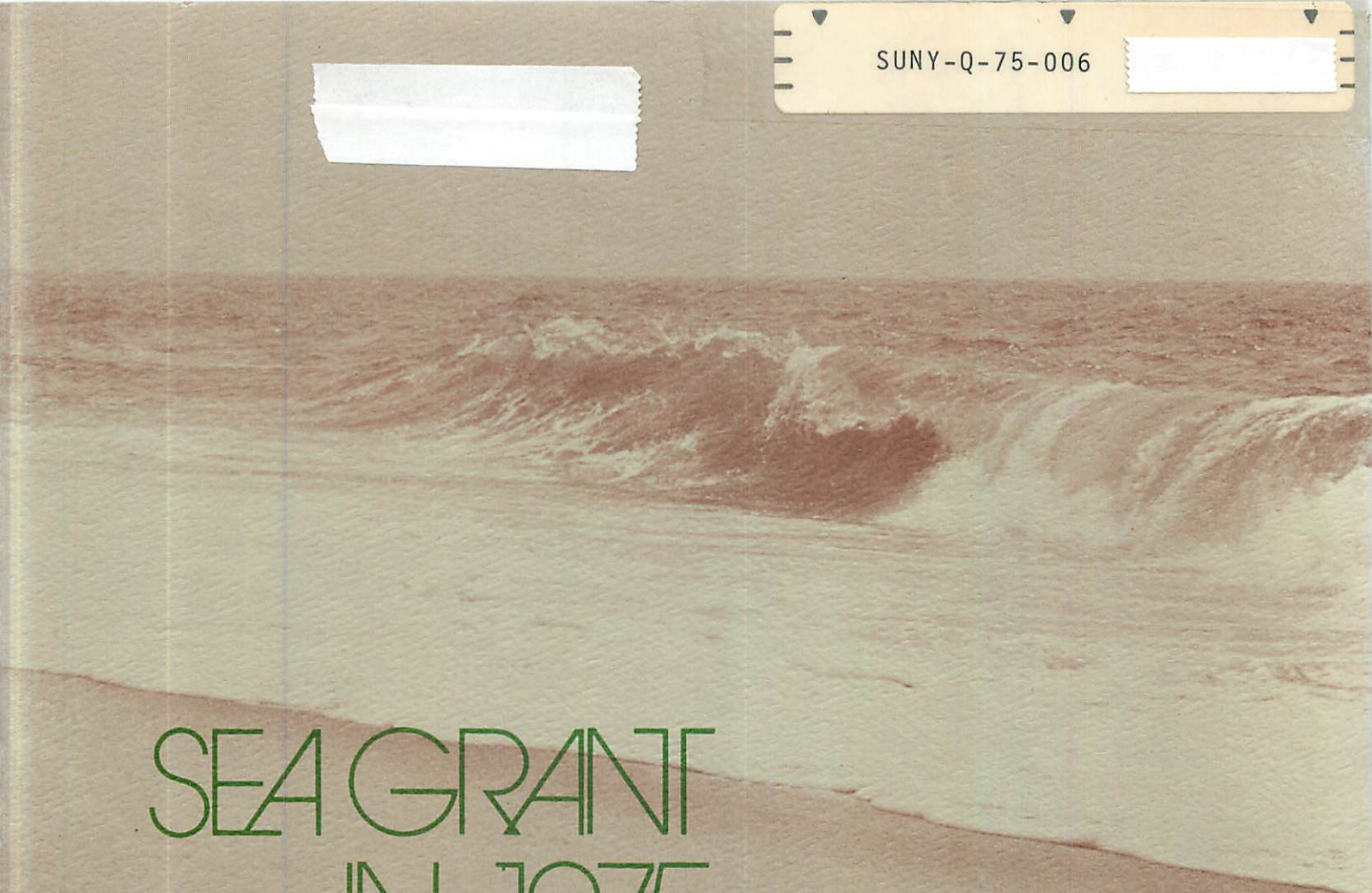


SEA GRANT IN 1975

ANNUAL REPORT
November '74-October '75
The Sea Grant College of SUNY and Cornell

CONTENTS

NEW YORK SEA GRANT INSTITUTE

State University of New York
99 Washington Avenue
Albany, New York 12246
518/474-5787

Cornell University
Fernow Hall
Ithaca, New York 14853
607/256-2162

ANNUAL REPORT CREDITS

Frances Richardson, Orville Terry *writers/editors*
Frances Richardson *designer*
Graphic Arts, SUNY Central Administration *production*
SUNY Central Administration Print Shop

Printed in USA
September 1976

No charge for this report.

1. FOCUS

Sea Grant is a project in the city of Dunkirk to build a floating breakwater for the harbor, using old tires. Sea Grant is new food products made from fish processing leftovers and underused fish species. Sea Grant is scientific data to help formulate policy on offshore sand and gravel mining. Sea Grant is public education on PCBs in Lake Ontario fish. Sea Grant is a new look at abandoned pieces of New York City's waterfront.

New York Sea Grant has meant undertakings like these for the past four years. Operated jointly by State University of New York and Cornell University, Sea Grant initiates research, education, and advisory service efforts on coastal issues along New York's marine and Great Lakes shores.

Advisory Service staff and researchers have developed close ties with New York's coastal industries, from marina operators on Lake Ontario and Lake Erie to clam fishermen and processors on Long Island. Sea Grant works closely, too, with local, state, and national government agencies. Where this means bringing together diverse groups and developing new lines of communication, our Advisory Service program, described by reviewers as among the finest in the country, has been the catalyst. Advisory Service people are Sea Grant's principal and enduring contact with the constituency we serve, bringing research information to those who can best use it—coastal zone planners, commercial and sport fishermen, community leaders, and people in coastal business and industry.

SEA GRANT COLLEGE AWARD

A highlight of 1975 was New York Sea Grant's designation as the eighth Sea Grant college in the nation. This is the most distinguished form of federal recognition of a Sea Grant program. US Secretary of Commerce Frederick Dent's presentation noted, "The State University of New York and Cornell University in three years of operating as coequal partners under the Sea Grant Program have mounted very strong programs of applied research, education and training, and advisory service in marine affairs, of which you can be very proud." This achievement testifies to the hard work of hundreds of New Yorkers—advisory committee members, university administrators and faculty from colleges all over the state, legislators, industry leaders, people from state and federal agencies, and Cooperative Extension staff.

This award recognizes that communities, agencies, and industry are finding that Sea Grant can aid in solving coastal problems. Among gains of local scope:

- Oswego County citizens prepared parking areas, visitor information, and guide and sporting goods services for the 1975 onslaught of salmon fishermen (over 22,000 angler trips, meaning nearly $450,000 in revenues). Sea Grant research predicted this increase, and Advisory Service staff helped Pulaski, the most heavily impacted town, to get ready.
- Long Island communities and industry are gaining income from fish chowder and clam broth now being made from previously discarded parts of the clam—once a source of pollution.

Two examples of benefits to the state from Sea Grant research:

- Cornell's food science group has developed and marketed several new convenience foods from commercially caught Great Lakes suckers; industry has reacted enthusiastically.
- Great Lakes communities are using techniques developed by researchers from several SUNY campuses to predict areas of high erosion risk, thus minimizing future losses.

Among projects with relevance beyond New York State:

- As part of New York's coastal zone management effort, SUNY researchers and Advisory Service staff helped set up a public participation workshop for Pennsylvania officials, at the request of the US Office of Coastal Zone Management and the National Sea Grant Program.
- The US Senate incorporated Sea Grant research recommendations in the Outer Continental Shelf Leasing Act, and the US Department of the Interior is using the information in making leasing decisions.

ADVISORY SERVICE REVIEW

Advisory Service received special attention in October 1975, when a panel from the National Marine Advisory Service reviewed its work in depth, by invitation of our Governing Board. The panel reacted positively, applauding among other things the achievements of the Advisory Service staff, New York Sea Grant's commitment to its advisory service program, and the mini-grant system, for funding quick-response research projects.

POTSDAM A/S OFFICE

Advisory Service opened a new office in Potsdam in January 1975. Working with communities along the St. Lawrence River, a region increasingly important as a center of recreation and tourism, this office completes the Advisory Service network along New York's coastlines.

ADVISORY COUNCIL REORGANIZED

Our Advisory Council was reorganized to stress citizen input: 10 advisory committees were established by Advisory Service specialists; one representative of each committee serves on the Council. These individuals, together with representatives of government agencies and two "citizens-at-large," not only voice local and regional needs, but also review Sea Grant research and advisory activities, through briefings with research group leaders and Advisory Service staff. The Council (see membership list opposite) reinforces links between Sea Grant and its many "working partners" in government, industry, and citizen groups.

GOVERNING BOARD

Sea Grant Institute policies are set by a Governing Board made up of ten university administrators (five named by SUNY and five by Cornell), one citizen leader, the Commissioner of Commerce, and the Commissioner of Environmental Conservation. In 1975, Dr. W. Keith Kennedy, dean of the NYS College of Agriculture and Life Sciences at Cornell, completed a two-year term as chairman of the Governing Board, and Dr. T. Alexander Pond, executive vice-president of SUNY at Stony Brook, was elected his successor.

NEW GROUP LEADERS

A new aspect to a more cohesive program: group leaders were formally established as an arm in research planning and direction. Five such leaders were appointed to integrate research within their groups and to evaluate group progress and effectiveness.

TRAINEESHIPS

This year, the Institute started a particular framework for graduate work: a traineeship program. Under our project, 33 full-time students were supported to do research related to Sea Grant concerns. In addition, six traineeships in engineering and marine technology and three for doctoral-level studies of marine industries got under way. During the summer, Sea Grant appointed ten coastal law fellows and six legislative interns.

ADVISORY SERVICE OFFICES

Cornell University
Fernow Hall
Ithaca, NY 14853
607/256-2162

SUNY College at Brockport
251 Hartwell Hall
Brockport, NY 14420
716/395-2638

SUNY College at Oswego
Rich Hall
Oswego, NY 13126
315/341-3042

SUNY College at Fredonia
374 Mason Hall Addition
Fredonia, NY 14063
716/673-3413

SUNY College at Potsdam
607 Benjamin Raymond Hall
Potsdam, NY 13676
315/268-3303

Youth Development Program
381 Park Av So, Rm 621
New York, NY 10016
212/685-5081

SUNY at Stony Brook
155 Old Biology Bldg 004
Stony Brook, NY 11794
516/246-7777

PUBLICATIONS/COMMUNICATIONS

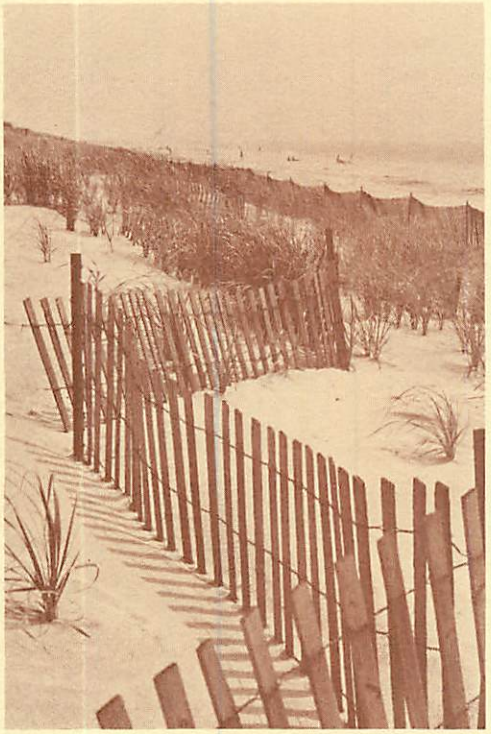
Our publications and communications work gets research results and other useful information to people whose living or working or studying is related to the sea or Great Lakes. We invite you to write for our free catalog of publications and audiovisuals.

In 1975 research information, we published 26 technical reports in house, got our first book off to a publisher, distributed reprints of 14 Sea Grant articles from scientific journals, and started three "condensed information" formats (bulletins, thesis abstracts, announcements of new publications) and an internal newsletter.

Information through Advisory Service for particular groups is often a multimedia affair. Among printed things, we started a series of flyers for the marine trades industry, published several pamphlets (subjects ranged from health insurance for fishermen to salmon fishing's impact on communities), continued the newsletter *Coastlines* (circulation 3,500), and started two joint regional newsletters, one on coastal zone management on Long Island, the other on the recreation business in the St. Lawrence area. Our third film, "The Switched-On Kitchen," on seafood handling and cooking, featuring Graham Kerr, is now available in 16mm film and videotape format, and a fourth, on improving planning for New York City's waterfront, is well along. A 30-minute videotape on organizing for action in marine trades has already been in great demand, and four new slide/tape sets were produced and put into circulation. Radio reports are broadcast weekly in three locations.

CONFERENCES

Information-sharing with the public takes other forms, as well. Sea Grant cohosted two major scientific conferences, one in May on Great Lakes research, the other in November on the New York Bight. We also sponsored a large meeting for upstate marine trades businessmen in March, and almost 100 specialized or local workshops or meetings to share scientific information or make it available to community needs.



ADVISORY COUNCIL

Kenneth Crayton, *Coastal Recreation Advisory Committee,* Rochester
Michael Donovan, *Salmonid Information Advisory Committee,* Sandy Creek
Eugenia Flatow, *Marine Youth Education Advisory Committee,* New York City
Paul F. Fox, *Coastal Processes Advisory Committee,* Rochester
Barry Klaassen, *Shellfish Advisory Committee,* West Sayville
W. Arthur Knorr, *Statewide Marina Committee,* Syracuse
Richard Mayer, *Lake Erie Regional Advisory Committee,* Fredonia
James McGuinness, *St. Lawrence Advisory Committee,* Ogdensburg
Richard Miller, *Commercial Fishing Advisory Committee,* East Quogue
Edward G. Parthe, *Coastal Engineering Advisory Committee,* Lindenhurst

Claire Stern, *Atlantic representative-at-large,* Port Washington
Marjorie Vesley, *Great Lakes representative-at-large,* Williamsville

Theodore Hullar, *NYS Department of Environmental Conservation*
Charles H. Jennings, *NYS Office of General Services*
M. Ismail Khan, *NYC Planning Commission*
Lee E. Koppelman, *Nassau-Suffolk Regional Planning Board*
Martin Lang, *NYC Environmental Protection Administration*
Leo J. Nowak, *Erie–Niagara Counties Regional Planning Board*
Raymond G. Paolino, *NYS Department of Commerce*
Dennis Rapp, *NYS Public Service Commission*
William Rogers, *NYS Geological Survey*
Ivan Vamos, *NYS Office of Parks and Recreation*
Henry G. Williams, *Division of State Planning, NYS Department of State*

PROGRAM EXPENDITURES*

Program Area	*NOAA Funds*	*Matching Funds*	*Total*
Marine Resources Development	$ 170,271	$ 132,010	$ 302,281
Socioeconomic and Legal Studies	89,229	71,069	160,298
Marine Technology Research and Development	39,864	52,128	91,992
Marine Environmental Research	149,867	123,363	273,230
Marine Education and Training	165,615	9,723	175,338
Advisory Service	270,000	148,223	418,223
Program Management	131,454	91,070	222,524
Special Projects			
NY Bight Symposium	36,900	–	36,900
NY Bight Atlas	6,100	–	6,100
EDBD	47,706	–	47,706
TOTALS	$1,107,006	$ 627,586	$1,734,592

* This summary is not a final fiscal report. Expenditure figures are only approximate. Program areas listed are federal activity categories.

PROJECT FLOWCHART

YEAR IV (1974-75)		YEAR V (1975-76)
MARINE FOODS AND TECHNOLOGY		
Using Filleting Wastes from Flounder Processing, *Baker* (1973)	1	Developing Convenience Foods from Underused Species, *Baker*
Fish/Shellfish Marketing, *Goodrich* (NI, 1974)		Fish/Shellfish Marketing, *Goodrich*
Use of Clam By-Products in Industry, *Shallenberger* (1972)	1,4	Marine Sources of Industrial Enzymes, *Shallenberger*
Reclaiming Protein & Flavor from Clam Washwater, *Hood/Zall* (1974)	1	Reclaiming Protein & Flavor from Clam Washwater, *Hood/Zall*
Diseases of Shellfish, *Leibovitz* (1973)	1	Diseases of Shellfish, *Leibovitz*
Shellfish Virology, *Gillespie* (1973)	1	Comparative Shellfish Virology, *Gillespie*
Pilot Projects in Aquaculture, *Terry* (1971)	C1,4,5	Lipids: How They Affect Quality of Fish Products, *Kinsella*
FOCUS ON COASTAL PLANNING		
NY Coastal Zone Management, *Marr* (1973)	1,2,4	Management of Coastal Waters, *Marr*
Intergovernmental Relations in CZM, *Heikoff* (1973)	1,4	Institutional Structure for Coastal Management, *Heikoff*
CZM Training for Local Govt Officials, *Eldridge* (1974)	C	Redeveloping the Urban Coastal Zone, *Moss*
Planning, Redeveloping Urban Coastal Resources, *Moss* (1974)	C2	Urban Neighborhoods & Recreational Uses of Coastal Zone, *Moss*
Developing a Coastal Aesthetics Program, *Harper* (1974)	1	Visual Quality of New York's Coastal Zone, *Harper*
Problems in Coastal Law (Legal Traineeships), *Reis* (1974)	4	Problems in Coastal Law, *Reis*
NY Bight Environmental Atlas, *Squires* (1974)	4	NY Bight Environmental Atlas, *Squires*
Lake Ontario Environmental Atlas, *Stewart* (1974)	1	Lake Ontario Environmental Atlas, *Stewart*
EDBD, *Judd* (1974)	1	EDBD, *Judd*
Leisure Home Patterns on the St. Lawrence, *Frederic* (NI, 1974)	C2	
COASTAL RESOURCES: USING THEM AND MANAGING THEM		
NY Fisheries: Past, Present, & Future, *McHugh* (1972)	C1,2,4	History of Hard Clam Industry & Resource, *McHugh*
Spawning Northern Pike in Wetlands, *Werner* (1973)	C1	
Freshwater Plant Communities, Lake Ontario, *Geis* (1973)	C1	
Stabilizing Sediments with Plants, *Churchill* (1974)	1	Stabilizing Sediments with Plants, *Churchill*
Great Lakes Shore Erosion/Deposition, *Calkin/Apmann* (1973)	1	Great Lakes Shore Erosion/Deposition, *Calkin/Apmann*
Energy Leasing Strategies, OCS, *Kalter* (1973)	C1,4	
Sand & Gravel Leasing Policy, *Kalter/Schubel* (NI, 1974)	1	Managing Offshore Sand & Gravel Mining, *Schubel* Dredged Spoil Disposal in LIS: Management Plan, *Schubel*
System to Use Heated Effluents, *Price* (1973)	C1,2	
THE RECREATION BUSINESS		
Coho Salmon Impact on NY Fishermen & Communities, *Brown* (1972)	1,3,5	Coho Salmon Impact on NY Fishermen & Communities, *Brown*
How to Evaluate Salmonid Fishermen Impacts, *Brown* (NI, 1974)	C5	
Energy Shortage Impacts on Boaters/Marinas, *Brown* (1974)	C1,5	"Learning by Doing" & Coastal Recreation, *Smith*
Traits of Users of Rented Recreational Boats, *Carls* (1974)	C	
Rented Recreational Boats: Supply & Demand, *Gratzer* (1974)	1	Supply of Rented Recreational Boats in NYS, *Gratzer*
Business Management Seminars for Marine Industries, *Parr* (1974)	C2	
Public Access Problems on Lake Erie, *Larson* (1974)	C2	

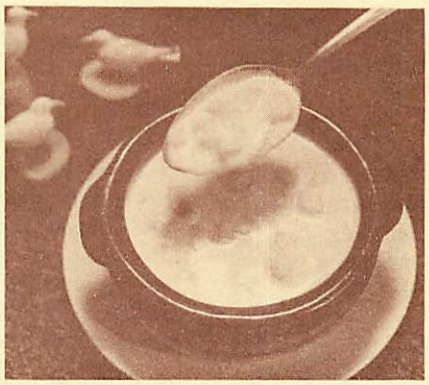
(1973)	*year project started*	*1*	*progress report*
NI	*new initiative*	*2*	*final report, unpublished*
C	*completed project*	*3*	*final report, published*
----	*continuing project*	*4*	*scientific article or book*
		5	*popular publication*

2. Marine Foods & Technology

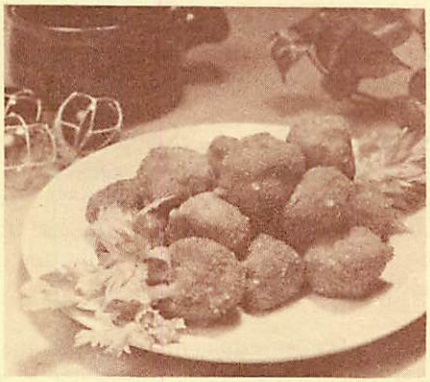
Seafood processing, culturing, and harvesting, important to the economy of many New York communities, also help insure a food supply for us all. Using Sea Grant funds, researchers developed more new products this year from otherwise wasted fish, and aided the shellfish industry by working on virus and bacterial disease problems. Fishermen got information from Advisory Service staff on more effective ways of harvesting the important food resources from the sea, and on staying economically competitive with other fleets, both foreign and domestic.

NEW CONVENIENCE FOODS

New York has great potential for developing new fish and shellfish products because its markets are sizable and ethnically diverse. Creating new markets can ultimately mean increased economic return to fishermen. Convenience food products, like fish crispies, can be an opening wedge into new markets for marine foods—markets that don't exist now because of consumer inexperience with, or reluctance to use, fish and fish products.



New England-style seafood chowder. The concentrate contains 24 percent deboned white sucker and 14 percent surf clam.



Fish crispies are made up largely of white sucker but also contain 17 percent surf clam. Soy fibers are added for texture.

Cornell's food science group, under the leadership of Robert Baker, is developing new convenience foods, anticipating greater interest in underutilized fish species ("trash fish") and more complete use of presently marketed species like flounder. The group's major goal: converting by-products, now inefficiently used and often considered pollutants or disposal problems, into marketable products.

One problem with the group's fish deboning process was darkening of the processed flesh. This was found to be caused by high cylinder pressure in the deboning machine, which forced tiny fragments of bone, skin, and scale into the flesh. Other than in appearance, the product was unharmed. Baker's team found that an attractive color could be maintained simply by dipping the fish in an antioxidant solution before deboning.

In previous work, the Baker project used flounder racks (the part left over after filleting), but they found that depending on only one species meant a variable and often insufficient supply. Meetings with commercial fishermen on Long Island and the Great Lakes were arranged by A/S specialists; one result was the "discovery" of a new raw material source, Lake Erie white suckers.

Members of the Rochester Culinary Club—chefs from the restaurant and hotel trades—sampled the newly developed Manhattan and New England-style seafood chowders, fish broth, and fried fish crispies—all made from white suckers. Reaction was enthusiastic. These products are soon to be produced and marketed commercially.

Work continues on developing other products such as fish hotdogs, fish bologna, fish sticks, sweet and sour fish, Swedish fish balls, fish balls in tomato sauce, fish cakes, sloppy joes, fish chili, and fish chips. Made from underutilized fish species, all these should be ready for market-testing sometime this year; they have already passed the taste-panel stage. In preliminary stages of development are fermented fish sauce, fish sausage, fish hash, and fish croquettes.

Consumer acceptance will be the ultimate measure of success of the new foods project. Dana Goodrich, marketing specialist, began in 1975 to determine market potential for these products. Through A/S-arranged meetings between Goodrich and seafood industry leaders, institutions like the Fulton Fish Market and the East Hampton Fish Producers Coop are getting new assistance with marketing questions.

This section is available separately as a flyer.

MAKING USE OF CLAM "WASTES"

New and better uses for "waste" by-products from fish and shellfish processing have been a major research concern. In conjunction with the Shelter Island Oyster Company, a major producer of minced clams from surf clams, Sea Grant has been looking for ways to reclaim usable protein from by-products. The company was also anxious to reduce water and sewage disposal costs; using 40,000 gallons of washwater per day for processing puts a heavy demand on the municipal waste treatment plant in Greenport. Lamartine Hood and Robert Zall of Cornell's food science group have postulated a system to recycle the washwater and limit water flow so that it would be used only when clams were actually present in the washing station.

Hood and Zall have also been studying ways to convert the clam washwater into a marketable food product by concentrating it to a "clam juice." Such reclaimed food is already bringing additional revenue to the nation's processing industry, reducing pollution, and providing an additional protein source.

A clam concentrate containing reclaimed protein and flavor components from clam washwater is now being used as a flavor enhancer for the food science group's convenience products. Their chowder, for example, has the reclaimed clam concentrate as one of its ingredients.

DIGESTIVE ENZYMES WITH MANY USES

In surf clam processing, the stomach and intestinal organs are currently waste materials. From the clam's crystalline style, a part of the digestive tract, Robert Shallenberger of the NYS Agricultural Experiment Station, Geneva, has isolated and partially purified *laminarinase,* an industrially promising enzyme that can break down cannery, brewery, and frozen food processing wastes. Transforming "useless" material from one kind of processing to useful material in a different processing field is a particularly attractive possibility.

Production of even small amounts of laminarinase has meant financial benefits to the shellfish indsutry itself—in sale of the styles and in pollution reduction.

Laminarinase could have other far-reaching applications. The National Institutes of Health is currently testing the enzyme as a possible anti-cancer agent. Another potential use: breaking down cell walls of yeasts, making yeast protein more available to animals and humans. Up to now, the presence of a cell wall has limited its digestibility; cell walls can be dissolved by other chemical means, but these are all expensive.

Shallenberger is also studying *chitinase,* a digestive enzyme of the squid, an underutilized species. In conjunction with laminarinase, chitinase may also be useful in breaking down food processing wastes as well as yeast and fungal cell walls.

National Fisherman

MARINE PATHOLOGY

In 1975 Louis Leibovitz of Cornell's College of Veterinary Medicine continued his investigation of shellfish disease problems, a major threat to the shellfish industry, especially in the indoor hatcheries where seed clams and oysters are grown. In 1976 he hopes to further define the important endemic diseases of Long Island shellfish. Two of the companies participating–Bluepoints, Inc., and Shellfish, Inc.–together represent the greatest single source of cultured hard clams in the United States.

Leibovitz's group sampled normal and diseased juvenile and adult shellfish populations to pinpoint disease. They also studied shellfish-fouling organisms and predators. When shellfish companies reported serious disease outbreaks, the team was able to drop other duties and investigate the problem immediately.

One hatchery, for example, was suffering clam larval mortality caused by bacteria in incoming water. On Leibovitz's suggestion, the hatchery owner made arrangements to draw in water from a cleaner part of the bay. The owner is also planning to follow Leibovitz's recommendation for a more rapid turnover of stored water, to avoid bacterial buildup.

In 1975 a group led by James Gillespie, NYS College of Veterinary Medicine, initiated a study of the transmission through shellfish of viruses that can be human disease agents. Conventional shellfish sanitation programs–testing shellfish to be sure they will not cause human disease–have concentrated on the bacteria that shellfish can take up from polluted waters. Similar testing for potentially disease-producing viruses has not been done on any significant scale because it has been so difficult to detect them. Gillespie is developing methods to find these viruses and thereby insure that they will not reach human consumers.

AQUACULTURE

New York Sea Grant has been doing exploratory work in aquaculture for several years. When first tried, most potential new crop organisms prove unsuitable, and they are set aside until some further development makes experimentation again promising. The process is almost continuous, aided by research findings from all over the country, including those of the industry itself.

Since 1971 Orville Terry of SUNY at Stony Brook's Marine Sciences Research Center has been culturing new crop species and providing open information on aquaculture. The crop receiving most attention has been the American lobster. In 1975 Milton Scott of Cornell designed a special diet for cultured lobsters, one step toward commercial lobster production. Because progress was slower than anticipated, the project has now been taken over by the Shelter Island Oyster Company, a partner in the lobster study since its inception.

Also in 1975 Terry initiated cultures of the lugworm, a possible replacement for the bait worms now imported from Maine for Long Island fishermen. Terry also grew several species of commercially valuable red algae in nutrient-rich East River water–a culture medium that would not only augment the natural supply but would also "clean" sewage effluent-polluted waters. Both small-scale projects were successful, but larger-scale testing is necessary to assess commercial potential.

WORKING WITH COMMERCIAL FISHERMEN

While researchers look into a better future for the seafood industry, those who harvest fish and shellfish have pressing and immediate needs. New York's 3,000 commercial fishermen live with limited marketing alternatives, outdated equipment, and few safeguards against personal and financial losses. The industry is an important one, in 1975 totaling 37 million pounds of fish valued at $28 million. Because future gains rest squarely on small improvements in day-to-day practices, Advisory Service spent much of 1975 working with commercial fishermen.

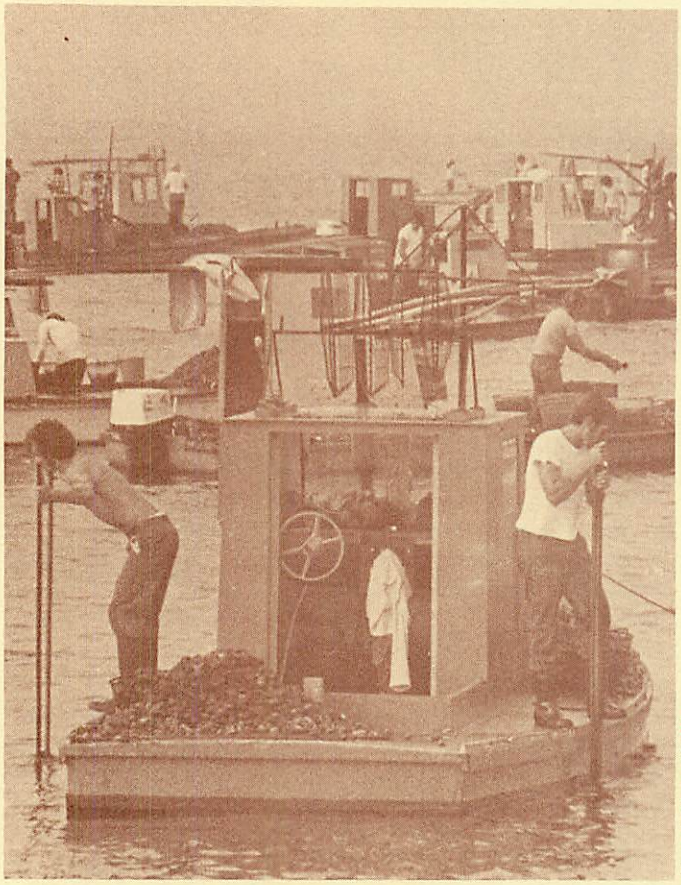
In a series of tax workshops, fishermen learned that they may qualify for fuel and sales tax exemptions. As a result, 100 are known to have used the sales tax exemption for the first time–some saving $2,000 each. A/S staff also distributed special tax guides to over 400 fishermen. A financial management workshop helped 50 fishermen learn better business techniques, and by the end of the year more than 50 others had adopted National Marine Fisheries Service (NMFS) record-keeping sheets as a decision-making tool.

One of the biggest problems for fishermen has been replacing boats and gear. Such equipment is expensive; without financial assistance, fishermen have been forced to "make do" with what they have–possibly a dangerous option. A prime goal for A/S during the year was to help fishermen discover new sources of loans. Many commercial fishermen have now set up savings plans under the NMFS Capital Construction Fund, which allows them to invest part of their incomes in new vessels. Strong fishermen-Farm Credit Service ties also evolved this year: loan requests were four times greater than last year. Approved Farm Credit loans also increased dramatically.

Interest in examining new equipment was high in 1975. Over 300 fishermen attended a meeting cosponsored by the Long Island Fishermen's Association and two firms that handle electronic gear and trawlers with experimental equipment designed at the University of Rhode Island.

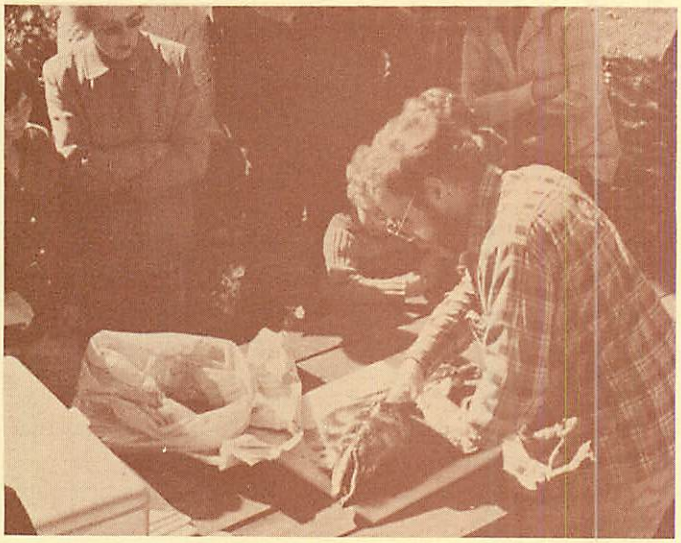
By forming cooperatives, American fishermen are finding that they can save money, open up new marketing options, and reap other benefits. On Long Island, A/S staff worked with members of two such coops and helped a third group get started. At a fishery cooperative workshop in November, A/S brought together fishermen and two organizations—the Farmers' Cooperative Service and the Springfield Bank for Cooperatives—to start increased services for the three Long Island coops. *Newsday*, a major Long Island newspaper, covered the workshop and reported the benefits to fishermen from working together and the help such agencies can lend.

Newsday now also publishes wholesale prices of selected finfish and shellfish from Fulton Market—a service that came about from A/S efforts to get a fish market report distributed through the mass media.



Frank Greenfield

Opening of a transplant area brings scores of clam diggers to the harvest in Great South Bay off Bay Shore.



Advisory Service specialist Sandy Schuman demonstrates salmon preparation.

EDUCATION ON SEAFOOD

Throughout 1975 consumers heard about PCBs—polychlorinated biphenyls, a group of industrial chemicals. PCBs are frequently found in Great Lakes salmonids and other fish. The Great Lakes A/S offices were deluged with phone calls from people worried about the possible effects of eating PCB-contaminated fish. Besides distributing information sheets and news releases on PCBs, A/S staff conducted workshops on PCB removal from fish—over 1,500 people attended. In interviews on local TV news, they also showed how to prepare potentially contaminated fish.

Seafood kept A/S staff busy in other ways. Approximately 800 consumers attended salmon cooking demonstrations, and 250 Cooperative Extension home economists learned seafood preparation so they, too, could conduct consumer workshops. Television's Galloping Gourmet Graham Kerr was enlisted; he stars in "The Switched-On Kitchen," the new film coproduced by A/S and Cornell's Division of Nutritional Sciences.

3. Focus on Coastal Planning

New York is a home rule state; local governments have a very strong voice here. The three diverse coastal regions of the state—Long Island, New York City, and "upstate" (the Great Lakes)—are shared and managed by a maze of local, regional, state, interstate, and international arrangements. A prime focus of research in the past years has been cutting through these jurisdictional gordian knots, helping New York's citizens, government agencies, state legislature, and industry develop clear understandings of and fresh approaches to managing the valuable assets of the New York coastal zone.

PROGRESS IN CZM

New York's first year of formal coastal zone planning under a grant from the federal Office of Coastal Zone Management drew upon state, regional, and local work. Seventeen agencies contributed to the beginnings of a statewide management program.

Paul Marr of SUNY at Albany's Geography Department spent 1975 keeping track of developments in CZM planning and briefing people in the NY Department of State on federal guidelines for allocating land and water resources in the coastal zone. These guidelines are based on techniques actually used in California, Delaware, and Maine, as well as general approaches to land-use allocation. Marr also served as a link with the state legislature, providing lawmakers with information on CZM concerns.

At the request of the federal CZM Office, Marr headed a task force that reviewed Pennsylvania's CZM public participation, leading to a significant reorganization. The task force formulated possible ways of encouraging public participation, and presented these at a workshop in November for Pennsylvania's state and regional planners.

WHAT IS PUBLIC PARTICIPATION?

"Will New York's CZM program allow people to have a say in the ultimate plan?" "What is the state really up to?" These are questions heard over and over along the New York coasts. Public participation *is* the people's say—public input as the CZM plan evolves, and public review as working drafts are written.

To help generate public participation, Advisory Service specialists have been arranging many conferences among planners, citizens, and various agencies. One, a January workshop, grew out of a meeting of the Sodus Bay Waterways Association and the Genesee/Finger Lakes Regional Planning Board. Sea Grant meetings with the NYC Parks Council led to initiation of a film for TV and other large audiences on waterfront management in the city. On Long Island, a Citizens Participation Committee is making constructive recommendations on floodplain management and erosion protection for private property.

A/S is also issuing publications about CZM. A CZM newsletter is being published jointly with Suffolk County Cooperative Extension, and a booklet, *Coastal Zone Management: Fact or Fiction?*, is a handy guide explaining CZM and clearing up some misconceptions about the federal CZM Act of 1972. For example, CZM is not an opening for extended federal control or an attempt by state government to dominate local authorities. The program urges strong local control, with coordination and guidelines offered at the state level. CZM *is* an opportunity to integrate a broad range of local and regional interests into a statewide planning process.

FRESH APPROACHES TO COASTAL LEGISLATION

Sea Grant's competence as a source of factual information is being sought more and more by legislators trying to reach decisions on controversial matters. Sea Grant offers impartial information through memos, publications, and testimony at hearings, and also sponsors legislative internships, under which graduate students research topics identified as critical by the NYS Assembly Scientific Staff. This year, for example, a student in fisheries management developed legislative alternatives to a proposed ban on commercial fishing for striped bass in New York.

For people wanting to know what the state legislature has been doing, Sea Grant publishes a yearly summary of marine/environment bills introduced during the previous legislative session.

This section is available separately as a flyer.

HELPING UNTANGLE COASTAL LAW

Most coastal planning activities sooner or later meet with some question of law interpretation, law enforcement, or the need for new legislation. To provide legal support, Robert Reis of the School of Law and Jurisprudence, SUNY at Buffalo, is heading a trainee program with emphasis on coastal and environmental law.

In 1975, the first year of the project, the Sea Grant Law Center was created. Ten law fellows were selected and trained; these students are available to aid researchers, A/S staff, and citizens looking for background legal information.

To disseminate the first results of this group's work, Reis compiled a coastal zone legal bibliography. Articles on nine legal problems pertinent to Sea Grant research projects are soon to appear in the first *Sea Grant Law Journal,* to be distributed nationally.

THE POLITICS OF EROSION

Joseph Heikoff of SUNY at Albany's Graduate School of Public Affairs selected one particular CZM problem and traced through the complicated sequence of legal and political moves in the case. His research resulted in a book-length study of intergovernmental conflicts behind a proposed extension of the now-celebrated groinfield at Westhampton Beach—a barrier beach off Long Island's south shore. This case study, *The Politics of Shore Erosion: Westhampton Beach,* is likely to become one of Sea Grant's most important publications.

The issue—still unresolved—is whether or not to build six additional groins to control beach erosion. There is considerable uncertainly among scientists and engineers as to the exact causes of this erosion and much disagreement on what to do about it: let nature take its course, attempt environmental control through technology, or adopt policies somewhere between these extremes.

Heikoff shows how management plans and proposals have been modified at every level of decision, federal, state, and county. Each has veto power. In this complicated setup, his case study pinpoints the worst snags, where new lines of approach to decision-making might do the most good.

REBIRTH OF NEW YORK CITY'S WATERFRONT

Urban port facilities, now largely obsolete for their intended function, present planners with an exciting opportunity for redevelopment in new directions. Mitchell Moss has conducted a study of this primary role change as it is beginning on New York's West Side. He finds that though shipping in the entire Port of New York has grown in recent years, the trend has been toward containerized and bulk transport into major new terminals on the New Jersey shore. The old West Side pier area has been almost entirely left behind. Passenger travel overseas is by air; even cruise ships prefer to sail from warmer, and less expensive, southern ports. Factories are now mostly outside Manhattan and see no need to send their shipments through its crowded and deteriorating streets.

A. Kleiman, Department of City Planning, NYC

Sixtieth Street railroad yards alongside the Hudson River

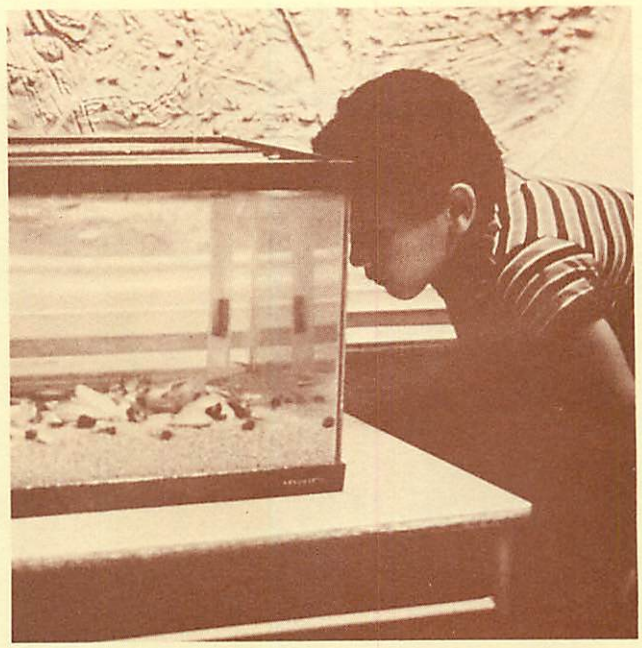
An example in Manhattan of major waterfront redevelopment is Battery Park City, proposed for construction on 100 acres of landfill over former pier sites. Other residential/service industry developments on the West Side are in various stages of planning or initiation.

Moss recommends a more comprehensive approach. New uses directly related to the waterfront—not simply occupying the space—would take advantage of the unique potentials of the waterfront for environmental integration into the social and economic structure of urban life. The port area needs to be made fully accessible to all the people who live and work in cities. It is one of the few urban spots where access to a natural physical phenomenon, the harbor, is possible. In addition, what historical buildings remain are an important cultural heritage and can be transformed to new uses. Better and more comprehensive planning—Moss is now a member of the Mayor's Waterfront Task Force—can start to realize these potentials.

NEW COASTAL UNDERSTANDINGS FOR URBAN STUDENTS

A goal of Sea Grant's New York City A/S is sparking the interest of young people in the rich array of delights and curiosities available for them in the marine environment and the New York City waterfront. One project is marine career education, especially for youth from high-density areas where the waterfront is now inaccessible, rundown, or commercial. Another is the City-as-School program, in which high school students spend the summer teaching elementary school children about the nearby waters and shores. Two marine awareness workshops for about 1,000 young people involved 13 New York City agencies, including the YWCA, YMCA, PAL, Salvation Army, Girls Club, and daycare centers.

To further the marine education idea, a Marine Education Association was formed this year as a communication channel for teachers and youth leaders. The association sponsors a resource center, a newsletter, and in-service training courses.



New York City school children learn about the marine environment.

BICENTENNIAL PROJECT

Oswego is another city whose existence is intimately linked with this country's waterways. It was at one time the largest grain milling center in the Northeast. Since Oswego is no longer a very active port, few people are aware of its historic ties to the waterfront. Recognizing this, A/S teamed up with two local historians to launch a Bicentennial project entitled "Port of Oswego: A Mirror of Our Heritage and Future." They gathered old photographs of the busy harbor in 1890, and taped interviews with older residents, who reminisced about the harbor's more hectic days. The end-products were two slide/tape programs to be used as educational tools, but one immediate dividend was that groups long disagreeing over the future of the harbor came together for the first time to talk over their concerns—another instance of coastal residents taking a fresh approach, with Sea Grant assistance.

HARBOR OF REFUGE PLANS

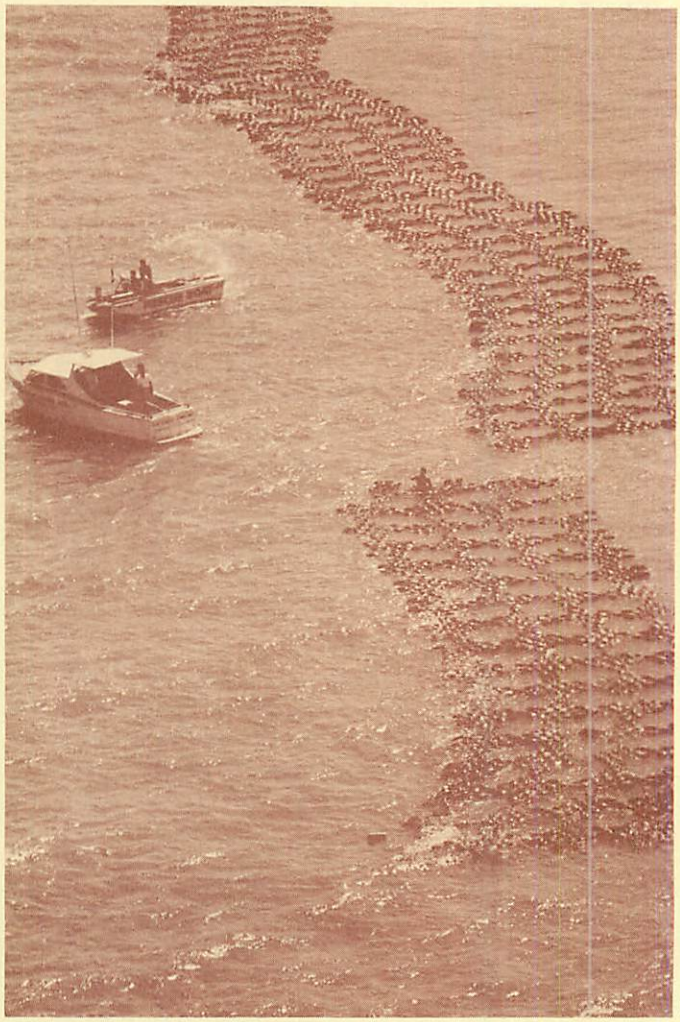
A little to the east of Oswego, at Port Ontario, a major effort is under way to build a harbor of refuge for fishermen and boaters during storms. Aware of the anticipated numbers of sportsmen interested in the developing salmonid fishery, the St. Lawrence-Eastern Ontario Commission is coordinating the planning. Sea Grant is providing help in the form of engineering and law students, who are studying problems of littoral drift and researching legal questions involved in the project.

SCRAP TIRES PROTECT THE SHORE

A town on Lake Erie is trying another innovative approach to coastal problems. Concern over storm damage in Dunkirk Harbor led to the installation in August 1975 of a floating breakwater made from old tires. The first such structure on the Great Lakes, it has already proved effective during heavy storms.

Goodyear News Bureau

Tire mats are chained together by divers to form a floating breakwater, Dunkirk, New York.



Goodyear News Bureau

The lacy effect of the breakwater is evident in a photo from a Goodyear blimp showing a section about to be added to the structure.

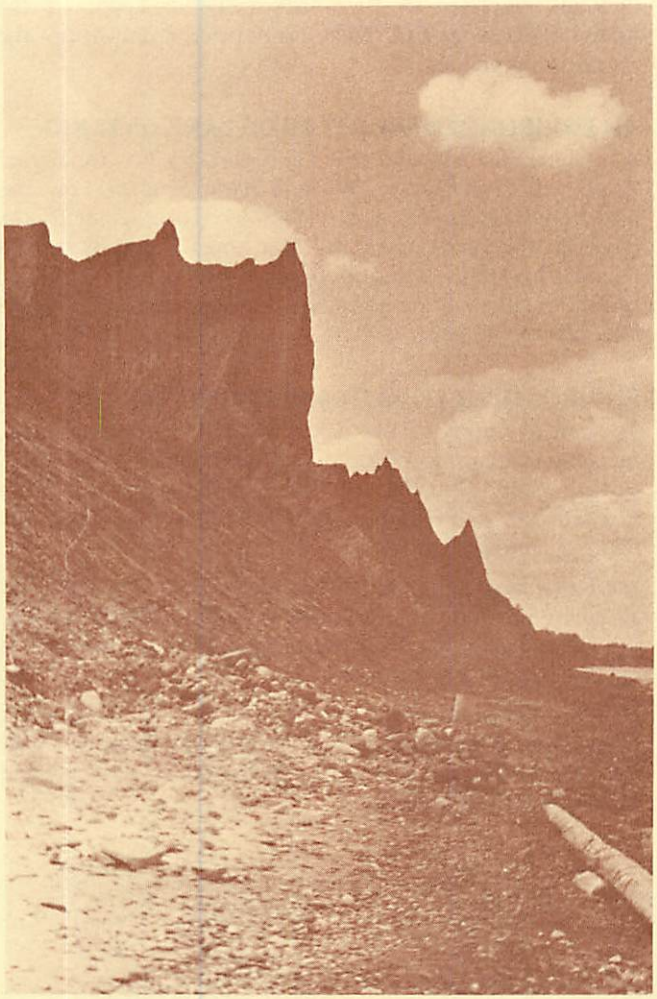
The idea of using scrap tires came to Dunkirk residents via Sea Grant research in Rhode Island and the Goodyear Tire and Rubber Company. The tires were donated to the city by local tire companies, and chains were donated by another local firm. Diving clubs, the yacht club, a marina, and local Naval Reserves volunteered their time. With such community help, the structure cost only $5,000 to build and install—and will probably save marina operators and boat owners many times this amount in property damage over the next few years.

Other New York coastal towns have heard of Dunkirk's success story, and are interested in doing the same thing. Building this breakwater is a good example of how Sea Grant can open up a channel for technical knowledge from private industry to the public.

HOW DOES IT LOOK DOWN ON THE COAST?

Depending on where you're standing, the New York coast can look aesthetically pleasing, physically revolting, or somewhere in between. Only since passage of the National Environmental Policy Act of 1969 has aesthetics been considered, along with ecological, cultural, economic, and other values, in land-use decisions. Poorly planned coastal development points out a need for action, but defining the vulnerable visual quality of our coastal zone is highly elusive.

David Harper of the SUNY College of Environmental Science and Forestry, Syracuse, is heading a group whose goal is making visual quality an understandable concept and defining roles coastal planners, residents, and others can play in promoting and protecting the coasts' visual quality. To discuss his ideas, he organized a Visual Quality Workshop that attracted over 100 participants—researchers, public agents, and coastal residents.



Dramatic vista, Chimney Bluffs State Park, on Lake Ontario

Harper's group has been conducting aerial and land reconnaissance of the New York shoreline. For selected sites, they have compiled shoreform descriptions, attitude surveys, and questionnaires on people's preferences. Next year, Harper expects to provide decision-makers with hard data, and to promote public understanding of visual quality issues.

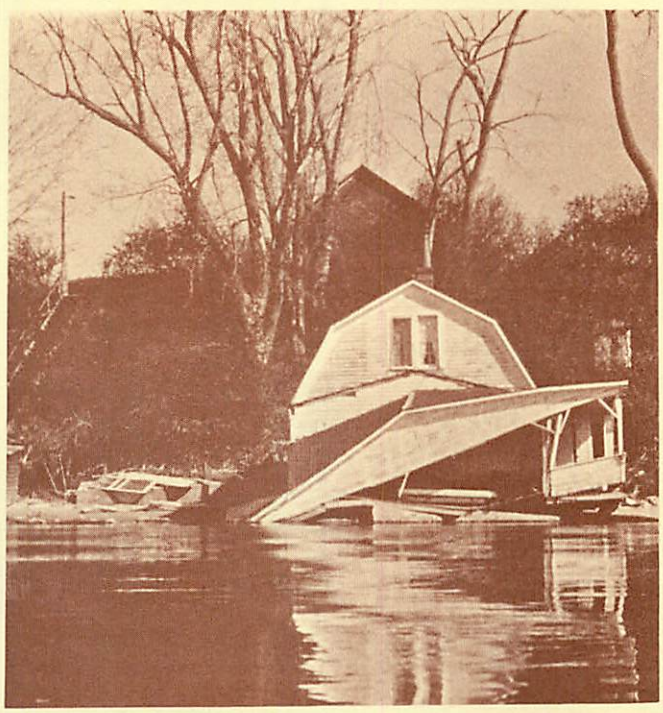
With a long-range goal of publishing a series of handbooks for coastal planners and managers, Harper is coordinating his research with planning and regulatory agencies and other Sea Grant projects in their work on recreation, engineering, and land-use policy.

"SECOND HOMES": ECONOMIC BOON OR EYESORE?

The shores of the St. Lawrence River have long been one of New York's vacation havens, a prime spot for summer cottages. These "second homes," while a major source of revenue, have also created problems of visual blight, scant shoreline access, and even poor safety and health. This dilemma prompted the planning board of Lisbon Township to enlist Sea Grant aid.

Paul Frederic of SUNY College at Potsdam's Geography Department surveyed summer home development in Lisbon Township and found that second homes had increased by 13 percent between 1970 and 1975. Unfortunately, zoning, fire, and health regulations were not often enforced: cottages are now clustered densely on the shores, many badly deteriorating or built of flimsy, flammable materials, many with wells and outhouses side by side, many perched precariously on steep, unstable bluffs or gradually sliding into the water.

Shore communities with recreation-based economies (including leisure home development, sportfishing, and marinas) should give special attention to environmental quality, Frederic says, because it is this resource that attracts vacationers and their money. In Lisbon, the real problem isn't the cottages themselves, but the lack of effective planning for them. His data should help Lisbon planners–and those in neighboring townships–plan intelligently for their future expansion.



Cottage that has suffered water and ice damage, Lisbon Township

NEW YORK BIGHT ATLAS AND MONOGRAPHS

In 1975 Sea Grant published the first five monographs of a series now expanded to 32 titles, to summarize what is known—and not known—about New York Bight. This 15,000-square-mile coastal ocean south of Long Island is one of the world's most heavily used: as a dumping site of sewage sludge, dredge spoils, and industrial wastes; as the corridor of commerce for America's busiest port; as a natural resource for minerals, fish, and shellfish with an annual value of over $80 million; and for recreation for 20 million people. The Bight may soon be exploited for oil and gas. Construction of offshore nuclear power plants, airports, and supertanker terminals has been proposed.

Somehow, amid the tangle of jurisdictions and regulations that overlap (and often contradict), a better planning perspective is urgently needed. The monographs and a comprehensive atlas are a first step in this direction, written for both scientists and nonscientists, for those who are making decisions and those who want to know the environmental implications of human activities.

The five 1975 monographs were on the subjects of beach forms and coastal processes, artificial fishing reefs, sand and gravel, demographic patterns, and electricity generation and oil refining. Work on the other manuscripts is progressing under an editorial board coordinated by the Marine EcoSystems Analysis (MESA) New York Bight Project, headquartered at Stony Brook. The widely praised series will be completed in 1976, and work has begun on the atlas, integrating and illustrating information from the monographs and elsewhere.

AN ENVIRONMENTAL ATLAS OF LAKE ONTARIO

A comparable project, the Lake Ontario Environmental Atlas, will incorporate all data now available on the nearshore waters of Lake Ontario, to document the physical, biological, chemical, and human impacts on the region. This atlas is being coordinated by Ronald Stewart of SUNY at Albany's Atmospheric Sciences Research Center. Publication will begin in 1976.

ENVIRONMENTAL DATA BASE DIRECTORY

To identify much of the data for the Lake Ontario atlas, researchers are using a data locator developed by the NOAA Environmental Data Service. Called the Environmental Data Base Directory (EDBD), it shows who has data, where the data are, and in what form.

Sea Grant started its part of this project in 1973, describing all environmental data files in New York State pertaining to the Great Lakes and New York Bight. The files are open to anyone inquiring about data.

NY Sea Grant is presently indexing environmental data from Ohio, Pennsylvania, New Jersey, and Delaware, with the help of graduate students at Ohio State University and the University of Delaware.

4. Coastal Resources: Using them & Managing

New York's coastal regions are subject to intense competition for space as well as resources. Located in the center of the most heavily urbanized section of the country, these shores have to accommodate waterskiers as well as fishing boats, swimming beaches as well as sand mining. Our Great Lakes coast, though not yet as heavily developed, has also begun to feel population pressures. Competing demands from so many different interest groups make appropriate allocation of coastal resources an acute problem and the need for management programs quite obvious. Some degree of conflict among different groups striving to meet the management need is inevitable; Sea Grant's main role is to mediate on scientific grounds, bringing information to bear on public decisions.

CONFLICTS OVER SALTWATER FISHERIES

Fish are the most evident and traditional marine resource. For the past several years J.L. McHugh of the Marine Sciences Research Center, SUNY at Stony Brook, has been directing a succession of projects examining various aspects of New York's marine fisheries. He finds that New York's is the classic story of ineffective management, with insufficient research, lack of attention to long-range considerations, and failure even to apply existing scientific information.

People generally put a high value on their own access to the public fishing resources. Good management of these resources could reduce their individual freedom of access. This leads to an emotional reaction like the perennial campaign by recreational striped bass fishermen either to restrict commercial fishing or to declare striped bass a game fish—in the interests of conservation. Actually, there is no evidence that commercial fishing has damaged the resource, McHugh finds. Along the Atlantic coast, sportfishermen take seven times the weight of striped bass that commercial fishermen take. Recreational fishing has become a major industry in its own right and now constitutes its own chief competition for species like striped bass.

The crux of the problem is not so much commercial fishing pressure or foreign fishing fleets, or even pollution, but rather unwillingness to face the need for management or our finite fish resources, so haphazardly exploited up to now.

Things may be starting to change, though. McHugh and other experts are being consulted more frequently by state and local officials and industry. One example is an issue paper McHugh prepared in April 1975, which was instrumental in resolving a legislative impasse.

SHELLFISH MANAGEMENT

New York is one of the leading shellfish-producing states, and NY Sea Grant is participating in a USDA-funded Northeastern Regional Clam Study. This study looks at alternative management strategies for the Atlantic coastal clam industry. It seeks to analyze the industry's current structure, assessing harvesting, handling, and processing methods, and present and future supply and demand. Advisory Service's contribution has included cataloging local New York regulations influencing the industry.

A March Shellfish Symposium cosponsored by Sea Grant and EnCon provided fishermen and agency staff with a forum for discussing a wide array of management problems. Printed symposium proceedings are available.

ERIE–NIAGARA FISHERIES STUDY

In 1975 Sea Grant partially supported the most comprehensive study made to date of both the sport and commercial fisheries of Lake Erie and the Niagara River. Wayne Hadley, director of the Erie-Niagara Fisheries Research Center, SUNY at Buffalo, initiated a series of projects focusing on spawning sites, migration patterns, population structures, and angler harvest of important fish species. His purpose is to help New York and Ontario fishery management programs, which cannot be effective without up-to-date information of this kind.

This section is available separately as a flyer.

WETLANDS *V.* WATERFRONTS

The continued productivity of most fisheries depends on wetlands–which had been fast disappearing until recent state laws put on the brakes. Only 12,000 acres of native marsh and swamp vegetation are left along the eastern shore of Lake Ontario in Jefferson County, for instance, the locale of two Sea Grant wetlands studies. Biological productivity and waterfront access are both essential to the recreation-based economy of the region; this has created a land-use dilemma.

Not enough is yet known about the biological importance of wetlands to help guide people in such dilemmas. One step in that direction: James Geis of the NYS College of Environmental Science and Forestry, Syracuse, directed the first comprehensive study of the ecology of Jefferson County wetlands. He selected two representative marshes, where he inventoried vegetation, estimated species and community productivity, and measured environmental relationships. Among other things, he determined that changes in water level (for example, the 1973-74 high water, which killed off emergent plants) were the main variable influencing community composition. This suggests that water level management should be taken into account in wetland management.

Robert Werner, also of the College of Environmental Science and Forestry, worked at determining what characteristics most influence the value of a lakeshore wetland as a spawning area for important fish like the northern pike and muskellunge. During the past two years Werner examined seven test marshes in Jefferson County (including those studied by Geis) to assess northern pike spawning and to correlate this information with environmental data he and Geis had gathered previously.

There were significant differences in the numbers of spawning adults using each marsh; not all marshes were equally attractive (or accessible) as spawning sites. High chloride levels in a marsh seemed to discourage pike from entering. The amount of dissolved oxygen, on the other hand, correlated positively with number of pike fry. Vegetative cover in the shallow marsh water attracted the pike.

With data from projects like Werner's and Geis's, localities may be able to protect those wetlands that turn out to be especially valuable to fish and wildlife, and relegate some less critical wetlands to human activities. Just as important, it may be possible to design productive artificial wetlands to replace some that have been lost.

MANAGING SAND AND GRAVEL MINING

With depletion of onshore sand supplies in urban regions, marine sands are an important resource. Only in New York Harbor is mining going on, and activities there are currently restricted to an area in and around Ambrose Channel. Behind these restrictions are the twin goals of preserving water quality for productive finfish and shellfish areas, and of maintaining a buffer zone to minimize shoreline erosion on Staten Island. Better scientific information could lead to some relaxation or modification of these restrictions, with direct benefit to the mining industry.

In response to a call from the NYS Office of General Services, a project was initiated in 1975 to help New York develop a management plan for sand and gravel mining in its coastal waters. J.R. Schubel of the Marine Sciences Research Center is conducting preliminary studies, which include a detailed geophysical survey of New York Harbor. Results will be used to predict environmental impacts on various parts of the harbor of different sand and gravel mining techniques and rates and patterns of removal.

Oceanographers from SUNY at Stony Brook's Marine Sciences Research Center, aboard the research vessel *Onrust*, bring up a grab sampler filled with sand and gravel.

MARINE DREDGING: A/S EFFORTS

Translating technology so that decision-makers can understand it is one of Sea Grant's major functions. New York's congressmen and state legislators surveyed some of the problems of sludge, offshore oil, and dredging through meetings with A/S–including a boat tour of New York Harbor, which dramatized a dredging problem there when the boat ran aground.

To prepare a report to the Office of General Services on sand and gravel royalties policy options (for mining state land underwater), A/S met with the Corps of Engineers, industry people, and Sea Grant researchers to obtain

dredging cost data. Initial feedback from OGS on Sea Grant's work was favorable.

A/S efforts on behalf of the Long Island State Parks Commission to claim the sand behind a groin at Orient paid off: an agreement was reached whereby the commission will be able to obtain the sand and use it for beach replenishment at Long Beach State Park.

MANAGING COASTAL PROCESSES

Erosion usually means the loss of a resource. This is a serious worry for people living along Lake Ontario and Lake Erie, especially after recent high-water levels there. Proposals for all kinds of shoreline stabilization projects have appeared. But new structures may not work unless we understand the natural erosion/deposition balance in the coastal system.

A comprehensive geology/engineering project to study the 600-mile stretch of New York's Great Lakes shoreline has been going on since 1974 under the direction of Parker Calkin and the late Robert Apmann of SUNY at Buffalo. Several other faculty members and students from SUNY campuses near the lakes are contributing to the project, working on four basic areas: streams, bluffs, beaches, and the lakes themselves.

Among the many subprojects are these:

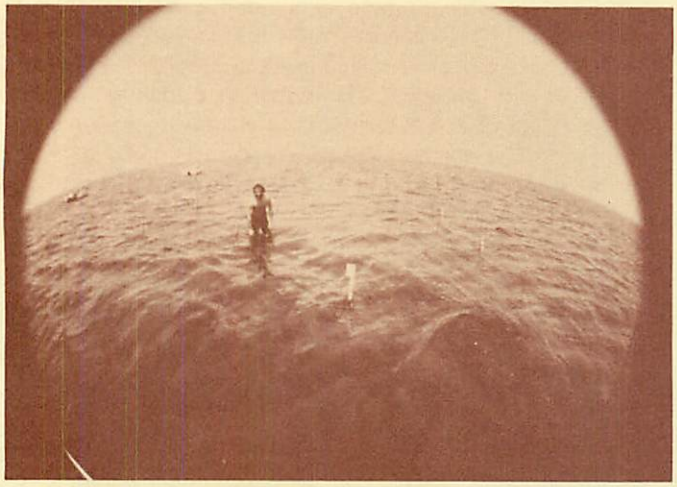
- Estimates of wave erosion potential along the Lake Erie coast, based on historical bluff erosion records. The predicted erosion, based on the geology of the bluffs, and actual measured erosion corresponded closely. This suggests that areas of high erosion risk can be predicted using geological parameters or historical patterns.
- A computer program that simulates erosion and deposition in stream channels, rivers, and reservoirs. This program will be used to study the effect of proposed harbor modifications in Cattaraugus Creek.
- A budget for stream sediment carried into Lake Erie. Four representative streams were studied to find where sediments were coming from. Compared to lake bluffs, these streams make an important contribution to downdrift beaches, so, say, if shore structures were ever built, they could trap sediments and starve the beaches.
- A quick-response study of the effects of the Sodus Bay jetties on erosion. It turns out that though jetties have accelerated erosion in some areas, the erosion does not have a single, simple cause.

A/S has been able to help in a number of Long Island erosion cases. The Village of Sea Cliff, for example, asked for Sea Grant advice on a bulkheading problem, as did the Nassau County Museum. The museum's difficulty was the complete loss of a terraced bluff face through erosion. A/S arranged for researcher Robert Apmann to look at these two sites and make recommendations. Under a minigrant, a graduate student will spend the summer of 1976 doing a detailed shoreline inventory of the surrounding Hempstead Harbor area. All features of the shoreline, including its past history and structures, will be recorded—a data base for future erosion control recommendations.

Robert Adams, SUNY College at Brockport, measures height of bouldery till on south shore of Lake Ontario, as part of the Great Lakes geology/engineering project.

UNDERWATER PLANTINGS TO SLOW EROSION

Transplanting submerged vegetation could be an inexpensive way to decrease erosion along channels and other areas of tidal currents, and to stabilize dredge spoil. In cooperation with the Town of Islip's Spoil Reclamation and Wetlands Project, A. Coolidge Churchill of Adelphi University's Institute of Marine Science experimented with various methods of planting eelgrass. Churchill selected two planting areas in the waters adjacent to Sand Island in Great South Bay, an island created by dumping dredge spoil from Snake Hill Channel. One area was relatively calm; the second was a dynamic and unstable environment characterized by loose, shifting sand. He tested single untreated shoots and shoot clusters (miniplugs). Miniplugs did better in the first area, though single shoots grew well, too. Results in the more turbulent environment suggest poor prospects for long-term survival of eelgrass plantings.



Wide-angle lens shows eelgrass transplants (dark areas in foreground).

PUTTING POWER PLANT WASTE HEAT TO GOOD USE

Waste heat constitutes a resource, especially in coastal areas. Cooling water of steam power plants discharges a lot of heat energy to the environment—about 6 billion BTUs per hour from a single modern power plant. Practical ways to use some of this heat could help ease energy shortages, saving fuel and reducing thermal stress on the cooling water source.

Don Price of the Agricultural Engineering Department, NYS College of Agriculture and Life Sciences, Cornell, designed and analyzed a system to use the heat in power plant effluent. Price used computer simulation to derive a hypothetical system that could use all the condenser flow of a large power plant.

Price's model emphasizes the use of cooling ponds. These appear to have certain financial and environmental advantages over more traditional cooling methods. His system envisages commercial catfish production in the ponds. Under some circumstances, water from power plants can also heat (or cool) greenhouses economically, Price shows. The low heat might be just right, too, for food processing.

ECONOMICS OF LEASING THE OUTER CONTINENTAL SHELF

The most economically overpowering coastal resource may be oil. The potential economic impact of oil and gas production on the Outer Continental Shelf (OCS)—if and when oil and gas are found there—is a matter of serious concern. Up to now, no comprehensive evaluation of alternative strategies and leasing schedules has existed. Moreover, the economic incentive/environmental impact argument has been confined to only one area at a time.

Responding to these deficiencies, Robert Kalter of the Department of Agricultural Economics, Cornell, has done a detailed analysis of our OCS energy potential, investigating expected economic impacts of exploiting this resource. He compared alternative OCS leasing systems and modeled a generalized leasing policy evaluation. His analysis shows that the present cash bonus leasing system, as already used in the Gulf of Mexico and the Pacific, is significantly less advantageous both for the government and for private investors than five of nine other leasing systems he considered.

The US Senate incorporated Kalter's research recommendations in the Outer Continental Shelf Leasing Act, and the US Department of the Interior is using the information in making leasing decisions.

Resource management is essential to coastal zone management; the acute coastal problems that generate the need for a coastal zone plan are usually resource questions. Answers to those questions usually generate more questions, investigative questions: How many? How much? How processed? What demand? What cost? How to minimize—or maximize? What techniques? What consequences? Working decisions are being made every day on partial answers; management can't wait for the full story. Sea Grant is tackling some of the questions, trying to put numbers and information where now there are critical blanks.

5. The Recreation Business

One of the most important uses of coastal resources, economically as well as socially, is recreation. Both social and economic aspects have begun to draw the attention of planners and researchers in recent years as recreation businesses and the numbers of people involved have mushroomed. None too soon: the demand for nonrecreational use of resources is intensifying.

Boating and sportfishing support major industries, mainly in the private sector. These businesses depend directly on, first, a good coastal environment and, second, abundant fish—basic coastal issues. Beyond the fundamental economic need for a healthy environment, the peculiar business problems of the recreation industries are just beginning to get serious consideration.

Where there are a lot of people (urban areas) and ways to get to the coast (access), recreational pressure is greatest. Because of its location, Long Island, the playground for metropolitan New York since the turn of the century, is under more stress than ever. Formerly rural expanses now house suburban residents who compete with "city people" for limited coastal recreation space. Here the recreation business is most developed, and problems are apparent.

Upstate, new highways branching out from the NYS Thruway to eastern Lake Ontario have meant rapid development of that area. The salmonid-stocking program conducted by EnCon since 1974 is developing into a promising major sportfishery. Aware of the problems caused in Michigan by that state's "coho stampede," Advisory Service has been working to help local communities adapt to the new situation. The St. Lawrence has been a tourist region for generations, known locally, nationally, and internationally; recreation interest there has lately been intensifying. Western Lake Ontario and Lake Erie coasts are not yet under heavy recreational pressure, but they have great potential for future recreational growth.

Sea Grant's objectives are to help townspeople minimize the inevitable stress and conflicts arising from change, to supply planners with information for best use of the resources involved, both socially and economically, and to aid the developing marine recreation businesses.

TOURISM ON THE ST. LAWRENCE

Sea Grant has been working with St. Lawrence area residents to plan collectively and systematically for regional tourism development. As a result of A/S help, the St. Lawrence Chamber of Commerce applied for a federal grant to promote tourism. A/S and Cooperative Extension together created a newsletter, *A Step Ahead,* for managers of motels, marinas, and gift shops—covering such topics as record-keeping, advertising, and signs. The first issue came out in January 1976.

ACCESS TO LAKE ERIE

One reason why Lake Erie is not used for recreation as much as it could be is the problem of public access to the lake. Access involves land ownership, site suitability for recreation, and people's views—if they think it's hard to reach a piece of the coast, they'll go somewhere else.

For another thing, local people tend to use Chautauqua Lake instead, believing that water conditions there are better than in Lake Erie. Erie water quality is improving, however, and as the public recognizes this, access to Erie's coast will become important.

David Larson of SUNY College at Fredonia's Department of Sociology used the Lake Erie coast as a test area, investigating the problems of coastal access. He gathered data on ownership, described the kinds of available recreational facilities, and by a questionnaire measured the public's interest in getting access to the lake. Half his respondents said they would like to have more chances to enjoy the lake, especially for picnicking and swimming. Lake Erie townspeople may use his information to increase recreational use of the lake's coast and thereby give the regional economy a boost.

This section is available separately as a flyer.

Beach behind a large "Keep Out" sign, west of Silver Creek, New York, on Lake Erie

OTHER ACCESS QUESTIONS

On Lake Ontario, access to fishing areas is in high demand. The greatest deterrent from the landowner's standpoint to selling (or leasing) public fishing rights is litter. To deal with this, A/S produced a group of radio dialogs between *Tom and Harry, The Courteous Fishermen,* promoting an anti-litter campaign. Great Lakes A/S offices and local Co-operative Extension also got together to address attitude and behavior problems relating to access; they produced newspaper articles, a slide/tape series, and radio and TV spots.

PRELIMINARIES ON AQUABUSINESS SEMINARS

Also on Lake Ontario, marina operators have recognized that they needed to develop and upgrade their management skills. Could Sea Grant help? Because there are no aquabusiness programs in the Northeast, a training program was the solution suggested by A/S and John Parr of SUNY College at Oswego's Business Administration Program. To identify specific problems, Parr surveyed 49 marina operators along the Ontario-St. Lawrence coast, and found that most of them would respond to the opportunity to build their management skills. His results supplemented data gathered by researcher Tommy Brown and A/S. Seminars are now being created on such topics as financial records, management techniques (like hiring and training employees and planning), marketing, and government relations. A/S and Parr will be starting the workshops in 1976.

MARINE TRADES GROUPS ORGANIZE

At a Sea Grant-sponsored meeting in April for marina operators, the idea of creating a state association was born. The operators agreed that a state organization could be a link with the legislature, provide leadership for New York's marine industries, and help dealers with business problems. The Empire State Marine Trades Association was formally created early in 1976, but the April 1975 meeting was the first for representatives from regional trades groups from all around the state.

WHO USES RENTED RECREATIONAL BOATS?

On Long Island, rented recreational boats still represent a substantial portion of the total recreation industry, despite fewer users in recent years.

Just who are the boat-renting fishermen and what are their needs and preferences? E. Glenn Carls of the University of Waterloo, Ontario, in close cooperation with researchers Miklos Gratzer and A/S, has been finding out, in an inventory of industry operations. Long Island planners and officials can use this information to stimulate private investment, arrange for expansion of facilities, or otherwise improve the fishermen's lot. The rental industry itself will benefit, by adjusting its operations to reported wants and needs of its consumers.

CHARTER BOATS: SUPPLY AND DEMAND

Overall in New York State, the recreation boating industry is growing fast. On Long Island, dockage berths are at a premium; expansion to meet future demand will be difficult. On Lake Ontario this industry is virtually non-existent, but because of the salmon-stocking program, it is expected to grow in the years ahead.

In the first systematic investigation of the New York charter boat industry, Miklos Gratzer, SUNY College of Environmental Science and Forestry, Syracuse, interviewed 89 charter boat captains from all around the state. Their most important problem, he found, is high operating costs. Many Long Island operators said foreign fleet overfishing was serious. On the St. Lawrence, overfishing by private boats and curtailed bass-stocking programs were cited as problems.

Gratzer updated an inventory of rental boats, identifying new charter operators along Lake Ontario. Results of his research will enable A/S to help plan for the charter boat industry that is expected to play an important role in the salmon fishery.

GREAT LAKES CHARTERS: PLAN AHEAD

New York's evolving salmon fishery is likely to spark several new kinds of recreation businesses on the Great Lakes. One such, charter boat operation, has generated much interest among locals. A/S sponsored a series of workshops to help people explore the nature of that industry. They found out that, generally, it's not highly profitable—most operators are in business because they're avid fishermen themselves. About one-half earn 25 percent or less of their total income from chartering. For those considering going into business anyway, A/S recommends weighing: 1) the possibility that the EnCon hatchery may not be in operation until the 1980s, 2) the controversy over PCBs, 3) the energy crunch, and 4) requirements for loans, insurance, and licensing. Optimism tempered with reasonable caution seems to be the appropriate attitude.

SALMON FISHERY—GROWING PAINS

Another bit of cautious optimism is found in Tommy Brown's study of the salmonid fishery, being conducted in cooperation with EnCon. Brown, of Cornell's Department of Natural Resources, says the potential for a fishery comparable to Lake Michigan's is real—but depends on solving biological, environmental, fiscal, and political problems. Increased salmonid survival and reduced PCB levels in the lake water are both essential to long-term success. Other problems starting to surface include limited public access to streams, a shortage of boat launching ramps, and a limited supply of rental boats.

Brown measured economic impact in two principal ways: a creel census that also included fishermen expenditures, and a survey of local service businesses related to fishing. He reports that New York anglers are reacting favorably to the salmonid fishing opportunity. As the fishery peaks, up to 12,000 anglers a day are anticipated; already the resulting economic upswing in the eastern Lake Ontario region has been substantial, led by a large increase in overnight stays and gear sales. In Oswego County almost $380,000 was new income—it wouldn't have existed without the fishery. The average daily expenditure of $19.61 per fisherman is one of the highest reported in the country, and 1975 saw the first new jobs created in the area. Labor Day weekend, traditionally the end of the tourist season, now marks the beginning of the salmon spawning run. Brown's research results are proving valuable to EnCon, the state legislature, and also to local agencies and firms as a guide for decision-making.

Sea Grant helped promote expansion of the fishery as well as cushion its community impact wherever possible. Among other initiatives, A/S provided:

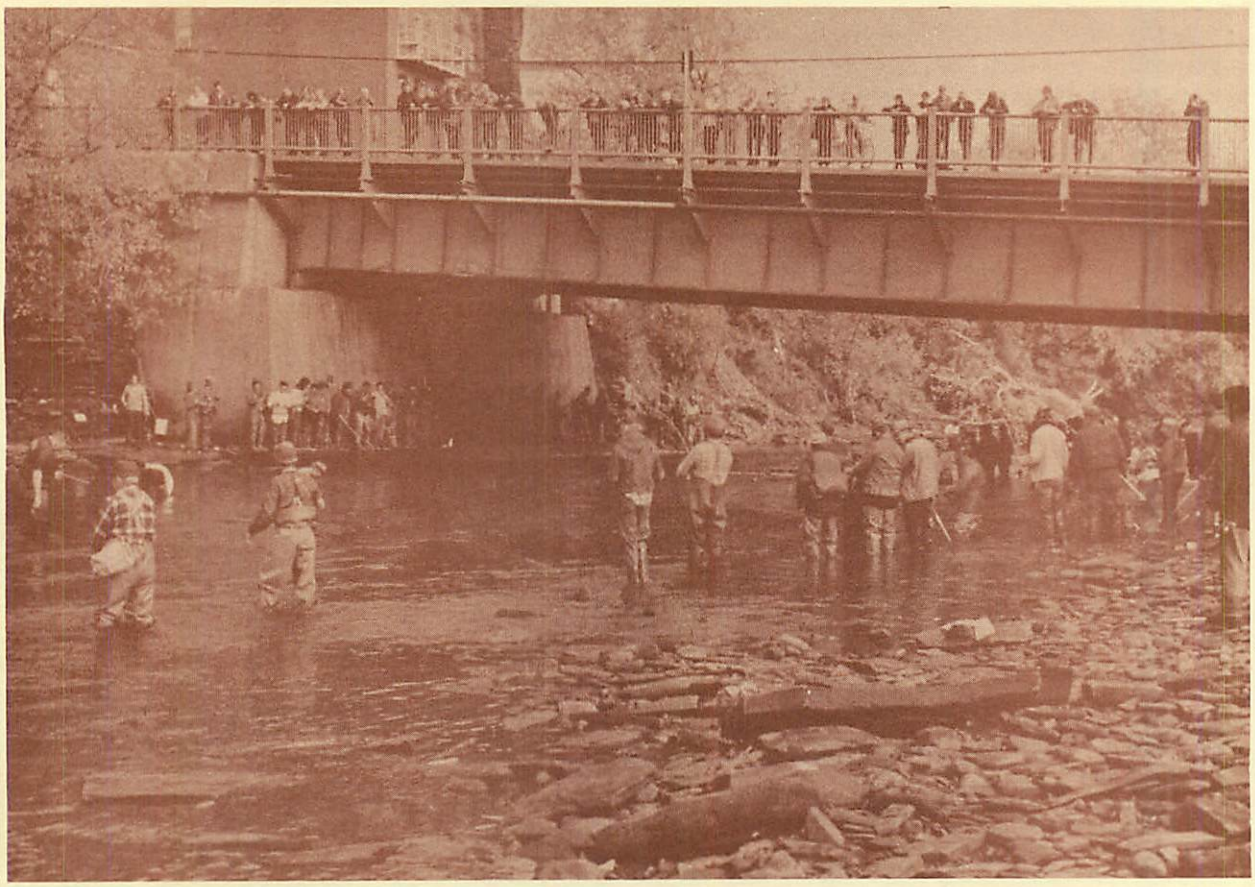
- Salmon tackle seminars in five coastal cities to illustrate lake fishing techniques and equipment.
- *What's-It?*, a popular brochure, a simple guide to identifying Great Lakes salmon and trout.
- A salmon dinner for the Oswego County Legislature, drawing their attention to the fishery. (Subsequently, they passed a resolution supporting construction at Port Ontario of a harbor of refuge—important for fishermen.)
- Joint revision and reprint of *Getting the Most out of Your Great Lakes Salmon*, a Wisconsin booklet in great demand.
- Radio spots highlighting opportunities and problems along the Great Lakes, including those of the salmon fishery.

Salmonid anglers on Lake Ontario fishing with special gear called downriggers

(Above and below) Two views of Pulaski, New York, during salmon season

- A slide/tape set, *The Pulaski Experience,* for sportsmen's groups, chambers of commerce, and local government groups, which chronicles the heavy impact of the fishery there.
- In cooperation with Tommy Brown, a *Guide for Estimating Recreational Fishing Pressure,* to help Great Lakes officials plan effectively for the salmonid fishery. It explains various ways of estimating numbers of fishermen coming through the area, so people can plan, if necessary, for more parking lots, greater access, more trash cans or toilets, or even more law enforcement personnel.

The concept of recreation as an industry is fairly new. Sea Grant's work in the recreation industry means planning: helping marine businesses plan management and operations, cushioning the impact of arriving throngs of tourists and fishermen, and studying questions of access to the coast. As water-related recreation becomes increasingly popular, information about it also becomes increasingly necessary—to agencies that must anticipate it, businesses that serve it, and people who engage in it.



Other New York Sea Grant Publications

New York Sea Grant Directory. Address and telephone listing of Sea Grant staff and researchers. Available in October of each year. No charge.

New York Sea Grant Program. Listing and description of all Sea Grant-sponsored projects for the coming grant year. Available in October of each year. No charge.

Catalog of Sea Grant Information. Listing and description of Sea Grant research publications and Advisory Service media resources. Revised periodically. No charge.

These publications and other information on Sea Grant are available from the following offices:

New York Sea Grant Institute
State University of New York
99 Washington Avenue
Albany, NY 12246

New York Sea Grant Advisory Service
SUNY College at Brockport
251 Hartwell Hall
Brockport, NY 14420

New York Sea Grant Advisory Service
Cooperative Extension Regional Office
412 E. Main Street
Fredonia, NY 14063

New York Sea Grant Advisory Service
Youth Development Program
381 Park Av So, Rm 621
New York, NY 10016

New York Sea Grant Advisory Service
Fernow Hall
Cornell University
Ithaca, NY 14853

New York Sea Grant Advisory Service
SUNY College at Oswego
Rich Hall
Oswego, NY 13126

New York Sea Grant Advisory Service
SUNY College at Potsdam
607 Benjamin Raymond Hall
Potsdam, NY 13676

New York Sea Grant Advisory Service
SUNY at Stony Brook
155 Old Biology Bldg 004
Stony Brook, NY 11794