smolt estimates translated into chinook salmon yields ranging from 9 to 3,750 smolts per hectare in eastern Lake



Research support specialist Chris Millard checking auger trap in Little Sandy Creek, 1990. Photo by Jonathan Kennen.

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KODAK'S DR. GRACE WEVER TO JOIN NATIONAL SG REVIEW PANEL

Having worked with New York Sea Grant for nearly a decade, Dr. Grace Wever, Eastman Kodak Company's Manager for State Government Relations/Midwest, has accepted an invitation to serve as a member of the NOAA/Sea Grant National Review Panel. The national panel is comprised of distinguished citizens appointed by the Secretary of the U.S. Department of Commerce, who advise the Secretary, the Administrator of the National Oceanic and Atmospheric Administration (NOAA), and the National Sea Grant Director on scientific and administrative policy.

The panelists, who are appointed to no more than two 3-year terms, participate in on-site reviews of university Sea Grant programs and evaluate the progress and potential of the National Sea Grant program, meeting at least twice a year to address opportunities facing Sea Grant. The panel was established as part of Sea Grant's authorizing legislation by Congress and consists of 15 members from throughout the country who represent a broad cross section of experience, knowledge, and training in marine science, education, extension services, government, industry, economics, law, and planning, among other fields.

Wever's involvement with New York Sea Grant began in the early 1980s, soon after she joined Kodak in Rochester. "At that time I was running a microbiology lab at Kodak and testing water because we were interested in the quality of our internal water



Dr. Grace Wever

Kodak

supply for manufacturing purposes. We soon understood that our water came not just from Lake Ontario but from throughout the Great Lakes," recalls Wever. "At that point, we realized that we needed more information than just our internal expertise alone could provide. So we started to look for resource people outside of Kodak. That's how I came to meet Chuck O'Neill from New York Sea Grant."

Within a short time Wever and O'Neill, a NY Sea Grant Extension Specialist at SUNY College at Brockport, initiated a two-day symposium on the impact of source and supply water on industrial and municipal processes. The symposium was cosponsored by Kodak, New York Sea Grant, and the Rochester/Monroe County Industrial Management Council.

Wever is concerned not only about the economic value of water resources, but about environmental stewardship as well. As a member of the Monroe County Water Quality Advisory Committee, Wever helped to formulate a Remedial Action Plan for the Rochester embayment.

Because of Wever's dual understanding of industrial and environmental needs, she has been instrumental in developing the Council of Great Lakes Industries that was established last year. The Council currently has some 20 members, including the Federal

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New York State of the Lakes Seminars

This spring over 180 fishermen, charter captains, and interested citizens gathered for two popular Sea Grant sponsored seminars on New York's Great Lakes fisheries. An all-day workshop about Lake Ontario was held in Rochester on March 14 and a similar meeting on Lake Erie took place in Dunkirk on April 11.

Dave MacNeill and David Greene, New York Sea Grant extension specialists, organized these events. In addition to Sea Grant specialists, featured speakers included representatives from the New York State Department of Environmental Conservation (DEC) and United States Fish and Wildlife Service (USFWS), along with faculty from Cornell University and SUNY Colleges at Buffalo, Brockport, and Syracuse, and charter boat association representatives.

The 1992 State of the Lakes seminars presented the most recent fisheries-related

research information providing an overview of the status and future of the lakes' natural resources. Data on the three main types of fish — alewife, smelt, and slimy sculpin — that make up the forage base for larger predatory fish such as salmon and trout were presented by Bob O'Gorman of the USFWS, and a high-tech way of assessing the forage base was explained by Cliff Schneider of the DEC. Other topics included sea lamprey control efforts, lake trout rehabilitation, a 1991 fishing boat census, lake thermal structures, exotic species, walleye stocking efforts, socioeconomic trends, aquaculture, contaminants, and an update on the charterboat industry.

The seminars provide a forum for researchers and educators to explain their studies to the public. According to Greene, "There is a need for interaction between researchers and user groups. The State of

the Lakes meetings help bridge this gap."

The inaugural State of the Lakes seminars were held in December 1990 and the positive response from charter captains and interested individuals prompted the continuation of this forum. MacNeill says, "This year 133 people attended the second State of the Lake Ontario seminar in Rochester. We will probably continue to schedule the seminars every 18 months or so, unless there are dramatic changes in the fisheries which would justify calling special sessions."

Because of the public's receptivity to the State of the Lakes format, New York Sea Grant plans to conduct a State of the St. Lawrence River sometime in the near future.

For more information contact Dave MacNeill at (716) 395-2638 or David Greene at (716) 652-5453.



New Publications from NY Sea Grant

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 more information.

Fact Sheets, Directories, and Guides

Guidelines To Increase Survival of Released Sport Fish. M. H. Malchoff, M. P. Voiland, and D. B. MacNeill. Cornell Cooperative Extension Sea Grant Fact Sheet 104SGFS-14. April 1992. NYSGI-G-92-003. 6 pp. \$1.00.

Zebra Mussels: A 1992 Overview. A. Klauber. Rev. May 1992. 8 pp. Single copies free; multiple \$.15 each (\$.10 each without identa-card).

Please send requests for the following publications (including checks payable to **New York Sea Grant**) to: Communications, New York Sea Grant Institute, Dutchess Hall, SUNY at Stony Brook, Stony Brook NY 11794-5001. Or call (516) 632-6905 for further information.

Fact Sheets, Directories, and Guides

A Guide to the Identification of Common Parasites and Diseases in New York's Fishes. R. Getchell. New York State Department of Environmental Conservation, New York State College of Veterinary Medicine, and New York Sea Grant Institute. May 1992. 16 pp. Single copies free.

Boat Pumpout Facilities in New York and Connecticut Marine Waters. New York Sea Grant Extension Program and Connecticut Sea Grant Marine Advisory Program. 1992. 10-panel brochure. Free.

1990-1991 New York Sea Grant Program Directory. D. Puglisi, ed. 1991. 48 pp. NYSGI-D-91-003. Free.

Journal Reprints

Coplanar PCBs in fish and mussels from marine and estuarine waters of New York State. C.-S. Hong, B. Bush, and J. Xiao. 1992. *Ecotoxicology and Environmental Safety*, 23:118-131. 14 pp. NYSGI-R-92-001. Free.

Dependence on dietary cholesterol for n-3 polyunsaturated fatty acid-induced changes in plasma cholesterol in the Syrian hamster. M. E. Surette, J. Whelan, G.-P. Lu, K. S. Broughton, and J. E. Kinsella. 1992. *Journal of Lipid Research*, 33:263-271. 9 pp. NYSGI-R-92-002. Free.

Journal Reprint

Effectiveness of recommended fat-trimming procedures on the reduction of PCB and Mirex levels in brown trout (*Salmo trutta*) from Lake Ontario. M. P. Voiland, Jr., K. L. Gall, D. J. Lisk, and D. B. MacNeill. 1991. *Journal of Great Lakes Research*, 17(4):454-460. NYSGI-R-91-028. 7 pp. Free.

Journal Reprints — continued

Expatriation of *Xyrichtys novacula* (Pisces: Labridae) larvae: evidence of rapid cross-slope exchange. J. A. Hare and R. K. Cowen. 1991. *Journal of Marine Research*, 49:801-823. 23 pp. NYSGI-R-91-026. Free.

Pharmacokinetics of enrofloxacin in fingerling rainbow trout (*Oncorhynchus mykiss*). P. R. Bowser, G. A. Wooster, J. St. Leger, and J. G. Babish. 1992. *Journal of Veterinary Pharmacology and Therapeutics*, 15:62-71. 10 pp. Free.

Recruitment of young-of-the-year bluefish *Pomatomus saltatrix* to the New York Bight: variation in abundance and growth of spring- and summer-spawned cohorts. R. S. McBride and D. O. Conover. 1991. *Marine Ecology Progress Series*, 78:205-216. 12 pp. NYSGI-R-91-027. Free.

Risk assessment, risk management, and fish consumption advisories in the United States. R. E. Reinert, B. A. Knuth, M. A. Kamrim, and Q. J. Stober. Nov.-Dec. 1991. *Fisheries*, 16(6):5-12. 1991. 8 pp. NYSGI-R-91-025. Free.

Tumor necrosis factor production by murine resident peritoneal macrophages is enhanced by dietary n-3 polyunsaturated fatty acids. I. Hardardottir and J. E. Kinsella. *Biochimica et Biophysica Acta*, 1095:187-195. 1991. 9 pp. NYSGI-R-91-024. Free.

New York Sea Grant Newsletters

Coastlines provides readers with information on New York Sea Grant's research and extension activities across the state. Did you know that New York Sea Grant publishes several specialized newsletters in addition to *Coastlines*? If any of these are of interest to you, contact the editors listed below.

Coastal Educators News. Intended for teachers dealing with coastal topics, this 4-page newsletter is published bimonthly during the school year and once in the summer. Focus is on lesson ideas and programs relating to coastal education. Edited by H. David Greene. No charge. Order from New York Sea Grant, Cornell Cooperative Extension Center, 21 South Grove Street, East Aurora NY 14052-2398.

Commercial Passenger Fishing Vessel News. Quarterly newsletter designed to keep charter and party boat operators informed about fishery management and small business topics. Edited by Mark H. Malchoff. No charge. Order from New York Sea Grant, Cornell University Laboratory, 39 Sound Avenue, Riverhead NY 11901-1098.

***Dreissena polymorpha* Information Review.** Summaries of research, meetings, legislation, and sightings of the zebra mussel, *Dreissena polymorpha*, targeted to the interested professional. Published bimonthly by the Zebra Mussel Information Clearinghouse; edited by Charles R. O'Neill, Jr. \$60.00 subscription price includes 6 regular issues, 1 or 2 special issues, 2 free database searches, and other benefits. Order from Zebra Mussel Information Clearinghouse, 250 Hartwell Hall, SUNY College at Brockport, Brockport NY 14420-2928.

Marine Network News. Newsletter with marine science information and lesson plans for educators on Long Island, in New York City, and the Hudson River Valley in New York State. Edited by Robert J. Kent. 8-page quarterly; no charge. Order from New York Sea Grant, Cornell University Laboratory, Riverhead NY 11901-1098.

New York Great Lakes Water Levels Update. This newsletter, issued twice a year, informs shoreline land and facility owners, local officials, and the media on Lake Ontario and Lake Erie water levels, lake level forecasts, shoreline erosion and flooding, mitigation alternatives, and sources of information or assistance. Edited by Charles R. O'Neill, Jr. No charge. Order from New York Sea Grant, Hartwell Hall, SUNY College at Brockport, Brockport NY 14420-2928.

Cadmium Contamination

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The U.S. Environmental Protection Agency has prepared a 5-year, \$80 million cleanup plan for the cove that calls for extensive dredging of the contaminated sediment. Before the dredging begins, a protective dike will be built, effectively cutting off the cove from the river to prevent the spread of the toxic heavy metals. According to EPA's remedial project manager, Pamela Tames, the project is currently out to bid, with a contract expected to be awarded by the end of the summer.

Innovative Traps Provide Data

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Ontario streams. Little Sandy Creek had the highest average yield, 1,317 smolts per hectare for the 1988 to 1991 trapping seasons.

These yields suggested that natural reproduction may account for a greater proportion of salmonids in eastern Lake Ontario than many agencies had recognized. This contribution may be as much as 20 percent.

Ringler's study was the first to quantify natural smolt numbers in Lake Ontario tributaries and other waters. Estimates of

"I think the major message of our work is that it highlights the issue of how a small point-source pollutant can have a very significant effect on a large geographic scale. Particularly an effect on fisheries," observes Levinton. "Unfortunately, in the Hudson River there are two clear examples — the blue crab and cadmium in the sport fishery, and striped bass and PCBs in the commercial fishery."

According to Levinton, another important part of the problem posed by cadmium contamination is how it affects the way average people perceive their environment. "People are learning that once a pollutant gets into the food chain it can spread right to our dinner tables," he says.

naturally produced fish, in conjunction with what is currently stocked by the New York State Department of Environmental Conservation and the Ontario Ministry of Natural Resources, will provide a better understanding of salmonid populations in Lake Ontario. The auger trap, in combination with adult salmon counts, has shown promise in the assessment of smolt production in Great Lakes tributaries. A current stock-recruitment analysis is examining the relationship between adult salmon and smolts.

The smolt traps have proved suitable for use in several other parts of the United States. In April 1989 a field workshop sponsored by SUNY CESF, New York Sea Grant, and the Upstate Freshwater Institute provided biologists in the Northeast with the opportunity to view the design and operation of the auger traps. Nineteen scientists from the northeast examined the trap firsthand at the study sites. As a result of this information exchange, biologists from Oregon, Minnesota, and Vermont placed orders with SUNY Oswego for the construction of smolt traps.

The information gained from Ringler's study will likely be used by fishery managers in important decision-making processes relating to the number of salmonids being stocked in Lake Ontario.

Jonathan Kennen is a Ph.D. candidate at SUNY College of Environmental Science and Forestry in Syracuse who is working with Dr. Ringler.

Wever

Continued from Page 5


Reserve Bank of Chicago, Xerox, Kodak, and the New York Power Authority. The group is in the process of developing an environmental quality management award that would be given out on a yearly basis to businesses by the governors of the Great Lakes states. According to Wever, the U. S. Environmental Protection Agency (EPA) regional offices have also shown interest in this award since it could be adapted to any region of the country.

When asked about her inclusion on the National Sea Grant Review Panel, Wever says: "I am pleased to be able to continue my long and fruitful association with Sea Grant by accepting this invitation. Sea Grant has continued to provide critical outreach to Kodak and others on coastal resource issues for over a decade, through its many university and college affiliations. So I am pleased to be afforded an opportunity to participate in shaping the future directions of the program."

"New York Sea Grant is delighted that a person of such high caliber as Dr. Wever has been selected for this most important panel," says Anne McElroy, director of New York Sea Grant. "Her participation will surely help to strengthen and enhance the entire Sea Grant program."

The other members of the National Sea Grant Review Panel are:

- Fernando Agrait of Puerto Rico
- Ronald C. Baird of Massachusetts
- Maumus F. Claverie, Jr. of Louisiana
- William F. Cochrane of South Carolina
- Marne A. Dubs of Connecticut
- Peter M. Dunbar of Florida
- Otto Klima of Virginia
- Frank L. Kudrna of Illinois
- Arthur Eugene Maxwell of Texas
- Saul B. Sails of Rhode Island
- Carl H. Savit of Texas
- Eugene Francis Shiels of Texas
- Gregory Switlik of New Jersey
- John Toll of Maryland



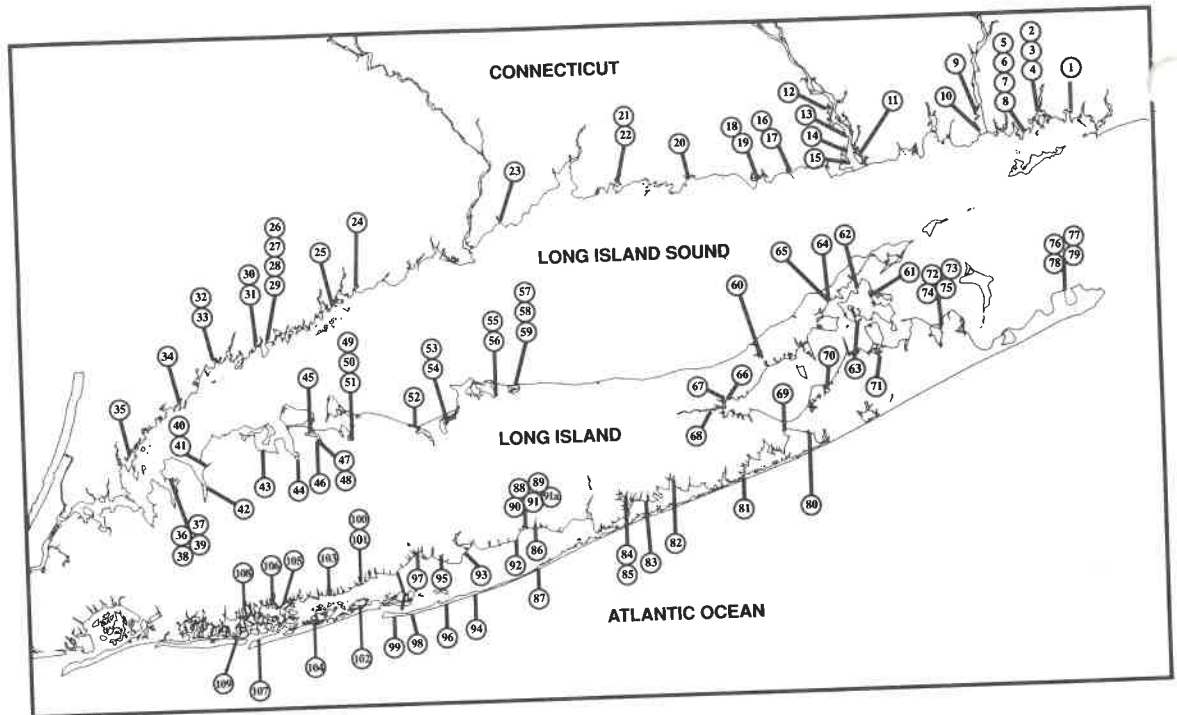
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This easy-to-follow map from the free 10-panel brochure *Boat Pumpout Facilities in New York and Connecticut Marine Waters* shows the sites of 109 facilities in the area. The brochure also contains an informative map key and text explaining how boaters can help protect marine resources. To obtain a copy, call New York Sea Grant Extension at (516) 632-8730.



Students Win Research Awards

Four student research projects were awarded \$100 each for their noteworthy research concerning the Great Lakes. The judging and awards were part of a two-day conference sponsored by the Great Lakes Research Consortium and held this past January in Syracuse. Funding for the awards was provided by New York Sea Grant. The students' projects were evaluated for scientific merit, relevance to Great Lakes research problems, organization, and presen-

tation. The winners and their project titles are:

Harold T. Lee and P. A. Keddy, University of Ottawa. "The Effects of Eutrophication on Wetlands Vegetation in the Great Lakes."

Rebecca L. Rockhill and T. P. Bonner, SUNY College at Brockport. "Fine Structure of the Zebra Mussel (*Dreissena polymorpha*) Byssus."

Sandra E. Bonanno and D. J. Leopold,

SUNY College of Environmental Science and Forestry at Syracuse. "A Great Lakes Barrier Dune System Under Recreation Pressure."

Betsy T. Kagey and A. D. Stark, New York State Department of Health. "Indicators of Human Reproductive Health Within the Great Lakes Basin Ecosystem."

Bruce L. Cady, SUNY College at Brockport. "Top-Down: Bottom-Up Effects on the Trophic State of Conesus Lake, NY."



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