

## Old Tires May Offer New Answers

It's no accident that there are now 8,000 scrap tires floating in the Dunkirk Harbor on Lake Erie.

A lot of Dunkirk residents worked three long months this past summer to put them there. Why? To protect the harbor—and probably save local marina operators and boat owners thousands of dollars in property damage over the next few years.

The city of Dunkirk has long had shore protection problems because of northeast storms on Lake Erie. A large, full-depth permanent breakwater and a natural point provide adequate protection for the harbor in all other directions, but during a northeast storm, waves and swells roll in virtually unchecked usually causing severe damage to the marinas and yacht clubs located at the south end of the harbor. Though the Army Corps of Engineers has been working with the city to build permanent breakwater facilities to protect the inner harbor, completion of the project is at least three years off. And so, throughout the past year, city officials have been looking for an inexpensive and effective means of providing temporary protection to the harbor during the interim period.

The idea of using scrap tires came to Dunkirk residents via Sea Grant from the Goodyear Tire and Rubber Company of Akron, Ohio. Scrap tires accumulate in this country at a rate of 220 million per year. In an effort to alleviate this environmental pollutant, Richard Candle, Section Head of Engineering Research at Goodyear, has been experimenting with possible ways to "recycle" the tires. One of his ideas was to use them to build a thin mat that could be floated offshore to attenuate wave action. He believed that such a "floating breakwater" might serve as an excellent low-cost protective device for both marine and freshwater coastlines, and also put the old tires to good use.

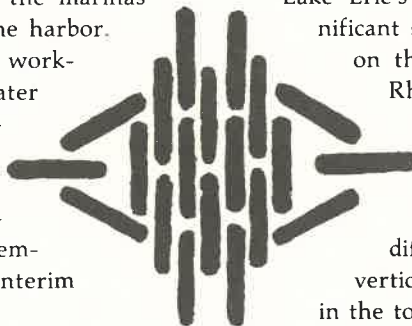
With the assistance of Dr. Tadeusz Kowalski, University of Rhode Island Professor of Ocean Engineering, and the

Rhode Island Sea Grant staff, Candle pilot-tested several prototype scrap tire floating breakwaters near the Narragansette Bay campus. These indeed did prove to be very effective. Word of this success passed from Rhode Island Sea Grant to New York Sea Grant, and eventually filtered down through New York Regional Marine Specialist, Rob Patten to local officials in the Dunkirk area. By early April of this year, the breakwater concept had come full cycle. Patten and local officials met with Candle, and all agreed that a floating breakwater might be an ideal solution for the Dunkirk Harbor. Within two months, construction of the breakwater was well under way.

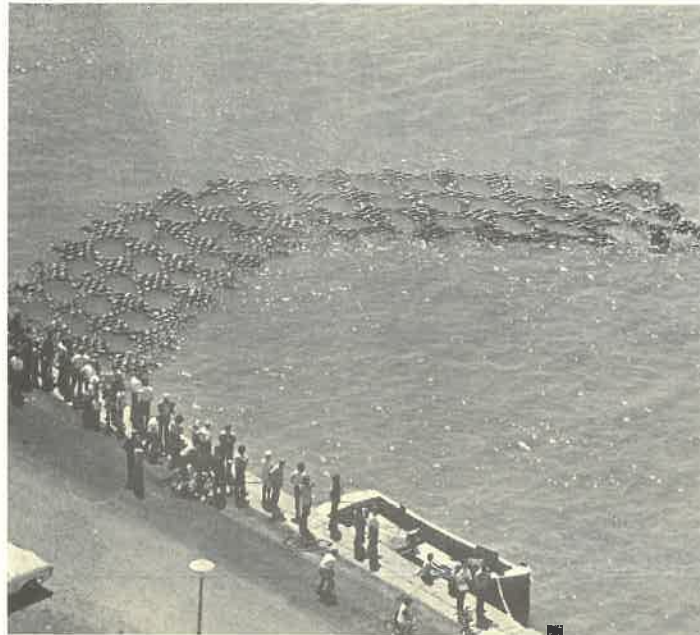
Lake Erie's floating breakwater is the fifth one of significant size in existence, and is the first and only one on the Great Lakes. (The other large ones are in Rhode Island, and several small ones are being tried on small inland lakes.) The earlier prototypes were horizontal mats, three tires deep, that used polyethylene foam to keep them afloat, but Dunkirk's mat is of a different design. It is made of tires arranged vertically and stays afloat because of the air trapped in the top of the tires. Actually the mat is composed of diamond-shaped modules of tires—18 tires to a unit. Each unit measures approximately seven by seven feet, with the total size of the completed breakwater projected at 900 by 28 feet. The individual tires are fastened together with quarter-inch stainless steel wire that is twisted and crimped at the ends, while the modules are connected by a half-inch chain. The entire mat is anchored at the leading edge with 500 pound weights spaced approximately fifty feet apart. Total cost for the Dunkirk structure is estimated at \$5,000.

Though the Lake Erie breakwater has only been in place for a few months, its integrity has already been tested. Several heavy storms hit the area late in the summer and, to everyone's delight, most of the harbor remained relatively untouched.

*(Continued on Page 5)*







During an official dedication ceremony, the last segment of the Dunkirk floating breakwater is towed out into the harbor.



Regional Marine Specialist, Rob Patten (shown above) was one of the many Dunkirk residents who helped to build the scrap tire breakwater.

## Some Additional Insights on Breakwaters

The recent successes of scrap tire floating breakwaters in New York and Rhode Island would seem to indicate that at last someone has finally found a neat answer for both pollution and shoreline problems. But as with any new undertaking, there are still risks involved, and it may be awhile yet before this concept is adequately tested. For those who may be wondering if a floating breakwater is the solution to their shoreline problems, Regional Marine Specialist Rob Patten offers a few additional insights.

-Floating breakwaters seem to be most appropriate for protecting man-made objects, such as boats and marinas rather than preventing erosion of shoreline property. The Dunkirk breakwater was effective because it was supplemented by an existing permanent protective structure.

-These scrap tire devices are durable, but they still can't be kept in the water throughout the winter. And since the winter and spring are the time when the most severe storms occur, the floating breakwater is not likely to be a good source of ongoing protection for property. The Dunkirk Harbor was ideally suited for the breakwater because it does remain ice free, year round, due to warm effluents from a local power plant.

-No one is really sure yet, just how long the tire modules will stay afloat. None of the existing breakwaters have been in the water long enough to determine a reasonable expected lifespan.

-The Lake Erie breakwater cost only about \$5,000, but that was largely due to the large numbers of supplies, such as concrete and chain, that were donated by local people. Although scrap tire breakwaters, in general will be relatively inexpensive, they may well cost more than \$5,000

if labor and supplies must be purchased.

-Before you build a breakwater, you must get the appropriate permits from the U.S. Army Corps of Engineers and the New York State Department of Environmental Conservation. At present neither of these agencies has taken a definitive stand on floating breakwaters and both will probably continue to sit back and wait until additional information about these structures becomes available before issuing any policies.

-On the positive side, the main component of these breakwaters, scrap tires, is widely available, and free for the asking. One of the biggest pluses for the floating breakwater is that it is indeed very economical.

-Also important, just about anyone can build a breakwater. No special skills seem to be required, just a lot of energy and the ability to follow the ready-made diagrams.

-Floating breakwaters are apparently quite compatible with existing creatures in the water. After a period of time algae will begin to grow on them and fish will swim nearby, just as though nothing were different.

-Finally, breakwaters might be reusable. Because a breakwater is a temporary structure, it is possible that after it has done its work in one area, it could be towed to another nearby location.

Exciting as it may be, the scrap tire floating breakwater is not likely to be a universal antidote for shoreline protection problems. Interested persons are advised to sit back and keep an eye on the experimental breakwaters in Rhode Island and New York for the next few years to see just how useful they really are.

## PCB'S IN LAKE ONTARIO FISH — An Update

By Mike Duttweiler  
Regional Marine Specialist

"Warning issued on PCB's" "Salmon contaminants reported!" "Lake Ontario brown trout added to state list, not to eat!" "PCB in Lake Ontario salmon not to jeopardize industry." "Poisoned fish, troubled waters" "Michigan, Wisconsin warn fish eaters" "Monkeys suffer—what about man?"

The above is a sampling of headlines from recent newspaper and magazine articles dealing with PCB's (polychlorinated biphenyls), a chemical contaminant found in the flesh of fish from certain waters, including the Great Lakes. Conflicting reports from state agencies and the media have resulted in numerous requests to N. Y. Sea Grant Advisory Service offices along the Great Lakes for information on the advisability of eating such fish. No simple answers are available.

The industrial pollutant PCB was first identified in the aquatic environment in 1966. Since that time PCB's have been found in Lake Ontario fish at levels up to two to three times higher than the regulations set by the U. S. Food and Drug Administration for commercial sale of fish. However, no definite ruling has been made on the safety of eating PCB contaminated fish. Research conducted by the University of Wisconsin Sea Grant Program is testing the effects of PCB contaminated diets on monkeys and hopefully will provide a much clearer picture of the possible effects of small doses of PCB's on man.

In the meantime, Wisconsin, Michigan, and New York have issued warnings that persons either limit consumption to one contaminated fish meal per week or to cease consumption completely. Fish sampling is continuing to establish accurate data on the presence of PCB's in Lake Ontario fish.

Research has shown that PCB's have an affinity for body fats and that PCB's in fish fat are 20-30 times more concentrated than in other fish flesh (Haile, et al., 1975). This has direct implications for persons who choose to continue eating contaminated fish. Some fish, par-

ticularly salmon and trout, have localized fat deposits which may be removed during preparation. A substantial portion of PCB's in a given salmon or trout may be removed by draining juices while cooking and by discarding fatty flesh in the belly flaps, along the back, and under the skin. The Great Lakes Advisory Service Staff has been passing along the New York Health Department recommendation of one meal of contaminated fish per week and has urged proper preparation of fish through shoreline newspapers, radio and T.V. As more definite information becomes available these recommendations will be refined.

For more information about PCB's in Lake Ontario fish and proper preparation of contaminated fish contact Mike Duttweiler at the Oswego office listed on the back.

## New Publications!

The New York Sea Grant Advisory Service announces a new series of publications, The Marine Trades Flyers. This series is for persons involved in all phases of the marine trades industry, and will be an on-going source of information on a variety of topics relating to this industry. The flyers are in an 8½" x 11" format with three holes punched for easy storage in a loose-leaf binder. The first six flyers, which were adapted from presentations at this year's Upstate New York Marine Trades Conference, are listed in this issue's "I Want More" section.

Also available this month is the 1973-1974 Annual Report of the New York Sea Grant Institute. A special form for evaluating this Annual Report is included with it. We hope you will take a few minutes to fill it out, as your comments will be very helpful in designing the next report.

## I WANT MORE

Further details to help solve several coastal problems are available. Each month we try to list several publications of possible interest to you; please check off those you would like and return to the Sea Grant Advisory Office nearest to you. Addresses are listed on the back page. All are publications of the New York Sea Grant Institute.

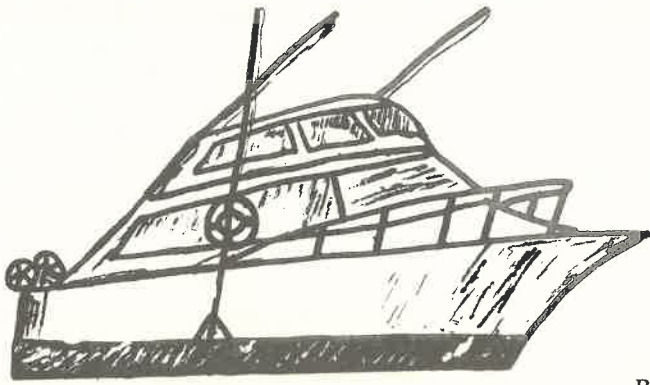
Single copies of the following publications are free.

- \_\_\_\_\_N10 New York Sea Grant Institute Annual Report 1973-1974. 48 pp.
- \_\_\_\_\_N11 Marine Trades Flyer #1: Getting the Most From Your Advertising. 1 pp.
- \_\_\_\_\_N12 Marine Trades Flyer #2: The Salmon Program in New York. 1 pp.
- \_\_\_\_\_N13 Marine Trades Flyer #3: Great Lakes Access and Harbors of Refuge Development. 1 pp.
- \_\_\_\_\_N14 Marine Trades Flyer #4: Financing Marine Products. 1 pp.
- \_\_\_\_\_N15 Marine Trades Flyer #5: Marina Insurance. 2 pp.
- \_\_\_\_\_N16 Marine Trades Flyer #6: Accounting Tips for Marinas. 2 pp.

There is a charge for the following publications. Make checks payable to "Cornell University."

- \_\_\_\_\_D5 The Hudson River Shad Fishery: Background, Management Problems, and Recommendations. William H. Medeiros. 54 pp. \$.50.
- \_\_\_\_\_D6 Present and Potential Ecological Status of the Diked Disposal Sites in Buffalo Harbor. Robert A. Sweeney. 27 pp. \$1.00.





## Before You Go Into the Charter Boat Business...

... a Cornell professor has  
some reflections on chartering  
that you may find helpful

By Rick Sojda  
Regional Marine Specialist

New York's evolving Great Lakes salmonid fishery promises to offer new opportunities for developing new kinds of recreational businesses. One such potential business, charter boat operation, has generated much interest among people who live along Lake Ontario. Though chartering may seem like an ideal investment, it does have its own set of peculiarities. So, during the past summer, the New York Sea Grant Advisory Service sponsored a series of workshops to help people explore the various facets of charter boat operation.

A key resource person for these workshops was Darwin Snyder of the Department of Agricultural Economics at Cornell University, who offered some excellent guidelines for evaluating this kind of financial investment.

"Whether you feel you *need* to make a financial profit from your charter business is up to you," emphasized Snyder. "However, to avoid unpleasant surprises, you should make some effort to determine your profit potential."

A recent survey of 44 of Wisconsin's 98 Lake Michigan charter operations by the Wisconsin Sea Grant Program showed that the average charter boat operator there nets less than \$1,000 per year for his efforts. Most of those operators are in business because they are avid fishermen. About half of them earn 25% or less of their total income from chartering.

In view of these seemingly bleak statistics, Snyder urged people to consider a number of factors carefully before making any kind of commitment.

"You need to look at the length of your fishing season and your potential operating capacity," he said. The U.S.

Weather Service estimates that a typical charter boat of 20-25 feet or larger would actually be able to safely operate on Lake Ontario about 110 of the 210 days between April 1 and November 1 that make up the fishing season. But according to the Wisconsin study mentioned earlier, operators can expect to have paying customers only about 45% of those 110 days—or a slim operating season of just 50 days.

Other factors Snyder felt were important for potential operators to consider were their interest and experience, health, other employment and time commitments, and whether they already own a boat or not. The operators at the workshops themselves pointed out that the type of boat used would be a critical factor because variable expenses such as gas, oil, and repairs would be affected by the age of the boat, type of hull, etc.

Snyder concluded by saying, "If you concentrate your efforts for two or three months when you can operate at higher capacity, for example 65%, you'll be more likely to make a greater profit per day-spent-chartering than if you try to spread your efforts over the entire fishing season."

Beyond those items mentioned by Snyder, the New York Sea Grant Advisory Service recommends that before you go into the charter boat business you also weigh the following factors:

- latest estimates show that the N.Y. Department of Environmental Conservation's salmon and trout hatchery may not be in operation until the early 1980's. No one knows if there will be enough fish in the lake to support a lake fishery during the summer months before then;

- controversy over PCB's may have some effect on the public's acceptance of salmon fishing;
- the energy crunch—what effects will it have on your operating expenses and on your customer's ability to travel to you?
- If you need to borrow money to get started, will low-cost loans be available?
- What will insurance cost for your business? Will you need both damage and liability coverage?
- If you carry even one passenger for hire, you need a license from the U.S. Coast Guard. ("For hire means for any kind of remuneration, whether it is a personal gift, enough fuel for the trip, or \$100). If you carry 6 or fewer passengers for hire at any one time, exclusive of a cabin boy or first mate, you must apply for a "motorboat operators license." To get such a license, you must pass a doctor's physical examination, present documented proof of one year of boating experience (based on an 8-hour day, 5-day week), and pass a written exam. If you plan to carry more than 6 passengers for hire, you must get a more stringent license. Your boat will be subject to Coast Guard inspection procedures and you must comply with Federal Communications Commission radio regulations.

If you have questions about going into the charter boat business on the Great Lakes, contact Rick Sojda at the Brockport Advisory Service office, or Sandy Schuman in Oswego. Addresses for both offices are listed on the back page.

## Freshwater Wetlands Now Protected

The future of some of New York's coastal resources may be a lot brighter because of the Freshwater Wetlands Act signed into law by Governor Carey on August 1. This new law will complement two predecessors, the Tidal Wetlands Act of 1973 and the Protection of Waters Act of 1965, to provide this state with one of the best water resources protection programs in the nation.

The Act will regulate activities on freshwater wetlands of 12.4 acres or more, as well as activities on lands within 100 feet of the vegetative boundary of each wetland. At present, the New York State Department of Environmental Conservation is inventorying all of the state's wetlands, and will eventually establish some guidelines for how each may be used. Until that time, part of the new law provides for a "Freshwater Wetlands Interim Permit Program" whereby it will be necessary for anyone conducting a regulated activity (such as mining, dredging, dumping, filling or

erecting structures) to file an application for an interim permit with DEC prior to commencing work.

Certain economic and aesthetic activities are exempt from the permit process, however. These include removing natural products of a wetland (i.e. recreational and commercial fishing, shell-fishing, hunting and trapping), grazing and watering livestock and certain activities related to public health.

In addition, under the Act, as of September 1, 1976, each local government may adopt a wetlands protection law or ordinance which provides protection to its nearby wetlands equivalent to that of the state law. This should allow localities to exercise some control over how their resources will be used.

The Advisory Service staff along the Great Lakes have collected some additional information on the new wetlands act. If you're interested in learning about it in more detail, please feel free to write or drop into any of the offices.

*(Old Tires, Continued from front page)*

Many Dunkirk residents believe that storm damage costs would have been quite high without the breakwater, so feel their efforts are really paying off. And Patten has seen still other kinds of benefits emerge from this project.

"I think one of the most important aspects of this whole undertaking has been the way in which the community really worked to make the breakwater a reality," he said. "Labor was donated by the Naval Reserves, the yacht club and a local marina. Divers from three of the local diving clubs offered their services free of charge and the Coast Guard Auxiliary donated the use of its rescue boat on numerous occasions so we could tow the mat out and set anchors. And, of course, all of the tires were donated by various local tire companies. I could keep on going, the list of contributions is quite impressive. People brought a lot of spirit to this effort, and I think it has

brought members of the community even closer together."

From Candle's perspective, the building of this and the other breakwaters has been significant because it has opened up a channel for getting technical knowledge from an industry to the general public. He points out that without groups such as Sea Grant and the University of Rhode Island who are able to play the middleman role, Goodyear would have no easy way of transferring the technical expertise of its staff to those who really need it. Candle is presently working with Sea Grant personnel in Michigan to test out a scrap tire beach stabilization mat.

It may be years before the real effectiveness of the floating breakwater is actually known. In the meantime, at least a few people seem to be better off because of some old tires floating in the water.

—Linda J. Camp

## Mean High Water Redefined

A July 2 decision by the New York State Court of Appeals may set a new precedent for determining mean high water.

This decision, the case of Dolphin Lane Associates, Ltd. vs. Town of Southampton, overturns an earlier lower court ruling (Geiler) and states that the high water mark is now the "seaward edge of vegetation" rather than the boundary between *Spartina Alterniflora* and *Spartina Patens*.

Additional litigation in this case is possible, but for now one potential outcome of this court case is that more wetlands will be in the hands of private property owners. No additional information was available on this matter as "Coastlines" went to press, but we'll keep readers posted as significant actions occur.

## N.Y. Commercial Landings Up

A preliminary report by the National Marine Fisheries Service (National Oceanic and Atmospheric Administration) has indicated that New York commercial fish landings for the first four months of 1975 were up in both quantity and dollar value over landings for the same period in 1974.

Between January and April, 1975, 9,128,356 pounds of fish were harvested, having a value of \$6,786,852. This represents an increase of about one and one-half million pounds of fish over 1974. Dollar value for the fish was up by over one million dollars.

Finfish accounted for most of the increase in landings, with total pounds increased by about one million over 1974. Shellfish landings in 1975 were up only by 324,267 pounds. However, shellfish accounted for most of the increase in dollar value of commercial landings in 1975. Shellfish brought in \$997,158 while finfish earned only \$289,324.

The New York Sea Grant Advisory Service and the Oswego County Cooperative Extension Service recommend these steps to maintain the quality of salmon and other fish you may catch.

1. Do not allow the fish to flop around, bruising flesh.
2. Clean thoroughly, as soon as possible after catching.
3. Keep on ice, in a cooler, not in standing water.
4. Protect the fish from strong odors, such as motor fuel.
5. Keep fish away from direct sunlight and air.
6. Use the fish quickly; wrap and freeze extra fish as soon as possible.
7. Do not keep in a deep freezer longer than 3 months or not over one week in a refrigerator freezer. Defrost

The Internal Revenue Service will put out a "Commercial Fisherman's Tax Guide" in December. This guide should aid fishermen with their tax questions and problems, and will be available in December from local Internal Revenue Service offices.

The National Marine Fisheries Service has just completed a comprehensive publication on the Capital Construction Fund. This booklet will provide detailed information on this investment program for commercial fishermen. New York Sea Grant Advisory Service offices will have copies available for distribution early in January, 1976.

The National Advisory Committee on Oceans and Atmosphere (NACOA) has recommended the establishment of a 200-mile U.S. Economic Resource Zone for the ocean waters off our coasts as a first step in protecting coastal fisheries against overfishing. This 25 person committee, whose members are appointed by the President from outside the Federal establishment, was created by Congress in 1971 to maintain a continuing review of the marine and atmospheric science and service programs of the U.S.

Complete information on the Committee's recommendations is available in the Committee's Fourth Annual Report, June, 1975. Contact the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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